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in Economy under the title
Market or Government?
18-19 June 2015**

Management Sciences

EDITED BY ADAM P. BALCERZAK

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edited by
Adam P. Balcerzak

Toruń, Poland

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From Confrontation to Cooperation – Institutional Support in Building Cooperation of Polish Enterprises

JEL Classification: *D21; D85; F63; L14; L21; L53*

Keywords: *cooperation; enterprise policy; institutional support; economic development; Polish enterprises*

Abstract: The article presents results of critical theoretical and empirical analysis of cooperation between Polish enterprises based on two models: made by T. Ozawa and M.E. Porter, and followed by market research concerning opportunities to support cooperation of Polish enterprises. Polish companies seem to opt for confrontation, as the main market strategy, basing on the development of one company while worsening the position of rivals at the same time. The aim of this paper is to show possibilities in supporting Polish companies to build their capabilities, as well as identifying barriers, in transition from confrontation to cooperation. The article is divided into four parts. In the first part, there are defined the stages of development of economy and enterprises in Europe, concentrating the attention on Poland, with reference to T. Ozawa model. The analysis covers the indicators included in European Innovation Scoreboard, Exploratory Approach to Innovation Scoreboard, Global Summary Innovation Index, and STI indicators, with regard to cooperation aspects. In the second part the authors analyse the essence and forms of cooperation between companies. The third part of the paper concentrates on the market research of the support means available for Polish enterprises. In conclusion, there was given a brief summary of the main findings about opportunities and barriers of institutional approach towards cooperation between Polish enterprises.

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In the paper two types of research methods were used: methods of data collection and methods of organizing and processing information. There can be enumerated especially methods of systems, cause and logical analysis of institutional support.

Introduction

Companies which want to be effectively competitive on the market do not have to use only their own resources, knowledge, competences and procedures. They may also cooperate with external partners to obtain solutions from outside, through the purchase of patents and licenses, and above all, through cooperation with other companies. This idea of openness is expressed by the concept of open innovation (Chesbrough, 2003). Innovative enterprises are based largely on the cooperation with other entities. Cooperation in the field of innovation allows companies to access mainly to knowledge and technology. While cooperating there is also a great potential for synergies, as partners learn from each other. Cooperation in the field of innovation can take place along the supply chain, include customers and suppliers in the joint work on the development of new products, processes, and may relate to the scientific cooperation with entrepreneurs. Collaboration between companies may include entities within one country, as well as partners from different countries.

Due to the great importance of the entrepreneurship's development in the national economy, it is important to recognize the activity of public institutions in supporting initiatives of cooperation between the enterprises in Poland, apart from financial support. The stage of development of Polish economy slowly impacts on appearing new challenges. At the beginning of transformation the most important need for creation a strong private sector in economy was an access to the capital. This phase is not finished, however, while gathering EU financing or use government's guarantee schemes, the access of entrepreneurs to external sources of financing increased very much, especially micro, small and medium entities. Policy to support SMEs is carried out in many areas and institutional levels. On the other hand, Polish legislation and activities are focused on financial demand and building innovation initiatives, which substantially provides better access to finance of this group of actors.

This article concentrates on the opportunities existing within the activity of institutions supporting entrepreneurs and its entire assessment. This research arose on the basis of the literature with theoretical approach to coop-

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eration issues and an analysis of the assumptions and principles of operation of presented institutional programs and activities.

Methodology of the research.

In the paper there were used two types of research methods: firstly, regarding data collection and secondly, methods of organizing and processing information. There can be enumerated especially methods of systems, cause and logical analysis. Moreover, methods of description and critique of the literature (analogy, deduction, induction and reduction) were used while studying Polish and foreign papers, providing the view on existing scoreboards of innovation in functioning the enterprises in the economy. The analysis covered then the indicators included in European Innovation Scoreboard, Exploratory Approach to Innovation Scoreboard, Global Summary Innovation Index, and STI indicators (Science, Technology and Innovation), with regard to cooperation aspects. The important aspect was analysis and synthesis of the methods describing the input of cooperation to innovation performance. Within the process of analysis and selection there were found some only examples of the attitudes to strengthen linkages between enterprises. Within the selection of such indicators there were identified these factors which relate to cooperation with the assessment of their performance in Polish market.

By reviewing economic theories of T. Ozawa and M.E. Porter exploring enterprises' behaviour on the market in the context of forms of cooperation and by empiric research of opportunities and ways of support available for the companies by institutions, the authors make the study in two perspectives. First, they try to deduct if the enterprises are prepared to cooperation and have accurate opportunities given by institutional support. Then, they describe the approaches towards institutional support at the local, regional and central levels considering cooperation development of the companies regarding already existing help in the area of external financial sources or creating networks.

Economic development level of countries based on T. Ozawa's model

T. Ozawa's model is a theoretical study explaining Japan's foreign direct investments (FDI) in the early stage. The objective of this model is to explain FDI within a framework of comparative advantage, specifically by considering the factor endowments of the home and host countries (Ozawa,

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1979, pp. 72-92). T. Ozawa observed development of Japanese foreign investment, comparing to an American model, and stated that it requires a different type of explanation. He noticed a shortage of land and also natural resources (especially energy and mineral resources) as irremovable scarcities which would limit the prospects for industrial expansion. That is why Japanese firms were compelled by necessity, caused by the resource constraints at home, to extend their subsidiaries overseas through direct investment (Phongpaichit, 1990, pp.15-16).

Ozawa underlined that FDI does not only transfer capital, but a larger package of resources, including technological and managerial assets which are specific resources of the country of origin. In such a perspective, foreign investment, derived from a technologically advanced country, can enhance the efficiency of the less developed country for the production of labor intensive goods. The objective of the investor is to increase the return on its assets since labor is more abundant and thus cheaper in a less advanced country. The Japanese model shows that this type of investment creates trade by increasing the comparative advantage of a less developed country in the production of labor intensive goods. It is essential that in this area “Japanese style” has been opposed to foreign investment in the USA, a highly developed country, which substituted foreign production for trade. It is worth to add that the structure of Japanese investment did not last and had evolved to become more comparable to that of the other industrialized countries. Japanese economy does not match this model anymore, as Japan largely invests in services and in technologically sophisticated sectors.

T. Ozawa summarizes his model as an “industry-cycle approach”. Firms relocate more or less mature industries abroad in order to keep exploiting some competitive advantage, while overcoming the increase of domestic costs (Sachwald, 2013, pp. 47-49). It is evident in T. Ozawa’s analysis, that the framework can be applied to the cases of newly industrialized countries (Miyamoto et al., 2011, p. 117).

Moreover, T. Ozawa formulated his economic development model as consisting of four stages (Puchalska, 2010, p. 351):

- stage 1 – the development is driven by factors of production; it is characterized by activity based on natural resources or labor-intensive industries;
- stage 2 – investment-driven development, it is characterized by the production of intermediates and capital goods and infrastructure construction;

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- stage 3 – innovation-driven development; arises when the country is rich in human capital and is manifested in research activity and development;
- stage 4 – wealth-driven development; it is characterized by the development of modern industries, flexible, diverse production, using various innovations.

Ozawa's point of view can be used to discover differences in the level of development of European countries in conjunction with the ability to cooperation. Cooperation is perceived as one of the drivers of innovation. The interesting results are presented by the Innovation Union Scoreboard, which gives the picture of a very little level of cooperation between small and medium enterprises in Poland. The measurement framework used in the Innovation Union Scoreboard analyses the performance of the EU innovation system and distinguishes three main types of indicators (the Enablers, Firm activities and Outputs) and eight innovation dimensions, capturing in total twenty five different indicators¹. They all together create Summary Innovation Index (SII). The Member States are classified into four performance groups based on their average innovation performance. Denmark, Finland, Germany and Sweden are "Innovation leaders" with their innovation performance high above the EU average. Austria, Belgium, Cyprus, Estonia, France, Ireland, Luxembourg, Netherlands, Slovenia and the United Kingdom are "Innovation followers" with performance above or close to the EU average. "Moderate innovators" are classified below the EU average innovation performance at relative performance rates between 50% and 90% of the EU average. This group includes: Croatia, Czech Republic, Greece, Hungary, Italy, Lithuania, Malta, Poland, Portugal, Slovakia and Spain. "Modest innovators" are: Bulgaria, Latvia and Romania with innovation performance well below the EU average (IUS, 2014, p. 4).

The most innovative countries perform very well in all dimensions: from research and innovation inputs, through business innovation accomplishments up to innovation and economic effects (IUS, 2014, p. 6). Their performance reflects a balanced national research and innovation system. Considerable differences between the Member States exist particularly in

¹ The Enablers capture the main drivers of innovation performance external to the firm: Human resources, Open, excellent and attractive research systems as well as Finance and support. Firm activities describe the innovation strengths at the level of the companies, grouped in dimensions like: Firm investments, Linkages & entrepreneurship and Intellectual assets. Outputs cover the effects of innovation activities in dimensions of Innovators and Economic effects. See more in: IUS (2014).

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knowledge excellence, internationalisation, and business innovation cooperation. Particularly large differences are seen in the international competitiveness of the science base and business innovation cooperation as measured by aspect called Linkages & entrepreneurship.

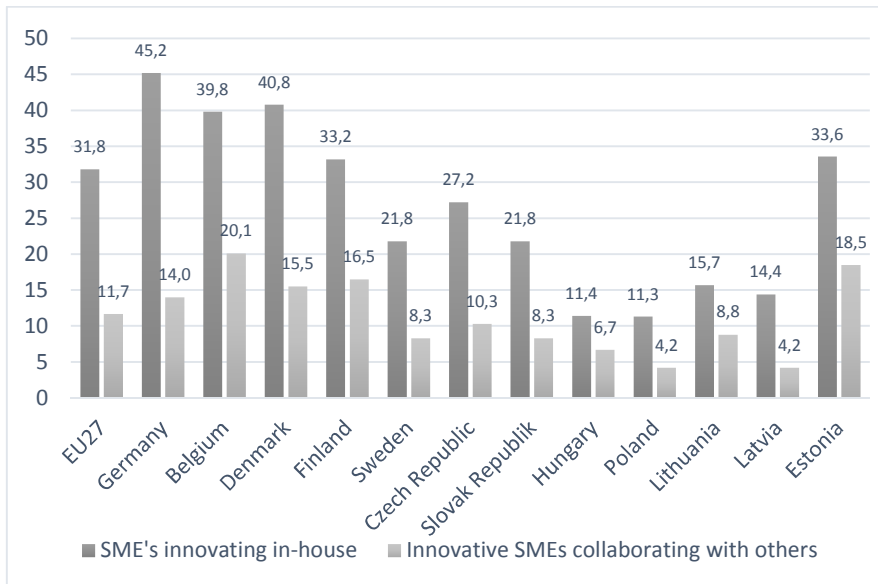
In the dimension Linkages & entrepreneurship the Innovation leaders (Belgium, Denmark, Sweden and the UK) are performing the best. SMEs in these countries have more deeply rooted innovation capabilities as they combine in-house innovation activities with joint innovation activities with other companies or public sector organisations. The research systems in these countries are also geared towards meeting the demand from companies as highlighted by high co-publication activities.

All the Modest and Moderate innovators achieve scores below the EU average and Poland is performing relatively weak even compared to the other Moderate innovators. Within the Moderate innovators the best performing country (Greece) performs almost four times higher than the least performing country (Poland) (IUS, 2014, p. 16). The innovation performance in Poland has only slightly improved between 2006 and 2013 and due to more prompt growth of the EU, the relative Polish performance has been declining from 54% in 2007 to about 50% in 2013. As the result Poland dropped from being a Moderate innovator up until 2011 to be a Modest innovator in 2012. Poland is performing below the EU average for most indicators. Relative weaknesses are: the number of PCT patent applications in social challenges, license and patent revenues from abroad. Relative strengths of Poland lie in the category of non-R&D innovation expenditures and youth with upper secondary level of education. High growth is observed for R&D expenditures in the business sector. Strong declines in growth are observed in measures like: number of innovative SME's collaborating with others, number of new doctorate graduates, SMEs innovating in-house and sales of new innovations (IUS, 2014, pp. 16, 65).

As the most important aspect for strengthening the cooperation of companies it may be pointed out the indicator called the "Innovative SMEs collaborating with others". This indicator measures the degree of involvement of SMEs in innovation cooperation. It is considered as the share of SMEs as the sum of SMEs with innovation cooperation activities, i.e. firms having any cooperation agreements on innovation operations with other enterprises or institutions within the three years of the survey time. Complex innovations, particularly in ICT, often depend on the capability to draw on varied bases of information and knowledge, or to collaborate on the growth of an invention. This indicator processes the transfer of

knowledge between public research institutions and companies or between firms. For Poland these indicators show the lowest level comparing to the CEE countries presented at Figure 1. It is limited to SMEs since almost all large corporations are involved in innovation co-operation.

Figure 1. Linkages and entrepreneurship performance according to the Innovation Union Scoreboard 2014



Source: own calculations based on IUS (2014, pp. 82-83).

SME's innovating in-house indicator shows the sum of SMEs with in-house innovation activities. Innovative firms are defined here as firms which have launched new or significantly improved products or processes either in-house or in combination with other firms. This indicator measures the degree to which SMEs have innovated in-house. The indicator is limited to SMEs because almost all large firms innovate and because countries with an industrial structure weighted towards larger firms tend to do better.

A similar methodology was used to determine the Global Summary Innovation Index (GSII), which in contrast to the IUS index is based only on the 12 indicators. Most of them are the same as in the IUS, but there are also some differences. GSII index consists of five complex components: the

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potential, knowledge creation, innovation and entrepreneurship (diffusion), application, intellectual ownership (Arundel & Hollanders, 2006, pp. 5-7).

However, both indicators have some disadvantages, which in 2006 drew attention of National Endowment for Science, Technology and the Arts (NESTA). According to it, these measures include mainly scientific and technological innovation, what in today's economy is not sufficient. This method of measurement of innovation was specific for the period of the linear model of innovation. When innovation develops in accordance with the interactive model, a method for measuring the level of innovation potential of the economy should involve the aspect of rising the large part of innovation out of the R&D departments, including services (Zadura-Lichota (Ed.), 2013, pp. 46-47). NESTA experts also questioned the economic sense of expenditure on research and development, arguing that there is no evidence that these expenditures have contributed to the growth of prosperity. They criticize the meter, which is the number of patents as not always effectively restrained by imitators, and a large part of them is not of market interest (NESTA, 2015, pp. 20-21).

EIS indicators (European Innovation Scoreboard) were developed and supplemented in the form of the EXIS indicators (Exploratory Approach to Innovation Scoreboards) in 2005. EIS indicators were supplemented then by (Arundel & Hollanders, 2015):

- a greater concentration on regional level than at the national level;
- a more diverse range of activities relevant for innovation, such as indicators of demand or innovation management, as well as marketing and organizational innovations;
- the partial indicators in the thematic areas.

Within EXIS indicators there evaluated factors connected with knowledge transfer from universities to entrepreneurs or financial aspects, like venture capital or institutional financial support, however, there is also subindicator concerning the percentage of firms cooperating internationally in the field of innovation calculated from separate data for processing and service sectors.

STI indicators (Science, Technology and Innovation) are determined on the basis of data collected by Eurostat, to support activities within the innovation policy at local communities. In 2010 The European Commission considered these indicators as corresponding closely to innovation policy and being a key element of the initiative under Innovation Union and the European Research Area (ERA) and monitoring tool The Europe 2020 strategy (European Commission, 2015b). Depending on the degree of com-

plexity they can be divided into four generations (Zadura-Lichota (Ed.), 2013, pp. 52-53). First-generation of innovation policy is involving the linear development of innovation, from R&D to the market. Indicators of this kind sign the volume of input and correspond to the concept of first-generation linear model of the innovation system targeting investments in R&D sector, expenditure on education, capital expenditures, staff research, college graduates, technological intensity etc.

Second-generation innovation policy was declaring the existence of multiple effects occurring in the innovation process, where there are created innovation systems in the form of patents, publications, quality improvement, number of new products or processes. Second-generation indicators were accompanied by calculating indirect expenses and the results in R&D activities.

Third-generation policy, which is currently carried out, put innovation in the centre of attention in areas such as research, education, competition, regional policy etc. Third-generation indicators focus on enriching the set of indices analysing research-based innovation. The primary task is to rank national benchmarking and capacity for innovation. The biggest difficulty is to follow the international comparisons and the inclusion the services sector, where the product is the process, not comparable in benchmarking.

From the point of view of the aim of this article the most crucial is the fourth-generation of innovation policy, which is actually in the early stages of formation. In relation to the third-generation it is based on the knowledge transfer, cooperation and networking of firms (Milbergs & Vonortas, 2015, pp. 2-5). These indicators include knowledge and networking. It is assumed that the current approach to measure innovation based on measuring the company's machinery and equipment or the number of doctorates or patents is insufficient in the information economy. Knowledge can be dignified using composite measures and complex performance indicators. Moreover, no organization is able to be innovative in isolation. Production of technologically advanced innovation requires the cooperation of many companies. Proper assessment of network economy based on knowledge is possible, provided the knowledge of the rules governing networks. The helpful in this task may be composite indicators of networking, which should include such elements as: strategic partnership, licensing of intellectual property, cooperation in the field of R&D, knowledge sharing or cooperation within the clusters.

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Indicators of the fourth-generation, on which work is currently under-way include (Milbergs & Vonortas, 2015, pp. 4-6): knowledge indicators, network indicators and conditions for innovations.

Knowledge indicators, which are still the subject of assessment methods as the ways in which knowledge is developed and disseminated is more complicated than in the case of patents or graduates; it can be measured only by composite indicators of investment in knowledge and complex indicators of achievement. Modern innovation rarely can be developed by individual companies, therefore most innovations require the cooperation of many different organizations. In particular, this applies to high-technology industries. The essence of the network is especially important with regard to measuring networking in the form of strategic partnership, licensing intellectual property, informal cooperation and exchange of knowledge, individual relationships between organizations (eg. clusters). Contemporary networks are not only regional but also a national, and even global. Conditions for innovation include socio-economic policy, changes in demand, infrastructure, social attitudes, the patterns and culture of innovation, as well as evaluation of technology options.

Forms of cooperation with domestic and foreign partners

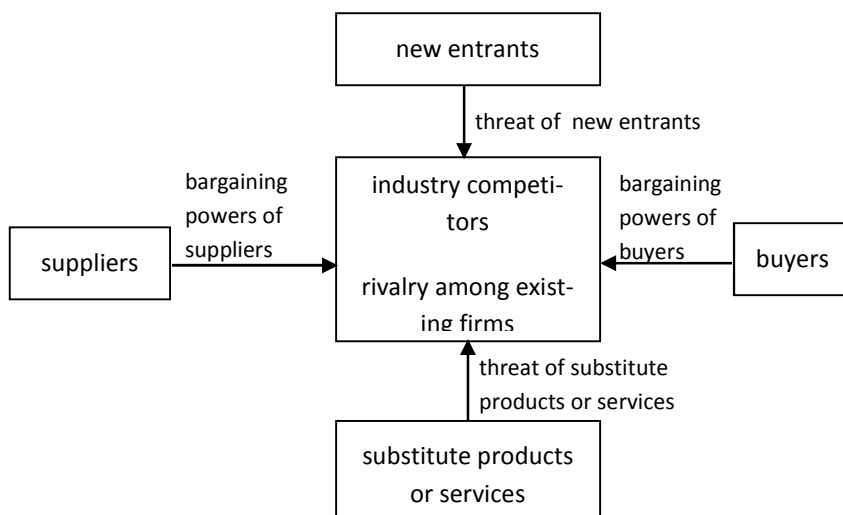
Relations between partners can be described using M.E. Porter's model of five forces². Although in the model he concentrates on intensity of competitive rivalry, there can also be enumerated two other strategies: cooperation and avoiding competitors.

Rivalry (named also as confrontation or conflict) occurs when one of competitors feels the pressure or sees the opportunity to improve his competitive position. He can use such tactics like: price competition, advertising battles, product launches, and increased customer service or warranties. The intensity of competition varies depending on: the number of competitors, the assortment of products, frequency and effectiveness of launching new products, the level of prices, technology used, the degree of organization of the sector, the scope of customer service, etc. All mentioned factors determine the nature of competition in the sector – when the level of competition is weaker, it is easier to compete. Rivalry combines positive and negative elements. On one hand, it can be a force for improvements and

² M.E. Porter shows forces that determine the competitive intensity and therefore attractiveness of an industry: threat of new entrants, threat of substitute products or services, bargaining powers of customers (buyers) and suppliers, intensity of competitive rivalry.

innovations in the industry; on the other hand it can be a destructive force leading to a dangerous phenomenon – market dominance. Making observations on the behavior of firms in Poland it can be said that it is currently the dominant type of relationship between businesses.

Figure 2. The five forces driving industry competition



Source: M.E. Porter, *Competitive strategy. Techniques for Analyzing Industries and Competitors*, The Free Press, New York 1980, p. 4.

Cooperation means business partnership with competitors in the industry. Motives inclining companies to cooperate are to protect themselves against strong rivals, as well as the motivation to enlarge the competitive potential of participants. Avoiding competitors is a strategy for these enterprises who are not able to confrontation nor cooperation. They are weak and have insufficient resources and competences to be a rival or a partner in business. These companies are active in a market niche.

Due to the fact that more and more business entities decide to implement the strategy of cooperation, it is worth to follow this phenomenon and its forms. The most important forms of cooperation between enterprises industry include: monopolistic agreements, short-term agreements, strategic alliances, associations, joint venture, mergers and acquisitions (Gorynia & Łaźniewska (Ed.), 2009, 116-119).

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Monopolistic agreements can be defined as any agreements between businesses, which will exclude or restrict competition by: limiting production, fixing prices, dividing market, excluding entry of a new competitor, or restricting the use of new technologies. They usually arise in an oligopolistic industry. However, as monopolistic agreements deny the idea of fair cooperation between companies, they will not be a subject of further analysis.

Short-term agreements relate to cooperation in various fields, eg. marketing, corporate finance management, purchasing or selling policies.

The form of cooperation with a much longer time horizon are strategic alliances. They are negotiated between parties with a significant competitive potential in the industry. Alliances help to achieve strategic objectives, which may differ regarding participants. The main motives to fix strategic alliances are:

- entering new markets and starting cooperation with new partners;
- improvement of the financial condition and value of the company, increasing profits, reducing costs;
- getting access to new knowledge, experience, technology;
- rationalization of activities by making better use of resources;
- strengthening companies' position on the market, increasing market share;
- reducing risk.

B. Kozyra underlines that strategic alliances are good opportunities to gain knowledge and skills from partners, although it may not always be the benefit for both sides. Often before forming an alliance, companies clearly define what part of their potential can be transferred to the partner. In general, in such cases, they are divided evenly. One of the partners shall transfer modern technology, equipment as well as knowledge and employees' training procedures, and in return receives eg. access to cheaper labor or to new markets (Kozyra, 2006, p. 53).

An export consortium is a special form of alliance. It is a voluntary alliance of firms with the objective of promoting the goods and services of its members abroad and facilitating the export of these products through joint actions. They are some of the least studied internationalization networks. However, they represent an attractive means of overcoming some of the barriers that make internationalization difficult or impossible for many entities because they enable them to pool resources that may be scarce at firm-level and exploit economies of scale without losing flexibility. For this reason consortia are particularly suitable for smaller firms, whether they are

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going international for the first time or trying to increase their existing degree of internationalization. Members of export consortia retain their financial, legal and management autonomy. Firms are thus able to realize their strategic objectives by grouping into a separate legal entity which does not imply a loss of identity for any member. By cooperating within an export consortium, which combines the expertise and financial means of several firms, SMEs can overcome the obstacles listed above and effectively enter and develop foreign markets at reduced cost and risk. At the same time, members can improve their profitability, achieve efficiency gains and accumulate knowledge (UNIDO, 2003, p. 3). The main obstacle of the participation in the consortium is a difficulty in choosing partners having similar motives of cooperation as those of other participants (Koszewski, 2011, pp. 95-104).

It is also worth to mention that export consortia are commonly used only in some countries like Italy, Spain and Spain, where their rapid development was possible thanks to the strong support organized at the government level.

Association be concluded by small companies having weak position on the market and small opportunities of development. They do not have a bargaining power with suppliers of raw materials and production equipment, banks and public institutions. Therefore, the possibility to take part in an association can help them to improve their position on the market.

A joint venture is a legal organization that takes the form of a short term partnership in which companies jointly undertake a transaction for mutual profit. International joint venture is broadly defined as joint venture that involve countries from different countries cooperating across national and cultural boundaries (Yan & Luo, 2001, p. 3-4). Generally each entity contributes assets and share risks. They are also widely used by companies to gain entrance into foreign markets. Foreign companies form joint ventures with domestic companies already present on one markets. D. Campbell and A. Netzer point out that foreign partners generally bring new technologies and business practices into the joint venture, while the domestic companies already have the relationships and requisite governmental documents within the country along with being entrenched in the domestic industry (Campbell & Netzer (Ed.), 2001, pp. 3-4).

Another significant form of cooperation are clusters. According to the definition of M.E. Porter, clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (eg., universities, standards

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agencies, trade associations) in a particular field that compete but also cooperate. Clusters are examples of cooperation in the system of the triple helix – between the business community, the public sector and the higher education institutions business (European Commission, 2015a). Clusters, or critical masses of unusual competitive success in particular business areas, are a striking feature of virtually every national, regional, state, and even metropolitan economy, especially in more advanced nations (Porter, 2000, p. 15; Porter, 1998, pp. 287-288). In working together SMEs can raise their productivity, be more innovative, create more jobs and register more international trademarks and patents than they would alone. The specificity of clusters lies in the fact that companies being competitors on the market, at the same time work together in those areas, where the interaction is possible. In the literature, special term “coopetition” was developed, joining together two words: cooperation and competition. In Europe there are some branch networks known that help in the development of clusters: CLUSTERPLAST (joins 14 European clusters in chemical sector), ABCEurope (Advanced Biotech Cluster platform for Europe) and ENMC (European Network of Maritime Clusters, joins 18 clusters).

Finally, the last form of cooperation between enterprises – mergers and acquisitions – undoubtedly may bring many advantages, concerning either bigger market share, reducing costs or gaining new technologies, know-how and other synergies (Megginson et al., 2008, pp. 562-569). But due to their character, in which the emphasis is put on management and capital control (Hooke, 1996, pp. 21-24; Frąckowiak & Lewandowski, 2009, pp. 24-48), they might be treated rather as a form of capital transformation and in this sense it will be omitted in this paper.

**Institutional support of companies at the central, regional
and local level**

In the literature relating to entrepreneurship issues there is much concern towards financial and formal aspects of supporting the entrepreneurs. In this article authors want to focus on support for the companies, which is concentrated on building the cooperation. Concerning the necessity of enhancing the cooperation between the companies authors have to indicate their development level as the strategic aspect of going forward in their strategy. Therefore, a crucial role is played by the institutions supporting their activities at different levels.

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As most of the companies rise from small and medium sized enterprises, it is especially important to support their development at the local and regional level. There are some organizations which play this role, declaring consulting and integration of enterprises' environment. At the Pomeranian voivodship the leading examples are Pomeranian Regional Chamber of Commerce (Regionalna Izba Rozwoju Pomorza, RIGP) and Pomeranian Development Agency (Agencja Rozwoju Pomorza, ARP).

Pomeranian Regional Chamber of Commerce is an organization of economic self-associating voluntary entrepreneurs operating in Pomeranian, West-Pomeranian, Warmia and Mazury, Kujawsko-Pomeranian and Wielkopolska voivodships (RIGP, 2015). Statutory activities of the Chamber are: representing and protecting the economic interests of the members, in terms of their activities, in particular with the State authorities, ensuring and strengthening networking, exchange of experience with domestic and foreign business organizations, shaping and promoting ethics in business. The aims of the Chamber are also: expressing the opinions on drafts of law regulations regarding business, participation, under the terms of the generally applicable provisions of law, in the drafting of legislation in this area, presenting to the state administration bodies and to local self-government and political and social organizations, the information and assessments on the functioning of the economy.

Pomeranian Regional Chamber of Commerce takes an active part in giving opinions on such domestic and international regulations as: The Law on Renewable Energy Sources, The Water Framework Directive, Assumptions for water rights, Energy Road Map 2050, Polish Energy Policy, Transport Development Strategy, Energy Security or Environment and Water blue print. It also actively takes part in the works on Pomeranian Regional Development Strategy 2020, Long-term National Development Strategy 2020 and Medium-term National Development Strategy 2007-2015.

Pomeranian Regional Chamber of Commerce has constantly growing number of companies and organizations, joining the wide range of members, more than 200 in 2015. These members are: micro entrepreneurs, small and medium-sized enterprises as well as large, important companies of the region (RIGP, 2015). Pomeranian Regional Chamber of Commerce provides also the Enterprise Development Fund. From the point of view of supporting the cooperation between the enterprises it takes many initiatives regarding agreements with national and international organizations supporting the development of the companies and enhancing their cooperation. The domestic examples are: Gdynia Innovation Centre, Gdansk University of

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Technology, Municipality of Gdynia, Academic Incubators of Entrepreneurship, Kashubian Business Incubators, European Congress of Small and Medium Enterprises. At the international level such cooperation is held with: Lvov Chamber of Commerce and Industry, Belarusian Chamber of Industry - Commerce Department in Mogilev, Chamber of Commerce in Antananarivo (Madagascar), Between Industry- Chamber of Commerce Chmielnick (Ukraine), Belgo-Polish-Luxembourg Chamber of Commerce "Bepolux". Pomeranian Regional Chamber of Commerce is a member of: Association of Chambers of Commerce of the Baltic Sea, Regional Office of the Pomeranian Region in Brussels, Project Management Association Poland, Baltic Eco Cluster (BEEC), Maritime Cluster, Gdansk Construction Cluster, Malbork Tourism Cluster, what create many opportunities to develop cooperation between the members of the enterprises joining the clusters.

The interesting initiative of Pomeranian Regional Chamber of Commerce in partnership with the Inter-Organization "Solidarity" in the Gdansk Shipyard and Scientific Society for Organization and Management was implementing a project funded by the European Social Fund (POKL 8.1.3) "International cooperation element in the development of Pomeranian SMEs". Representatives of the Pomeranian enterprises had a possibility of a free trip to Germany, the purpose of which was: improving the competence of Pomeranian enterprises in international cooperation, an increase of organizational competences of managerial and technical staff. In the study visits participated the representatives of management and highly qualified employees Pomeranian small and medium-sized enterprises operating within the industries of logistics, building, energy and food.

Pomeranian Development Agency mission is working for the harmonious development of Pomerania, helping and encouraging entrepreneurs, business environment institutions and local authorities and supporting initiatives and economic projects of regional significance (ARP, 2015). The main objectives of Pomeranian Development Agency are: encouraging entrepreneurship, assisting local authorities in the implementation of regional policy, supporting investment processes, handling EU funds, promotion of the region of Pomerania and initiating and participating in international cooperation projects.

Activities of Pomeranian Development Agency are carried out in three main areas. Firstly it is the implementation of financial support instruments for small and medium-sized enterprises, secondly – supporting the development of entrepreneurship and thirdly, promotion of the region and the

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service for investors. Within the process of implementation of financial support instruments for small and medium-sized enterprises Pomeranian Development Agency supports grant applications, what includes assessment of formal and substantive documents, promoting and providing information about the implementation of the grant programs. It organizes information meetings and training for local governments, business institutions and entrepreneurs in the delivery and settlement of projects. Pomeranian Development Agency also monitors the implementation of the grant agreements, handles requests for payment of grants and ensures technical support for administrative grant programs. It takes up close cooperation with the Polish Agency for Enterprise Development, the Marshal's Office and other institutions.

From the point of view of development of entrepreneurship, Pomeranian Development Agency provides SME research, support in financing expert and innovative projects at an early stage of development (through Equity Fund of Pomeranian Development Agency).

Equity Fund of Pomeranian Development Agency was established on 1 January 2009 as a seed fund, involved in the creation and development of technology companies with above-average potential growth rate, higher than the market level of investment risk. The funds raised from the sale of company assets are invested in further innovative business projects. The creation of this Capital Fund was 100% financed by the European Union under Measure 3.1 "Capital for Innovation" Innovative Economy Operational Program for the years 2007 - 2013. The amount of support was 35 million PLN. The Fund's portfolio of 37 companies established in the years 2009-2013. The Fund is managed by the Department of Capital Investments ARP. In 2014 Capital Fund activities included: supervision of corporate governance in portfolio companies, which takes into account the provisions of investment agreements and the provisions of the Pomeranian Development Agency policy Code of Commercial Companies, supervision of the activities of the operating companies through active involvement in the work of their organs, involvement in the operations of companies, in order to create synergies companies within the industry in the area of products and sales, active management of individual companies by employees of the department, in order to use their experience in managing these types of entities, support for corporate bodies in the process of raising capital, mainly of the equity, preparation and implementation of the exit strategy of the companies and conducting the process of selling the assets of the fund / asset the company.

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Pomeranian Development Agency also provides consultation and information on the possibilities and procedures for the use of European funds and starting a business, implementation of projects aimed at promoting entrepreneurship and supports fundraising for the investment. Pomeranian Development Agency plays an important role in regional promotion and offering services for investors interested in the activity in Pomeranian region, it supports preparation and implementation of the promotion of the region, through its own activities and joint authorities province and publishing regional economic and statistical information.

Pomeranian Development Agency carries out projects financed from EU funds, which are designed to support the development of regional and local entrepreneurship and the promotion of Pomerania. With the implementation of the projects it works with regional partners, domestic and foreign.

The examples of projects supporting development of the enterprises by Pomeranian Development Agency are: The System of Promotion and Economic Information for Pomeranian Region, Model of Strategic Competence Development Services, Pomeranian Economic Observatory, Pomeranian Business Forums, Business to Business - building a platform for cooperation between private investors and smart entrepreneurs, Patent for Property, project RespEn, Creative Business Network, Training tailored Pomeranian companies, The Economic Promotion and Information Pomerania Province (SPiIG), Design Your Profit, The International Maritime Cluster (InterMareC), Pomeranian Innovation Leader, Pomeranian Griffin (Gryf Pomorza), Pomeranian Entrepreneurship Council.

The institution cooperating closely with the entrepreneurs and investors both at the central and regional level, is the Polish Information and Foreign Investment Agency, which helps investors to enter the Polish market and find the best ways to exploit the potentials available to them. It guides investors through all the crucial administrative and legal procedures, provides access to the multifactorial information relating to legitimate and business problems regarding the investments, supports the companies in finding the appropriate partners and suppliers, together with new locations. In order to run the service to investors it was established a network of Regional Investor Service Centres across Poland, having as their goal enhancement of the regional investor services quality. Such offices ensure access to the latest investment offers and to regional microeconomic data. Their task is also to strengthen relations and contacts between the investors and local authorities. Polish Information and Foreign Investment Agency is supporting such

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initiatives like Go Global and Go China, enhancing the Polish investors in creating opportunities and investing abroad.

The example of such regional approach may be Invest In Pomerania Initiative, which was established in 2011 to link the activities of all the key players related to the operation of foreign investors in Pomerania. The members of the initiative are: Marshal's Office, the city of Gdansk, Gdynia, Slupsk and Sopot, Pomeranian Special Economic Zone, Slupsk Special Economic Zone, InvestGDA and Pomerania Development Agency, the coordinator of the initiative. The statements of investors considering the region as a potential location for new projects show that they appreciate the opportunity to work with the regional institutions in the system of so-called "one stop shop" (Invest in Pomerania, 2015).

An important effect of the activities of Polish Information and Foreign Investment Agency and its regional offices is the expansion of Business Services Sector (BPO/SSC/IT services) in Poland (PAIiZ, 2015). Apart from the evident advantages in creation of job creation and regional development, it possibly creates the opportunity of tightening the cooperation between business and science, as the new sites are usually planned in the cities and regions offering the wide range of higher education institutions, including universities, technical universities and research institutes. Invest in Pomerania implemented also the project "Smart Pomorski Up" which aim was to improve the chances of young people in the labour market, giving the possibilities of training in the context of the priority of BSS services, such as BPO / SSC, ICT, logistics or production. Students realized together with companies from the region the projects in which they gain professional qualifications, which are currently the most sought after Pomeranian by employers on the labour market.

The central level institution is also Polish Agency for Enterprise Development (Polska Agencja Rozwoju Przedsiębiorczości, PARP), which is a government agency providing support to entrepreneurs within the implementation of competitive and innovative projects. It declares as the primary objective to develop the sector of small and medium-sized enterprises in Poland. To support entrepreneurs financially, PARP uses the government budget funds and European Funds. In the 2007-2013 financial perspective, the Agency was responsible for the implementation of measures under three operational programmes, concerning Innovative Economy, Human Capital and Development of Eastern Poland (PARP, 2015).

One of the main tasks of PARP is supporting export, what comprises strengthening of the competitive position of Polish enterprises on foreign

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markets and making it easier for SMEs to make contacts with foreign companies in their business. Therefore, PARP offers Polish SMEs an opportunity to take part in economic missions organised around the world, cooperative exchanges and fair events. Enterprise Europe Network, operating under PARP, arranges opportunities for the entrepreneurs seeking partners abroad to publish their company profiles in the Cooperation Offers' Database available for access by about 600 network units in the world. Moreover, Enterprise Europe Network offers comprehensive services covering information, training and analysis measures in the field of European Union law and policies, business activity, access to sources of financing, internationalisation of enterprises, technology transfer and participation in EU framework programmes.

Among many activities of Polish Agency for Enterprise Development there is a special tendency since 2013, to make projects which enhance entrepreneurs to cooperate with their business environment organisations and research units. These activities were addressed to enterprises under motto "Cooperation repays!" with the instruments and programmes that facilitate access to information, funding and partnerships (PARP, 2015). In 2015 Enterprise Europe Network at the Polish Agency for Enterprise Development and Investment Promotion Section in collaboration with the Consulate General in Cologne, ZENIT GmbH, the Focal Point for EU Research Programmes, University of Warsaw and the Council of Research Institutes launched a cooperative exchange designed for companies interested in implementation of joint Polish-German projects under the EU Framework Programme Horizon 2020. This programme of cooperation is addressed to research institutes and companies from the innovative industries like: ICT, Energy and Environment, NMP (Nanotechnologies, Advanced Materials and Production) or Transportation.

The authors underline also a huge impact of Bank Gospodarstwa Krajowego (BGK) to supporting entrepreneurship in Poland. It is the only state-owned bank in Poland. Since its inception, the BGK contributed to the socio-economic programs, government programs and local government and regional development. Currently BGK, both realizes and is the originator of many programs for the economic development of Polish enterprises (BGK, 2015). It is a pillar of the government's investment program, under which organizes long-term financing of investment projects, including investments of strategic importance for the national economy and the interests of the state. It conducts programs to promote exports and infrastructure programs and develops system guarantees. It participates in the financing of

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local governments, utility companies and health care facilities, as well as in the implementation of programs related to the improvement in the housing market and access to housing. It is the leading institution in the process of consolidation of public finances and cash flow system in Europe.

BGK provides *de minimis guarantee* program, implemented in the framework of the "Program to promote entrepreneurship through guarantees and warranties BGK". It fits in two aspects of economic policies of the government in the context of a slowdown - counter-cyclical and striving for continuous improvement of working conditions for entrepreneurs. Guarantees *de minimis* are very popular with entrepreneurs, evidence of the scale of the program is the number of beneficiaries, more than 78,000 companies. Since the beginning of the program by the end of January 2015, BGK *de minimis* aid granted a guarantee for a total amount of approx. 17.34 bln PLN. With the guarantee of a *de minimis*, banks granted loans worth a total of approx. 30,88 bln PLN (BGK, 2015).

Before entering *de minimis guarantees* program, BGK secured by guarantees only working capital loans, related to the financing of the current business activities. The analysis conducted by the BGK showed that among guaranteed loans BGK's most often used depend on the providers and the purchase of materials, having periodic liquidity problems. As many as 42% of them are from the commercial sector. BGK expanded the program to cover the investment activities will be what was particularly important also for the manufacturing sector.

The program covers the majority of banks operating in Poland, which makes this product available in every part of the country. The process of guarantees is still the same - the company applies for protection of BGK in the same bank where it takes a loan. The procedures will remain transparent and business friendly. Basic conditions for new guarantees are:

- the purpose of the loan: investments or expenses that affect the development of the company;
- guarantees are granted for 24 months from 19 November 2013 to 31 December 2015;
- the maximum amount of the guarantee is 3.5 mln PLN, or 60% of the loan;
- maximum warranty period is 99 months;
- commission rate for the given guarantee of 0.5% per annum.

According to the BGK, increased investment activity has a direct impact on economic growth. The projected increase in expenditures on fixed assets for 2014 was 4.5 percent (BGK, 2015). But the scale of the contribution of

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investment in the acceleration of growth may be limited compared to previous episodes of economic recovery after periods of slowdown. Particularly affected by the negative effects of this factor will be SMEs, which was directed towards a large part of the EU funds in the current term. In the years 2006-2011 SME investments accounted for between 46 and 50 percent of total expenditures of enterprises in Poland and about one-quarter of all investment in the economy.

Instruments supporting entrepreneurs in accessing funds to finance development in the period of low economic activity and until the launch of funds under the new financial perspective can be guarantees repayment of loans intended for broad investment objectives, ie. the standard investment loans and working capital loans to finance current expenditure associated with running investments (eg. credit to finance VAT) and other working capital loans to finance development goals (expenses that affect the development of the business such as. to create a new property or upgrading an existing one, the implementation of a new product, introducing a new process).

The guarantees will facilitate access to finance broadly defined investment objectives as well - as the instrument is not binding to the actual transfer of funds – it will be an element contained in the nature of support that is planned in the new financial perspective. It is one of the forms of *de minimis* aid granted under the permissible aid to cover a loan or investment rotating micro, small or medium-sized enterprises (SMEs).

Warranty *de minimis*, is not a cash grant and is not directly related to the transfer of funds entrepreneur, do not produce any tax consequences.

For working capital loans guaranteed *de minimis*:

- is granted for a maximum period of 27 months,
- protects up to 60% of the loan,
- does not include interest and other costs associated with the loan,
- is secured promissory note entrepreneurs,
- commission rate guarantees have been given is 0.5% of the guarantee on an annual basis.

For investment loans guarantee *de minimis*:

- is granted for a maximum period of 99 months,
- protects up to 60% of the loan,
- does not include interest and other costs associated with the loan,
- is secured promissory note entrepreneurs,
- commission rate guarantees have been given is 0.5% of the guarantee on an annual basis.

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The most important effect of the *de minimis* guarantee scheme is a positive impact on employment in companies. Raising additional funds for the development of companies through guarantees stopped the job cuts, and in some companies allowed to increase it. It is estimated that in all companies which are members of the program it created a total of approximately 22.5 thousand jobs, which is noticeable in the scale size of the economy. A very important conclusion also relates to the development of companies benefiting from the guarantee. Almost 60% of them could make investments as a result of the receipt of the loan with *de minimis* guarantee, and by changing the position of the company (BGK, 2015).

Moreover entrepreneurs who start business activities, as well as entities that exist on the market and have plans concerning fast development may receive support from business environment institutions. These institutions are: entrepreneurship incubators including academic ones, science and technology parks and technology transfer centers. They support aspiring entrepreneurs since the inception of the idea to create a company up to achieving market stability. Incubators' employees emphasize that they offer "space, knowledge and networking". Incubators' offer include: lending legal personality, bookkeeping, legal, tax, business (soft and hard skills trainings) and IT assistance, access to office infrastructure, promotion through the website of the incubator, training and mentoring. Conferences, trainings and seminars organized for entrepreneurs are an excellent opportunity for them not only to get knowledge, but also to acquire new contacts and find potential partners for the future cooperation. Incubators and science parks also offer help in finding partners and in applying for EU grants to start a business. Moreover they offer financial assistance in the form of capital investment in new business through the acquisition of shares and recapitalization of the company by a co-investor. In Poland there are 46 entrepreneurship incubators, 50 academic incubators and 42 science and technology parks.

Barriers of the development of cooperative relations in Poland

As it was already been said, innovation and creativity are the result of cooperation. The weak position of Polish enterprises in this area is caused by a set of substantial barriers. Among them there can be enumerated psychological, mental, organizational, institutional and market barriers.

The most significant barrier of the development of cooperative relations in Poland is low level of companies' ability and willingness to cooperate

with other entities. It remains a strong psychological barrier. This is due mostly to the lack of confidence between institutional partners in business. This threat is enhanced by another obstacle – the lack of skills in the field of cooperation. Educational system in Poland is highly focused on the individual achievements of students and requires no ability to cooperate (Zadura-Lichota (Ed.), 2013, pp. 46-47). Moreover the way of teaching in Polish schools and universities does not motivate young people to work together, as methods like case study are quite rarely taught adequately, even though they often appear in the study programs. It should be also underlined that students in Polish schools have problems to acquire and develop soft skills like: building motivation, developing creativity, supporting initiatives, putting own goals, building self-confidence, expressing own opinions and making confrontations with the point of view of others (Bizon & Poszowiecki (Ed.), 2013, pp. 103-118). All above mentioned problems contribute to limit the dialogue between potential partners. The situation is worsened also by the mental barrier – the lack of sufficient knowledge about the forms of cooperation that can be implemented on the market. Entrepreneurs do not know whether there are clusters and regional networks already established close to their area of activity. They also ignore benefits the cooperation can bring and may result in the transfer of knowledge, diffusion of innovation and finally increasing the company's competitive position. Finally, this low level of intensity of collaboration consequently determines the degree of innovation of Polish economy.

Organizational barriers relate to the actual shape of Polish economy, in particular poor formal relations between entities, poor cooperation of companies in the field of R&D and superficial forms of cooperation in economic life.

Institutional barriers are associated in particular with the undeveloped R&D sector, insufficient development of business environment, inefficiencies of central and local governments as well as bureaucracy limiting access to public funds.

Finally market barriers are connected with the condition of Polish economy and its competitiveness and actual phase of the business cycle, low level of innovation in the economy, low number of patents obtained and limited financial resources (BOSSG, 2015).

Analysing barriers of the development of cooperative relations in Poland we cannot forget the importance of activities towards supporting the expansion of Business Services Sector (BSS) in Poland. If it comes to job creation and overall regional development, it may possibly generate the

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profits for the economy. It also comes together with general opportunity of tightening the cooperation between business and science, as the new sites are usually planned in the cities and regions offering the wide range of institutions of higher education, universities, technical universities and research institutes. However, the assessment of these advantages, coming from this positive trend, is varied in the context of building innovation by cooperation (PAliIZ, 2015). There are not so many examples of such cooperation resulting in scientific publications, new patents or new start-ups. There are few projects realised by universities together with companies placed in the same region and this opportunity should be strongly emphasized and enhanced. At the moment localization of BSS centres is positively correlated with the presence of institutions of higher education because of good access to graduates having professional qualifications, which are appreciated by employers on the labour market. There is still space for creation and development of new ideas in teamwork created by business and science representatives.

Conclusions

While characterizing the position of Poland using the model of T. Ozawa, it has to be underlined that the level of economic development of Poland is now between the second and third stages. It means that the development of our country is possible thanks mainly to investments, as well as progressively to innovations. However, conclusions made on the basis of scoreboards published by official offices, describing the stage of innovation development, underline that Poland is performing below the EU average for most indicators.

From the point of view of M.E. Porter it should be also noticed that Polish companies seem to opt for confrontation, as the main market strategy, basing on the development of one company while worsening the position of rivals at the same time. It looks, therefore, as if Polish entities are not ready or do not see necessities for cooperation with actual competitors.

In the context of tendency of entering the new stage of development in the future, involving the enterprises into wider cooperation, the efforts of organizations and institutions that are creating networking forums of exchange, contacts and knowledge transfer have to be greatly appreciated. Most of the institutions functioning in Poland works hardly on the capital facilities, making easier to get financing for the companies, in the forms of incubators, capital funds, guarantees for enterprises. Many of them are also

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dedicated to ensuring the attractiveness of Polish regions and a whole country for potential investors, especially foreign ones. Creating the opportunities for the companies in the form of easier access to capital is a core matter, taking into the consideration the stage of development of Polish economy, which is only twenty five years after the milestone of the transformation. However, a step ahead is needed in the future, that will allow not only to collect capital, but also to convince companies to change their strategic activity on the market from competition to cooperation. This must be done in spite of the existing barriers in the development of cooperation between enterprises, especially psychical, mental, organizational, institutional and market ones. The possibility to supplement the competitive potential by joining resources and competences of several entities, will contribute to improvement of strategic and operational efficiency, and thus faster implementation of objectives and the achievement of outcomes. It requires strong and wide support regional and central institutions in building efficient networks to gain results mentioned above. Widespread cooperation between companies and thanks to the spill-over effect, may contribute to accelerate Polish economy to the innovation-driven stage.

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Model of Building Relationships With Customers Via the Use of Mobile Devices

JEL Classification: *M31*

Keywords: *customer; customer relationship management; mobile devices; apps; Smartphone*

Abstract: In this paper was shown how is possible to build relationship with customers by using mobile devices. There was discussed the various tools and the benefits arising from their use. The author shows examples of the use of mobile devices in building strong and profitable relationships with customers. It was also shown marketing opportunities, that result from the use mobile devices by growing group of customers. This paper is based on practical and theoretical knowledge and experience form Poland and another countries.

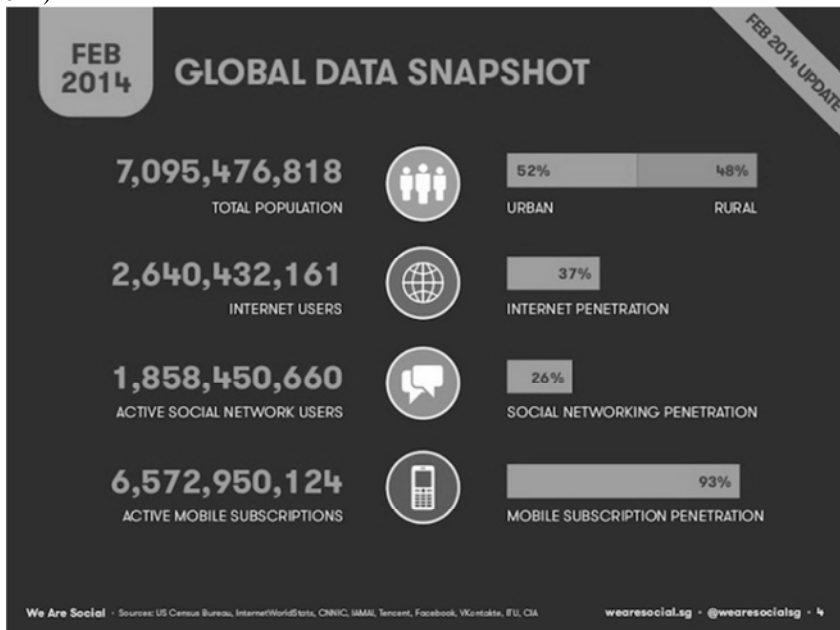
Introduction

Dynamic development of mobile technologies and the increasing role of mobile Internet access are currently observed on the global markets. The availability of online products and services becomes more and more widespread. The possibility of using the Internet for marketing activity in a greater extent than before opens for companies. Our era is sometimes called the era of mobility. Nowadays, larger group of customers use mobile devices. According to the report from 2014, around 6.5 billion of various

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types of mobile devices are active in the world (Figure 1). In Poland, approx. 50% of the population use this type of devices actively (Figure 2). Almost 50% of Poles over 15 have at least one phone with touch screen, operating system, and the possibility to install applications, and every tenth person uses a tablet and these values increase from year to year (Kolenda, 2014, p.12).

Figure 1. Global population, Internet users, social media and mobile devices users (2014)



Source: Digital & Mobile Worldwide, 2014.

From the report entitled "Mobile Online Development Perspectives in Poland", made available at the conference IAB Forum, it is apparent that in the next few years the time of connection of an average user to the Internet via mobile tools will be longer than in the case of stationary equipment (Miller, 2014).

Figure 2. Polish statistics about activity of users of mobile devices (2014)



Source: Digital & Mobile Worldwide, 2014.

Nowadays mobile devices become a platform for customer - company contact. Companies that will not open to such a contact with customers may soon lose a lot in relation to the competition. Customer relationships can be built in different ways and using different means. A group of customers actively using applications installed on mobile devices is a perfect group to use the tools in the field of customers building relationships. This opportunity is used by various companies in various ways. The aim of these activities is, however, one: the acquisition of a large group of loyal and regular customers.

Methodology of the research

As part of preparation for this article, literature research on mobile devices market and applications as well as the theory on customer building relationships was conducted. The research was based on the possibly latest sources with the use of the Internet sources, as the knowledge contained in them in this topic is the most current.

An observation of selected applications available for a variety of mobile devices was used to determine how to build relationships with customers in the market of mobile devices and applications.

Types of mobile devices used by the customers

One of the definitions of mobile devices says that "... mobile device (portable) is an electronic device allowing processing, receiving and sending data without necessity to maintain a wired connection to the network" (Wyborcza.biz, 2013). Most of the customers have mobile phones. A large part of them allows connecting to the Internet and data transmission. We can distinguish the following mobile devices:

- Palmtop – handheld computer,
- MDA – Mobile Digital Assistant,
- mobile phone,
- smartphone,
- tablet (computer),
- Nintendo DS – portable game console,
- notebook – personal portable computer,
- pocket PC – handheld computer,
- pendrive – portable Flash memory,
- MP3 player,
- MP4/MTV player, PMP,
- PlayStation Portable – portable game console,
- digital camera,
- memory card reader,
- portable GPS navigation devices (Informatyka i komputery, 2013)

Each of these devices works a bit differently, has different functions. Opportunities to build relationships with the MP3 player user are different than in the case of smartphone user. Different tools are to be used to build a profitable and long-lasting bond with such customers. That is why it is important to determine at the very beginning what devices are used by the customers. For example, designing a mobile application for smartphones and tablets, one can direct actions initiating client - company relationships only to the users of these types of devices.

Mobile systems and applications

Among the most common mobile devices on market one can distinguish the following mobile operating systems:

- iOS (Apple),
- Android,
- Windows Mobile,
- Symbian,
- Nokia Operating System.

They not only vary in terms of system functions and solutions providers, but also some details in the field of customer relationship management. Relationships with the clients are affected by, among others, whether a system supplier (as in the case of IOS) determines the shape and quality of offered applications, or whether it is assigned to the application providers (as in the case of Android). In the first case it is much easier to maintain a consistent policy of customer relationship management. Thanks to the solutions used by Apple, customers can expect greater support in the use of the application and submitting a complaint. One could say that it builds greater trust among customers.

Mobile applications can be divided into the following basic groups:

- focusing on solving a specific problem of the user, e.g. weather application InstaWeather, applications to send messages Snapchat, WhatsApp;
- applications concerning the existing services, e.g. Facebook, Spotify, LinkedIn, Twitter;
- banking applications, e.g. mbank;
- games, e.g. Angry Birds;
- supporting business operations, e.g. Starbucks marketing application.

In each of these groups of applications in a different way one can implement the appropriate tools to build relationships with customers. To describe in detail the tools to build relationships with customers via mobile devices, one must first divide these tools into those under operating system and under mobile applications. Tools employing e.g. geolocation work under the operating system. Tools employing e.g. QR codes can work under the mobile applications. Both of these tools will be described further in this article.

Building relationships with customers via mobile devices

Since the 90s of the last century, we have been dealing with a dynamically growing tendency to build lasting relationships with customers. This results, among others, from the fact that it is cheaper to maintain a loyalty than getting a new one, and good relations with regular customer can be really profitable for the company. The natural response to this tendency was the establishment of the concept of customer relationship management (CRM - Customer Relationship Management). CRM creates two kinds of values: the value of the company for the client and that value of client for the company (Qia et al. 2014). Within the concept of CRM, one can distinguish the tools to build lasting and profitable relationships with the customers. Some of these tools are supported with solutions used in applications dedicated to mobile devices. Any actions that are intended to make contact and to continue dialogue with the customer contribute to build proper and profitable relationships with customers. An example of such activity may be encouragement of mobile devices users to assess the application. Thanks to such solution the software publisher can obtain actual and reliable information on the receipt of his product. Encouragement of the customers to register applications, during which they have to provide their details in order to receive some profits may also be helpful. Data that a company can receive from the customer are the most important in CRM systems. By linking and analysing data one can e.g. receive information about from what linguistic or geographical region customers come from or what is their age, education degree or interests. All this allows customizing new offers and marketing messages. It is also important what the customer gains from building a relationship with the company, because it creates greater tendency to loyalty. Mobile applications offer a number of opportunities for clients, starting from purchasing directly from the application and ending with the performance of medical imaging with a mobile device (Hirschorn et al., 2014).

The company can use different strategies towards to different customers, depending on the expectations of specific customer profitability. It is also connected with the collected in an appropriate manner data. In order to make the customers willing to share their data, they should be encouraged to do so. In addition to the aforementioned techniques, such as an encouragement to register the software or the assessment of the application by the client, one can use different types of loyalty programs. Moreover, mobile devices allow the user location and the connection between the various data

stored in the device, e.g. the possibility to upload pictures from the camera to the application of social media like Facebook via an application.

Not without significance is also the possibility to use mobile devices for marketing purposes. Nowadays marketing has usually dimension of relationship marketing, which is directly related to the concept of CRM. Relationship marketing is influenced by such elements as building customer value, social media marketing, mobile marketing or building relationships with business stakeholders (Figure 3). Mobile marketing and indirectly building relationship through social media are important for consideration of this article.

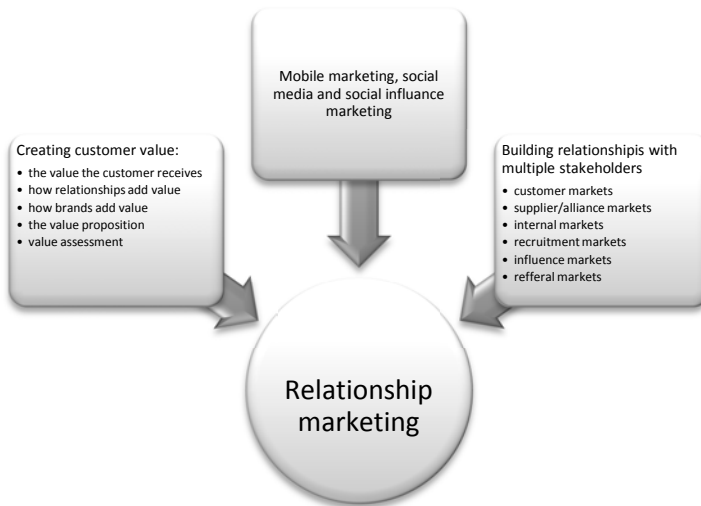
Mobile marketing is one of the most currently used ways to reach the client (Amirkhanpour, 2013). Marketing message often becomes an integral part of the mobile application.

Applications produced by the specific company are often offered to attract customers and strengthen the relationship built with them. Examples of such applications are:

- application Dziennik Maluszka offered by company NIVEA Polska and promoting children's cosmetics;
- application Ikea which is the catalogue of Ikea company;
- application Zara which is the catalogue of Inditex fashion company;
- application Mój Orange offered by Orange Polska company;
- application Netia Player Pilot offered by Netia S.A. company;
- game Cool Cubes offered by Unilever Inc company and promoting Lipton tea.

On the above examples it is easy to see how wide and various can be the use of a mobile application for various companies. Some companies, such as NIVEA or Unilever Inc offer applications that go beyond the scope of their core activity to meet the needs of the customer. These applications create in customers positive associations with the brand. Other applications are used to promote specific products and even allow their purchase via the internet (Zara, Ikea). Applications such as Mój Orange or Netia Player Pilot allow remote management of already purchased service thus extending the functionality of this service.

Figure 3. Creating a relationship marketing



Source: Payne, 2013.

Modern trends in the field of mobile marketing are primarily associated with the use of geolocation services and Quick Response codes (QR) (Kapera, 2012). Geolocation allows users of mobile phones and other mobile devices determining their geographic location using the GPS navigation, and together with this the acquisition of information about local services. This tool is particularly important in the context of a dynamic development of social media, including in particular services that enable users to signal the presence in a certain place. An example of the use of geolocation in mobile application can be Promotion In Motion by ABIX that literally guides the user to a cheaper hairdresser or for a pizza, using geolocation and searching locally promotional offers (Figure 4). The second mentioned technology is based on advanced barcodes, which are recognized by a special application installed on a mobile phone with built-in camera. QR codes can provide users a number of information useful for identifying products and comparing their prices. With these codes companies can very easily make interactions with current or potential customers. An example of a universal application to scan QR codes can be QR Droid Code Scanner (Poland) produced by DroidLa (Figure 5).

Application using QR codes is based on the hardware capabilities offered by the mobile device, in this case this is the camera. Because of the

possibility of using the hardware capabilities, the mobile applications can be divided into native, web and hybrid. Native applications are run directly by the operating system and allow the use of hardware resources such as GPS, camera, wi-fi, accelerometer, compass, Bluetooth, microphone, speakers, storage space etc. Web applications allow easy viewing of content on smartphones and tablets. Internet browser installed on the device is enough to run such applications. They must also be tailored to the hardware requirements of individual mobile devices (Stormer, 2005). In contrast, hybrid applications are a combination of native applications, in which web component is responsible for functionality part (Rozwiązania mobilne, 2010). Table 1 presents sample applications from all three groups with specification how relationships with customers are built in each of them.

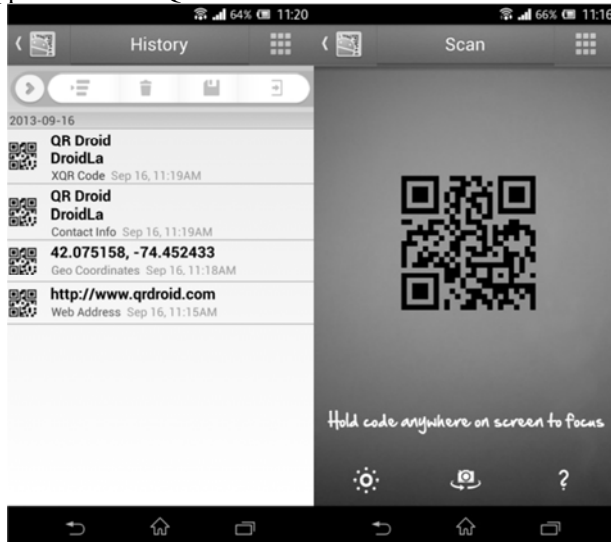
Figure 4. App Screenshots Promotion In Motion



Source: own elaboration

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Figure 5. App Screenshots QR Droid Code Scanner



Source: own elaboration

Table 1. Examples of building relationships with customers via native, web and hybrid applications

	Example	Relationship building with customers
native applications	Panorama 360: The Big Picture	The application allows creating panoramic images with the camera installed on the device; the user can send these photos from the application level to the selected social media and can mark on the map where the photo was taken. Tools used in this application allow the location of the customer and understanding his interests (based on the pictures sent to the sites such as Facebook and Instagram)
	aDyno	The application uses the accelerometer built into a portable device to measure the acceleration of the car. The very installation of this application by the customer shows his interest in the automotive industry, thus he can be addressed (also via the application) the marketing message of properly selected content.
	Restaurant Finder	The application employs GPS to give the user location of the nearest restaurants, as well as hotels, cash machines, grocery stores, etc. On the basis of the data collected in this application, one can determine what the customers are looking for at what hours and days. With this knowledge, one can properly tailor the advertising message to the customer as well as consider the more convenient for client's location of e.g. cash machines.

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web applications	Ceneo with Allegro Group	Price comparison adapted to mobile devices. Thanks to it, you can determine which products are most searched by the clients and what parameters they expect from each product. In combination with the geolocation one can undertake analyse in different cities or even in different neighbourhoods. Customers via this application can quickly and easily find suitable offer. Offer messages of many companies may also be presented to the client.
	mBank PL	Mobile electronic banking application. A multitude of functions contained in this application allows making any CRM analysis which is expects by the bank in relation to their clients. It can be determined e.g. how often a client logs on via the mobile application and what actions he performs most frequently. The next step would be the preparation of personalized offer for such a customer e.g. credit. For customers, this application is convenient, as they can conduct bank transactions without using a PC.
	Zooplus.pl	Mobile application of an online store with food and articles for animals. On the base of data on the customers collected from this application one can carry out many analyses, e.g. the frequency and volume of purchases. It can also remind the client about the possibility of re-placing an order. For the customers, this application gives the possibility to make purchases at any time and from anywhere without access to a computer. The customer can also repeat one of the previous orders, which facilitates this process and reduces transaction time.
hybrid applications	Instagram	The application allows using the camera installed on the device and disk space and posting photos on Instagram and Facebook. This application is a convenient tool for customers as far as image processing is concerned. It allows the user's location. For the need of a specific marketing message one can analyse the content posted by the user.
	S Health	Default application of Samsung Galaxy Note 4 employing, among others blood saturation sensor. This application helps the user to care about his health. Thanks to it, one can check the pulse during exercise, the number of steps, type of food, the number of exercises and the amount of sleep during the day. This application makes the customer feel that Samsung cares about him in a special way. On the other hand, Samsung can gather a lot of information about their customers, their lifestyle, health, eating habits. This knowledge allows creating an offer tailored to a specific person, e.g. dietary supplements.
	Coigdzie.pl	An application that allows you to search in the selected location the most interesting cultural events in the specified time. The client can quickly make a choice regarding the events in which he wants to attend. The application allows gathering information about the location of users and their preferred ways of spending free time. This knowledge can be used while planning further events.

Source: own elaboration

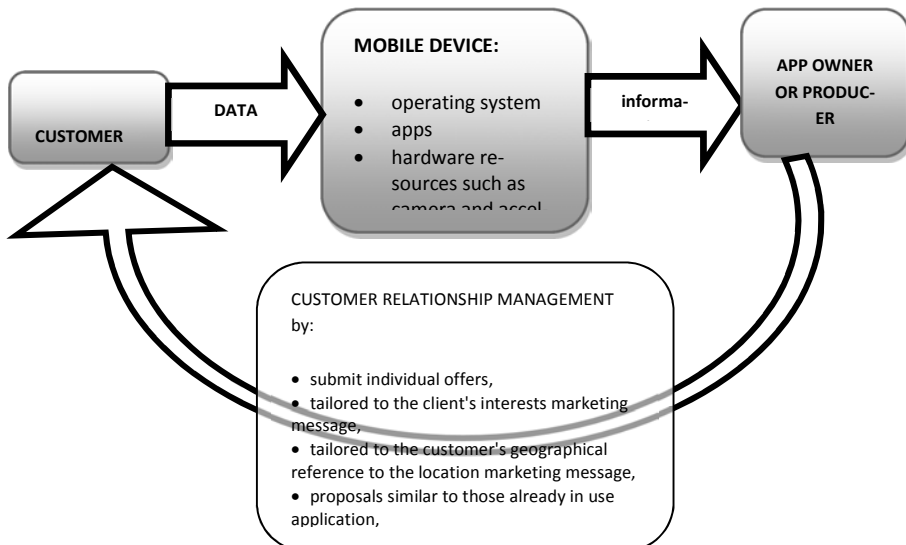
**Universal model of building relationships with customers
via mobile devices**

On the basis of the above-described examples of tools to build relationships with the customers one can distinguish important determinants of building relationships via mobile application, these are:

- maintaining brand awareness and recognition by the customer;
- building positive associations with the brand via the mobile application;
- "facilitating customers' lives" - facilitating the use of an already purchased service;
- encouraging the client to spent more in the context of already purchased services (up-selling);
- motivating customers to make purchases in the framework of their interests;
- presentation, on a regular basis, of company's news to the customer;
- testing whether the customer likes the product or service that he bought;
- monitoring of customer's activity in time and space.

Universal model of building relationships with customers via mobile devices (Figure 6) shall refer to at least some of these determinants. This model, cannot fail to take into account the functions provided by the device (such as a camera or GPS) and the characteristics of the operating system installed on the device. Actually, every application allows collecting data about customers and their processing for the purpose of relationship marketing and CRM. Make good use of emerging opportunities.

Figure 6. Universal model of building relationships with customers through your mobile device.



Source: Own elaboration.

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In the process of building a relationship with the customer via a mobile device, it is assumed that the client enters or allows sharing certain information such as where he is or what are his current interests. These data are processed and forwarded by a mobile device, which also has the possibility to collect data through the system, mobile applications and hardware resources. Data are subject to analysis and provide information to the manufacturer or owner (they are not always the same) of the application. This knowledge can be used to build a lasting relationship with the client, e.g. by offering the customer an individualized, tailored to his needs unique offer.

Conclusions

The current times are sometimes called the era of mobile, as more and more customers use the services offered via mobile devices. Mobile technology allows taking an advantage of the fact that customers use it willingly to build lasting relationships between companies and customers. Not without significance is the fact that the concepts of CRM and relationship marketing are becoming more and more popular even among the smallest businesses. Companies are forced by the market to look for solutions that will allow attracting and retaining loyal customers. Building relationships with customers via mobile devices can be done in many ways and can be used in many areas. There are different types of devices with different operating systems and hardware; there are various applications that can be installed on them. This article presents a simplified model, according to which one can build profitable customer - company relationships. Thanks to its universality, this model can find many uses. It shows the flow of information and selected possible tools to build relationships with customers.

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Offshoring sector in Poland*

JEL Classification: *L24; L80; M15*

Keywords: *outsourcing; offshoring; foreign direct investment*

Abstract: Companies across industries gain the competitive advantage by outsourcing and offshoring. Developing countries are becoming the attractive locations for the BPO/SSC enterprises. The article reviews the definition of outsourcing and offshoring and presents the findings for the fast-growing BPO/SSC area in Poland. The study is based on detailed analysis of the literature on outsourcing and offshoring. The article presents a preliminary analysis of offshoring sector in Poland. The following considerations are taken into account: the number of companies and employees in this sector, foreign direct investment. The growing number of companies and employments in this sector. Subsequent growth of the offshoring business service sector in Poland is visible.

Introduction

Contemporary management of a company is based on continuous changes, which bring both opportunities and threats. The market environment is highly influenced especially by two trends: globalization of the

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economy and the business management. Deindustrialization of the economy also leads to many changes in market systems.

In recent years, an increase in the importance of globalization of services can be noticed in the world economy, which is a relatively new phenomenon. More of a free flow of products, services, knowledge, ideas and capital across national borders can be seen. Companies must look for new solutions, because the global market is characterized by an increased competition (Kłos, 2010, p. 11-12).

The phenomenon of de-industrialization of the economy is the opposite of industrialization. This is a process in which traditional industries, particularly heavy industry and all related industrial branches, disappear. This phenomenon causes the decreasing importance of the processing industry, and – at the same time - the growing importance of services in creating GDP and employment. Technology is another important direction of changes in the business environment, since it affects the shortening of product life cycle and the development of information technology (Kopczyński, 2010, p. 17-18).

Between the business services and the process of globalization appear dependencies of bilateral nature. Growing globalization affects the internalization and evaluation of business services, which in turn are a source of further integration of markets and increased competition on them. One of the dominant views on the causes of the development of the business services is offshoring. The growing use of offshoring is becoming the dominant business practice in the global economy. The aim of the article is to present the theories associated with the outsourcing and offshoring. The article analyzes offshoring sector in Poland.

Methodology of the research

Indicators such as position in the world rankings, such as A.T. Kearney, inflows and outflows of foreign direct investment, the number of centers, the level of employment in them, salary levels and the number of graduates were subjected to analysis. At the beginning, brief review of the theoretical approach to outsourcing and offshoring was made, and preliminary analysis of offshoring sector in Poland has been applied.

The aim of the study is to present the future investment trends on the Polish market and the assessment of the current climate created for potential investors. Due to the fact that offshoring in Poland focuses mainly on

specialized services, the following article is mostly devoted to the so-called captive offshoring and captive nearshoring.

The concept of outsourcing and offshoring

The use of external resources for the dispensing of some of the core business of the company is called outsourcing. The name originates from the “outside - resource – using” and simply means the use of external resources. According to M. Trotsky outsourcing is associated with taking the problems of the company outside, and - more specifically - it is associated with commissioning of some work to the external contractors. It is assumed that this work will be completed more efficiently by external company than it would be possible in the ordering company, which may affect the achievement of pre-determined results (Trocki, 2001, p. 11). Chase et al. defined outsourcing as "the act of transferring some of the internal operations of the company and decision-making activities to an external provider." In contrast, Lankford and Parsa define outsourcing as a purchase of products and services from sources external to the organization (Schneiderjans et al., 2005, p. 3).

One of the main motivations behind entrusting the completion of some activities to outsourced company is cost-saving, the second reason is focusing on the company's core business. The third motivating factor is the lack of technical capability or competence to perform the activities within the company (King et al. 2000: 323-334).

Smaller trade and investment barriers, as well as technological advances in communication occurring in recent years facilitate globalization of services. Technological changes that have occurred in the production and communication influence delegating the production processes of the companies to other firms around the world. This allows using of the differences in such factors as the cost of production factors without losing the benefits of specialization (Sethupathy, 2013, pp. 73-97). Increasingly, one can encounter the desire to minimize the costs and benefiting from the delegation of some activities and even their production by the companies to their foreign branches or to other companies that will accomplish the activities or produce things more efficiently. This is called offshoring.

This phenomenon raises a lot of controversy. On the one hand, it can help companies to improve their profitability and impact the creation of new jobs in the countries where the off-shoring companies are located. On the other hand, it may have negative consequences for macroeconomic of

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home countries, that is, for the so-called importers of offshoring. Offshoring may increase productivity and development of skills. It may increase the purchasing power of consumers through lower import prices and reduction of exchange rate fluctuations for exporters (Cheung & Rossiter, 2008, pp. 15-28).

In the subject literature we can meet two terms: offshoring and offshore outsourcing. Offshore outsourcing means that the location of business is transferred to another country and functions are outsourced to specialized suppliers (Hätönen, 2009, pp. 61-76). On the other hand, offshoring is a transfer of business activities from the home country to other countries, but within the same company. It is a strategy that is considered a managerial practice, which began in the late seventies. In addition to the desire to minimize costs, it is important for companies to also search for talent and technology resources for scalability purposes (Roza et al., 2011, pp. 314-323). The use of offshoring could improve the efficiency of the organization. Thus, the savings that can be obtained from offshoring the company can invest in research and innovation, which can lead to long-term increase in productivity.

The phenomenon of offshore outsourcing has become one of the cornerstones of the various disciplines, including international business, strategic management, supply chain management and information systems (Cheung & Rossiter, 2008: 15-28). This phenomenon can be seen in at least two concepts of business management. The first approach involves the possibility of recording the operations of companies in attractive tax jurisdictions or tax havens¹ Most frequently companies are transferred to tax havens to significantly save money on taxes, protect assets, reduce risk, reduce costs, protect privacy and avoid bureaucracy. B. Spitz in his book says that the concept of offshore originally was connected with the activities of the American and British companies in the tax havens.

The second approach is to transfer the offshoring business activities due to the possibility of reducing the cost and competitive quality advantages that can be provided by contracting services in another country. This is an important approach from the standpoint of the global economy. This im-

¹ According to the OECD, classic tax havens are currently located in Malaysia, Costa Rica, the Philippines and Uruguay. Tax haven is a jurisdiction that deliberately shapes its law contrary to the standards applicable in the Member States. OECD lists several factors that determine whether a jurisdiction is a tax haven: it does not impose any or imposes very low taxes; it is characterized by great discretion of activities; there is a lack of transparency of rules; there are no legal requirements of running a business in a tax haven.

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plies a competitive price and quality of resources, resulting in lower operating costs and access to knowledge and experience, which the company does not have (Próchniak, 2012, p. 362).

Increasingly, outsourcing companies outsource jobs to other countries culturally and geographically close - from Western Europe to Central and Eastern Europe. Such situation can be found in Poland, where service centers that work for clients mainly from Western Europe are located. This is influenced by the resources and the quality of the workforce, including training of staff, the cost of doing business, investment climate, the state of infrastructure and quality of life (Szukalski, 2013). Therefore, in recent years in Western Europe developed the concept of nearshoring (Bock, 2008, pp.490-508). Nearshoring means the transfer of operations to a closely located country separated only by the border (eg. For US and Canada it is Mexico, for Western Europe it is Poland). It may occur in the form of a branch or subsidiary company – co-called *captive nearshoring* or in the form of delegating activities to another independent company from its mother company – so-called *nearshore outsourcing*. The author of the forthcoming doctoral dissertation will explore enterprises operating in the offshoring and nearshoring. Table 1 shows the division of outsourcing based on the place of business delegation.

Table 1. Outsourcing division based on the location for moving the company's activities and the form of ownership

Ownership	Location with no changes	Location in a nearby country	Long distance location
Full	Captive Onshore	Captive Nearshoring	Captive Offshoring
None	Onshore Outsourcing	Nearshore Outsourcing	Offshore Outsourcing

Source: Own study based on K. Rybiński (2007, p. 31).

Factors influencing the placement of business services

In recent years, an interest in the phenomenon of offshore outsourcing increased. Despite the growing importance of this phenomenon of all the detailed aspects of making location decisions are still not explained. In the subject literature, the location is an important factor for foreign direct investment. Locational factors that influence the attraction of foreign investors include the most important features of the location. According to Jensen and Pedersen these factors can be grouped together (Table 2).

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Table 2. The most important location factors

Localization factor	Description
Labor costs	It is one of the most important factors. The aim of the company is to reduce costs and consequently take advantage of the offer of countries where wages are lower. (Stringfellow et al., 2008, pp. 164-179). However, there may also be some additional costs that affect the volatility of costs, which often results in preventing the achievement of expected results (Bhalla et al., 2007, pp. 322-335). At the same time the subject literature also mentions, that the consequences of outsourcing go far beyond the direct cost reduction. (Ellram et al., 2007, pp.148-163; Mudambi & Venzin, 2010, pp. 1510-1533; Contractor et al., 2010, pp. 1417-1433)
Resources availability	The choice of the country where the offshoring activity is to be located is influenced by the availability of human and technological resources. (Lewin & Peeters, 2006, pp. 221-239; Luzzini & Ronchi, 2010, pp.7-21; Jensen & Pedersen, 2011, pp. 352-372). For example Doh (2005, pp.695-704) stresses that the quantity and quality of human resources is also important, while Roza et al. (2011, pp. 314-323) think that the availability of other service providers and access to talented individuals are equally important (Bunyaratavej et al., 2008, 227-242).
Cultural proximity	It refers to the geographical proximity (Stringfellow et al., 2008, 164-179), language and cultural factors (Doh, 2005, pp. 695-704; Bunyaratavej et al., 2007, pp. 7-21; Youngdahl et al., 2010, pp. 798-820; Clampit, 2015, p.79-93). In countries with similar culture, companies will be able to minimize the additional costs, such as costs of additional training. Cultural closeness also affects consumer perception of where the service is performed and whether it is completed close to home country. (Tate, 2014, pp. 66-68)
Business environment and local networks	The company may decide to order the performance of its services to the country, which offers access to local markets (Kedia & Mukherjee, 2009, pp. 250-261; Jensen, 2009, pp. 181-193; Roza et al., 2011, pp. 314-323) or investment incentives (Bunyaratavej et al., 2008, pp.227-242). There is a high risk of theft of intellectual property, which affects the decision on the location of the company. Some countries do not have dealt with legislation on intellectual property theft, which affects their negative perception by potential foreign investors. (Tate, 2014, pp. 66-68)

Source: Own elaboration based on mentioned works.

The potential of Poland as a location of outsourcing of business services

The field of Business Process Outsourcing / Offshoring (BPO) and Shared Services Center (SSC) is one of the fastest growing industries in the world. In recent years there has been a significant increase in interest in the problems of BPO / SSC in Poland, which is one of the fastest growing fields. Areas used by BPO / SSC, which include advanced solutions, new technologies and expertise, make this sector an efficient channel of ex-

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change of information and know-how. The popularity of Poland and other countries in Central and Eastern Europe grows every year, because this geographic region currently provides the best possible offer of providing comprehensive and advanced BPO services in the world (ABSL, 2012).

At the beginning of 2011 the political and military turmoil in North Africa resulted in an increased risk of BPO companies operating there. The industry has been developed well there for many years. Egypt was considered one of the best locations for operating centers, with centers of some of the major international companies. Considering the lack of security and stability of the services provided, many companies decided to move their services to new, safer locations. This turns out to be a great opportunity for Poland and other Central and Eastern European countries. There is another important factor – the closeness. Increasingly, foreign investors are looking for a location for SSC and BPO, which would allow them the same or similar geographical area and faster air connection. (Colliers International & AT Kearney, 2008).

The events of early 2014 in Ukraine decreased the interest of foreign investors in operating there. The current unstable political situation and the danger of war with Russia effectively discourages potential investments. Also, poorly developed road infrastructure and ICT are another disadvantage. The political crisis and instability will result in a dramatic outflow of FDI from this country. Therefore, Poland has a chance to increase its competitive advantage among the countries of Central and Eastern Europe. Observing changes in the assessment of the potential attractiveness of Polish localization is an important source for the study of conditions of business services transfer. These observations are allowed, among others, by periodic surveys conducted by a company A.T. Kearney. They present three categories of location advantages:

- Financial Attractiveness, which includes, in particular: average wages, infrastructure costs, tax and regulatory costs;
- People skills and availability, describing the size of the IT and BPO sectors, the total workforce, university-educated workforce, scores and standardized education and language tests;
- Business environment, which includes the security of Intellectual property (IP), Cultural exposure, quality of infrastructure, country environment.

Table 3 shows the measurement of location of business services in Poland indicators in the various value categories on the basis of A.T. Kearney research, conducted between 2009 and 2014.

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Table 3. Location attractiveness of Polish economy in terms of transferring of business services according to the research by A.T. Kearney (2009-2014)

Years	Financial attractiveness (max. 4)	People skills and availability (max. 3)	Business environment (max. 3)	Totality	Rank
2009	1,82	1,22	1,73	4,77	38
2011	2,14	1,27	1,81	5,23	24
2014	2,28	1,39	1,87	5,54	11

Source: Own elaboration based on A.T. Kearney, Global Services Location Index 2009, 2011 and 2014.

Based on the provided data it can be seen that the overall assessment of the Polish economy value for business services continues to grow. From 2011 the assessment of all the indicators of location have improved. The biggest change in 2014 (compared to 2009), was reached by a financial attractiveness indicator. The increase in the assessment of the cost attractiveness can be associated with the fact that, although the cost profile is slowly approaching the value observed in Western Europe, it is still several times lower. Relatively low and competitive wages in this sector in Poland in comparison to other countries of Central and Eastern Europe influenced this the most. An increase in the assessment of human capital is also noticeable. This is due to rising of the quality of education and knowledge of foreign languages, and thus greater access to skilled labor. Specialized skills are offered not only in English.

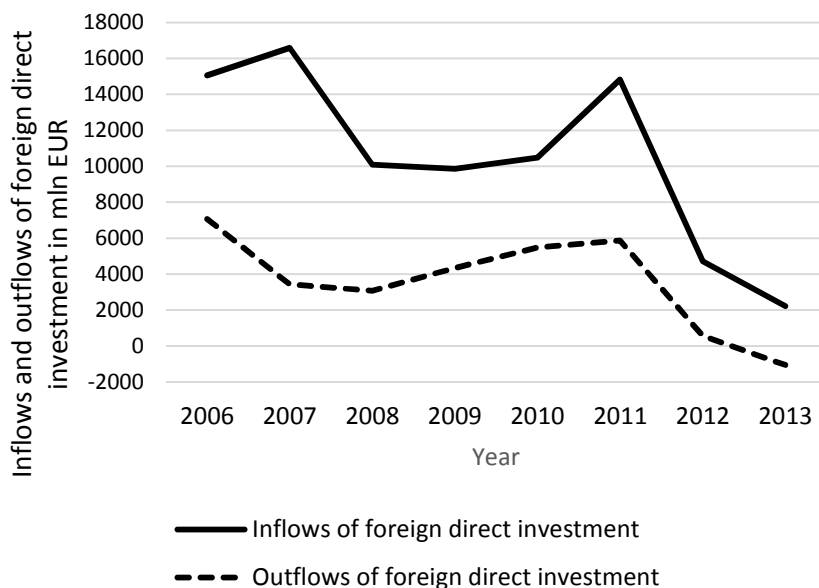
Systematic improvement of business environment evaluation can be observed. The increase was caused by the improvement in the perception of country risk and increase in the availability and quality of information technology. The improvement in this indicator could also be affected by the political crisis in Ukraine, which began in November of 2013.

An improvement in the assessment of the competence and the availability of resources and reduction in transaction costs is also noticeable. Foreign investors assess Poland positively also because of a stable business environment. This in turn helps in keeping a relatively high attractiveness of the location for the transfer of offshoring services. The importance of qualified human resources is increasing, and considering these qualities we can notice a good direction of adapting of the Polish economy to the new market conditions in the offshoring area. Further development of social capital, knowledge, innovation and the development of the business environment can be one of the Polish competitive advantages on the European market. Increased activity of the local government units towards foreign

investors in this sector can contribute to greater absorption of investments related to the relocation of business services. (Malik, 2013, pp.203-223)

Political changes in the late 80's and 90's of the twentieth century influenced the attractiveness in terms of moving services to Poland. Also, lower labor costs than in other EU countries and accession to the EU in 2004, provoked more positive perception of the country in the eyes of investors. An important role was also played by transnational corporations that brought in direct foreign investment. According to the World Investment Report 2006 developed by UNCTAD, Poland is one of the largest recipients of offshoring investment among the countries of Central and Eastern Europe. (UNCTAD, 2006)

Figure 1. The value of inflows and outflows of foreign direct investment (in millions of dollars, 2006-2013)



Source: Own elaboration based on the data of Polish National Bank <http://www.nbp.pl> (13.03.2015).

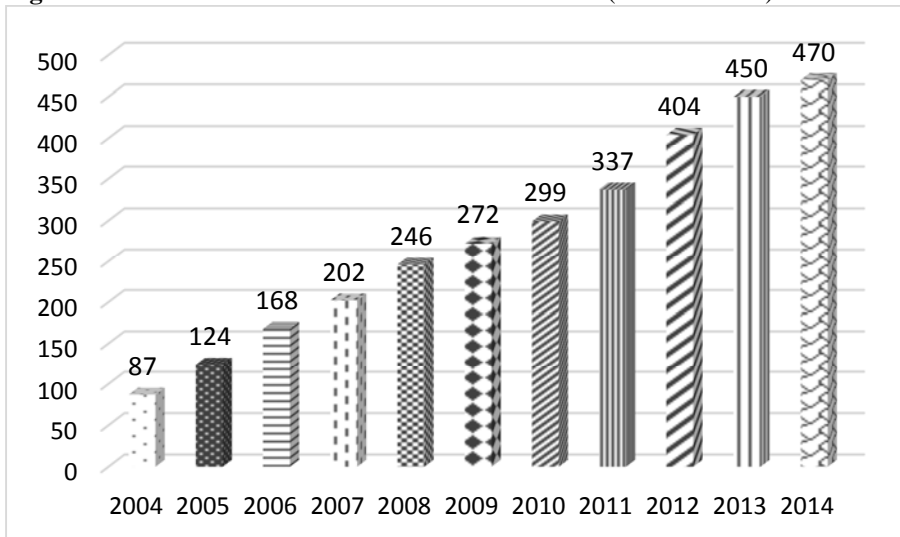
Statistical data presented in Figure 1 illustrate the decrease in inflow and outflow of foreign direct investment in Poland. It is especially visible in recent years. Until 2011, an increase in the inflows and outflows of foreign direct investment in Poland was a visible. 2013 was another year of decline

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in foreign direct investment into Poland. Net inflow of these investments amounted to 2,208 million Euro, and it was more than twice lower than the inflow of investments in 2012. It was the year with the lowest direct investment inflows into Poland since 2006. This situation could be affected by the elimination of special purpose entities and the withdrawal of capital in transit, the sale of equity interests in the banking sector to foreign portfolio investors and the reduction of activities by some financial holding companies and the withdrawal of the equity interests of foreign investors. Also the global trends, such as the slowdown in the economies of the European Union and the impact of the phenomenon of capital in transit, could cause a drop in direct investment inflows into Poland. Still, there was an influx of new investments into Poland, which included both greenfield investments and capital for business development of existing companies. According to the Polish National Bank data the largest inflow of foreign direct investment came from the United Kingdom (3343 million Euro) and Germany (1910 million Euro), a major investor from outside the European Union was Switzerland (955 million) (the Polish National Bank, 2013). On the other hand, Polish investors withdrew more than 1 billion Euro of foreign investment. Active policy of the state would be able to help build new location advantages, which could be based on a highly skilled workforce, innovation and technological progress.

Figure 2 shows the number of offshoring centers in Poland between 2004 and April 2014. Number of offshoring centers with the participation of foreign capital in Poland is growing continuously since 2004. The change in the number of existing service centers could be affected by the number of new foreign companies that are just entering the Polish market of business services and did not have their centers in Poland before.

Figure 2. Number of business service centers in Poland (2004-04.2014)



Source: Own elaboration based on the data presented by Association of Business Service Leaders in Poland (2014), Sektor nowoczesnych usług biznesowych w Polsce, ABSL, s.14, <http://www.paiz.gov.pl/> (14.10.2014)

Currently, a phenomenon of reshoring in business services is not noticeable. This phenomenon involves delocalization of business to the home country. The largest rate of growth in the number of centers over 30% is noticeable in 2005 (43%) and 2006 (35%). Inhibition of growth is noticeable in the following years. Since 2010, the growth rate does not exceed 20% per annum. In 2012, the number of service centers exceeded 400 types of entities. At the end of April 2014 as many as 470 companies in this sector were located in Poland.

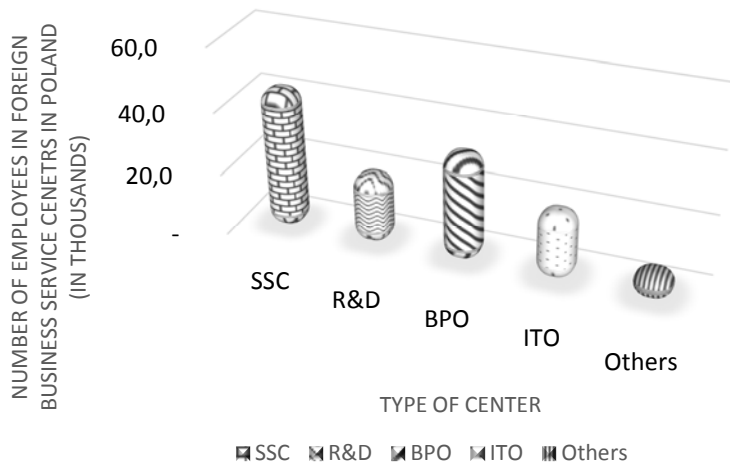
Most centers with the participation of foreign capital in Poland are Shared Services Center (SSC) -165, 113 are R & D centers, 109 are Business Process Outsourcing / Offshoring (BPO), 73 entities are Information (ITO) and 10 which are difficult to qualify for any specific type.

Employment in the business service centers with the participation of foreign capital in Poland is steadily growing. In 2013 there was an increase in employment of approx. 27,000 people compared to 2012 (Figure 3). The average annual growth in the country in a few years (from 2009 to 2013) stood at about 15 000 a year. As many as 95% of all workers BPO / SSC / ITO in Poland are employed in the ten largest business service centers: Krakow, Warsaw, Wrocław, Trojmiasto, Łódź, Katowice Agglomeration,

Poznan, Bydgoszcz, Szczecin and Lublin. The largest number of employees are in the SSC-type entities (44,1 thousand people), in the BPO it is 33,7 thousand people, in R & D centers 21.6 thousand people are employed, while in the ITO 21.1 thousand people work. In other centers, which are difficult to qualify for a particular type 7,7 thousand people find employment.

The average service center in Poland employs 272 people. For SSC this value stands at 267 people, BPO - 309, R & D - 191, ITO - 289. In Poland 28 service centers that employ at least 1,000 people are located. Most people working in service centers are employed full-time (contract). The largest number of people employed in the business service centers in 2014, worked in Krakow (30.6 thousand people), Warsaw (21.8 thousand people), Wroclaw (20.5 thousand people), with about 128 thousand employed in Poland. Analyzing the employment in this sector it can be seen that Krakow, Warsaw and Wroclaw have the largest number of employees in this sector, a total of about 57%.

Figure 3. Number of employees in foreign business service centers in Poland, broken down by type of center (in thousands, 2014)

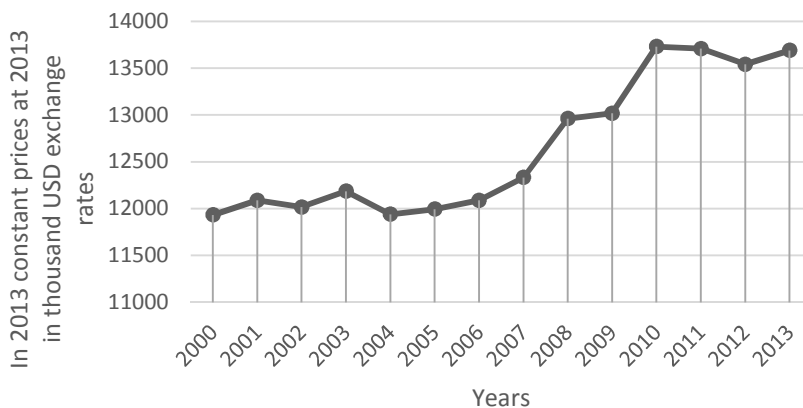


Source: Own elaboration based on the data presented by Association of Business Service Leaders in Poland, Sektor nowoczesnych usług biznesowych w Polsce, ABSL, s.14, <http://www.paiz.gov.pl/> (14.10.2014).

Since the beginning of 2012, the highest increase was recorded in Wrocław (68%), Krakow (59%) and Lodz (57%). In contrast, the largest number of jobs was created in Krakow (11.4 thousand) and Wrocław (8.3 thousand). Medium-sized centers of employment between ten thousand and twelve thousand people we may include Trojmiasto, Łódź and Katowice. Based on these data it can be seen that the concentration of service centers coincides largely with the location of the largest academic centers in Poland. Of all the service centers with foreign capital the largest share were US companies (38%), followed by France (18%), UK (9%) and Germany (8%). US companies chose large urban centers for its location, which are traditionally associated with the business services sector. (ABSL 2014)

Poland has not experienced the crisis and recession, to an extent similar to many other countries in Europe. The average real wage in 2013 increased by 1.1% (Figure 4). The main reason for this was deflation and an improvement of economic conditions.

Figure 4. The average annual salary in Poland in 2013 with constant prices at 2013 USD and exchange rates in the years 2000-2013



Source: Own elaboration based on the data presented at <http://www.oecd-ilibrary.org> (13.03.2015).

It should also be noted that the increase in demand for the selected experience in the region can have a direct impact on the increase in the level of wages in a given specialty. Workers in this sector are the most mobile

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group of professionals, therefore interesting job offers in one region can attract experienced workforce from other centres, both domestic and foreign. The level of remuneration in the processes of customer service, finance and accounting, and IT support is affected by: years of experience and the level of position taken in the organization.

Conclusions

Poland is an attractive location for investors from BPO / SSC. For Poland the most competitive markets in the world in terms of locating business service centers are China and India. On the European market, Poland loses often with Slovakia, the Czech Republic, Hungary, Bulgaria and Romania. Despite this, Poland stands out from its competitors because it is centrally located in Europe, has access to qualified and multilingual staff and has a relatively low cost of labor.

Based on the available data it can be concluded that the phenomenon of offshoring in Poland in the first decade of the twenty-first century was a significant economic process. This was influenced, among others, by economic changes, technological development and the evolution of the operation and activities of transnational corporations.

The development of offshoring in Poland led to increased employment and development of new professional specialization in the sector. The development of this sector was caused mainly by enterprises with foreign capital. The further development of this sector in Poland may indicate an increase in employment, the number of business service centers and improved availability of human resources. An important factor which affects the development of the phenomenon of offshoring in Poland is the location. Poland is located close to the major European economies. Polish EU membership is also very beneficial, due to the political and economic unity. One of the advantages is the ability to make use of an easy and quick travel between countries in the same time zone. There is also a greater availability of low-cost airlines, which support all major European cities. EU member states have simplified administrative procedures.

If Poland wants to seek a greater inflows of FDI, the country should strive to remove existing barriers that hamper economic activity in our country. This is necessary also due to the fact that the cost attractiveness, which is one of the main advantages for foreign investors may be significantly reduced in the future. This is not only because of the increase in salaries, but also because of a decline in the importance of labor costs fac-

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tor in comparison to such other factors as: an access to a skilled workforce, access to well-developed technical infrastructure and the level of labor productivity. That is why it is important to invest in human capital and modernization of the infrastructure, which is one of the priorities of the Polish economic policy.

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Social Relations and Environmental Influence as a Determinant of Customer Capital

JEL Classification: *A11; D11; D12*

Keywords: *customer; customer capital; company value; business relationships*

Abstract: In the article there is an influence presented of feedback and recommendations provided by the customers on customer purchase behavior along with the benefits resulting from using the customer feedback potential in the process of company value creation. On the basis of survey research conducted on the beer market in Poland it was indicated that customer feedback and recommendations have a significant influence on purchase behavior and allow cost reduction of customer communication. In the results of the analysis there were statistical methods used, including focus analysis, ANOVA test and factor analysis.

Introduction

An unquestionable consequence of changes taking place in the business environment is intensification of competitive struggle which in the conditions of increasing demand barrier comes to struggle for the customer. In the struggle the company wins which creates a distinguishing customer value. Such value, remaining in a relation with changing customer needs, has a subjective and dynamic character, what from the business perspective means not only a necessity of “listening” to the customer and defining the

value proposal and then building the structure of operational processes on this basis, but also creating such customer relationship that enable customer engagement in the process of value creation. (Henkel et al, 2014)

The foundation of the relationship is emotional customer engagement, what finds its reflection in, among others, launching a one-way or two-way information transfer. Regardless of the fact whether this transfer takes place inside the customer group or between the customer and tenderer, it may result in capital supply for the company, having its final reflection in the customer capital. This capital, expressing economic customer value, most often comes down to the value of generated net cash flow that the company obtains in the customer life cycle.

In the conditions of supply surplus over demand, increasing significance of the Internet in taking purchase decisions by the customer and increase of customer requirements that remain in a relation with the level of their education, in the process of customer capital creation the greater significance is ascribed to feedback and recommendations provided by the customers. However, it should be emphasized that the potential of this message remains in a relation with the amount of feedback as well as power of information transfer. This means that it depends on both, customer readiness and ability to launch the information transfer as well as recipient readiness and ability to use the information. Nevertheless, these variables depend on the company itself to a large extent as it creates its image through the development of customer relationship. The image may encourage or discourage the willingness of transferring and using the information obtained. (Aarikka-Stenroos & Makkonen, 2011). Therefore, the questions seem justified:

- do environmental relationships, maintained by the customer, have influence on taking purchase decisions?
- can the customer feedback potential be used in the process of company value creation?

The basic objective of the article is to indicate the significance of recommendations and feedback provided by the customers in the process of taking purchase decisions and customer capital creation.

In order to achieve the objective stated in this way it was assumed that the opinions given by the customers as well as impact of the group that the customer maintains social relations with determine his purchase decisions and have influence on the level of the costs of customer communication.

Methodology of the research

Verification of the hypothesis was based on survey research conducted on a sample of 800 adult beer consumers. The acceptable statistical error of the research sample equaled no more than $\pm 5\%$ with the confidence coefficient $p=0.99$. Based on that the objective and subjective factors determining the consumer purchase behavior were identified, taking into consideration the criterion of the tenderer. 12 variables that characterize the customer value proposition were estimated by the consumers using 5-level Likert scale. The results achieved were subjected to focus analysis and factor analysis. In order to determine the number of main factors a scree test was used as well as the method of the percentage of variance explained by those factors. In order to examine the differentiation of the ranks of variables determining the choices of the consumer the ANOVA test was used.

In order to examine the relation between the choice of the products offered by the analyzed tenderers and information transfer, the Chi-squared test was performed. Additionally, the analysis of intensity and effectiveness of advertising activities conducted by the tenderers during EURO 2012 was performed, including the customer readiness and the tendency to provide feedback and recommendations as well as the prestige of the tenderer.

The determinants of the customer feedback potential

In the contemporary management conditions the creation of the company value, and its most objective is the value of generated cash flow, is to an increasingly high degree dependent on the relationships with the subjects of the environment that the company established. In the network of those relationships the customers relationships gain fundamental significance, and their value is reflected by the customer capital. (Michalak, 2013, pp. 380-384) This capital is a derivative of the direct and indirect capital supply acquired by the company during the period of maintaining customer relationship. (Kumar & Reinartz 2006) The former is a result of the transactional customer relationship. On the other hand the indirect supply is a derivative of a one- or two-way information transfer which may take place both between the customer and the company as well as among the customers (Steck, 2003, pp. 109-131; von Wangenheim, 2003, p. 34). In effect, the value of customer capital is determined by the customer market and resource potential, which remains in a direct relation with the profitability and the duration of those relationships (Caputa, 2015, pp. 129-163).

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Undoubtedly, at the bases of the creation of customer relationship, regardless of duration, lies the providing of the customer value. This value, even though it is not uniformly defined, is tied to the advantages identified by the customer due to the product purchase, ownership and use (Vogel, 2006, s. 15-16; Piercy, 2003, p. 53; Szymura-Tyc, 2003). Those advantages are of multidimensional character and their identification should be connected with the tasks, set by the customer in specific conditions to be performed (Caputa, 2013). These tasks can be of functional character, which means that they focus on the essence of the product (e.g. fulfilling the desire) and of emotional character in which they are most often tied to personal tasks (a sense of success) or social tasks (distinction in the eyes of others) (Ulwick, 2009, p. 57). As a result the customer value is the reflection of the sum of advantages expected by the customer in return for the price paid for the product which is bought in the specific conditions of exchange.

Taking into consideration the changes occurring in the business environment, including changes in the customer attitudes, expectations and behaviors, it should be recognized that the substance of this product is created by: knowledge, competencies and skills of organization, that need to be systematically developed for the product to find such a user who will choose it from many others offered on the market and will be willing to pay for it. (Laosirihongthong et al 2014), (Cruceru & Moise 2014) In the customer's opinion such product should comprehensively solve the '*customer's problems*'. On the other hand, in the company's opinion, it should make it possible to: acquire above-average advantages, reduce '*empty*' actions and the risk of customer leaving, as well as to launch synergy effects stemming from the enrichment of the company's competencies with the customer's competencies in the process of company value creation (Caputa, 2008, pp. 165-167), (Jonek-Kowalska, 2007, pp. 117-133) Therefore, if the company wants to maximize the advantages coming from the engaged capital and wants to generate it in the long period of time, it has to create such customer relationship, in which the customer is not only a passive recipient of the product but also a supplier of knowledge as well as a subject communicating the value created by the company to the other participants of the market game (C.K. Prahalad & V. Ramaswamy, 2000, p. 80), (Szymura – Tyc, 2006, p. 160), (Rudawska, 2005, pp. 178-190).

In the conditions of: overproduction, unrestricted possibilities of transferring and acquiring information, which are accompanied by a rise in the information overload, as well as the increasing significance of knowledge

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about the company and its products in making purchase decisions, interpersonal communication becomes particularly significant (Meyer & Davidson, 2001, p. 679). The effect of this communication, from the perspective of meeting the company goals, is reflected in the value of feedback and recommendations provided by the customer, the measure of which is, among others: increase of the number of customers gained, reduction of the costs of gaining them, reduction of the risk of engaged capital or increase of the confidence in the company and its reputation which are the effects of creating the feedback circle (E. Rudolf-Sipötz, 2001, pp. 111-113), (Rau, 2009, p. 40), (Caputa, 2011)

Achieving those effects depends on the individual activity and the strength of the influence of both the suppliers as well the recipients of feedback which is determined by satisfaction (or lack thereof), engagement, customer confidence as well as a network of social relations, which the supplier and recipient of feedback create in the environment (Friedrichs-Schmidt, 2006), (Cornelsen, 2000, p. 199).

Parameters of consumer decisions on the beer market in Poland

When analyzing the possibility of using the customer feedback potential in creating the customer capital, firstly the question should be asked whether opinions and recommendations are significant parameters determining the customer purchase behavior. Answering such question was based on the survey research mentioned in the methodological part, in which twelve variables characterizing the customer value proposal were based on the assessment of respondents in the context of their importance in the process of taking purchase decisions, including the criterion of tenderer at the same time (Table 1)

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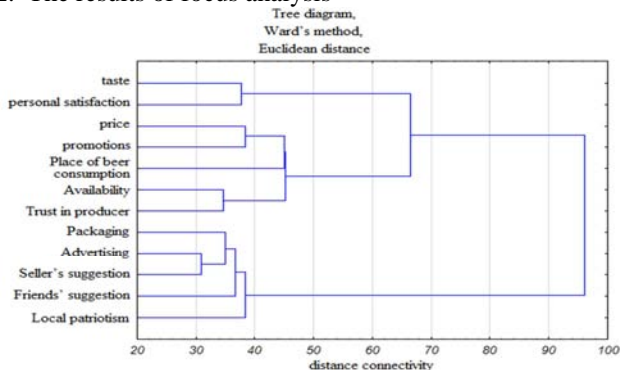
Table 1. Determinants of purchase decisions of beer consumers in Poland

Influence of the particular factors of deciding significance when choosing the particular brand of beer							
Factor	Total	Żywiec Group	Kompania Piwowarska	Calsberg Polska	Other corporations	ANOVA test	ANOVA test
	O	A	B	C	D	ABC	ABCD
Taste	4.74	4.71	4.80	4.70	5.00	NS	NS
Personal satisfaction	3.94	3.87	4.02	3.85	4.13	NS	NS
Confidence in producer	3.29	3.39	3.40	3.03	2.88	0.0233	0.0401
Availability	3.26	3.26	3.38	3.15	3.13	NS	NS
Place of beer consumption	3.26	3.28	3.28	3.17	3.25	NS	NS
Price	3.21	3.23	3.23	3.21	3.50	NS	NS
Promotion	2.72	2.83	2.72	2.74	1.50	NS	0.047
Friends' suggestions	2.71	2.72	2.68	2.69	3.25	NS	NS
Package	2.46	2.53	2.50	2.27	2.63	NS	NS
Advertising	2.21	2.28	2.21	2.23	1.13	NS	0.0316
Local patriotism	2.17	2.30	2.14	1.81	2.25	0.0023	0.0067
Seller's suggestions	1.89	1.93	1.85	1.90	2.13	NS	NS

Source: own work

As it is shown in table 1, seller's suggestions and friends' suggestions, which are the variables directly connected with customer feedback potential, belong to the factors of the least influence power on the customer purchase decisions. Furthermore, this observation is confirmed by focus analysis, in the effect of which there are three basic groups of influence indicated (fig. 1).

Figure. 1. The results of focus analysis



Source: own work.

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The first group consists of two factors with the greatest influence, that is taste and personal satisfaction. Next, price, promotion and confidence in producer, beer availability and place of consumption generate a set of factors with average impact on consumers. The lowest influence is noticed in case of the remaining factors. However, it does not mean that they may be considered as insignificant, what is proven not only by the amount of focus point but also the results of factor analysis conducted (table 2). On this basis there were three leading factors generated that determine consumer choices.

The first one remains in a direct relation with the social relations established by the customer as well as readiness to use information provided by the environment. Therefore, the construction of this factor is based on mutually correlated variables such as: friends' and seller's suggestions, advertising and local patriotism. However, it should be stressed that taking the set of variables under analysis into account, the variables indicated above are the most correlated with one another.

The second factor determining consumer choice is offer availability and producer identification. In effect, this factor links such variables with one another that on the one hand reduce the cost of customer satisfaction enabling him a quick establishment of transactional relationship without bearing additional outlays (product availability), on the other hand they facilitate product choice by, among others, package specific for the brand of the product offered. Nevertheless, it is worth noting that this factor translates into proximity of two parties of the relationship. The customer is able to buy the product that he knows quickly and he can identify it in the whole set of the brands offered by various producers. In turn, the producer, in the way of availability, reduces the risk of using competitive offers by the customer and in the way of advertising he builds not only his knowledge resources, but also establishes and maintains the customer relationship based on emotions, what finally translates into permanence.

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Table 2. The main factors determining consumer purchase decisions – normalized

Decision parameter	Factor loadings (normalized Varimax) Distinguished: The factors of the highest confidence (The loadings found are >.350000)				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Taste	-0.011932	-0.029947	0.381057	-0.017995	-0.007131
Personal satisfaction	0.102477	0.618685	0.073793	0.128688	0.048035
Confidence in producer	0.215530	0.168757	0.089387	0.637082	0.084429
Availability	0.089520	0.222615	0.308664	0.422248	0.144610
Place of beer consumption	0.115730	0.566411	0.068172	0.151891	0.618532
Price	0.396965	0.007212	0.057486	0.522753	0.568846
Promotion	0.619723	0.080283	0.102990	0.089350	0.029660
Friends' suggestions	0.742204	0.059538	0.009757	0.072425	0.119948
Package	0.125853	0.017286	0.477581	0.073951	-0.033228
Advertising	0.153975	0.038977	0.547063	0.280478	0.113768
Local patriotism	0.368627	0.012115	0.167819	0.255906	0.053300
Seller's suggestion	0.308610	0.145211	0.086207	0.181255	0.051353
Output value	1.441683	0.815619	0.835524	1.093100	0.771358
Share	0.120140	0.067968	0.069627	0.091092	0.064280

Source: own work.

The last of the factors generated remains in a relation with the basic factors of the cost of customer satisfaction, that is price of the product offered and promotional activities correlated with it. Consequently, we deal with a variable directly referring to the value of company's offer perceived by the customer on one hand, on the other hand with activities supporting transactional customer relationships.

On the basis of the analyses performed it may be assumed that on the examined market we deal with three types of consumer behavior. The first behavior means taking decisions under the environmental influence. The second one is to choose the recognized and available product. And the third one is making a choice on the basis of the direct transactional factors. However, it should be emphasized in this moment that the factors described above may be considered as the basic determinants of customer choice, regardless of the offer of the producer selected. Furthermore, in some cases changes were observed concerning the area of factor construction (table 3).

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Table 3. Factors determining consumer choice who use the product offer of the beer market leaders in Poland

Factor construction – total population	Seller's suggestion Friends' suggestion Advertising Local patriotism	Price Promotion	Confidence in producer Satisfaction Taste	Package Advertising Availability	Promotion Advertising
Output value	14.4%	8.15%	8.4%	10.9%	7.7%
KOMPANIA PIWOWARSKA	Seller's suggestion Friends' suggestion Advertising Local patriotism	Price promotion	Confidence in producer Satisfaction Taste	Price promotion	Package Advertising Availability
Output value	14.3%	7.7%	8.2%	8.1%	10.7%
ŻYWIEC GROUP	Price Promotion	Seller's suggestion Friends' suggestion Advertising Local patriotism	Confidence in producer Satisfaction Taste	Advertising	Package Availability Advertising
Output value	11.5%	15.7%	9.6%	5.6%	9.9 %
CARLSBERG POLSKA	Advertising Package Promotion	Local patriotism	Price promotion Availability	Seller's suggestion Friends' suggestion	Confidence in producer Taste Availability
Output value	16.5%	10.1%	11.6%	12.3%	9.4%
OTHER PRODUCERS	Seller's suggestion Friends' suggestion	Advertising Package Promotion	Satisfaction Confidence in producer Price – negative correlation	Availability Local patriotism	Taste Place of consumption – negative correlation
Output value	16.7%	15.6%	14.4%	11.9%	10.2%

Order of the variables in the table includes the correlation strength of the variable.

Source: own work

Undoubtedly, for the whole examined population the factor that explains the consumer purchase decisions to a large degree is environmental influence. The construction of this factor does not change in case of the two largest beer producers. These capital groups address their market offer to the similar groups of consumers. Therefore, it is worth paying attention to the fact that the direct transactional factors, that is price and type of promo-

tion used, in case of Żywiec Group explain a much higher percentage of variance than in case of Kompania Piwowarska. What is more, in case of the latter producer the factor based on the aforementioned variables explains only 7% of variance whereas for other groups it exceeds 11%. Consequently, it may be concluded that the consumers preferring the brands of Kompania Piwowarska are less susceptible to price change. This may mean at the same time that price rise of the products offered by Żywiec Group, especially in the segment of low-cost beer, as well as reduction of promotional activities may result in customers leaving.

In case of the remaining groups this factor still explains the largest percentage of variance, nevertheless, its internal structure may be analyzed. It is limited to seller's and friends' suggestions. Accordingly, it means that correlation between the aforementioned variables and local patriotism as well as advertising is much lower than in case of the two largest beer producers. What is more, in these groups there is a separate factor generated with similar loadings – local patriotism. It includes only one variable for Carlsberg group. However, in the group of “Other producers” it is correlated with product availability. It may mean that the consumers preferring the brands of Carlsberg and of other producers are linked by a specific bond with the producer and it may reduce effectiveness of the activities aimed at customer gaining and retaining undertaken by other subjects in a significant way.

This statement has found its confirmation in the course of the direct interviews conducted by the author with the representatives of the management staff of the examined companies and consumers. In this place it is worth emphasizing that in the product structure of the analyzed groups the segments of regional beer plays an important role as which is preferred by the customers searching for a non-standard, outstanding product. It may be justified by a higher share of environmental factor in variance explanation in comparison with the other groups as well as by isolating local patriotism as a separate factor.

Environmental influence

The results presented implicate that one of the factors determining consumer choice is environmental influence. This finds its reflection in one-way or two-way information transfer taking place between the consumers as well as the consumer and the product tenderer. Taking into account the beer market, the seller is the direct tenderer (shop, restaurant etc.). Never-

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theless, it does not mean that the producer is excluded from the information transfer. This subject provides information for both seller and consumer through advertising campaign, and in effect it has an indirect influence on seller's recommendation and consumer choice.

In the context of the problem raised it is worth paying attention to: consumer inclination to passing information about the product, frequency of this message as well as possibility of peer influence on purchase decisions made by the consumer. In the presented research this goal was achieved using three questions indicated in table 4.

Table 4. Social information transfer – message frequency

	no	never /sometimes	sometimes	often	always /yes
	w %				
<i>“When feasting do you talk about: beer quality, its assessment, taste, producers etc.?”</i>		14.1		70.6	12.8
<i>“Have you ever recommended the beer brand or brands you prefer to your friends?”</i>	22.9		53.2	22.4	
<i>“Do your friends drink the same beer or the same beer brands?”</i>	9.1		32.9	36.8	18.6

Source: own work.

As it results from the table, most respondents, during social information transfer: pass information about beer quality often (70.6%), sometimes (53.2%) or often (22.4%) recommend the beer of brand preferred, however, over 55% of the interviewees drink the same brands of beer as their friends. Therefore, the results of research obtained provide a base to make a statement that the beer consumers have a large feedback potential. Consequently, it means that they constitute a source of not only direct but also indirect capital supply of the company.

Taking into account the environmental influence it is worth emphasizing that only about 9% of the respondents have declared that their friends drink a different type of beer. This means that the choice of product is affected by both, social information transfer as well as group's influence that the consumer maintains relationship with, what is confirmed by the results of Chi-squared test presented in table 5.

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Table 5. Social information transfer – the results of Chi-squared test

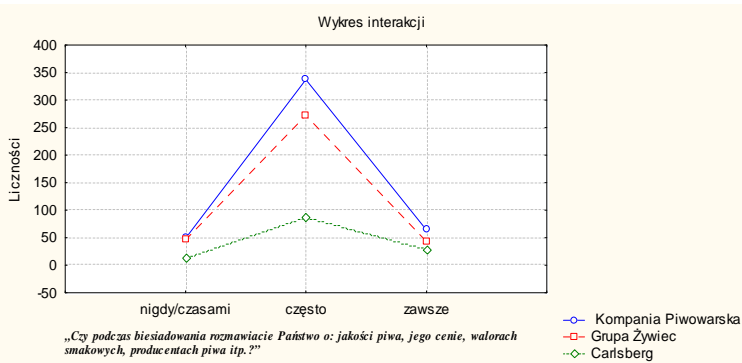
CRITERION TYPE	<i>“Do your friends drink the same beer or the same beer brands?”</i>				
	no	sometimes	often	always	Total
pl	17	92	151	75	335
pp	14	70	122	56	262
pi	14	65	60	32	171
re	6	35	40	11	92
ek	4	22	42	22	90
Sm	10	24	21	6	61
Ogół	65	308	436	202	1011
Test	Ch2	df	p		
Per.	35,29	15	,002		
NW	33,56	15	,004		
CRITERION TYPE	<i>“Have you ever recommended the beer brand or brands you prefer to your friends?”</i>				
	no	sometimes	often	Total	
pl	74	187	74	335	
pp	40	178	43	261	
pi	28	96	46	170	
re	9	38	45	92	
ek	22	36	31	89	
Sm	14	32	14	60	
Ogół	187	567	253	1007	
Test	Ch2	df	p		
Per.	58,19	10	,000		
NW	55,39	10	,000		
CRITERION TYPE	<i>“When feasting do you talk about: beer quality, its assessment, taste, producers etc.?”</i>				
	never/ sometimes	often	always	Total	
pl	37	259	37	333	
pp	23	203	34	260	
pi	20	129	22	171	
re	5	63	24	92	
ek	8	48	33	89	
Sm	17	39	4	60	
Ogół	110	741	154	1005	
Test	Ch2	df	p		
Per.	70,52	10	,000		
NW	58,77	10	,000		

Source: own work.

Furthermore, it is worth paying attention to the chart of interactions occurring between the frequency of information transfer and the choice of products offered by the leading beer producers.

As it results from figure 2, beer qualities are a subject of information transfer, especially in case of the products offered by Carlsberg Group. If this transfer results in the desired purchase behavior from the company's perspective, what is proven by the research results, then the producer is able to reduce the outlays for customer communication maintenance.

Figure 2. Frequency of information transfer and choice of products offered by the producer

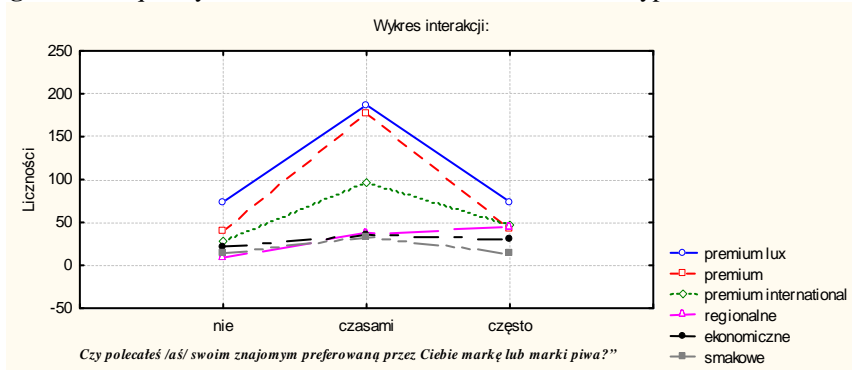


“When feasting do you talk about: beer quality, its assessment, taste, producers etc.?”

Source: own work.

However, it should be emphasized, that customer susceptibility to pass information about the product is not consistent with susceptibility to recommend the product. As it may be seen in figure 3, the products of the Premium class are more often recommended than it was expected, and these dominate in the product structure of Żywiec Group in specific. These are relatively expensive products and their buyers are people of rather high income potential (Caputa, 2015)

Figure 3. Frequency of recommendation and choice of beer type



"Have you ever recommended the beer brand or brands you prefer to your friends?"

Source: own work.

Consequently, it may be concluded that customer susceptibility to pass recommendation remains in a relation with the product (producer) prestige itself perceived by the environment. The higher prestige the more often and more willingly the product is recommended, becoming at the same time an element distinguishing the consumer himself.

However, the fact cannot be omitted that the customer purchase behavior remains in a direct relation with its income potential. This potential has diminished in the last few years, what translates into interest increase in the products of economical segment (Caputa, 2015). In effect, the recommendation provided, concerning the Premium segment, may not bring the results desired by the tenderers.

Feedback and recommendations contra costs of customer communication

The aforementioned research indicated that customer readiness to conduct social information transfer is especially high in the segment of customers who prefer the economical products. In this segment the position of Carlsberg Group is very strong, what means that for this subject the social information transfer may be used on the one hand as an instrument of brand awareness creation, that is ability of potential customer to recognize the brand or to get reminded that it belongs to the particular product category (Aaker, 1991, p. 61). On the other hand, it helps brand image creation, reflecting the product's significance for the buyer connected with the power, advantages and exceptionality of the associations translating into such im-

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age. However, it should be emphasized that the effect of brand awareness and brand image creation is customer loyalty (Kall & Sagan, 2006, pp. 11-32), (Szwajca 2009, s. 645-655) which, beside profitability, is the basic factor of customer capital creation. The use of customer information potential should therefore provide a possibility for the company to gain the customer and to reduce the costs connected with customer communication maintenance and with brand awareness creation. Having verified the observations made and resulting conclusions, the attention may be paid to expenditures on advertising borne by the leading beer producers as well as to changes taking place in their market share.

Table 6. Estimated advertising expenditures of the leading beer producers in the years 2009-2012 (in PLN million)

Producers	Advertising expenditures			
	009	010	011	012
Żywiec Group	12.4	41.3	31	31.8
Kompania Piwowarska	5	61.	30	69.1
Carlsberg Polska	9.8	2.3	8.5	1.3

Source: own work based on: Agencja Kantar Media, www.wirtualnemedia.pl, 23.08.2013.

As it results from table 6, a significant growth in advertising expenditures is observed in the year 2012, what is connected with the Euro 2012 football cup in Poland. In this period the highest activity in terms of TV use is specific for Żywiec Group, which in the ranking of beer industry advertisers took the definite first place. The GRP ratio (*Gross Rating Point*), being a measure of intensity (impact) of the advertising campaign equaled 843 for the aforementioned Group whereas for Kompania Piwowarska it obtained a level of 522, furthermore, SOV ratio was on the level, accordingly: 6.5% and 4.2%. However, none of the companies was able to retain the previous market share. The expenditures of Carlberg Polska are much lower and despite this fact, its market share increased in the analyzed period from 13.2% to over 18.5%.(Carlsberg, 2014), what may confirm the effectiveness of information transfer through the network of social relations.

Conclusions

The research results presented confirm the necessity of diverting from a passive approach into an active approach concerning the perception of the customer role in the process of company value creation. On the consumption goods market a special significance is ascribed to customer readiness to pass information about the product and tenderer to other customers and using the own network of social relations for this purpose.

Launching such activity, was it confirmed by the research, translates into benefits obtained by the company, which find their expression in the following possibility, among others: impact on customer purchase decisions, operational cost reduction including the cost of customer communication or creating confidence in the company and its reputation.

The research results presented and the conclusions drawn from them should incline the producers to undertake actions aimed at creation of social groups, organizing feasts, concerts or other similar events that enable establishment of social relations and use of group influence as a stimulus inclining to the choice of the products offered.

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**Features of Polish Companies. Results of the
Company Competitiveness Barometer 2014**

JEL Classification: *D4*

Keywords: *company competitiveness; competitive advantage, competitive potential, strategy of competition, competitive positioning*

Abstract: In the paper there are results of the research on competitiveness of Polish companies which was conducted within the Company Competitiveness Barometer in 2014. The paper includes a short description of the integrated company competitiveness model, their integral elements and methodology of the research. Then there are results of a competitive potential, a strategy of competition, a competitive advantage, a competitive position of examined companies. 252 companies took part in the Company Competitiveness Barometer 2014. Answers to the survey placed on www.konkurencyjniprzet.rwaja.pl let get knowledge about some sample of Polish companies in different sectors of economy. The data was also a foundation to verify some theoretical assumptions of relations between the elements of competitiveness.

Introduction

A lot of companies in the market create a variety of situations in which they compete with one another. At the same time companies crave for the same pool of demand, and in fact the money held by the buyers (Wilkinson, 2005, pp. 74-75). Only those companies that have mastered the art of competing for customers stay in the market (Strużycki (Ed.), 2002, p. 61). Attempts to define the notion of competitiveness of the company appears frequently in scientific publications and in the research conducted by various institutions in different countries (Cetindamar & Kilitcioglu, 2013). The concept of competitiveness is used to determine the ratio of enterprise characteristics to those of its competitors, resulting from many internal features and the ability to deal with an external environment (Lombana, 2011).

The purpose of this article is to present some results of the Company Competitiveness Barometer, conducted in 2014 on a group of 252 Polish companies. Barometer is a theoretical basis for the competitiveness integrated model (Flak & Głód, 2009).

The specific objectives of this article are:

- to provide an overview of the research methodology,
- to indicate the selected approaches to the competitiveness of the company and the competitiveness integrated model of the company,
- to present the results of empirical studies of 252 Polish companies,
- to create an outline of the future direction of the research on competitiveness of enterprises by means of the Company Competitiveness Barometer.

Methodology of The Research

Based on the above assumptions and effects of the conceptualization of existing approaches of the phenomenon of company competitiveness and the ways of its research, the authors of this article developed two test methods for the company competitiveness – ALL2USE and NEXT2USE (Flak & Głód, 2012, pp. 219-230). One of them – ALL2USE – was the basis for the creation of an annual Company Competitiveness Barometer, a research tool for assessing the competitiveness of companies that take part in the study.

In the Company Competitiveness Barometer the questionnaire method was used in 5 areas of the company competitiveness research. In addition,

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questions of the Barometer were chosen in such a way that the knowledge of the components of these areas of the company's competitiveness is widespread among employees. Most of the research questions do not require detailed financial, personal or technical information.

The questionnaire used in the Company Competitiveness Barometer contains 48 questions. 45 of them are related to the characteristics of the company that are affecting its competitiveness, and 3 questions are metric questions. The questionnaire can be found on the www.barometry-gospodarki.pl website and on www.konkurencyjniprzetrwaja.pl.

The fact of using the research method of the questionnaire and the need to aggregate the respondents, also influenced the choice of closed questions for the questionnaire.

Web-based tool that supports the questionnaire, has a built-in algorithm for the evaluation of companies participating in the study. The method for calculating the results of the competitiveness' assessment of a particular company is based on the following assumptions:

- a) there is no theoretical model of an absolutely correct answer for any sector of the economy (the platform of competition) valid for a longer period of time, defining the features of the most competitive company (Flak & Głód, 2012, p. 44),
- b) the comparison of the company's competitiveness can only be relative (Olszewska & Piwoni-Krzeszowska, 2004, p. 507),
- c) the characteristics of the most competitive companies in the sector are focused on some of the values of these features, but there is a low probability that companies with extreme characteristics were among the most competitive in the industry (Bień et al., 1997, pp. 143-144).

The assumptions presented in the bullet points a, b, c above, and the fact that the respondents, especially filling the questionnaire online, expect an immediate result of their actions, led the authors to develop an algorithm for an online calculation of the results which procedure is as follows.

1. The $n+1$ answer for every question is assessed by a incidence of answers coming from previous n respondents.
2. By the means of a pilot study, a minimum amount n of the answers for the m questions is created. In this case, n was 50 respondents who were invited to the pilot study.
3. $N+1$ respondent submits m answers (m – the number of questions) about their company.

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4. The answer to each question of m possible ones is assessed in terms of matching the frequency of responses of n respondents, who answered them earlier.

An example of such assessment is shown in Table 1.

Table 1. An example of assessing the answers of $n+1$ respondent

Variable	Question of the questionnaire	How often in teams or departments of the company constructive conclusions are drawn from projects or activities that were successful?				
		never	rarely	sometimes	often	always
a	Number of particular answers of the n respondents	4	6	5	13	8
b	Contractual value for the number of answers	3,076923	4,615385	3,846154	10	6,153846
c	Number of points given for an answer for the question	0	4,62	0	0	0
x	Answer of the $n+1$ respondent		x			

Source: Own research.

The example in Table 1 shows the question which the number answers of the n respondents in particular categories, is indicated by a variable a . $N+1$ respondent replied under the sign "x". The maximum number of points that the respondent would receive, if his answer would be compatible with the most common response ("often"), would be 10 (variable b). The variable b indicates how many points you could get for a different answer, proportionally to the maximum number of points (10) and the response rate (variable a). Since the $n+1$ respondent answered "rarely", they received 4.62 points out of the possible 10.

The algorithm, after each new entry into the database of the Company Competitiveness Barometer, updates for each question the contractual value of the points, searching first for the maximum frequency response, and giving that answer 10 points. This way the computer "learns" how the successive respondents answer and on this basis establishes the criteria for awarding the points to the next respondent.

Theoretical Basis of the Company Competitiveness Barometer

Competitiveness is of particular importance for scientists, policy makers and economic businessmen in small and open economies (Stojcic, 2014, p. 194). In the current state of art, there are different approaches to study the competitiveness of companies. The starting point for the analyses is a classic, but still developed concept of M. Porter (Ketels, 2006). However, positive competitive outcomes can only be obtained by matching competitive strategy is the available resources (Block et al., 2015, p. 39).

A popular approach is also the use of benchmarking as a tool to carry out specific rankings of competitiveness (Attiany, 2014). The studies conducted often refer to international comparisons (Abel-Koch & Gerstenberger, 2014) and aspects of internationalization of enterprises affecting their competitiveness (Pereira et al., 2009).

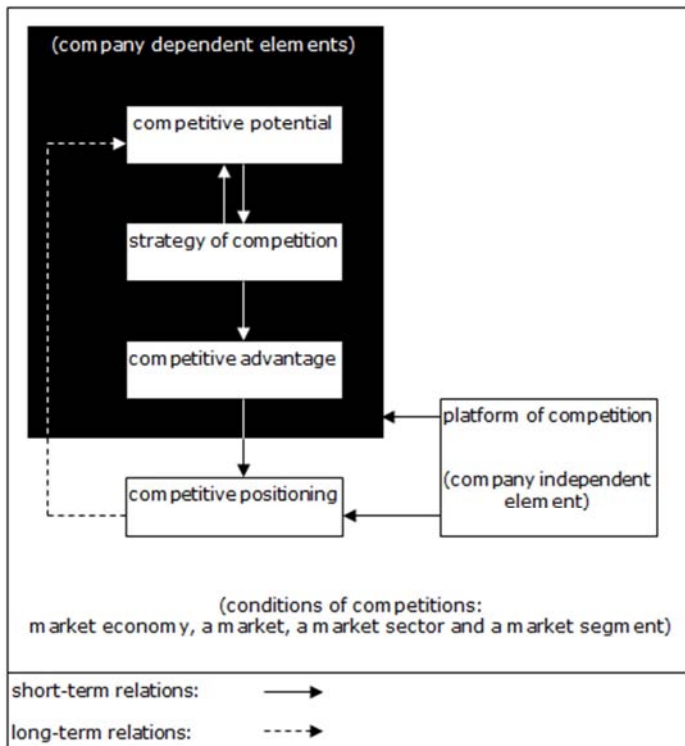
In the state of art, one can find an integrated approach, which was also used by the authors and its description can be found below. The inspiration for its creation was, among all, the Integrated Model Of Destination Competitiveness (Armenski et al., 2012, p. 488). The Integrated Model defines six main categories of competitiveness: inherited resources, created resources, supporting factors and resources, destination management, demand conditions and situational conditions. In the literature, one can find the view that the main competitive factors in competitiveness models created from small be very different individual competitiveness indicators (Gomez-elja & Mihalic, 2008, p. 306).

It is worth noting that most of the definitions of competitiveness, in the current state of art, indicates that it is a multi-dimensional characteristic of a company (Iarossi, 2013). The subject of the competitiveness's evaluation should be all areas of the company, that decide on the attractiveness of the offer, economic condition of the company, its organizational and technical effectiveness (Donno, 2013).

The authors of this article have attempted to systematize the concepts, definitions and models related to the subject of the company's competitiveness. The authors' model of competitiveness of the company has been improved and operationalized, and by the means of the research tools, was adapted for practical use in the evaluation of various aspects of the company's competitiveness (Flak & Głód, 2012, p. 44). The authors focused on competition as the motive for repositioning, whereas most of the existing strategy literature focuses on opportunity as the motive (Wang & Shaver, 2014, p. 1586).

The creation of the competitiveness integrated model was aimed at generalizing most companies and identifying key relationships between different aspects of competitiveness. Competitiveness integrated model, and the situational context, conditioning competing companies, is shown in Figure 1.

Figure 1. The Competitiveness Integrated Model



Source: Flak & Glód (2012, p. 44).

The competitiveness integrated model is based on 7 assumptions. Firstly, the competition between companies takes place within the sector. Secondly, the competitiveness of companies is affected by dependent and independent factors. Thirdly, the platform of competition comprises the features proximal and distal environment; the characteristics of the distal environment are fixed at the time and the same for all competitors; the characteristics of the proximal environment may be different for each of them. Fourthly, the characteristics of the platform of competition do not depend

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on a single company. Fifthly, the characteristics of companies included in the concepts of the potential, strategy, advantage and competitive positioning, are different for each of them. Sixthly, the characteristics of the company, included in the concepts of the potential, strategy and competitive advantage, are dependent on the company. Seventhly, the characteristics of the company included in the concept of the competitive positioning, are independent of the company (Flak & Głód, 2014, pp. 12-16).

Table 2 shows the definitions of the terms used in the competitiveness integrated model. Components of the competitiveness integrated model are linked temporally and causally. Their relationship has been verified in previous publications of the authors (Flak & Głód, 2014, pp. 12-16).

Table 2. Definitions of the terms used in the Competitiveness Integrated Model

Element on the Model	Definition
Competitive potential	Resources, which the company has or should have to be able to use them to build, maintain and strengthen its competitiveness. These are, in a broad sense, business opportunities arising from owned tangible and intangible capital. Competitive potential of the company is at the same time a relative, multidimensional concept.
Strategy of competition	Adopted program of action aiming to achieve a competitive advantage against other subjects of the competitive environment (microenvironment), serving the basic objectives of the company.
Competitive advantage	The company's ability to deliver the tangible and intangible assets to the buyer through the market. The competitive advantage of the company is a relative, multidimensional concept.
Competitive positioning	Synthetic market and economic results of the company, resulting from the degree of the use of capacity of the enterprise to compete now and in the future. The competitive positioning of the company is a relative, multidimensional concept.
Platform of competition	Group of of macro- and microenvironment's features in which the company operates. Features of the macroenvironment are the same for each company operating in the sector, while the microenvironment characteristics may be different for each company in the sector.

Source: Flak & Głód (2014, pp. 12-16).

Research results

Characteristics of the research sample

The Company Competitiveness Barometer 2014 was attended by 252 companies. The survey was carried out from March 1st to September 30th, 2014. This was the third edition of the Barometer. In 2013, 173 companies participated in the Barometer and, in 2012, it was 109 companies. The results of the Company Competitiveness Barometer from all past editions can be found on the website www.konkurencyjniprzetrwaja.pl. The structure of the research sample, which took part in the Company Competitiveness Barometer 2014 are shown in Table 3.

Table 3. Structure of the research sample in 2014

Number and percentage of the companies with a different time of operation in the market	
Up to 5 years	43 companies (17,06%)
From 6 to 10 years	55 companies (21,82%)
From 11 to 20 years	90 companies (35,91%)
From 21 to 40 years	44 companies (17,46%)
More than 40 years	20 companies (7,93%)
Number and percentage of the companies with a different number of employees	
Up to 9 employees	76 companies - 30,15%
From 10 to 49 employees	72 companies - 28,57%
From 50 to 249 employees	44 companies - 17,46%
250 employees and more	60 companies - 23,80%

Source: Own research.

Chosen aspects influencing the competitiveness of the company

Due to the editing limitations of this article, the analytical part presents the most important and interesting, according to the authors, results of empirical studies. The analysis shows different aspects of the functioning of the companies, which include the following elements of the competitiveness model: competitive potential, competitive advantage, platform of competition and competitive positioning.

Z kolei analiza według kryterium istnienia firmy wskazuje, że największe trudności z osiągnięciem zysku na podstawowej działalności mają firmy najmłodsze (do 5 lat istnienia).

In the assessment of the competitive potential, the question about obtaining profit on the core business was raised. Nearly three-quarters of the

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surveyed companies achieved profit on their core business, and only approx. 8% of companies indicated a negative situation, meaning incurring losses. In contrast, more than 18% of the companies did not indicate a clear statement in this regard. Analysis of the responses by the company's head-count shows that negative results were recorded by the smallest companies (up to 9 employees) and the largest ones (over 249 employees). The analysis, according to the criterion of the company's existence, indicates that the greatest difficulty in achieving a profit on the core business activities have the youngest ones (up to 5 years of existence).

Table 4. Profit from the core business

Are you obtaining profit from your core business? N=252		Size of the company (number of employees)				Number of years of existence in the market				Altogether
		up to 9	from 10 to 49	from 50 to 249	more than 249	up to 5	from 6 to 25	from 26 to 50	more than 50	
Definitely not	n	2	0	0	1	0	3	0	0	3
	%	2,6	0,0	0,0	1,7	0,0	1,7	0,0	0,0	1,2
No	n	11	3	1	3	7	10	1	0	18
	%	14,5	4,2	2,3	5,0	15,9	5,7	4,8	0,0	7,1
It's hard to say	n	17	12	8	9	12	30	3	1	46
	%	22,4	16,7	18,2	15,0	27,3	17,0	14,3	9,1	18,3
Yes	n	37	42	19	34	23	90	12	7	132
	%	48,7	58,3	43,2	56,7	52,3	51,1	57,1	63,6	52,4
Definitely yes	n	9	15	16	13	2	43	5	3	53
	%	11,8	20,8	36,4	21,7	4,5	24,4	23,8	27,3	21,0
Altogether	n	76	72	44	60	44	176	21	11	252
	%	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Source: Own research.

Information resources, that are a part of the competitive potential, were assessed among others, in the context of the collection of knowledge. The analysis shows that with the increase of employment, a tendency to use electronic complete studies grows. In smaller companies (approx. 25%), in addition to the presence of structured forms of knowledge accumulation, the absence of any form of archiving knowledge is visible (in companies employing up to 9 employees, and 10 to 49 employees). Also, with increasing age the company's tendency to use electronic archiving is growing, and, at the level of approx. 18-19%, it occurs in all company's age groups.

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Table 5. Collection of knowledge in the company

In which way is knowledge collected in the company? N=252	Size of the company (number of employees)				Number of years of existence in the market				Altogether	
	up to 9	from 10 to 49	from 50 to 249	more than 249	up to 5	from 6 to 25	from 26 to 50	more than 50		
complete paper descriptions	n	13	15	5	8	9	26	5	1	41
	%	17,1	20,8	11,4	13,3	20,5	14,8	23,8	9,1	16,3
paper unrelated documents	n	8	3	1	1	2	11	0	0	13
	%	10,5	4,2	2,3	1,7	4,5	6,3	0,0	0,0	5,2
electronic complete descriptions	n	21	19	21	42	14	72	10	7	103
	%	27,6	26,4	47,7	70,0	31,8	40,9	47,6	63,6	40,9
electronic unrelated documents	n	14	15	12	6	8	33	4	2	47
	%	18,4	20,8	27,3	10,0	18,2	18,8	19,0	18,2	18,7
in the heads of employees	n	20	20	5	3	11	34	2	1	48
	%	26,3	27,8	11,4	5,0	25,0	19,3	9,5	9,1	19,0
altogether	n	76	72	44	60	44	176	21	11	252
	%	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Source: Own research.

Another element of the assessment of the competitive potential, are the innovation resources, which have been assessed from the perspective of, inter alia, the possibility of minor improvements by a single employee in their work. The analysis shows that 36% of the companies this option exists to a certain extent, and only 4% of companies indicated that such a possibility does not exist at all. Together with the development of the organization and longer functioning period, the autonomy of employees is gradually reduced (analysis of answers "in most cases alone"). Complete freedom in this area is declared only by 7% of companies and it is the largest in the youngest and smallest companies.

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Table 6. Introduction of facilitation at work

To what extent can a particular employee introduce small facilitation in doing their work? N=252	Size of the company (number of employees)				Number of years of existence in the market				Altogether	
	up to 9	from 10 to 49	from 50 to 249	more than 249	up to 5	from 6 to 25	from 26 to 50	more than 50		
cannot	n	3	2	0	5	1	7	2	0	10
	%	3,9	2,8	0,0	8,3	2,3	4,0	9,5	0,0	4,0
to a small extent, only after discussing it with a supervisor	n	17	14	8	22	10	40	6	5	61
	%	22,4	19,4	18,2	36,7	22,7	22,7	28,6	45,5	24,2
to a certain, limited extent	n	20	31	20	20	7	73	8	3	91
	%	26,3	43,1	45,5	33,3	15,9	41,5	38,1	27,3	36,1
in most cases alone	n	27	21	12	12	21	45	4	2	72
	%	35,5	29,2	27,3	20,0	47,7	25,6	19,0	18,2	28,6
ma pełną swobodę działania	n	9	4	4	1	5	11	1	1	18
	%	11,8	5,6	9,1	1,7	11,4	6,3	4,8	9,1	7,1
altogether	n	76	72	44	60	44	176	21	11	252
	%	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Source: Own research.

Another aspect, that was evaluated, was the creativity of key employees of the surveyed companies. It was assessed mainly at a moderate (36%) and high (41%) level. Top assessment was given to the companies employing between 50 and 249 employees, and the largest companies. According to the company's age criterion, the most creative key personnel works in the youngest and oldest companies.

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Table 7. Creativity of the key employees

How do you assess the creativity of the company's key employees? N=252	Size of the company (number of employees)				Number of years of existence in the market				Altogether	
	up to 9	from 10 to 49	from 50 to 249	more than 249	up to 5	from 6 to 25	from 26 to 50	more than 50		
very low	n	4	1	0	1	2	3	1	0	6
	%	5,3	1,4	0,0	1,7	4,5	1,7	4,8	0,0	2,4
low	n	7	11	6	4	2	23	3	0	28
	%	9,2	15,3	13,6	6,7	4,5	13,1	14,3	0,0	11,1
moderate	n	27	20	17	27	14	64	9	4	91
	%	35,5	27,8	38,6	45,0	31,8	36,4	42,9	36,4	36,1
high	n	31	33	18	24	22	72	6	6	106
	%	40,8	45,8	40,9	40,0	50,0	40,9	28,6	54,5	42,1
very high	n	7	7	3	4	4	14	2	1	21
	%	9,2	9,7	6,8	6,7	9,1	8,0	9,5	9,1	8,3
altogether	n	76	72	44	60	44	176	21	11	252
	%	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Source: Own research.

Another interesting aspect in the area of innovation was the issue of documenting the ongoing projects, operations and production processes. Documentation is present in a moderate (34.5%) and high (31.3%) level. Almost 18% of companies declare that all these aspects are subject to documentation. In the largest companies this trend is particularly evident. Also, an increase in the degree of documentation is associated with the length of existence of the surveyed companies.

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Table 8. Documenting the projects in the company

To which extent are the ongoing projects, operations and production processes documented in the company? N=252	Size of the company (number of employees)				Number of years of existence in the market				Altogether	
	up to 9	from 10 to 49	from 50 to 249	more than 249	up to 5	from 6 to 25	from 26 to 50	more than 50		
not at all	n	8	4	1	0	3	10	0	0	13
	%	10,5	5,6	2,3	0,0	6,8	5,7	0,0	0,0	5,2
low	n	11	13	3	1	5	20	3	0	28
	%	14,5	18,1	6,8	1,7	11,4	11,4	14,3	0,0	11,1
moderate	n	33	21	15	18	21	55	9	2	87
	%	43,4	29,2	34,1	30,0	47,7	31,3	42,9	18,2	34,5
high	n	19	21	14	25	11	60	5	3	79
	%	25,0	29,2	31,8	41,7	25,0	34,1	23,8	27,3	31,3
always and every	n	5	13	11	16	4	31	4	6	45
	%	6,6	18,1	25,0	26,7	9,1	17,6	19,0	54,5	17,9
altogether	n	76	72	44	60	44	176	21	11	252
	%	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Source: Own research.

An element evaluated in terms of the competitive potential were as well organizational resources, including the aspect of how the employees are informed of the company's strategy. In half of the surveyed companies, a declaration was made, that such information is transmitted during regular meetings with supervisors. The other most common forms in the studied area are: prepared materials (20.6%) and regular meetings (16.7%). Only in 4% of companies that possibility does not exist, mainly in the smallest businesses.

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Table 9. Awareness of the company's strategy

In which way can the employees get to know the strategy of the company? N=252	Size of the company (number of employees)				Number of years of existence in the market				Altogether	
	up to 9	from 10 to 49	from 50 to 249	more than 249	up to 5	from 6 to 25	from 26 to 50	more than 50		
they can't, it's secret	n	5	3	1	1	2	7	1	0	10
	%	6,6	4,2	2,3	1,7	4,5	4,0	4,8	0,0	4,0
during meetings with the supervisors	n	36	40	25	25	21	91	10	4	126
	%	47,4	55,6	56,8	41,7	47,7	51,7	47,6	36,4	50,0
from the prepared materials	n	22	7	9	14	10	38	3	1	52
	%	28,9	9,7	20,5	23,3	22,7	21,6	14,3	9,1	20,6
from the external www service	n	3	8	2	9	2	16	3	1	22
	%	3,9	11,1	4,5	15,0	4,5	9,1	14,3	9,1	8,7
from the cyclical information actions	n	10	14	7	11	9	24	4	5	42
	%	13,2	19,4	15,9	18,3	20,5	13,6	19,0	45,5	16,7
altogether	n	76	72	44	60	44	176	21	11	252
	%	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Source: Own research.

In terms of competitive advantage, an assessed element was the main objective of the pricing strategy used. Almost 35% of companies use a strategy of maximizing profits over a long period of time. In contrast, almost 31% of companies use a strategy of maximizing participation in the sector or market segment. Passive behavior focusing on surviving the difficult times is declared by only 12% of the surveyed companies. The increase in the use of strategies to maximize participation in the sector or market segment occurs with an increase in the size and length of existence of the surveyed companies.

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Table 10. The aim of the pricing strategy

What is the main objective of the currently used pricing strategy for all the products or services altogether? N=252	Size of the company (number of employees)				Number of years of existence in the market				Altogether	
	up to 9	from 10 to 49	from 50 to 249	more than 249	up to 5	from 6 to 25	from 26 to 50	more than 50		
surviving the difficult Times in the market	n	11	12	3	4	6	19	5	0	30
	%	14,5	16,7	6,8	6,7	13,6	10,8	23,8	0,0	11,9
maximizing profits over a short period of time	n	19	14	9	15	11	37	6	3	57
	%	25,0	19,4	20,5	25,0	25,0	21,0	28,6	27,3	22,6
maximizing profits over a long period of time	n	28	24	19	17	18	61	5	4	88
	%	36,8	33,3	43,2	28,3	40,9	34,7	23,8	36,4	34,9
maximizing the participation in the sector or market segment	n	18	22	13	24	9	59	5	4	77
	%	23,7	30,6	29,5	40,0	20,5	33,5	23,8	36,4	30,6
altogether	n	76	72	44	60	44	176	21	11	252
	%	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Source: Own research.

Assessment of the competitive positioning of the surveyed companies happened, inter alia, by the means of an assessment of their liquidity. The ratings in this area are relatively high (40.9%) or moderate (26.6%). The best results are recorded by companies employing from 10 to 49 employees and existing 5 years and more.

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Table 11. Liquidity of the company

What is a financial liquidity in your company (can the company timely pay off their obligations)? N=252	Size of the company (number of employees)				Number of years of existence in the market				Altogether	
	up to 9	from 10 to 49	from 50 to 249	more than 249	up to 5	from 6 to 25	from 26 to 50	more than 50		
very low	n	2	0	1	1	2	1	1	0	4
	%	2,6	0,0	2,3	1,7	4,5	0,6	4,8	0,0	1,6
low	n	10	11	1	0	6	13	3	0	22
	%	13,2	15,3	2,3	0,0	13,6	7,4	14,3	0,0	8,7
moderate	n	28	15	8	16	15	47	3	2	67
	%	36,8	20,8	18,2	26,7	34,1	26,7	14,3	18,2	26,6
high	n	20	35	23	25	11	78	9	5	103
	%	26,3	48,6	52,3	41,7	25,0	44,3	42,9	45,5	40,9
very high	n	16	11	11	18	10	37	5	4	56
	%	21,1	15,3	25,0	30,0	22,7	21,0	23,8	36,4	22,2
altogether	n	76	72	44	60	44	176	21	11	252
	%	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Source: Own research.

Platform of competition was judged by the legal environment in which the surveyed companies operate. Aspect selected in the presented analysis was the question of the possibility of using flexible forms of employment. In this area, high (32.1%) and moderate (28.2%) assessments dominated. Only 7.5% of the surveyed companies indicated that such a possibility does not exist. These opportunities increase with the increase in the number of employees.

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Table 12. Flexible forms of employment in the company

To which extent can your company use the flexible forms of employ- ment? N=252	Size of the company (number of employees)				Number of years of exist- ence in the market				Altogether	
	up to 9	from 10 to 49	from 50 to 249	more than 249	up to 5	from 6 to 25	from 26 to 50	more than 50		
there is no such a possi- bility	n	4	8	2	5	1	17	1	0	19
	%	5,3	11,1	4,5	8,3	2,3	9,7	4,8	0,0	7,5
low	n	16	17	11	11	7	36	9	3	55
	%	21,1	23,6	25,0	18,3	15,9	20,5	42,9	27,3	21,8
moderate	n	20	25	10	16	9	52	7	3	71
	%	26,3	34,7	22,7	26,7	20,5	29,5	33,3	27,3	28,2
high	n	22	17	18	24	18	54	4	5	81
	%	28,9	23,6	40,9	40,0	40,9	30,7	19,0	45,5	32,1
fully	n	14	5	3	4	9	17	0	0	26
	%	18,4	6,9	6,8	6,7	20,5	9,7	0,0	0,0	10,3
altogether	n	76	72	44	60	44	176	21	11	252
	%	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Source: Own research.

The platform of competition was also evaluated and assessed by the technological environment and, inter alia, the aspect of change of the technology used in the past 5 years. In 42.5% of the surveyed companies, significant changes in this area were introduced, extreme responses (no change or a complete change) accounted for a total of 6%. Together with an increase in the size of the surveyed companies declared changes had a greater range.

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Table 13. Extent of preserving the technology in the company

To which extent in the last 5 years was the technology that you use in your company preserved? N=252	Size of the company (number of employees)				Number of years of existence in the market				Altogether	
	up to 9	from 10 to 49	from 50 to 249	more than 249	up to 5	from 6 to 25	from 26 to 50	more than 50		
no change	n	3	2	0	2	2	5	0	0	7
	%	3,9	2,8	0,0	3,3	4,5	2,8	0,0	0,0	2,8
changed a bit	n	25	25	9	10	11	51	6	1	69
	%	32,9	34,7	20,5	16,7	25,0	29,0	28,6	9,1	27,4
significant changes were introduced	n	22	31	21	33	14	78	9	6	107
	%	28,9	43,1	47,7	55,0	31,8	44,3	42,9	54,5	42,5
it changed a lot	n	21	12	13	15	14	38	5	4	61
	%	27,6	16,7	29,5	25,0	31,8	21,6	23,8	36,4	24,2
a complete change	n	5	2	1	0	3	4	1	0	8
	%	6,6	2,8	2,3	0,0	6,8	2,3	4,8	0,0	3,2
altogether	n	76	72	44	60	44	176	21	11	252
	%	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Source: Own research.

Conclusions

In this study, the "landscape" of competitiveness of the surveyed companies seems to be interesting and at the same time allows to draw some conclusions. The criteria of the age of the surveyed companies and their headcount used in the analysis allow to look at the existing trends from the perspective of the growth and maturation of companies. Normal phenomena in terms of increasing the formalization and standardization appear. In turn, creativity as a natural feature of young companies decreases with increasing age of the organization, and at some point, it revives again as an indispensable source of creating a sustainable competitive advantage. The possibilities of using certain forms of employment and introducing new technologies increases with the increase in the number of employees in surveyed companies. Certainly most of the surveyed companies care about their development in the long term or want to favorably position their company in the market space, because as we all know only competitive ones can survive.

The research carried out from the point of view of the company's employees offer an opportunity to reflect and think about the competitiveness of their own organization and factors that are shaping it. The IT tool used

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makes it possible to compare own results with other companies participating in the survey. In the future, in addition to maintaining the current form of research, other studies based on the specific industries can be done.

To capture the value dynamic approach to the conducted research, an effective solution would be to do the research for several years on the same closed test sample, in order to meet the conditions of the formula of a longitudinal research study. In parallel, the authors are developing an international research topic (through the platform barometer24.org).

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**Paradigm of Empirical Research of Tools
Determining Management of Contemporary
Economic Organisations With the Use
of the Delphi Method**

JEL Classification: *B41; D22; D23*

Keywords: *economic and financial tools; methods; organisational tools, strategy*

Abstract: This article contains a model of a practical conduction of empirical research with the use of the Delphi method deriving from the group of inventive methods. Research material includes tools which directly determine management and operation of contemporary economic organisations. Identification of strategic spheres of operation of business entities was the starting point for the determination of research material. The five most important spheres were selected for this article and then described. The identification of the most important tools determining operation of each of them was made on the basis of the selected strategic spheres. As a result, identification and systematisation of economic and financial and organisational tools in the exogenic and endogenic aspect, determining the operation and development of modern economic entities was made. Subsequently, methodological guidelines were developed and practical use of the Delphi method concerning the research of identified economic and financial as well as organisational tools was presented.

Introduction

The operation of the economic organisations on the modern market is both a complex process and “the art” of using all chances and avoiding or minimizing threats which occur. First of all, the process of development relies on the use of the arsenal of tools which appear in the market economy. These tools directly influence the operation of business entities. The appropriateness of an adequate way of development of the modern economic organisation depends on the professional identification of the tools. They are crucial in the appropriate recognition of the market and allow their users to distinguish malfunctions in organisations, occurring development opportunities as well as threats in the operation and development of business entities. They constitute basis to create both a strategy of survival in the periods of crisis as well as to create the strategy of development and what is the most important, the arsenal of implementation tools of these strategies and a total process of strategic management. The purpose of this article is to identify the above-described tools which determine the operation of the modern economic organisations and the selection of adequate method of their study.

Methodology of the research

The method of analysis and Delphi method were used as the research method in order to achieve the aim.

The determination of the most important (strategic) spheres of the operation of business entities was a starting point to identify the tools which influence the operation of the modern economic organisations. The identification of the economic and financial as well as organisational tools in the exogenic and endogenic aspect, which influence the opportunities of the operation and development of the modern economic organisations, was made on the basis of the selected strategic spheres.

Taking into account that the majority of the identified tools have qualitative character, they were studied with the use of the Delphi method, which derives from the group of inventive methods. The primacy of this method over other results from the specifics of the studied issue (dominated with its qualitative character) as well as from the assumption that as the consequence of the interaction among specialists, it is possible to create the effect of interdisciplinary synergy, which appears in the inventive approach implemented by the group of experts.

The creation of the model (an example) of the practical use of the method of opinion of specialists in the empirical research of the identified economic and financial as well as organisational tools in the aspect of their influence on the development of economic organisation is the final effect of this article.

The determination of the strategic spheres of the operation of the modern economic organisations

The value chain was used in this article to determine strategic spheres of the operation of the modern business entities. This tool launched by M.E. Porter allows us to present in a sequent form all elementary collections of functions occurring within the enterprise (from business concept, through shopping, manufacturing of goods, service, distribution and sales, to the achieved profit) (Porter 1990).

As a result of mutual interactions and connections, functions being parts of value chain allow us to determine strategic spheres of operation, i.e. elements of dynamic structure, in which there are processes deciding directly about the development of enterprise and its position on the competitive market.

The core spheres include: Sphere of finance which is connected with the collection of criteria and rules of procedure subordinated to the current operation and the implementation of the strategic development. They are used by the managers of an enterprise while making decisions concerning acquiring funds on the financing current and future needs as well as determining directions and methods of the use of these means taking into consideration existing opportunities, limitations and connections with the surrounding.

The sphere of management is aimed basically at the generation of decisions in the four most important functions of the management: planning, organising, motivating and controlling. The sphere of management directly determines the operation of the remaining strategic spheres and the whole enterprise.

The sphere of staff whose task include: acquiring, deploying, encouraging the development and motivating employees who are necessary for an enterprise to pursue its objectives. The staff fulfils simultaneously or alternately two basic roles: a generator of aspirations, needs, initiatives reacting on the company in order to get some beneficial changes as well as a maker

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of strategies, functions and tasks which constitute the essence of the operation of the business entity.

The sphere of production of goods is characterised by: suprastructure and machinery condition, the level of their usage, organisation of production, diversification actions regarding the extension of the range of goods as well as, most importantly, the quality of goods. The most important element of the enterprise, a product, is generated in this sphere. Therefore, the appropriate choice of factors of production together with their adequate use, taking into consideration effectiveness, influences the operation and development of the enterprise on the market.

The sphere of marketing includes actions referring to the analysis of the current situation, market and company research, creation of distribution channels as well as promotion in its wider sense.

Each strategic sphere which influences the operation and development of the modern economic organisations has its own specific tools which determine it.

**The identification of the tools which determine the operation
of the modern economic organisations**

The identification of the tools which determine the operation of the modern business entities was made on the basis of the analysis of the most important functions of each previously-determined strategic spheres as well as up-to-date knowledge from the theory of organisation and management. Hence, the economic tools in both external and internal dimension were identified in the sphere of finance. Whereas, the organisational tools were identified in the spheres of management, staff, marketing and production of goods (Łobejko & Pierścioneek, 2011, p. 186).

Clarifying the determination of the economic tools by virtue of the range of their usage and their specifics, they may be called the economic and financial tools. A real flow of money is a direct result of the operation of these tools and it determines the operation of the modern economic organisations, Cash flow is the result of functions pursued by economic and financial tools which include:

- a redistributive function connected with the distribution of goods through the transfer of funds. It involves the fiscal function which relies on the supplying the income by the state authority which is necessary to cover planned expenses relating to the non-productive sphere,

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- a regulation function means capability to create funds which stay in the economic organisations in such a way to be sufficient to cover requirements of these organisations, especially in the aspect of basic and developed reproduction,
- a motivational function relies on the use of interest of the management and employees in net profit through the use of the adequate economic and financial factors.

Identifying the economic and financial tools in accordance with the pursued functions, they should be divided into:

- the external economic and financial tools reacting on the economic entities which are under the control of state (they result from the redistributive function),
- the internal tools which determine the operation of business entities which are primarily under the control of the managers of the company (they result from the regulation and motivational function).

Exogenic economic and financial instruments are unambiguously included to the factors of economic reaction of the state to the economic organisations. Tools of direct investments from budget or subsidy are considered as regulators of supply in conditions of the market economy. Support of enterprises with financial tenders from the budget is a direct result of their influence. Instruments burdening activity of business entities i.e. tax instruments both in the form of tax burden such as: VAT and excise, CIT, property tax, VED and quasi taxes as payments from profit, State Fund for Rehabilitation of Handicapped People (Polish Abbreviation PFRON), social security contribution for employees as well as various charges are of different nature. Identified exogenic instruments such as: customs, tariffs, exchange rate, interest rate determine demand and supply and shape market conditions as well as enable rational allocation of manufacturing factors.

The internal economic and financial tools are typical instruments of the market economy generated in the economic organisation or tools whose use depends on people who manage these entities. The identified economic and financial tools are presented in Table 1.

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Table 1. A summary of economic and financial tools

The economic and financial tools	
Exogenic economic and financial tools	Endogenic economic and financial tools
Direct investments from government budget	Prices
Subsidies	Depreciation
VAT and excise	Investments
CIT	Profit allocation
Property tax	Supplier credit
VED	Overdraft
Payments from profit	Receiver credit
State Fund for Rehabilitation of Handicapped People	Mortgage loan
Labour Fund contribution	Bill discount facility
Social security contribution for employees	Factoring
Charges	Long term loans
Customs	Shares
Tariffs	Bonds
Exchange rate	Venture Capital
Interest rate	Leasing

Source: Own study.

Price of manufactured goods is a basic endogenic tool. This factor allows us to: make profit (a fundamental, synthetic factor of the effectiveness of management), compete in particular segment of the market, create a pricing strategy. The allocation of profit giving managers the possibility to have at disposal this part of profit which remains in the enterprise after deducting the part of compulsory taxes and charges given to the state as well as investments and depreciation connected with new or enlargement existing objects belonging to assets constitute identified derivatives of the above-mentioned tool. Endogenic instruments include also financing of the business activity i.e. achievement of capital or its disposals, starting from long-term loans and supplier credit, receiver credit, overdraft, mortgage loan, bill discount facility to obtainment of capital in the form of crediting through shares and bonds connected with capital market and venture capital – capital with higher risk. Leasing and factoring are also endogenic instruments of the sphere of finance.

While assessing the above-identified economic and financial tools, which determine the operation of the modern economic organisations from

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the perspective of the microsphere of economic relationships, one should indicate that a main role of these tools should rely on:

- necessity of alleviating factors which burden business entities and creating independence terms strictly connected with self-financing of these entities,
- simplification of the tax system and making it clearer, readable and convenient to a tax payer,
- keeping relative stability of the rules of operation of the necessary external and internal factors,
- creation of conditions for the development of effectiveness of management of production factors.

The organisational tools which determine the operation of the modern economic organisations should be regarded as a group of the tools of management which are to create and shape forms of the operation of the economic organisation. Decisions which determine frameworks in the identified strategic spheres, i.e. staff, marketing, production of goods and management are a direct consequence of their interaction. These frames are determined by the entities which create economic policy with the use of adequate tools which are independent from the business entities and factors under the control of the management of the economic organisations.

The organisational tools were identified taking into consideration the same division into the external and internal factors as in case of the economic and organisational tools.

Taking into account this retrospective assumption, it is a group of noneconomic instruments which are under the control of the entities which create economic policy. As nonparametric tools, they may have legal, administrative or informative form. A detailed statement of the organisational tools is presented in Table 2.

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Table 2. A summary of organisational tools

The organisational tools	
Exogenic organisational tools	Endogenic organisational tools
Legal	In the sphere of staff
Administrative	Selection of staff
Informational	Evaluation of employees
	Motivation
	Education
	Remuneration
	In the sphere of marketing
	Market research
	Company research
	Distribution
	Promotion
	In the sphere of manufacturing
	Organisation of production
	Diversification of operation
	Quality of offered goods
	In the sphere of management
	System of information
	Organisational structure
	Planning
	Control
	Effectiveness of management

Source: Own study.

The legal form refers to: normative acts which refer to the organisational, functional and ownership structure of entities and systems as well as technical standards connected with the construction and exploitation of the fixed assets. The administrative form involves orders and resolutions of the authority of imperative nature; concessions, limitations, licenses, permissions; location decisions etc. The informative form is connected with: prospective forecasts of growth of the state; information on planned structural, functional, supply changes; information on demand and supply situation, preferences of users, quality assessment; information on expected balance of income and expenses covered by the population etc.

The identified internal organisational tools are tools which are determined by the market but they are under the control of the managers of the modern economic organisations. As tools which depend on them, they should be used in such a way to support current operation and the adopted strategic assumptions in the most effective way.

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In the sphere of staff, obtainment, deployment, support of development and motivating employees to realise targets of the enterprise with the usage of following instruments: selection of staff, motivation, evaluation of employees, education and remuneration is a priority task of the identified instruments.

The sphere of marketing includes the following identified instruments: market research, company research, distribution and promotion. Actions in this sphere are connected with analysis of the current situation, market research and company research as well as with improvement of existing and creation of new distribution channels of goods and promotion in a broad sense.

Instruments in the sphere of manufacturing, namely: organisation of production, diversification and quality determine directly: suprastructure and machinery stock, level of their exploitation, organisation of process of production, diversification activities as well as improvement of the quality of offered goods.

The sphere of management with its main processual target, i.e. generation of decisions in the four most important functions of management, namely: planning, organisation, motivating and control directly determines functioning of remaining strategic spheres and at the same time whole economic organisation. Identified tools of this sphere consist of: system of information, organisational structure, planning, control and effectiveness of management (Gajda, 2014, pp. 333-335).

**The selection of method for empirical research of economic
and financial as well as organisational tools which determine
the development of the modern economic organisations**

The selection of the adequate procedure, which should be correlated with a problem being solved, appears to be a basic determinant which has a significant effect on the quality of the final result.

Solving problems is, from methodological perspective, a process consciously aimed at the implementation of some final changes into the situation. Etymologically, a term "method" derives from Greek "meta hodos" and means a road to the goal, moving, following or chasing somebody. Plato understood the method as a doctrine. Aristoteles as a research doctrine. Descartes wrote: "the method that tells us to follow the correct order, and to enumerate exactly all the relevant factors, contains everything that gives certainty to the rules of arithmetic." A. Apanowicz (2005, p. 54) iden-

tifies the method with a systematic action emphasising that it is a way of making a complex action relying on the specific selection and order of particular sub-actions. The author pays attention to the repetition of the course of action as well as to the need to of modification and adoption of it to the problem which is being solved. The course of action is determined by the composition and order of its stages.

Using the above-mentioned deliberations we may assume that the method is a way of solving a problem, characterised by some methodical rules used in a particular procedure. Hence, the method of action requires the correlation of two qualitatively different elements. The first group involves principles which implicate methodological rules connected with particular variants and specified equipment which is used when the operation is limited. The second group contains a procedure. It involves the course of use of the elements of methodological requirement which are correlated with the problem. These elements are ordered in a particular way which determines the efficiency of the given method in relation to the problem being solved.

The Delphi method (use of the opinion of experts), which derives from the group of inventive methods, was used in this study to conduct empirical research into the tools which determine effective management and development of the modern economic organisations (Perycz, 2009, p. 88). The score-based assessment is used as a technique in the implementation of the considered research problem. As it was mentioned in the introduction, the advantage of the chosen method over other possible solutions is the result of the specifics of the studied problem dominated by the qualitative character of the majority of considered tools as well as of the assumption that, in case of the inventive approach implemented by the group of experts, it is possible to create an effect of the interdisciplinary synergy which is the result of the interaction between these specialists. The effect relies on the mutual support of the considered aspects of solutions, cumulation and qualitative increase of the intellectual effort of the group. Particular solutions stimulate the creation of subsequent points of view and at the same time allow us to multiply points of view on the basis of which the exploration of the research problem is made (Stankiewicz, 1998). The fulfilment of basic methodological rules and acceptance of the adequate procedure of action, in accordance with the above-accepted definition of the method, is necessary for this effect to exist and for the selected method to solve the strategic problem.

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Hence, the appropriate selection of experts, who create a team of co-creators of the research and interact in a proper way, is a basic determinant of the use of the Delphi method. The method assumes that the experts should be selected among professionals on issues substantively connected with the subject matter of the research in order to represent all the fields of knowledge and experiences which considerably refer to the problem. Fulfilling requirements of this condition, representatives of the management board and the financial sphere of the enterprise (managers, chief accountants, directors, finance specialists) should be selected to the research into the economic and financial tools which determine effective management and development of the modern economic organisations. Whereas, the organisational tools should be analysed and assessed by the team which represents the remaining strategic spheres of the enterprise, i.e. human resources, marketing, goods production as well as management (i.e. managers, directors/managers of HR departments, marketing and production).

The selection of this body allows us to fulfil the other condition which refers to the adequate level of competences among the group of experts. The matter of the level of competences is the result of the theory of chosen method which assumes that the object of study includes most frequently a lot of issues which are in a diversified relation to knowledge and experience of particular experts. In practice, there is a view that it is possible to choose experts to the problem in such a way that all of them are competent. It is used in studying the problems which have clear and substantially compact structure in which the criteria of selection of specialists together with their knowledge and experience tackle the whole substantial subject matter of study. It happens in the case of the research into the economic and financial as well as organisational tools. The experience of the selected experts in this matter should be the result of the range of their duties whereas their knowledge from schools of business they left and life experience they have gained (Kołodko (Ed.), 2014).

The selection of the adequate form of interaction and communication between specialists is the first issue in the chronological order of necessary settlement. Generally, there are three solutions: correspondence, stationary and tele computer version which occur in the literature on subject dedicated to the Delphi method. The stationary version is valid to conduct research into the solution of strategic problems dominated by the qualitative aspects. In this version a group of specialists is gathered in one place and time. "The technology" of the iteration should take place in accordance with one of the plans presented below. In case of the former, the experts are informed

about the aim, manner, subject matter as well as the results of following iterations. They aim at aligning scores to the adequately prepared questionnaires which are treated as verdicts and are regarded as expert opinions. The opinions are justified by the specialists, directly on the stage of discussion which is an integral part of a given interaction. In the latter, the experts are informed about the aim and manner. However, the results of iteration are given in questionnaires in which cumulative studies of justification are collected. The experts discuss directly with each other only in matters relating to the unification of notions and, possibly, agreements of the limitations of the research problem. It is recommended to use the first form of communication and interaction between experts (Stankiewicz, 1998).

The method of beginning the process of solving the problem is very important for the findings in the Delphi method. It is highly correlated with the above-presented interactions which occur among experts. The beginning of this process implies three possible solutions:

- solution of the problem begins from the determination of the list of research hypotheses and research topic;
- the introductory list of hypotheses and topics which has open character is presented to the experts, their task is to complete the list and/or exclude some elements from it during the first iteration;
- the ready, closed list of hypotheses and topics is presented to the experts, the first iteration has to bring verdicts which describe the problem.

The determination of the method of calculation of results of particular iterations is another significant aspect during the adaptation of the Delphi method. Classical recognition assumes the creation of histograms of the distribution of answers and calculation of medians as well as the interquartile range whose minimisation is the purpose of the following interactions. This recognition is adequate to analyses and interpretations of the verdicts of experts which regard values which are possible to quantify and sort according to the qualitative criteria. However, using percentage in giving the results is a more useful method when the research refers to the dynamic or quantitative issues, while finding and interpreting the results, than using complex statistic functions (Stankiewicz, 1998).

The paradigm of the practical use of the Delphi method in case of the empirical research into the identified tools

After the fulfilment of the conditions of the use of the Delphi method, the following procedure was accepted. The questionnaire which involves

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the identified economic and financial as well as organisational tools should be presented to the experts.

During the first iteration, in order to the use of the technique of score-based assessment, the groups of experts should identify a maximal number of criteria with the use of which it is possible to assess all the identified instruments in the aspect of development. Subsequently, the specialists must choose the most important criteria of importance. They give weight to each criterion and their total sum is one, e.g. economic weight of the instrument – 0,40; intensity of reaction – 0,35; susceptibility to influences – 0,25.

During the second iteration, the experts use score-based assessment and assess particular economic and financial as well as organisational tools. They may give from 1 to 10 scores to each of the presented criteria. This multi-criteria assessment should be applied to scalar by adding the products of weights and scores applied to them. Calculated and added weight averages, for each of the criteria, determine the position of particular tools in the importance rank after the second iteration. A statement of the rank of tools of particular experts, calculation of averages and then, the creation of the rank which is based on the all results of the experts who take part in the research, is the following stage of the classification.

The presentation of the generated rank to experts, who in the following iteration work in a team and agree the final classification of the economic and financial as well as organisational tools which have a significant impact on the development of economic organisation, is the final part of the study.

Conclusions

It is necessary for the economic organisations, which want to be successful on the modern market of dynamic character, to recognise and use the modern arsenal of the analytical and implementation tools during the creation of the operation and development plans having at the same time creative (lateral) approach of the managerial staff to the strategic problems.

The economic and financial as well as organisational tools of the most important spheres of the operation of the modern economic organisations identified in this article are the key to be a successful business entity on the market. Particular spheres determine objectives of the organisation which are then transmitted into the functional programs of operation within accepted partial strategies. They, in turn, determine a target strategy. The identified economic and organisational tools, which operate on the modern

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competitive market and are created there, are descriptors of both partial strategies and global economic organisations on the stage of their creation and implementation processes.

The economic organisations, which are aware of the multitude of the instrument at disposal and know the rules which govern them, will be able to use them efficiently in practice depending on the needs and current situation. They may pursue their objectives confidentially and optimistically monitor their future development.

The content and scientific value of this study refers to: the concrete connection of the theory with economic practice; the original approach to the identification of the instruments which determine the operation of the enterprises on the basis of the strategic spheres of the operation of the enterprises; the innovative, uncommon in literature identification of the economic and financial as well as organisational tools which influence the development of the enterprise and the practical presentation of the paradigm of the empirical research of these tools in the aspect of the opportunities of the development of the economic organisation. Taking everything into consideration, it may be said that the accepted aim was fully pursued.

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Asset Sources of Competitive Advantage of SMEs From High-tech Sector in the Region of Greater Poland

JEL Classification: *O31; O32*

Keywords: *soft assets; competitive advantage; high-tech sector; innovations; SME's*

Abstract: The article tackles the question of the ever growing importance of soft factors of production in the process of competitive advantage for contemporary enterprises. This condition has resulted of turbulent environment characterized by increasing competition, generalized uncertainty and information asymmetry. Based on the above assumption during 2013-2014 a research project was carried out on the role of intangible resources in the process of gaining advantage over competitors in high-tech companies from Greater Poland. The study was complete for the given population and was conducted using the CATI method. On the basis of responses to the questions in the survey, one can conclude that these companies implement modern management paradigm and its activities are based largely on soft resources which are impossible to be copied and on skills in the form of human capital, propensity for learning and the social capital of employees. The findings of the project can serve as a valuable clue for those companies which at the moment do not represent a prospective approach to achieving entrepreneurial categories in practice.

Introduction

Market environment of modern enterprises is referred to as the economy of discontinuities characterized by the asymmetry of information, generalized uncertainty and chaos. Zygmunt Bauman identifies it even with the "liquid world" on the grounds that "sustainability got devalued, while transitoriness has been rapidly gaining in value." (Bauman, 2001, p. 161) These features have been further exposed by the current economic crisis (Mączyńska, 2010, p. 200), which - as noticed by Roubin, N. and Mihm, S. - "[...] made it clear to everyone that the coming years more deserve to be called the years of "extreme volatility" than of "great moderation." (Roubin & Mihm, 2011, p. 335) This instability is undoubtedly associated with changes initiated already in the twentieth century and which are reflected in, among others, the information revolution, the liberalization of economies and the related processes of internationalization and globalization, as well as in an increased competition from the so called emerging countries and – most importantly - rising commodity and environmental barriers.

In the face of such increasing difficulties in the implementation of the idea of sustainable and balanced growth both in terms of macro and micro-economics, changes in the rules of organizing and functioning of modern enterprises also become necessary (Bąkowska, 2014, p. 87; Avella & Fernandez & Vazquez, 2001, pp. 139-157; Tracey et al., 1999, pp. 1319-1350; Liu & Liang, 2014, pp. 1019-1037). These entities need a new business philosophy and the development of new value in a globalizing and integrating market and making such arrangements or regulatory actions that will create a new value for customers and businesses, raise their competitive position, as well as limit the uncertainty and risk (Janasz, 2012 p. 54; Burnad & Bhamra, 2011, pp.5581-5599; Ismail et al., 2011, pp .5469-5487; Teece, 2007, pp. 1319-1350). As noted by Machaczka, J. "the challenges faced by contemporary organizations draw attention to the need to take into account (in shaping competitive advantage) not only quantitative factors, but also qualitative indicators of competitiveness." (Machaczka, 2014, p.7) Thus, contemporary management paradigms are gradually being redefined and broaden with such strategic and intangible elements as: knowledge, skills and experience, or human capital, as well as trust, loyalty and credibility - collectively referred to as social capital (Libertowska, 2011, p. 177). In addition, the importance of creativity and innovativeness has been growing, as well as high flexibility and seamless adaptation to the environment

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(see Brillman, 2012; Easterby-Smith et al., 2009; Eisenhardt, 1989, pp. 532-550; Kogut & Zandar, 1992, pp. 383-397).

The main purpose of this article is to present the results of the research on the factors influencing competitive advantage of small and medium size business entities from high-tech sector located in the Greater Poland region. The analysis sought to ascertain whether these entities acting in a turbulent environment attach greater importance to the role of material resources, or perhaps they value the intangible ones, which are rare, inimitable and impossible to replace?

Factors of competitiveness - theoretical background

As noted by W. Szymanski, the globalization of economy and the opening of national borders for external entities "lift competition to the role of a general determinant of development." (Szymanski, 2011, p. 45) This concept embodies in itself the process by which entities compete with each other in order to gain new customers and thus increase their profits. Therefore, in order to successfully compete, these companies must demonstrate high competitiveness (Śliwinski, 2012, p. 20). This feature is broadly defined in literature; however, it can be assumed that competition is "an ability to build main skills more cheaply and more quickly than the competitors. Such skills generate new products, which are better than those of competitors'." (Hamel & Prahalad, 1999, p. 86) Thus, this means that the company is able to achieve competitive advantage over other companies using these skills and resources.

It is not disputed that competitiveness of enterprises depends on both the external and internal factors. The first are generated by the environment and their operators have no influence upon them or such an influence is considerably reduced. These elements may constitute a macro-environment, which is the set of conditions for the functioning of a company resulting from the fact that it operates in a certain country, and thus in a specific political or legal system. Moreover, they can create a meso-environment by specifying the terms for functioning and growth of an enterprise in a specific industry in a given geographic market (Gierszewska & Romanowska, 2003, p. 34 and 92). The factors of macro and meso-environment are presented in the table below.

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Table 1. Macro and meso-environment factors

Macro-environment	Meso-environment
Economic factors (e.g. GDP, interest rates, inflation, employment rate, exchange rate)	The impact of buyers and customers in the industry (including the degree of concentration in the supplier sector in relation to the recipient sector, monopolistic position of the supplier or customer)
Political and legal factors (such as antitrust law, environmental law, tax law, labor law)	The threat of an emergence of new products and substitutes (attractiveness of the sector, barriers to entering the sector, the possibility of reprisals from the manufacturers of the sector)
Technological factors (state spending on R & D, business expenditure on R & D, new products, new discoveries in technology transfer)	The rivalry between competitors (competitive structure, strategic partnerships)
Socio-cultural factors (lifestyle change consumer activity, the size of an average family, regional migration, birth rate)	Regulatory factors (regulatory agencies, interest groups)

Source: Wright & Kroll (1998, p. 31), Porter (2006, pp. 253-272), Griffin (2005, pp. 81-87).

However, in contrast to the macro and meso factors, the micro-economic ones shape competitiveness of companies from the inside. At this level competitiveness of a company is created and all of the basic factors that determine it. Generally, these factors are divided into resource and strategic ones. The first group includes the resources and skills of employees. As Śliwinski, R. notes, skills combined with resources constitute a company's competitive potential, which determines the achievement of better or worse market outcomes. Competitiveness of resources and skills means, therefore, that it is not only the acquisition of a set of resources, but also their ability to compete with the resources and skills of competitors (Śliwinski, 2012, pp. 33-34).

The second group includes strategic factors which cover the methods of defining the market, adopted business model, corporate vision and mission, as well as the right action strategy (Śliwinski, 2012, p. 33). However, due to the high complexity of management processes and the rapid pace of change, the researchers of competitiveness more and more often explore the idea that the sources of business success in competitive markets should not be sought in the adoption and implementation of appropriate market strategy (*market based view*), but in the possession and skillful management of a set of strategic resources (*resource based view*) (Bendkowski, 2012, p. 20; Terzivski, 2010, pp. 509-533; Thun, 2008, pp. 370-382), which allow to increase the effectiveness and efficiency of a company's market activities (see Barney, 1991, p. 99).

It is worth noting here that the asset sources of competitive advantage are commonly divided into those of tangible and intangible character. The

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division discussed here has been suggested by de Wit, B. and Meyer, R. According to these authors, the first group consists of tangible assets such as land, buildings, and materials - collectively called physical capital. It also consists of financial resources. The intangible assets are divided into relational resources and competences (Wita & Meyer, 2007, pp. 162-165). Based on the extensive literature in the field of economics and management, Sliwinski, R. made a detailed statement of enterprise assets divided into those of tangible and intangible character. This distinction is presented below.

Table 2. Distribution of assets

Assets	
<i>Tangible:</i>	<i>Intangible:</i>
Physical capital: machinery, buildings, materials, means of transport, telecommunications and information technology infrastructure.	Competence: expertise, core competencies, quality of products and processes.
Financial capital	Relational: formal relations, informal relations; access to resources, jobs and information;
Human resources: staff, leader.	Organization: organizational structure; organizational culture, coordination activities, functional systems / architecture processes, information systems, optimization processes.
	Legal: purchased intangible assets, produced intangible assets
<i>Combinations of tangible and intangible assets:</i> company reputation and entry barriers.	

Source: Sliwiński (2012, p. 36).

It should be noted that at present intangible factors are considered crucial in the long-term and sustainable development of enterprises, and even for the economy as a whole. The growing unpredictability of the management sphere results in the fact that intangible, ineffable resources (depending on the circumstances and embodied in the people) are all gaining importance (Hayes & Upton, 1998, pp.8-25; Teece et al., 1997, pp. 509-533). Moreover their valorization is justified by Grudzewski, W.M. who states that "the economics of intangible resources works differently than in the case of tangible ones. In particular, this applies to the law of diminishing marginal effects. The increase in the use of the intangible factor [...] leads to an increase in the marginal benefits from its use" (Grudzewski et al., 2009, p.13). In addition, intangible resources are difficult to imitate, so they cannot be copied or replaced (compare Barney, 1991; Grant, 1996; Jashapare, 2006) and this can determine the winning edge over competitors.

Evaluation of resources and skills in the high-tech SME sector in Greater Poland

The research problem

Within the framework of the project undertaken in the period from May 2013 to November 2014, titled "The role of intangible assets in shaping competitive advantage of high-tech companies in Greater Poland"¹ a survey of small and medium-sized enterprises from the high-tech sector was conducted. All the participants were located in the Greater Poland region. The basic research problem was to identify the extent to which these entities use the soft factors of production in acquiring the superior position over their competitors. Among other things, the study was looking for responses to the following questions:²

1. Based on what resources / skills do small and medium-sized high-tech companies build the sources of competitive advantage to gain market position?
2. Do they base their innovative activities on the conscious use of hard factors and not attributing soft factors with any decisive role?
3. Do these entities value intangible factors?
4. And, if so, which ones are treated by the managers of these companies as the most important in shaping competitive advantage?

Attempts to answer these questions appear extremely important in the face of increasing frailty, inconsistency and instability of existing social-

¹The study is carried out with a MSc.Eng. A. Libertowska under a grant titled "DS - Young faculty" at the Faculty of Management, University of Technology funded by the Ministry of Science and Higher Education.

²The study omitted large companies that run on completely different principles of functioning in comparison to the SMEs. In addition, the specificity of the industry indicates that these are companies with large capital, often foreign, and therefore, their autonomy in decision making regarding the data for research is limited. The classification of areas of advanced technologies has adopted a methodology set out by Eurostat, based on statistical reporting of the Member States, candidate countries associated with The European Free Trade Association (EFTA) and third parties. According to this classification, the high-tech industries in accordance with the Polish Classification of Activities (PKD 2007) include the following (Science ... 2012, p. 180-181, based on Eurostat data): production of basic pharmaceutical products and medicines and other pharmaceutical products (C 21), manufacture of computer, electronic and optical products (C 26), manufacture of aircraft, spacecraft and related machinery (30.3 C), activities related to the production of films, video and television program production, sound recording and music (J 59), broadcasting (J 60), telecommunications (J 61), activities related to software and consultancy and related activities (J 62), services in the field of information (J 63), scientific research and development (M 72).

economic and geo-political systems, which force companies to continuously modify the conduct of their businesses (Gajowiak, 2013, p. 73). Thus, there is a need to base it not only on tangible factors in the form of physical and financial capital, but also on the intangible factors of production responsible for competitiveness. As underlined by Janasz, W. "companies predominantly attach importance to the current efficiency, represent the traditional approach, while too little business entities select a strategy which is characterized by changes, innovation and flexibility - the so called prospective approach." (Janasz, 2012, p. 37) For this reason, the study focused on the high-tech enterprises, which are generally the units focused on pro-innovation activities. Thus, the identification of factors responsible for shaping competitive advantage can become a guideline for other entities as to what resources and skills shape competitive advantage.

The sample and methodology of the study

The selection of subjects for the study was complete and was a result of at least a couple reasons. Firstly, SMEs are the largest group of companies in Poland (about 99.8%), hence their state and prospects of further development illustrate to the greatest extent the potential of entrepreneurship, innovativeness, and thus competitiveness. Secondly, these entities also feel the barriers to the conduct of their businesses the most. Thirdly, the "industry of high technology, due to high intensity of the processes of research and development is a specific sector, the analysis of which provides not only information on the impact of R & D, but also on competitiveness and the ability of the economy to absorb the results of the work in the fields of science and technology" (Konkurencyjność, 2009, p. 3).

The choice of the territorial scope was due to the fact that the region of Greater Poland from 2008 to 2012 significantly differed compared to other provinces in the country in terms of the size of investment in innovative activities and R & D activities of small and medium-sized industrial and service enterprises, as well as in terms of the largest number of significant concentration of people employed in high-tech industries (Analiza, 2010, p. 16).

The analysis of data obtained from the statistical office indicated that 215 entities met the criteria for selection defined in the project. The study was complete for the given population. Finally, the participation in the study (using CATI technique, i.e. Computer-Assisted Telephone Interview) was accepted by 44 entities (maneuverability at 20%), of which 32 were

small (10-49 employment level), and 12 medium-sized (50 to 249 employees) companies. These companies represent the following sections of PKD (Polish Classification of Activities): J³ (up to 30 companies), then C⁴ (10 entities), and section M⁵ (only 4). The largest companies (up to 30 entities) are located in the city of Poznań.

The main research tool was a survey consisting of 27 questions divided thematically into two parts. The first concerned the degree of innovation and competitiveness, the other - social capital of an organization.

Key factors of competitive advantage of SMEs

The basic premise of the study was that the companies predisposed to build competitive advantage not only by means of the so-called hard factors, but also by powerful intangible resource management (especially important in turbulent environments), are companies belonging to the high-tech sector. Opportunities to improve the conditions for the development of advanced technologies in Poland "should be associated with the development of small and medium-sized enterprises operating in the high-tech sector. These entities should in fact constitute a natural link between science and business environments, facilitating the application of the latest scientific business practice." (Mizgajska & Wściubiak, 2008, pp. 275-289) Therefore, the questionnaire consisted of 21 questions about the resources and skills, which in the opinion of managers of these companies allow one

³ Companies in this section represent the following: Production of motion pictures, video and television program production, projection of movies, Television programming and broadcasting, Wireless telecommunications activities except satellite telecommunications, Wired telecommunications activities, Software activities, Consultancy regarding IT, Management of IT devices, Other services in the field of information technology and computer data processing; Management of websites (hosting) and similar activities, Data processing; Management of websites (hosting) and similar activities, Web portals.

⁴ Companies in this section, in turn, represent the following: Production of medicines and other pharmaceutical products, Manufacture of electronic components, Manufacture of electronic circuit boards, Manufacture of computers and peripheral equipment, Production of (tele) communications equipment, Production of consumer electronics, Manufacture of instruments and appliances for measuring, testing and navigation, Manufacture of optical instruments and photographic equipment, Manufacture of air and spacecraft and related machinery.

⁵ Companies in this section represent the following: Research and experimental development on natural sciences and engineering, Research and development in the field of social sciences and humanities.

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to gain a competitive advantage. Distribution of the respondents' replies is provided in the table below.

Table 3. The importance of the resources and skills to shape competitive advantage

Factor	Median	Dominant	Arithmetic mean
Human capital	5	5	4,63
Machines, manufacturing equipment	3	3	3,18
R&D activity	3	3	2,86
Flexibility of organizational structures, processes and strategies	4	5	3,63
Eagerness of a company to learn	4,5	5	4,18
Quality Management Systems	3	3	3,5
Financial condition	4	4	3,95
The condition of logistics	3	3	3
Implemented innovations	4	4	3,4
Patents and licences	3	1	2,63
Social capital of employees	4	5	4,13
Social capital in relation to business partners	4	5	3,95
Know-how	4	4	3,95
Foreign contacts	3	2	3,13
Company image	4	4	3,95
Location of the enterprise	3	4	3,04
The processes of organizational learning	3	3	3,31
Collaboration between employees	4	4	3,81
Collaboration with business partners	4	4	3,9
Shortening of the period of results' commercialization	3	3	3,13
Others	3,5	4	3,16

Source: own study based on empirical research results.

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Based on the above chart, it is understandable why the managers of the analyzed companies on a scale from 1 (lowest rating) to 5 (highest rating), attributed the highest score to the following:

- human capital ($m_e=5$, $d=5$, $\bar{x}=4,63$);
- tendency of a company to learn ($m_e=4,5$, $d=5$, $\bar{x}=4,18$);
- social capital of workers ($m_e=4$, $d=5$, $\bar{x}=4,13$).

Table 4. The weight of intangible and tangible assets

Intangible assets	Tangible assets
1.Human capital	1.The state of company's finance
2.Company's eagerness to learn	2.Implemented innovations
3.Social capital of employees	3.Quality management system
4.Social capital in relation to business partners	4.Company's location
5.Flexibility of organizational structures and activities	5.Machines, production equipment
6. Know-how and corporate image	
7.Cooperation established with partners	
8. Collaboration established between employees	
9. Research and development activity	
10. Shortening the period of the commercialization of results	
11. The processes of organizational learning	
12. Patents and licenses	

Source: own study based on empirical research results.

These factors can therefore be considered a set of determinants, which in the highest degree allow the creation of competitive advantage for small and medium-sized enterprises in the high-tech sector of Greater Poland. In addition, these results indicate that the analyzed entities primarily enhance intangible resources so difficult to imitate and follow. The first tangible factor in the form of company's finances has been positioned sixth. It should also be noted that the analyzed subjects (over 80%) also indicated that their financial situation compared to the industry average and the biggest competitor is at the level of good or very good. The table below presents a summary of tangible and intangible resources and skills responsible for shaping competitive advantage according to their priority given by the

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respondents of the survey (based on the above-mentioned statistical measures).

High importance assigned to human capital clearly demonstrates that small and medium-sized entities are aware that in the face of both potential opportunities and new dangers (that are emerging in a globalized economy) knowledge, skills and experience of employees as the basic attributes of this capital are crucial in the fight against competitive market. This approach is consistent with the concept of a *knowledge-based economy* which, from a microeconomic perspective, assumes that knowledge remains an undisputed source of competitive advantage of most businesses, including those of small and medium size (Koźminski 1996). Moreover, according to Edvinsson and Malone, human capital embodies the dynamics of an intelligent organization through its creativity and innovativeness (Edvinsson & Malone, 2001, p. 34). It is also worth noting that until recently the area of knowledge management was dominated by a technical approach that assumed that it is a measurable asset, and thus possible to be codified and stored. However, as noted by Bendkowski, J. "[such an] approach has not produced the expected results in addition to high expenditure on the maintenance of information infrastructure and employees disillusioned by existing initiatives in the field of knowledge. This approach showed that technology alone was not able to overcome the barriers to knowledge transfer." (Bendkowski, 2012, p. 10) For this reason, social orientation has gained importance. It assumes that knowledge is created in the process of mutual interaction and group learning. As added by the quoted author, "the main element of knowledge management system is the man, as a carrier of tacit knowledge. The process of knowledge creation is a cognitive activity. As a result, individuals produce tacit knowledge externalized within the context-specific human interactions." (Bendkowski, 2012, p. 10)

On the other hand, in the opinion of the respondents the second most important (also in this case an intangible production factor) is a company's eagerness to learn. This resource becomes crucial in the context of the acquisition of competitive advantage in a situation where continual changes in economic systems cause "the future to become increasingly vague, and the present – unsatisfactory." (Mączyńska, 2010) Therefore, a specific challenge faced by enterprises today is the relentless "creative destruction" in thought and action, which has already been addressed by Schumpeter, J.A. who identified it with the impact of the implementation of innovations, when "better behavior forced the destruction of the old." (Schumpeter, 1995, p. 192) According to Szymanski, W., "rapid change means rapid

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obsolescence of ideas, experiences, parts of knowledge, decisions, because the conditions that were the basis of their adoption have changed. A role of sensitivity at all levels of decision making has been growing, and therefore the analysis of earlier decisions' ageing, the analysis of undermining the sense of previously taken decisions - due to the fact that the predicted conditions under which they were made did not come true in practice, or have been substantially changed." (Szymanski, 2012, p. 19) Therefore, the weight of organizational learning also increases. It is a process in which the acquired knowledge increases the ability to both solve current problems, as well as undertake more effective actions (Rokita, 2005, p. 105; Zott, 2003, pp. 97-125; Wang & Ahmed, 2007, pp. 31-51). Thus, it allows a high flexibility of operation (Bendkowski, 2012, p. 18). Similar conclusions have been reached by Senge, P.M. who stated that organizations that are able to build competitive advantage in the future are those who can take a fresh look at the place and importance of social capital of a given organization, and those, who will learn to use the involvement of employees and their ability to learn in a right way (Senge, 2002; Chen, 2008, pp. 380-390; Wang et al., 2013, pp. 2667-2679).

It is worth mentioning the fact that managers of the analyzed companies recognize the importance of their employees' social capital - their mutual relationships based on, inter alia, trust, loyalty, or even credibility (compare Lauzikas & Dailydaite, 2015, pp. 37-51) in the process of gaining competitive advantage. And although a deficit of social capital in Poland is still widely observed and J. Hausner even states bluntly that "our development suffers from a lack of social capital," (Hausner, 2010, p. 64) the fact that it is valorized in terms of the organization is quite encouraging. Even more so with the fact that a number of studies confirm its positive impact on economic activity (compare Knack & Keefer, 1997; Fukuyama, 1997; Coleman, 1990; Granovetter, 1973; Lin, 2000, McKeever et al., 2014 Nahapiet & Ghoshal, 1989 ; Adler & Kwon, 2002; Januszek, 2004; Skawińska, 2011; Matysiak, 1999; Gajowiak, 2012). In particular, from microeconomic perspective the following aspects are especially significant:

- halting or even eliminating the opportunistic behavior of company members;
- reducing the need for management intervention and the involvement of management structures in the course of transactions;
- encouraging to a greater responsibility in economic interactions;
- allowing for innovative approach formation that may allow to obtain competitive advantage;

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- forcing an individual to make choices that are beneficial to all employees. This capital does not allow obtaining benefits at the expense of the common interests of the entire team;
- providing access to resources, including tacit knowledge and its rapid diffusion between employees (Gajowiak, 2010, pp.14-15).

It should also be noted that - as noted by Grzanka, I. - social capital allowing access to important information and other strategic resources has a significant impact on the ability of companies to adapt to changes, including both challenges and opportunities emerging in the environment. The more possibilities for interaction between employees, the more social capital is created, "which results from the fact that new knowledge accumulated by a company creates new opportunities in the environment." (Grzanka 2009, p. 126) Thus, it seems true that knowledge and values shared by people slowly replace three elementary principles of competitiveness, i.e. cost advantage, higher quality of goods and services and the speed of response to customer needs. Thus, the idea of social capital becomes crucial in solving specific problems - in particular the relationship with customers, employees and between employees themselves or with the outside world (Grzanka 2009, p. 91). Moreover, as Lauzikas, M. and Dailydaite, S. underline, social capital is the driving force of innovative behaviors, and its absence may be a significant drag (Lauzikas & Dailydaite, 2012, p. 85-97).

Identifying the factors responsible for the development of competitive advantage of modern enterprises, it should also be noted that the least assessed intangible assets are patents and licenses. Among the reasons for this state of affairs the following can be identified: the lack of need for company managers to purchase a patent, or licenses and the cost of such actions (the process of patenting / or licensing and security charge / license). This does not mean, however, that these companies do not introduce any innovation. According to the study, the implementation of innovation is a second key tangible factor enabling the gain of competitive advantage. In addition, according to the research, most companies have implemented product innovations (more than 32%), and then process innovations (29%), as well as marketing and organizational innovations (about 18%). Moreover, over the next two years more than 80% of them are planning to implement further innovations. In addition, over 36% of companies spend at most 5% of their revenue on R&D and 23% of companies over 5%. This fact is significant because Poland still significantly lags behind in comparison to other EU countries in terms of innovation in general, as well as the level of expenditure on R&D. According to the report by Innovation Union Scoreboard

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2013, the expenditure of private companies on R&D accounted for (during the year under review) only 0.23% of GDP, while the EU average is at the level of 1.27% of GDP (Innovation Union Scoreboard, 2013, p. 71).

Conclusions

In the turbulent environment in which businesses operate today, the need to look for new ways to gain competitive advantage and thus attract and retain increasingly demanding customers, is also recognized by small and medium-sized entities of the high-tech sector located in Greater Poland.

Based on the gathered survey results, it becomes apparent that these companies base their business on competitive market supported by both hard and soft factors. However, they assign greater importance to the development of competitive advantage due to the latter ones. This approach, in the opinion of many researchers, becomes justified against the challenges these companies face on a daily basis. High complexity of economic processes, increased competition, chaos, fast variability, or a lack of boundaries are all forcing companies to modify the way they operate and support their activities on those elements which help to reduce uncertainty and unpredictability, as well as help to reduce opportunistic actions.

Thus, the managers of the analyzed companies who are aware of these challenges provided the highest score to the following: human capital, company's eagerness to learn, social capital of employees. The tangible factor in the form of corporate finance scored only sixth among the set of twenty-one resources and skills. A skillful use of intangible assets, which are inimitable, extremely rare and valuable, results in the fact that these companies claim to be intelligent organizations, which are commonly identified with the highest stage of the process of improvement of modern organizations. Celebrating knowledge, skills, experience, willingness to learn and the basic attributes of social capital in the form of trust, loyalty and reliability of employees enables these companies to enjoy high flexibility and fast adaptation to the changing rules of the game in a competitive market.

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**Problems in Measuring Price Dispersion
in E-commerce**

JEL Classification: *D40; D82; D83*

Keywords: *price dispersion; e-commerce; shopbots*

Abstract: Until recently, Internet was considered as technology that will make the trade in goods frictionless. Online retailers' margins were to fall to zero and prices - according to theory of economics - were to equalize as a result of buyers comparing prices more easily (e.g. using shop bots). Empirical research performed so far has not proven these expectations right. Studies in many countries show that online prices vary significantly (sometimes price dispersion in the Internet is higher than that in traditional trade). The purpose of this article is to present a critical view on the methods of measuring price dispersion in e-commerce. Researchers of this area use different measures of price differentials, include shipping costs or not, use the proposed price or try to determine transaction prices, reject part of the data considered as outliers that may indicate a hidden heterogeneity of a product. Some scientists also try to justify price dispersion with the reputation of a vendor, and also additional features of the sellers such as the amount of information presented in the offer, convenience of shopping, user-friendly interface, etc. All these factors are problematic for the research due to lack of a clear (and proper) way of measuring the mentioned attributes. Most of the previous studies also ignored the pricing strategy of vendors, which is a very important factor for price dispersion – it may involve reduction in prices of several products in order to attract customers to the store to buy other products with a much higher margin.

Introduction

The classical theory of economics assumes zero transaction costs, as the perfect competition markets include many small buyers and sellers that are well informed. Information is spread in zero time and without any costs. As a result, homogenous goods are sold at the same price.

Further theories assume that every economic exchange requires incurring some transaction costs. Referring to Coase's theory one may say that the sum of costs attached to all transactions equals the friction forces in a physical system (Sobiecki, Pietrewicz, 2011). In this approach the most important elements are the costs of: determining adequate prices, negotiations and making contracts.

J. Stiglitz postulates moving from the competition paradigm to the information paradigm. He claims that assuming imperfect information, often there is no equilibrium on the perfect competition market and enterprises can establish prices above the marginal cost (Boehlke, 2010).

Gathering information is quite an expensive process. Additionally, very often partial information is not worth buying (up to a certain amount of information its value equals zero). Differences in attitudes towards buying information result in information asymmetry on the markets. Part of the buyers will be aware of more offers and will have a better view on the price distribution than the buyers with e.g. higher alternative costs of time.

According to many researchers, Internet was supposed to turn the trade in goods into a frictionless process. Lower search costs (one-click distance), increased number of sellers and tools like shop bots were supposed to reduce the price dispersion significantly, resulting in fact in one market price for a product set on a marginal cost level. Although in many countries e-commerce has not yet reached full maturity and not all the buyers use shop bots, some researchers already decided to conduct empirical studies in price dispersion on the Internet. Unfortunately these studies have not confirmed the initial assumptions. Moreover, recent studies often indicate that price dispersion is even higher online than on traditional markets.

The goal of the article is to present some chosen (often inconclusive) results of empirical studies in price dispersion of homogeneous goods and to explain the research methods used in each case in order to indicate potential challenges in this area. Price dispersion set as a result of the mentioned studies does not necessarily correspond with the real price distribution on a certain market. This paper aims to list the most important comments regarding the way of measuring price dispersion in e-commerce.

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Methodology of the research

The aim of the paper is to show the challenges of research methods used for measuring price dispersion. The article is based on existing papers presenting particular problems and their proposed solutions. Conclusions described in the article will be used by the author in the consequent work on an own research method for measuring price dispersion of the homogeneous goods online.

Results of empirical studies in price dispersion of homogenous goods sold online

There were many attempts of measuring online price distribution in different countries, taking into consideration different products and various periods. The table below presents some of the results of these studies.

Table 1. Results of empirical studies in online price dispersion

	Research period	Product category and item number	Number of sellers included in the research	Relative differentiation (%)	Variance (%)
Bailey (1998)	1997	Flight tickets	-	Over 28	-
	02.1997-01.1998	Books (125)	8	-	13,3
	02.1997-03.1997	CDs (108)	9	-	17,61
		Software (104)	35	-	7,07
Brynjolfson and Smith (2000)	02.1998-05.1999	Books (20)	8	33	-
	02.1998-05.1999	CDs (20)	8	25	-
Lee and Gosain (2002)	02.1999 – 01.2000	CDs (22 old)	9	31	-
	02.1999 – 01.2000	CDs (21 new)	9	19	-
Clay and others (2002)	04.1999	Books (107)	13	27-73	-
Clay, Krishnan and Wolff (2001)	09.1999-01.2000	Books (399)	32	32-65	12,9-27,7
Clay and Tray (2001)	2001	Books (95)	9	23-42	-
Baye, Morgan, Schelten (2004)	11.1999 – 05.2001	Electronics (36)	20 on average	57*	12,6
Baye, Morgan, Schelten (2003)	08.2000-03.2001	Electronics (1000)	2-40	40*	10
Scholten and Smith (2002)	2000	Books, electronics	-	-	12,87
Pan, Ratchford and Shankar	11.2000	Books (105)	12 on average	48,9	13,8
		CDs (43)		51	18,4

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(2003)		DVDs (96)		43,7	16,7
		PCs (105)		34,4	27,1
Pan, Ratchford and Shankar (2003)	11. 2000	Laptops (105)	12 on average	25,7	13,9
		Palmtops (37)		37,1	14,4
		Software (51)		35,6	25,9
		Electronics (66)		31	11,7
		8 categories in total		38,5	11,8
Ratchford and others (2003)	11.2001	Books (134)	8 on average	48	16,6
		CDs (120)		39,3	13,2
		DVDs (103)		32,29	10,22
		PCs (107)		15,01	5,46
		Laptops (96)		17,87	6,11
		Palmtops (52)		30,26	9,86
		Software (120)		18,95	6,51
		Electronics (94)		22,12	8,22
		8 categories in total (826)		28,7	9,8
Pan and others (2003)	02.2003	Books (141)	9 on average	48,9	14,21
		CDs (108)		51,04	8,79
		DVDs (110)		43,67	10,31
		PCs(41)		34,39	7,03
		Laptops (110)		25,7	7,32
		Palmtops (49)		37,1	14,13
		Software (100)		35,58	9,22
		Electronics (110)		30,99	10,83
		8 categories in total (769)		28,8	10,4

*Based on a difference between the lowest and the highest price divided by the minimum price of the product

Source: M. Krzesaj, Rozproszenie cen produktów homogenicznych w internecie. Retrieved from http://mikroekonomia.net/system/publication_files/741/original/4.pdf?1315213995

Results of the studies listed above indicate that the online price dispersion exists and additionally, very often its level is not minimal. However, it is very important to realize that the level of price dispersion depends significantly on the research method chosen for a particular study. Some data presented in the table above may already raise following questions:

- is price dispersion going to decrease as a result of Internet development?
- does price dispersion depend on types of products chosen for a research?
- do time and location of the study impact price dispersion?

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- A deeper analysis of the results and the research methods applied can lead to further questions and doubts:
- how is all data collected? Is it assumed that the buyers use shop bots or simply finds the offers using a search engine?
- which statistical measure is used to quantify price dispersion?
- what price should be considered for the study purposes – with or without delivery costs?
- prices offered by the online sellers are not necessarily final, so perhaps only transactional prices should be used for the research purposes?

In the next part of the article the author will try to answer all the above and several additional questions.

**Methods of measuring price dispersion
on the Internet - methodology challenges**

The main methodology challenges in price dispersion studies are listed below.

Offered prices vs. transaction prices

Almost all studies in online price dispersion are based on the offered prices. Researchers use shop bots or other sources enabling comparisons between the e-shop offers and assess the price distribution of all the collected prices. Using offered prices is one of the most criticized assumptions for measuring price dispersion on the Internet because it results in fact in measuring dispersion of offered prices, not the final ones established at the end of transactions.

Research results can be significantly impacted by several shops that for some reasons decided to try to sell their products at overestimated prices. Higher price can be also a result of certain price strategy (described later on in this article). According to E. Hopkins it should be verified if the vendors offering higher prices do actually sell their products (Hopkins, 2006). The only research that attempted to be based on transactional prices was the study of Bounie et al from 2012. It was an analysis of Amazon offers, where a transaction was considered finalized after the offer disappeared from the web portal and did not appear again within the next two days (Bounie et al., 2012). The authors were aware of some drawbacks of the method applied – the fact that an offer disappeared from Amazon might as well mean that the product was sold in other place at a different price. On

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the other hand, some online services supporting the sellers on internet auctions offer exposing a product once again after the product was sold or after unsuccessful auction. In such case if the seller renews the offer within the next two days, the previous end of the offer it will not be considered as a successful transaction.

Internet store as an advertising channel, not a selling place

Online stores can be divided into two categories: the ones that operate only on the Internet (dotcoms) and shops that have also their stationary branch (MCR - Multi Channel Retailer). K. Clay et al recognize that in case of MCR sometimes an online store may be only a form of advertisement (Clay et al., 2001). Such a conclusion may result from the fact that the research was performed in 2001 when the Internet (especially e-commerce) was not yet mature and some of the retailers did not fully understand the nature of online competition. However, the study by Xing from 2010 confirmed that MCRs have higher prices than dotcoms (Xing, 2010). The research was conducted on five MCRs and five dotcoms in China, using data about 51 DVD titles. Results clearly indicate that dotcom prices are lower than MCRs and the price dispersion among the MCRs is higher than within dotcoms. Higher dispersion is explained by the fact that prices of part of the MCRs are equal to dotcom prices and part of the MCRs is trying to sell their products online at the same prices as in their stationary shops. This research has also shown an important role of the time spent on the study. MCR prices go down slower than the dotcom prices, so the difference between the two types of shops decreases with time.

Time and place of the study

It is probably the most important decision that has to be taken while planning price dispersion research. Scientists choose concrete products; check their prices in a certain country, state (USA) or city. There are many possible mistakes that can be made during this process. Limiting the territory may cause that a researcher sees only part of the picture – part of the buyers can search for the products e.g. outside of their own country, state etc. Studies regarding English-language books, electronics, CD-s and DVD-s cannot be limited only to the Polish market because buyers have the possibility of buying these products abroad. Despite higher shipping costs,

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differences in prices often encourage to purchase products in other countries (especially in case of buying more than 1 item).

Companies may have different price strategies on different markets. One of the recent examples was reported by a customer who compared prices of the same sport jacket in LIDL between Poland and UK. The price in Poland was 75 PLN (approximately 15 GBP) and 6,99 GBP in UK (Przyłapał Lidla..., 2014). In this case widening the research territory from Poland to e.g. Europe would give completely different results.

A second example of challenges for price dispersion studies is the research conducted for the Polish web site dlahandlu.pl. The largest retailers are regularly checked in terms of the price of a certain basket of grocery products. The main problem of this research is that the retailers are being informed about a pollster visiting the store at a given date, which gives the stores the opportunity to set discounts on the checked products. One time when the pollsters visited the shops without previous announcements it turned out that the basket price (50 products in) was higher by up to 50 PLN comparing to the previous month (Sieci handlowe..., 2013). The ranking of retailers is different when it is prepared after informing the stores than performed by surprise, so is the price dispersion.

The research conducted for dlahandlu.pl does not take into consideration any discounts (e.g. granted for bigger purchases) which influence the price dispersion.

Among the studies in Internet price dispersion there are also examples showing how choosing a certain time and place of the research can impact its results. For instance, in the research conducted by Clay at a group of stores was selected by using two shop bots (Clay, 2001). If a store was found out by both shop bots, it was included in the study – this way many companies that were not cooperating with both or even one of the bots, were omitted.

J. Lindsey-Mulikin and D. Grewal performed a research of TV sets (77 models) and VCR prices (64 models). The trial was based on one day data and information about prices were collected only via one shop bot - Bizrate (Lindsey-Mulikin, Grewal, 2006).

Z. Ge and Y. Shao limited the scope of their research to five largest Chinese online book stores (dangdang.com, joyo.com, bjbb.com, china-pub.com, welan.com) (Ge Shao, 2005). Taking into account the fact that the study included only 50 titles, the results can be considered flawed.

The research conducted by W. LUO and Q.B. Chung is a counterexample of the above cases. Prices of electronic devices were gathered not via

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shop bots like in other studies, but by simulating purchases (Luo Chung, 2010). This way enabled collecting up to date prices, including discounts, shipping costs etc.

A similar method of collecting data was chosen by A. Civan et al in their research from 2007. These scientists simulated purchases of 80 products in 8 categories. Here on the other hand the main objection can be raised around popularity as a criterion for choosing products for the study. Goods were added to the research database if the number of offers was higher than a certain level (Civan et al., 2008).

In two articles (from 2009 and 2012) Bounie et al described result of studies based on the top 100 books, CD-s and DVD-s on Amazon in USA, UK and France. This was also not the best approach – as described by Clay et al. (2001 paper), price dispersion of bestsellers is higher than the rest of books. It can be assumed that the more popular the book, the more some sellers are trying to raise the price. Bounie's conclusions are also instructive for a different reason – price dispersion measured in France was significantly lower than in USA or UK (all results for Amazon). This result is caused by the French law – in France it is not allowed to sell a book at a price lower by more than 5% from the level officially set (Bounie et al., 2009 and Bounie et al., 2012).

Data for the Baily's research were gathered only in Boston. Brynjolfsson collected data in several states, but here the data from stationary stores for comparisons was difficult to collect due to holiday period (no volunteers). Missing data were replaced with data from Boston and September was not included at all (Brynjolfsson., 2000). Moreover, the cost of a traditional purchase was calculated based on a distance to the nearest book store – this variable may differ depending on the country (different distances and fuel costs).

Dispersion measures

There is a wide range of statistical measures that can be used to quantify price dispersion – beginning with standard deviation, gap, quartile deviation, ending with variability index. Standard deviation and variability index are the most common in price dispersion studies, but other measures are also quite often used. One of them is a difference between maximum and minimum prices divided by the minimum (or maximum) price. A second, more interesting example is the study of Baye et al, where price dispersion

is calculated as the difference between the two lowest prices (quoted from: Civan et al., 2008).

Depending on which measure of variability is chosen, some data may have a significant impact on the study results. The crucial role is played here by the so-called outliers. In case of using the spread between maximum and minimum price, or dividing this spread by the minimum or maximum price, the presence of outliers will have a significant impact on the results. Applying the Baye's measure on the other hand will cause that the maximum price (no matter how high it is) will not affect the size of dispersion.

Another important decision in price dispersion studies is the approach to weights used for calculating dispersion. A researcher has to decide whether any offer has identical share or stores that sell more items should have higher weights and therefore bigger impact on the results. Unfortunately, it is difficult to get to know the number of transactions in an online store. One method to overcome this problem is using the number of comments on the internet shops' websites. Not every transaction ends up with a comment, but previous studies indicate that the correlation between the number of comments and the number of transactions is 0.9 (Bounie et al., 2012).

Product availability

Most of the researchers measuring price dispersion use shopbots to gather input data, but in many cases the results don't contain any information about the product availability. As a consequence, the study may be partially based on offers that are no longer valid. The work of shopbots is based on checking from time to time (usually once per day) if the offer on a store's website has not changed. It is possible then that the price changes in online stores are not reflected in the shopbots results – in a certain point of time the price or the product may be different or the item is no longer available.

Homogeneity of products

In the studies in price dispersion the most frequently used products are: books, CDs and DVDs. That is because of their homogeneity and popularity in terms of Internet sales. However, sometimes even these products are not as homogeneous as they appear. Some books and CD-s offered on the online auctions are signed by the authors or artists, which significantly

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increases their value and definitely shows that we no longer deal with a homogeneous product (Bounie et al., 2009). Sellers can also add different kind of freebies to their product, which again causes that the product is not homogenous anymore. In order to unify the products, items which are not homogenous have to be rejected, but performing such a rejection may be challenging. It is difficult to eliminate offers manually, so researchers often apply some rules to automate this process. In the study already quoted, Bounie et al. rejected the top percentile of prices (Bounie et al., 2009) or offers with prices that were 2 times lower or higher than the median (Bounie et al., 2012).

Shipping costs

Cost of the delivery is one of the major problems of Internet price dispersion studies. Firstly, some researchers often ignore the fact that the products bought online have to be delivered to the customer and focus only on the so-called pure prices. This approach obfuscates the online price dispersion, as the pure price is only one of the components of the whole service and should not be considered separately. Secondly, shipping costs are much more complicated than the pure price – usually there are several shipping options available in a store or auction, and the user has to decide which version is the most profitable in a particular case. The options depend e.g. on the product size, weight, number of purchased and the location of the buyer and seller. Part of the shops allows the buyers to collect the products themselves from the offline shops (at no additional costs). Some areas have packstations, but in other places customer can only use the national postal service or courier services. All this diversity of delivery costs seems to be an underrated factor influencing the size of price dispersion on the Internet. Search costs of the pure prices are effectively reduced thanks to Internet, but the costs of seeking additional information may reduce the sensitivity of the price and consequently increase the prices (Ancarani, 2002).

Price dispersion is often higher in studies based on prices that include delivery costs (Ancarani, 2002). Sometimes the results are contradictory (Nelson et al., 2007) because vendors pricing strategies assume offering lower prices for products themselves and higher shipping costs to make up for this loss of margin. Part of the shop bots and auction services now allows comparing the offers by both pure prices and prices including shipping costs. It does not solve the problem completely, as the cheapest deliv-

ery option is usually collecting the product from a traditional (offline) store, which is uncomfortable and unprofitable for most of the users.

Another factor that seems to be completely overlooked by researchers is the possibility of buying a few items at a time - most of the studies focuses e.g. on the purchase of a single book or CD. This aspect may be less important in case of dispersion studies, but researchers often combine price dispersion analysis with the price level study and in this area the results often show that buying products online is not profitable because of a high delivery cost. This conclusion would be different if purchasing more products was considered.

Product selection

The most common products used for price dispersion studies are goods of a relatively low cost like books, CDs and DVDs. There are no studies that analyse more luxury homogeneous goods to check whether the product price level does not affect the price dispersion. According to Civan, luxury goods may have a greater dispersion of prices because they are bought by people who are less sensitive to price and have higher opportunity costs of time (Civan et al., 2008). As already mentioned, in case of selecting books or CDs as subjects of price dispersion studies, there is a difference in price dispersion between bestsellers and other books. Other challenge that can be met here is choosing sufficient number of comparable products and their apparent random selection. Test samples often contain approximately 20-30 titles and this size may be assessed as not representative. Price dispersion can also vary depending on the group of books, e.g. in poetry, reportage, guides, etc. There is no research so far that would take into account this diversity.

Price changes over time

This issue is related to the choice of testing time. The key factor for the study results is the frequency of measuring prices (e.g. daily, several times a week or once a month). This topic is related to the development of tools for dynamic pricing. Such tools are used by companies for positioning their offers in the shop bots results. Change in the competitors' price often causes automatic reaction of other sellers - such changes may take even place several times an hour (Price wars..., 2012). The authors of Price wars quote the example of the microwave oven which price on Amazon changed 9

times in one day, it cost from 744 to \$ 871. BestBuy responded immediately to almost all these changes (Price wars..., 2012).

However, Bounie et al. concluded in their studies that dynamic price-fixing tools are not so popular yet (in some countries shop bots do not allow for such procedures). In the aforementioned studies on Amazon in the US, UK and France prices remained unchanged by approx. 90% of the duration of the offer. An interesting observation was that the Amazon prices were likely to remain at the same level, and if they changed, it was often an increase. The rest of the sellers changed prices more frequently and it was rather reduction of the price (generally the smallest changes were noticed in France because of the already mentioned law regulations) (Bounie et al., 2009).

For the price dispersion studies it is also crucial if the analysed book is new or not. When introducing a new product to the market it sometimes happens that a publisher has a monopoly for a given period of time (dispersion is then equal to zero). After that more companies will try to get their share of the market, e.g. using lower prices, so the price dispersion increases. In a study of Nelson et al prices were collected weekly and researchers decided to include the variable "Week" in their model to see if dispersion is changing each week or not. It turned out that the variable is relevant and the longer the period, the higher dispersion (Nelson et al., 2007). Perhaps it can be explained by the fact that after the first wave of selling, some bidders are trying to use lower prices to get rid of the rest of the stock and thus raise cash for the next purchase.

Price strategies

In theoretical models and in many empirical studies it is assumed that the lowest price at which one can sell a given good is the marginal cost (in practice the researchers do not know this cost). Hence the idea of Baye to measure price dispersion as the difference between the two lowest prices. Companies however apply different pricing strategies and sometimes may sell part of the products below marginal cost, e.g. when an item is meant to attract buyers who will purchase also other items, with standard margins. Companies may have different goals at a certain point of time - e.g. to maximize profit in the short or long term, to maximize sales, gain market share or maintain price leadership. Based on that, firms set their pricing strategies that include: the choice of pricing tactics, the method of calculating price

discounts, payment methods, reactions to the competitors' moves, etc. (Rogoda, 2004).

Preparing pricing strategies is typical for larger companies, and research on the price dispersion generally concerns books and records, traded mostly by small entities. The research shows that these companies use in practice only one pricing strategy - cost plus. This strategy is based on adding a margin to the calculated unit cost. It has a huge advantage over the other methods in case of selling large amount of products (e.g. books or CDs and DVDs), because it is very easy to use. In such a situation the existence of price dispersion can be explained by the fact that companies simply do not check competitors' prices very often, they rather carry out their cost-plus strategy with a few exceptions, e.g. to attract the customers. In order to understand this topic in more details, perhaps a survey of online retailers should be carried out to find out what are their pricing strategies and what does it mean for the price dispersion.

The fact that the seller use different pricing strategies was noticed in the research conducted by Nelson et al. The prices of all bidders were sorted from lowest to highest and they have been given a rank - 1 for the cheapest offer, and 10 for the most expensive. Afterwards the researchers calculated the average rank of each bidder, taking into account all the products. If a company has always offered the lowest prices, it would rank 1. The lowest average ranks received in the survey were: 3.45 for books, 3.73 for DVDs and 2.41 for CDs. This study has shown that there are no firms which have the lowest prices for all their goods (Nelson et al., 2007).

The ways of searching for offers and information processing

The appearance of the Internet and tools like shop bots caused that some of the scientists predicted that the price dispersion will quickly disappear. It turns out that one of the important factors limiting this process is differences between the customers buying products online. Data on the number of Internet users in the world do not contain information about the level of their information literacy. Not every internet user searches for information in the same way and has the same knowledge about such tools as search engines and shop bots. The studies presented in this article are in general limited to the use of shop bots, but perhaps the researchers should also take into account the fact that some users will buy a book by typing the title to search engines or will use the auction sites. Gathering these data could give other results in terms of price dispersion. Apart from that, even using the

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shop bots one may get different results depending on a concrete shop bot. There are several shop bots on every market and each of them has signed an agreement with the other group companies. On the Polish market we can use e.g. Ceneo.pl, Radar.pl, Nokaut.pl, Skąpiec.pl, Tanio.pl or Okazje.info.pl.

Price comparison websites can be also divided into several categories:

- Autonomous and neutral shop bots – containing only information about the price, offers sorted by price (owner's revenue is mainly advertising),
- Autonomous biased shop bots – collecting fees for positioning the offers,
- Context shop bots - tables of prices and product information,
- Personalized shop bots - give the ability to sort listings by consumer filter (Krzyszak, 2006)

Some studies also show that the shop bot owners are not interested in redirecting the users always to the same stores. In order to achieve that, the so-called obfuscation strategies of offers are used (Ellison Ellison, 2001).

Supposing that the buyer wants to find the lowest price of the product using a search engine, the key questions are:

- How many result pages will he/she check?
- How will the query be built?
- Which search engine will he/she use (e.g. google, ask, baidu)?
- Should he/she take into account the sponsored links?

The concept of reducing price dispersion on the Internet almost completely ignores the issue of processing information by the buyers. Higher availability of data or tools to process them does not necessarily mean that consumers have better knowledge. "The basic assumption of information processing is the assumption about the economics of this process. According to this assumption processing of all available information would make no sense - most of the data is useless for a person in a concrete situation. Moreover, a person is not able to process all the information available, even if it is fully useful, because the human mind has limited capacity. According to S. Fiske and S. Taylor, the man is a cognitive miser, a creature that usually involves only a part of available cognitive resources "(Necka et al., 2008).

While analyzing the online shopping for homogeneous goods we should also take into account the achievements of psychology of economics. Probably part of the buyers use the so-called mental accounting and has a different way of searching for the best offer when buying a book for themselves or e.g. as a gift. The attitude may also result from the fact that in a given

period a person has already spent a certain amount of money on cultural goods and will plan to spend as little as possible for the next goods in this area, e.g. a next book (Piskorz Zaleśkiewicz, 2003). An important role may be also played by the reference point chosen by the buyer - perhaps some buyers at the beginning of the search set their maximum amount to spend and buy at the first store that will meet this requirement.

Reputation of the seller

The last factor presented in this article that may affect the price dispersion is the reputation of sellers. Some researchers undertook the difficult task of checking whether a greater reputation of stores let them set the higher prices. Of course, the most difficult part of this research is to determine how to measure the reputation. Some researchers use comparisons done by the Bizrate shop bot, which in addition to the price also indicates the overall assessment of the seller in terms of the presented information about the product, quality of the service, usability of the online store, etc. In some studies shops are divided into 2 groups: sellers that advertise a lot on TV and the rest of the shops (Civan et al., 2008).

The vast majority of studies have failed to find a relationship between the reputation and the price level. One of the reasons given here is the fact that provide more information does not give the seller an opportunity to set higher prices. Since the distance between two shops is reduced to just one click, a buyer can retrieve information from one source, and then buy a product in another store at a lower price (Brynjolfsson, 2000). Up to some point there was a statement amongst the scientists that the Internet will divide shop into two groups – there will be sellers with a low price but poor service and the second group will include shops having a great level of service, but the consumer will have to pay more for it. Research of K. Baylis J. Perloff overthrew those beliefs, as it turned out that that online companies split in fact into "good" and "bad" sellers. The good ones have low prices and good service and the bad ones have high prices and a lot of inconvenience for the purchase (Baylis Perloff, 2002).

Nelson et al summarized the results of research on vendors' heterogeneity with following conclusions:

- It is not known which factors are relevant,
- In various studies the same factors interact in different ways,
- If any of the factors explained dispersion – it was minimal (Nelson et al., 2007).

Conclusions

The studies of price dispersion of homogeneous goods sold on the Internet involve many challenges. Manufacturers and retailers are taking many actions to distinguish their products and as a result, these goods are often no longer homogeneous. Studies conducted so far focused mainly on books, CDs and DVDs, so they cannot be generalized to all products. Part of the available research results is already quite outdated because of the development of e-commerce and the increased use of tools such as shop bots. Further studies should apply a unified method of research – which means e.g. the same measure of dispersion, the same selection of products and the same way of reaching out to the offer (search engine, shop bots or auction sites). Due to the fact that the price dispersion studies are carried out in different countries having their own specific features (e.g. law in France), meeting all these conditions does not seem to be achievable.

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Knowledge Acquisition in Small and Medium-sized Enterprises

JEL Classification: *L21*

Keywords: *small and medium- sized enterprises, manager, knowledge, absorption of knowledge, knowledge acquisition*

Abstract: This article applies to the process of organizational knowledge acquisition by managers and specialists with possesses manager license. In the theoretical part explained concepts of knowledge, knowledge management, knowledge sources, the step of creating and acquiring knowledge. The research part focuses on the presentation and analysis of obtained results of research performed by the author.

Introduction

The problems associated with the process of knowledge management in present organizations, including those from the small and medium-sized, are often undertaken in Polish and worldwide literature. The subject has been described by many researchers, from different points of view: management, economics, psychology, accounting, sociology. Despite such a broad research of the topic, it is still alive, but not well studied. We live in the time of a knowledge-based economy (KBE), so the search for new op-

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portunities to acquire knowledge, its application and use, is an important issue. In the research area of the article author, acquisition process (absorption) of knowledge in the sector of small and medium-sized enterprises (SME) is the main interest.

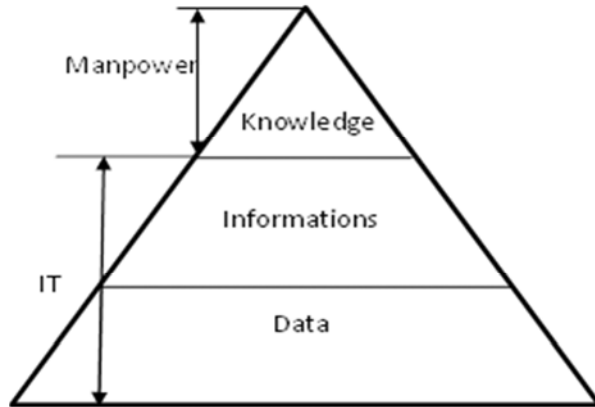
Methodology of the research

The study was carried out on a sample of 30 companies from the sector of SME in the Lodz region (Poland). The surveyed companies represent different sectors (eg. textile, food, metal, transport). In order to conduct the interview, forty managers of different levels and specialists from various fields and functions (eg. supply, logistics, HR, IT) were chosen. The research was carried out in the framework of the Faculty of Management at the University of Lodz at statute as its chartered activity (about own activity). The research tool was a questionnaire. The purpose of this article is to present the results of research in connection of the knowledge acquisition in the SME. The hypothesis is: the most common sources of organizational knowledge in the process of absorption are: employees, the Internet and trainings. The research is a continuation of the study started in 2014. Parallel to these, studies in the area of the internationalization of enterprises are being conducted.

Knowledge - the concept and essence

Knowledge is deemed to be the key resource of an organization and a key factor in the success of any business, regardless of size or industry type. It has an impact on the company's mission, objectives, vision, strategies, methods and technologies. P. Drucker notices that the material resources of the organization went to the wayside (Drucker, 1999, p. 13). According to many sources, the basis of knowledge are both: data and information (Brdulak, 2005, p. 14) (Fig. 1).

Figure 1 Hierarchy of knowledge in the organization



Source: Applehans et al (1999), p. 20, Brdulak (2004). Retrived from <http://www.e-mentor.edu.pl/artykul/index/numer/4/id/52> (14. 11. 2014).

The data are numbers and events, which are the constituent elements of information (Grudzewski & Hejduk, 2004, p. 75). The data can be informal and unorganized, however it can also be ordered and formalized, and "tailored" for the user's needs they become an information. An information is a registered, grouped, collated and interpreted form, from the point of view of the particular situation (Galata, 2004, p. 59). Knowledge is a specific type of organization resource, which comes up along as it is used (in opposition to the other organization resources) (Galata, 2004, p. 50). An information is defined as everything that anyone knows about a particular field or a particular subject (Penc, 1994, p. 3). The word "information" comes from the Latin *information* (explanation, image, notification); and knowledge is a "supply of messages from a particular area" (PWN Ecylopedies[in:]<http://encyklopedia.pwn.pl/haslo/3914686/informacja.html> [odczyt dn. 12 XI 2014]). The Polish Dictionary says that the information is understood as a "message about something (Bańko (Ed.), 2005, p. 543)," but also a "data processing by a computer" (Drucker, 1999, p. 43). Knowledge is explained as the "general information acquired through learning, understanding of something, awareness of something." In the literature there is a consensus on the fact that the data are the basis of creating an information, and those makes the organizational knowledge. P. Drucker, one of the first researchers in this area, has emphasized the importance of knowledge in the economy, he defined it as an effective use of information (Drucker, 1999, p. 43). A.K. Kozminski refers the knowledge to the formation of competi-

tive advantage, noting that transformed prior knowledge, becomes a secondary knowledge, which in the process of knowledge management can give an advantage in the market (Kozminski, 2005, p. 96). An interesting definition of knowledge is given by A. Tiwana, from his point of view, it is a mix consisting of contextual experiences, values, skills, information, understanding and assimilation of new information (Tiwana, 2003, p. 60). Moving on to the term of organizational knowledge types, it is comprehensively presented by B. Mikula, who has upheld the knowledge components such as: core of a personalized knowledge, personalized knowledge itself, codified knowledge, well-established knowledge, up to the organizational knowledge, which determines the key competencies (Mikula, 2005, p. 16). With the core the modification of personalized knowledge to the codified is possible.

Knowledge management- essence, components, steps

The concept of knowledge management also has many definitional approaches regarding its essence. Among them, the most often developed (by advisory and consulting companies) can be listed, as they are based primarily on the use of knowledge as a source of competitive advantage of the company. According to K. Perechuda: knowledge management is a process by which it is possible to continuously execute the functions of management (Perechuda (Ed.), 2005, p. 219) and "management in terms of the knowledge-based economy" (Perechuda (Ed.), 2005, p. 219). Referring to the Encyclopedia of Management, the definition explains the process as "general actions for the identification, preservation, dissemination and use of knowledge overt and covert of the company staff, mainly for increasing the efficiency and effectiveness of employees actions" (Encyclopedia of Management [in:] http://mfiles.pl/pl/index.php/Zarządzanie_wiedzą [odczyt dn.: 12 XI 2014]). D. J. Skyrme sees knowledge management through the prism of the stages of the process: creating, gathering, organizing, diffusing, use and exploitation (Skyrme, 1999, p. 59). On the other hand M. Sarvary emphasizes that knowledge management is a business process by which companies use organizational knowledge (Sarvary, 1999, p. 95). Similarly to D. J. Skyrme, understanding of the process of knowledge management can be found in the book *Knowledge management in organizations* (G. Probst, Raub S., K. Romhardt). The authors have developed a knowledge management scheme, where can be found following steps:

- Acquisition of knowledge,

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- Locating of knowledge,
- The preservation of knowledge,
- The use of knowledge,
- Sharing of the knowledge (dissemination),
- The development of knowledge (Probst et al., 2002, p. 42).

A. Jashapara proposed own approach in the process of knowledge management cycle. His approach is based on the following specific processes: knowledge discovery, knowledge generation, application of knowledge, valuing knowledge and its dissemination (Probst et al., 2002, p. 42). E. Skrzypek defines the knowledge management as a combination of: understanding and experience, overt and covert knowledge, and physical and social technology (Urbańczyk (Ed.), 2001, p. 254). From the economic point of view, the essence of this process is presented by K.M. Wiig, saying that it is a systematic and thoughtful creation and application of knowledge in order to maximize the efficiency of the business and achievement of a profits on the resources of knowledge (Wiig, 1993).

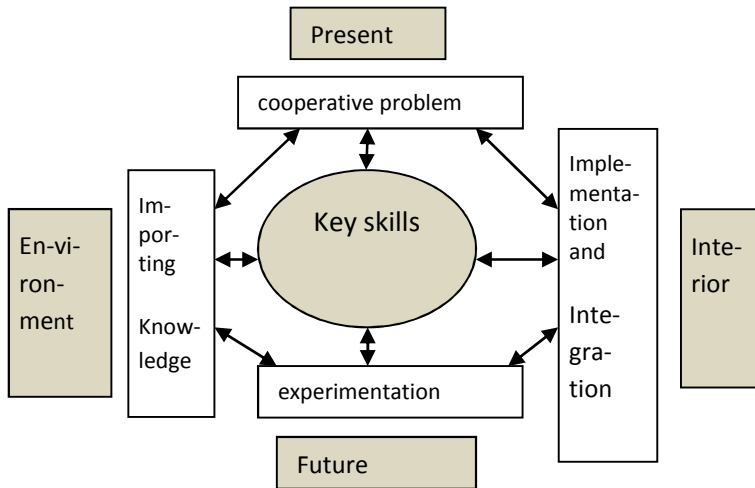
Generally, in a multitude of definitions, they can be divided into two paths according by the approach of the knowledge management process: as information systems, where the key role is an information management and technical-technological support and a management of human resources in the organization (Jashapara, 2006, p. 26). From the point of view of the subject of this paper, the author combines the two paths in the process of knowledge management, especially taking into account the stage of acquisition.

Sources of knowledge and knowledge creation stages

Acquiring a knowledge is often called absorption (Polish Language Dictionary). The word comes from the Latin *absorptio* and means to imbibe of something (PWN Encyclopedies). This is the initial step in the process of knowledge management. The basic conditions that are conducive to the process of acquisition and creation of a knowledge in organizations, include mainly appropriate organizational culture. It makes the employees engaged to the process of knowledge acquisition. A crucial role is played by managers, who through the attitude, style of management and appropriate systems of motivation, can and should create a culture based on the knowledge. Among the basic conditions conducive to organizational knowledge acquisition I. Nonaka and H. Takeuchi mention the following order: intention, autonomy, instability (creative chaos), redundancy and the desired diversity

(Nonaka & Takeuchi, 2000, p. 98). Based on the resource model, also known as "sources of knowledge" model, which was created by D. Leonard - Barton, can be distinguished both the existence and interaction of several elements for the proper management of knowledge (Fig. 2).

Figure 2 Model of knowledge sources



Source: Leonard-Barton (1995) In Sopińska, Wachowiak (2006). Retrieved from <http://www.e-mentor.edu.pl/artykul/index/numer/14/id/275> (15.11. 2014).

A. Sopińska and P. Wachowiak say that the model of knowledge sources (above) "is too firmly rooted in the realities of the industrial economy to bring any revolution in terms of knowledge creation. The more that most of the results of the organization are focused on short-term activities related to the exploitation of the existing knowledge, rather than exploration (and creating) new knowledge" (Sopinska & Wachowiak, 2006). The process of knowledge creation is supported by a number of activities and initiatives aimed to increase the amount of knowledge in the organization, needed to achieve a competitive advantage (Jaśkowiec, 2010, p. 26). M. Kłak brings the knowledge creation process to the following activities:

- Search for new information,
- Selection of the information,
- Creating concepts, structures and properties (Kłak, 2010, p. 49).

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M. Sarvary calls the process by which a company acquires knowledge as organizational learning (Sarvary, 1999, p. 96). M. Morawski notes that the process of acquisition (creation) of knowledge is one of the elements of knowledge management and is part of the knowledge, which derives from internal as well as (mainly) external sources, which refers to the environment (relations with customers, suppliers, partners, etc.) (Morawski, 2005, p. 80). All of the concepts of knowledge management process, include and emphasize the importance of an elements like the process of acquiring and creating knowledge. The author of this article deems that the acquisition and creation of knowledge are sequentially succession, but not identical, however for the simplicity in the study of these processes, they are called as a one term: absorption of knowledge.

Knowledge absorption in the enterprise- analysis of the results

In the section on research methodology has been emphasized that the research was carried out within its own statutory activities. Respondents were informed about the purpose of the study and about the key definitions related to the process of knowledge management, including the process of absorption of knowledge in organizations. 40 managers and specialists were interviewed, all respondents answered affirmatively to the question about the possessing the knowledge as a potential source of competitive advantage for the organization. In the free statements they have emphasized that the knowledge have to be acquired and updated continuously. Only then it is possible to meet the demands of the market and follow the customer demands, also an increased competition forces a company to develop the knowledge.

Another part of the study was to provide to respondents prepared and randomly written sources of knowledge. Respondents were asked to evaluate the importance of different sources of knowledge absorption and frequency of their use, using the elements of subjective and objective evaluation. For this purpose, the following scale was used:

- no significant - "0"
- small significant - "1"
- Strong significant- "2"
- Very strong significant - "3".

The scale was related to several key processes: supply, production, sales, management, introduction of new technologies.

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The results in the rows of a table were developed as statistically most given answers (40 managers and professionals from various fields) (Table. 1).

Table 1. Sources of knowledge (Listed only those sources that have the power of the strongest impact labeled- "3")

Source of knowledge	Supply	Production	Sale	Management	Introduction of new technologies
Internet	3	3	3	3	3
Top manager	2	2	2	2	2
Employees	2	3	2	1	3
Providers	3	3	1	1	3
Customers	3	3	3	2	3
Knowledge acquisition alone	1	3	2	1	3
Training	3	3	3	3	3
Company documentation	2	2	2	2	3
Technical documentation	2	2	1	1	3
Studies	2	1	3	2	2
Research, analysis, reports	3	3	3	3	3
Databases existing in the company	1	2	2	2	1
Books, magazines, media	3	2	2	2	3
Benchmarking	2	3	3	2	3
Friends, family	1	1	1	0	1
Contests	0	1	1	1	2
Cases of Polish and foreign companies	1	3	2	3	3

Source: own analysis.

Analyzing the results presented in the table, it can be noticed, that the strongest influence (on the surveyed managers and specialists) on absorption of knowledge are the following sources: the Internet, trainings, research, analysis and reports; then: customers, employees, business docu-

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mentation, benchmarking, cases of Polish and foreign companies. Statistically the smallest significance for the respondents have: friends and family, contests, databases existing in the company. Subsequently, analyzing the data of the table, referring to the importance of the various sources of knowledge, it can be noticed, that the same sources influences stronger some particular processes, and less some other. The results show that:

- For the supply process (in the process of knowledge absorption) strongest influence have: the Internet, suppliers, customers, trainings, research, analysis and reports, books, magazines and the media;
- In the production process: the Internet, suppliers, customers, independent acquisition of knowledge, trainings, research, analysis and reports, benchmarking, cases of Polish and foreign companies;
- In the sales process: Internet, customers, trainings, studies, research, analysis and reports, benchmarking;
- For the process of management: the Internet, training, research, analysis and reports, cases of Polish and foreign companies;
- In the process of new technologies introduction: the Internet, employees, suppliers, customers, independent acquisition of knowledge, training, documentation, business and technological documentation, research, analysis and reports, books, magazines and media, benchmarking, cases of Polish and foreign companies.

The expanded interview shown that the trainings are generally low assessed. The respondents emphasized that trainings are often different from their expectations. The author of this article is interested particularly in the question of workers as a source of knowledge. Studies have shown that in this case it is certainly underestimated resource. Managers note that employees do not show initiative in improving processes nor knowledge sharing, and they should be more often motivated to "show independence in thoughts and action". Since the purpose of this article was not to study the existing incentive schemes in the surveyed companies, nor checking their impact on employees' engagement, and due to the fact that the respondents were people holding managerial positions, the questions about wages and/or motivation bonus were not asked. In addition, the surveyed companies represent different industries, so the workers employed, are often characterized by different licenses and skills, hence the question of average wages would be unfounded. However, there is a presumption of serious infirmities in the system of evaluation and remuneration of employees' in the surveyed enterprises.

Barriers and difficulties in the knowledge absorbing

In the literature different barriers associated mainly with the process of knowledge sharing are often described. The barriers of organizational knowledge obtaining are mentioned seldom. Often, although wrongly in the opinion of the article author, it is assumed that knowledge is widely available and anyone can reach it. Respondents have indicated various examples of the difficulties and barriers related to the process of knowledge acquisition in the surveyed enterprises. They are presented in the table below.

Table 2. Barriers and difficulties in the process of absorption of organizational knowledge (Listed only those sources that have the power of the strongest impact labeled- "3")

A kind of barrier	Impact strength
No access to the Internet	0
No friendly IT	3
"Unsupportive" management style	3
Unwillingness of workers to self-development	3
Inability to self-knowledge acquisition	3
Unwillingness providers to share knowledge	3
Lack of commitment to the processes of the customers side	2
Lack of time for additional improvement, for example courses, etc.	3
High costs	3
The belief that contribute little training	1
The belief that the studies do not prepare for practice	1
Untrustworthy preparing documentation of business and of technological documentation	3
Lack of ability to use sources of knowledge	3
Reluctance to performing research, analyzes, reports	3
Lack of appropriate databases in the company	3
No of tangible publication	2
Barriers associated with the use of benchmarking	3
Information noise, uncertainty information	3
No connection with the acquisition of knowledge in the company's motivational system	3
No strategy, no objectives	3
Lack reliable scientific studies and case studies	3
Lack of proper organization and coordination	3

Source: own analysis.

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Analyzing this data, it can be seen that the greatest impact on the barriers formation (in the process of knowledge absorption), according to the opinion of the respondents, have following factors: lack of friendly IT, "unsupportive" management style, reluctance of workers for the self-development, the reluctance of suppliers to share the knowledge, high cost of the knowledge acquisition, lack of time for additional improvement, unreliable technological and company documents preparation, disability to use sources of knowledge, inability to self-knowledge acquisition, unwillingness to perform research, analyzes, lack of relevant databases in the company, barriers associated with the use of benchmarking, hype and uncertainty of information, lack of the connection between the knowledge acquisition and the company's incentive system, lack of strategy and clearly defined objectives, lack of reliable scientific studies and case studies, lack of organization and coordination. Lack of access to the Internet in the opinion of the respondents is not the main barrier in the process of acquiring knowledge, they said that in the era of computerization, the access is basically unlimited and it cannot create a barrier.

Conclusions

The study had a pilotage character and it is a complementation to the study, carried out in 2014. The author is aware that the results are unrepresentative. However, on this basis it can be concluded that the Polish companies in the sector of micro and SME is not prepared for the overall process of knowledge management, even though the importance of knowledge acquisition for the competitiveness of the organization is clearly seen, it is not formal, regulated, or mandatory. It is not even systematic. The hypothesis was partially verified positively and partly falsified. The author of this paper in the past was a person in the position fulfilling a managerial functions, emphasizing on the workers knowledge as the most important (in her opinion) source of knowledge in the process of organizational knowledge absorption, so it was somewhat surprising that in the Internet, as a source, went ahead of the workers knowledge.

The research will be continued in 2015 as part of the statutory activity, with an extension to the internationalizing companies, as it was highlighted in the introduction, the author carries out a parallel study on the process of Polish enterprises internationalization.

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**Technological Parks and the Innovation
Activity of Enterprises in the Industrial
Networks – Developed Regions vs. the
Intermediate Ones**

JEL Classification: *L60; O31; O32*

Keywords: *innovation; industry; technological parks; network*

Abstract: Currently, technological parks constitute the most organisational and conceptually developed type of innovation centres and entrepreneurship. This results in the fact that they can be encountered in all highly developed countries in the world. They are also formed in the catching-up countries. However, one should consider whether the stimulation of innovation in the countries, which are not based on knowledge through institutional solutions used in the developed countries will turn out to be effective. Because between these countries there is a technological gap. The aim of the article was therefore to determine, using the probit modelling, the direction and strength of technological parks on the innovation activity. The study covered two provinces: Silesian, which is one of the most developed regions in Poland and Pomeranian with the intermediate industrial system. The influence of technological parks on innovation was determined based on the survey conducted in 1453 industrial enterprises. The main conclusions are brought down to the following theses: (1) using the technological parks increases the chance for the implementation of new solutions by enterprises, (2) parks to a greater extent stimulate the innovation activity in the developed province, (3) enterprises entering in the cross-regional network relations favours the selection of the technological park as the catalyst for innovation processes.

Introduction

In the modern economy it is recognised that technological parks constitute and most organisational and conceptually developed type of innovation and entrepreneurship centres (Mażewska & Tórz, 2012, p.25). This implies that they can be found in all highly developed countries in the world.

The official definition by International Association of Science Parks (IASP) is: A Science Park is an organization managed by specialised professionals whose main aim is to increase the wealth of its community by promoting the culture of innovation and competitiveness of its associated businesses and knowledge based institutions. Parks should foster knowledge flows, mainly among park firms, as well as between these and external R&D institutions (Jimenez-Moreno et al., 2013, p.19).

According to the Polish legislation, technological park is a group of separate buildings with the technical infrastructure, created in order to make the flow of knowledge and technology between scientific units (...) and entrepreneurs, on which the entrepreneurs using the modern technologies are offered with services within consulting in creation and development of companies, transfer of technologies and transformation of the results of scientific studies and developmental works into technological innovations, as well as creating these entrepreneurs the possibility to run the business activity by using the real estate and technical infrastructure on the contractual basis (Journal of Laws, 2002, art. 2, p.15). This definition shows a wide range of specialised services offered to entrepreneurs conducting the business activity in the parks. Moreover, the need for transfer of knowledge from the science to the world of economy and transforming it into innovations indicates the high level of technological advancement of entities residing in the parks.

Technological parks often combine in one structure functions of all other centres of innovations and entrepreneurship (Matusiak, 2009, p.29). The fact of focusing in the given closed area of companies and business services evokes the “synergy effects”, what combined with the R&D activity and risk financing may become the innovation environment (Matusiak, 2004, p.335). Improvement of the conditions for the course of the innovation processes is to lead to the increase of the competitiveness and boost of the regional development (Matusiak, 2008, p.9). Here what is important is the fact that the mere cooperation between companies is a necessary condition, but it may not be sufficient to begin the processes of knowledge transfer.

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For this reason, attention is also paid to the geographical concentration of economic entities, precisely through the creation of parks (Sarif & Ismail, 2006, p.134).

By acting in the network, the park residents have access to information, knowledge, ideas. It can be assumed that the network meets the functions of the incubator of the innovation process, in which the key role is played by communication, coordination and cooperation between participants. The role of the parks is to stimulate interactions between entities and institutions, while in the already developed parks the secondary meaning is found in the infrastructure, which is only the means to an end (Adamska & Kotara, 2011, p.76). It follows that in the process of managing innovations in the networks the biggest meaning is played by the provided services (BMW, 2012, p.6). Therefore, for the entrepreneurs there should be created the appropriate environment, which will allow the stimulation of the process of interaction and creativity (Kessler Park, p.7).

Technological parks in Poland are developing dynamically. In 1995 on our market there was 1 technological park. Currently, there are identified 40 parks and 14 park initiatives. Technological parks, however, are institutions, which for the Polish ground were moved from the highly developed countries. The question which arises at this stage concerns the effectiveness of their impact in case of stimulating the innovation activity. Will they meet their functions in Poland, where in relation to western countries there is a technological gap, and the processes the transfer of knowledge from science to economy are not yet developed. Will the divergence in the impact of the parks in the case of the different level of development of the industrial system of the studied region be noticeable? How does the distance from the competitor, supplier and recipient and the relations of the companies with them influences the decision concerning the launch of the cooperation with technological parks? The aim of the paper is to determine the direction and strength of the influence of technological parks on the innovation activity of the regional industrial networks. The direction determines whether the park increases or reduces the chances for the occurrence of the innovation activity, and the strength clarifies the probability of the given phenomenon. In addition, it will also be possible to determine how to choice of cooperation with the parks is determined by the distances and relations along the supply chain and with a competitor. The research hypothesis is the statement that the innovation activity of companies will grow in industrial networks as a result of establishing cooperation with

technological parks. Furthermore, also the divergence associated with a different level of development of the studied provinces will be noticeable.

In this paper, technological parks will be subjected to analysis from the point of view of companies, which used their services. Previous studies illustrating the functioning of technological parks were conducted in the parks. The approach to the issues from the point of view of the recipient of the park it is an interesting supplementation of these analyses.

Methodology of the research

The selection of variables in the study of influence of technological parks on the innovation activity of companies is based on probability theory. This results from the dichotomous nature of the variables adopted for the study. Because the answers of the respondents were assigned with the value 1, when they provided an affirmative answer, or 0, when the answer was negative.

In the first part of the study, these values were assigned to the following dependent variables, which were distinguished according to the international standards of the innovation activity measurement:

- 1) Investment expenditures connected with the conduct of research and developmental works into new fixed assets, which included buildings, premises and lands, and the machines and technical equipment, as well as new computer software (Oslo, Eurostat, 2005, pp.92-93)

$$Y_{li} = \begin{cases} 1, & \text{if the company incurred expenditures} \\ 0, & \text{if the company did not incur expenditures} \end{cases}$$

- 2) Implementations of new products and processes, both technological and those not directly related to production (Oslo, Eurostat, 2005, pp. 48-49)
- 3) Vertical cooperation (along the supply chain) and horizontal (with competitors and entities from the sphere of science) in the area of implementation of new solutions (Oslo, Eurostat, 2005, p. 80)

With the independent variable there were adopted technological parks, the services of which were not used by manufacturing companies in the studied provinces:

$$X_{li} = \begin{cases} 1, & \text{if the company used the park services} \\ 0, & \text{if the company did not use the park services} \end{cases}$$

In the second part of the study it was checked how the establishment of cooperation with the technological park influences the distance from the closest competitor and the main supplier and recipient, and relations with them. In this situation, the dependent variable is the technological parks. The independent variable was the distance from the competitor, recipient and supplier and the relations of companies with these entities. In all cases, there were adopted four types of contacts. For the competitor these were: lack of contacts, close (cooperation), rather hostile and “neighbourly”, for the supplier: only necessary, close (cooperation), rather reluctant, “neighbourly”, and for the recipient: lack of contacts, close (cooperation), rather reluctant, “neighbourly”. As in previous cases, value 1 was assigned in the situation, when the given type of relation occurred, and 0 when it did not.

In a situation, in which for the study there are adopted the dichotomous variables, the statistical modelling takes place using the probability theory. The analysis and interpretation of the results takes place like in the classical method of regression. The ways of selecting the model and testing hypotheses have a similar scheme. The most important differences, which occur, are brought down to the fact that calculations are more complicated and time-consuming, and the calculation of values and making the residue charts often does not bring anything new to the model (Stanisz, 2007, p. 217).

In case of the model, where the dependent variable achieves the value 0 or 1, the expected value of the dependent variable may be interpreted as the conditional probability of the realisation of the given event with the determined values of the independent variable (Świadek, 2011, p. 102). The applied probit modelling allowed to assess the chance of different innovation behaviours depending on the accepted boundary conditions (Świadek & Szopik-Depczyńska, 2011, p.98).

Parameter estimation of models with dichotomous variables takes place using the method of maximum likelihood. According to this, there is sought the vector of parameters, which guarantees the highest probability of obtaining values observed in the sample (Welfe 1998, p. 73). Determining the statistical significance of the estimated parameters takes place using the *t*-Student statistics, which is based on the asymptotic errors of standard assessments. The verification of the model was conducted based on the chi-

square statistics. For the estimation of the models there were adopted the confidence intervals at the level of 0,95.

The estimated models have the form of the linear function $y=ax+b$. The positive sign by the directional coefficient means that the probability of occurrence of the given innovation phenomena (e.g. incurring expenditures on the R&D activity) under the influence of technological parks is greater than in the group of companies, which did not cooperate with the parks.

Calculations of the models were made in the *Statistica* program. In order to improve the clarity of the presented results in the article there were presented only those models, which met the conditions of the statistical significance and its main measures, i.e., standard errors of assessments, value of the *t*-Student and *chi*-square statistics. For them there was also determined the probability of the occurrence of particular innovation phenomena.

Characteristics of the study sample

The study illustrating the influence of technological parks on the innovation activity was conducted for the years of 2010-2012 among 773 industrial companies of the Silesian province and for the years of 2009-2011 among 680 companies of the Pomeranian province. The activity profile of the studied companies is qualified to the section C PKD 2007 the Industrial Manufacturing.

The selection of provinces adopted for testing was dictated by a different level of the development of the industrial system, on which they can be found. In terms of expenditures on the innovation activity, the Silesian province in 2012 is on the 2nd position, and the Pomeranian on the 10th place in the country. Expenditures on the research and developmental activity are similar in both regions. The Silesian province was ranked on the 3rd, and Pomeranian on the 4th place in Poland. However, it should be emphasized that Silesia has been on this position for many years, while Pomeranian was promoted from the 8th position in 2010. In terms of the granted patents, the Silesian province is on the 3rd place, and the Pomeranian on the 8th place in the country (ex quo with the West Pomeranian province). Thanks to this selection of the spatial framework of the study, it will be possible to determine the divergence in the functioning of technological parks due to the level of the development of the studied province.

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Table 1. Expenditures on the innovation, research and developmental activity and the obtained patents in the studied provinces in 2012.

Province	Expenditures on innovation activity (in thous. zł)	Gross domestic expenditures on R&D (in mln zł)	Patents granted
Silesian	2744440	1298,5	213
Pomeranian	620046	1011,1	85

Source: own research based on website of Statistical Office in Katowice and Gdańsk

In the Silesian province, most of the studied provinces (nearly half) are the micro companies (employing up to 9 employees) and small ones (from 10-49 employees). Together, they constitute 80% of all studied companies. The share of average companies (from 50 to 249 employees) was over 17%, and the large ones (employing over 250 people) nearly 3%. In Pomeranian province, this structure differs slightly. Micro and small companies constitute nearly 73% of the test sample, opposite to the Silesia, there are more small entities. The share of average companies in the sample was over 23% and large ones over 4%.

Table 2. Structure of the studied companies in terms of size classes distinguished based on the level of employment in the studied provinces in 2012.

Company size	Province			
	Silesian		Pomeranian	
	Number of companies	Percentage	Number of companies	Percentage
Micro	337	43,6%	211	31,0%
Small	281	36,4%	283	41,6%
Medium-sized	133	17,2%	158	23,3%
Large	22	2,8%	28	4,1%
Sum	773	100%	680	100%

Source: own research based on conducted survey

Due to the level of the applied manufacturing technique in both provinces, there is the largest amount of the entities, which activity profile is based on traditional areas of industry. However, it should be emphasized that in Silesia they constitute 44%, and in Pomeranian as much as 53% of the studied population. On average, the low technique is used in the manufacturing process in both studied regions by almost 29% of the tested companies. In the Silesian province, the medium-high technique is used in almost 1/4 of the studied companies, and in the Pomeranian province in 1/8.

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The high technique is used in Silesia by over 4%, and in Pomeranian by over 6% of the studied entities.

Table 3. Structure of the studied companies in terms of the level of technical advancement in the studied provinces in 2012.

Level of technical advancement	Province			
	Silesian		Pomeranian	
	Number of companies	Percentage	Number of companies	Percentage
Low	341	44,1%	361	53,1%
Medium-Low	220	28,5%	196	28,8%
Medium-High	180	23,3%	81	11,9%
High	32	4,1%	42	6,2%
Sum	773	100%	680	100%

Source: own research based on conducted survey

The influence of technological parks on the innovation of industrial companies in the Silesian and Pomeranian provinces

Analysing the activity of technological parks in the Silesian province it is observed that they significantly influence the innovation potential of industrial companies of this region. Their influence is visible in all studied innovation attributes except for the implementation of new products to the market. Therefore, it can be assumed that in this province there is the system stimulation of the innovation activity in the industry by the technological parks.

Using the services offered by technological parks to the greatest degree increases the chances of companies for investments in new fixed assets. They amount to 89% and are 20 percentage points higher than in the group of companies, which did not cooperate with this support institution. The detailed analysis of these investments indicates that parks to a greater extent increase the probability of increasing machine park of companies, rather than the purchase (or lease) of new buildings, or premises. In the first case this probability is $p_1=0,83$, and in the second $p_1=0,45$. In groups of entities not cooperating with technological parks these probabilities are significantly smaller and are for the investment in new machines and technical devices $p_2=0,57$, and for new buildings $p_2=0,25$.

Technological parks significantly increase the chances to implement new technological processes. A positive phenomenon is the fact that this mostly applies to the introduction of new manufacturing methods – proba-

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bility of this phenomenon is $p_I=0,74$ and is 76% higher than in the opposite group. In case of investment in new production systems and the supporting probability values are similar and amount to, respectively, $p_I=0,43$ and $p_I=0,45$. In companies, which do not use the services of technological parks, are about half the size.

Thanks to activity of parks in companies the expenditures for new computer software are more often increased. Chances for this investment are $p_I=0,77$ and are nearly half higher than in the opposite group. These disproportions are even greater in case of stimulation of the research and developmental activity by the parks. Although probability is the smallest from the main groups of attributes of innovation, because it amounts to $p_I=0,66$, however it more than doubles the chances of the occurrence of this phenomenon in the opposite group of companies.

In the Pomeranian province technological parks increase the chance of the occurrence of the innovation activity in seven out of ten analysed areas. Their impact therefore cannot be considered as systemic, but their contribution to the improvement of the competitive situation of the region is significant.

Thanks to the activity of parks it can certainly be concluded that in the studied region the industrial companies, which cooperate with them, will implement new methods of manufacturing. Probability of the occurrence of this phenomenon is $p_I=0,99$ and is 19 percentage points higher than in the group of companies, which do not use the park services. This mainly refers to the investments connected with the implementation of systems supporting the activity of companies, where the chances for their occurrence are 38% and are more than half greater than in the opposite group.

Thanks to the cooperation with technological parks for almost certain there can be assumed also the occurrence of investments in new fixed assets. The chances of the occurrence of this phenomenon are 93%. In most cases they apply to the increase, or the changes in the machine park of the studied companies, because the probability of occurrence of this investment is $p_I=0,75$ and is almost 1/4 greater than in the opposite group.

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Table 4. The impact of technological parks on the innovation activity of industrial companies in the Silesian and Pomeranian province in the years of 2010-2012

Innovation Attributes	Support Institutions	Technological parks					
		Silesian province			Pomeranian province		
		p_1		p_2	p_1		p_2
		σ	t	χ^2	σ	t	χ^2
Expenditure on R&D		0,98x-0,57			0,89x-0,39		
		0,66		0,29	0,69		0,35
		0,19	5,02	26,32	0,17	5,32	29,63
Investment in the so far under invested fixed assets including:		0,74x+0,5			0,64x+0,81		
		0,89		0,69	0,93		0,79
		0,25	2,97	10,23	0,23	2,74	8,72
a) buildings, offices and land		0,53x-0,66					
		0,45		0,25			
		0,19	2,76	7,54			
b) machinery and technical devices		0,78x-0,18			0,38x+0,3		
		0,83		0,57	0,75		0,61
		0,22	3,51	13,65	0,17	2,19	4,96
Software		0,64x+0,08			0,5x-0,04		
		0,77		0,53	0,68		0,48
		0,21	3,1	10,22	0,17	3,01	9,29
Implementation of new products					0,44x+0,33		
					0,78		0,63
					0,18	2,46	6,33
Implementation of new technological processes, including:		0,67x+0,37			1,34x+0,84		
		0,85		0,65	0,99		0,8
		0,23	2,92	9,44	0,4	3,38	21,35
a) manufacturing methods		0,87x-0,21					
		0,74		0,42			
		0,2	4,26	19,48			
b) production-related systems		0,48x-0,67					
		0,43		0,25			
		0,19	2,54	6,36			
c) support systems		0,72x-0,85			0,4x-0,7		
		0,45		0,2	0,38		0,24
		0,19	3,76	13,91	0,16	2,44	5,88

p_1 – the predicted probability of the occurrence of the given type of innovation activity in the group of companies cooperating with technological parks
 p_2 – the predicted probability of the occurrence of the given type of innovation activity in the other group of companies, i.e., not cooperating with technological parks
 σ - asymptotic standard error of the parameter estimator of the independent variable, i.e., technological park
 t – value of the t-Student distribution of the estimator of the parameter of the independent variable, i.e., technological park
 χ^2 – value of chi-square test of the estimated model

Source: own research based on conducted survey

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Technological parks increase the chances to introduce new products to the market. They are 78% and are, like in the case of changes within the machine park, about 1/4 greater than in the opposite group. The chances to introduce into the company the new computer software under the influence of the cooperation with parks are 10 percentage points lower than in case of the introduction of new products. In the opposite group the probability of the occurrence of this phenomenon is 30% smaller and is $p_2=0,48$.

In the Pomeranian province technological parks significantly increase the probability of conducting the R&D works. Thanks to cooperation with them it is shaped at the level of $p_1=0,69$, and in the opposite group at $p_2=0,35$. Thus, after establishing cooperation with the technological park this probability will grow almost twice.

In the Silesian province, technological parks significantly increase the chances of the occurrence of cooperation in the area of new solutions. Probability of establishing cooperation under their influence is $p_1=0,79$ and is more than two times bigger than in the group of companies, which do not use the park services.

To the greatest degree, technological parks stimulate to the introduction of new products in cooperation with suppliers. These chances are 55% and are more than two times bigger than in the opposite group. Thanks to the part there is also noted the 3 times increase of chances to establish the innovation cooperation with competitors ($p_1=0,15$ compared to $p_2=0,05$).

Thanks to the activity of parks there comes to the search for new solutions in cooperation with such subjects from science like universities, national research institutes and developmental units, as well as the PAS unit. Probabilities of establishing cooperation with these entities are not high, in case of universities they are $p_1=0,21$, of scientific units $p_1=0,15$ and PAS units $p_1=0,09$, however, significantly outweigh the chances of occurrence of these phenomena in the group of entities not using the park services. In the first case they are 4 times, and in the second time more than 3 times, and in the third one 9 times greater in the opposite group.

In the Pomeranian province technological parks increase the chance to establish the innovation cooperation by nearly half. In the group of entities using the services, the probability to establish cooperation in order to implement new solutions is $p_1=0,62$, and in the group not cooperating with parks $p_2=0,48$. Unfortunately, after a detailed examination of particular types of cooperation it turned out that conditions of the statistical significance are met only by the model estimated for the cooperation with foreign research institutes. Thanks to the activity of parks, chances to establish

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cooperation with them are 9% and are 9 times greater than in the group of companies not cooperating with them.

Table 5. Influence of technological parks on the establishment of cooperation in the area of new solutions in the Silesian and Pomeranian province in the years of 2010-2012

Support Institutions	Technological parks					
	Silesian province			Pomeranian province		
	p_1	p_2		p_1	p_2	
	σ	t	χ^2	σ	t	χ^2
Cooperation with suppliers	0,76x-0,63					
	0,55		0,26			
	0,19	4,02	16,23			
Cooperation with competitors	0,57x-1,61					
	0,15		0,05			
	0,24	2,4	5,3			
Cooperation with Polish Academy of Sciences departments	1,03x-2,4					
	0,09		0,01			
	0,3	3,41	9,97			
Cooperation with universities	0,87x-1,66					
	0,21		0,05			
	0,22	3,93	14,06			
Cooperation with national R&D centres	0,73x-1,77					
	0,15		0,04			
	0,24	3,03	8,27			
Cooperation with foreign R&D centres	1,13x-2,48					
	0,09		0,01			
	0,28	4,05	15,44			
Cooperation with clients						
General innovation cooperation	1,07x-0,28					
	0,79		0,39		0,46x-0,16	
	0,21	5,09	28,86	0,16	2,85	8,26

p_1 – the predicted probability of the occurrence of the given type of cooperation in the group of companies cooperating with technological parks
 p_2 – the predicted probability of the occurrence of the given type of cooperation in the other group of companies, i.e., not cooperating with technological parks
 σ - asymptotic standard error of the parameter estimator of the independent variable, i.e., technological park
 t – value of the t-Student distribution of the estimator of the parameter of the independent variable, i.e., technological park
 χ^2 – value of chi-square test of the estimated model

Source: own research based on conducted survey

**The effect of the location of the main competitor, recipient
and supplier and the relation among them on the cooperation
of industrial companies with technological parks**

In case of the Silesian province the importance in the manufacturing process of the technological park as the provider is in the location of the competitor on the local and national market. In case of the close proximity of the competitor (local market) there is observed a significant decrease of the chances to establish cooperation with technological parks. They are only 2% and are 4,5 times smaller than in the group of entities, which closest competitor is located outside the local market. The situation is opposite in case of having the competitor on the national market. In such a situation, the chances to use the services of the technological park increase. The probability is $p_1=0,12$ and is 3 times greater than in the group of entities, which competitor is found in the region or abroad.

In the Pomeranian province greater chances for the establishment of cooperation with technological parks appear in case, when the closest competitor is located in the country and in the situation, when relation with them are rather hostile. In the first situation, the probability to establish cooperation is $p_1=0,14$, and in the second $p_1=0,19$. In opposite groups in both cases it is equal $p_2=0,09$.

In the Silesian province the significance on the selection of the technological park as the provider is found in the local, national and foreign location of the main supplier. It can be noticed that the further located the supplier, the greater the chances to establish cooperation with the technological park. Having a supplier on the local market makes the chances of the company to use the park services are smaller than in case of companies, which recipient is located in the region of the country, or abroad, altogether. It is $p_1=0,02$ and is 4 times smaller than in the opposite group. Having the supplier on the national and foreign market has a stimulating effect on cooperation with technological parks. The chances for the occurrence of this phenomenon in case of the supplier located in the country are $p_1=0,09$ (in the opposite group they are 1,8 times smaller), and abroad $p_1=0,16$ (in the opposite group they are 3,2 times smaller). In the Silesian province there is also increased the probability to cooperate with the parks in case of cooperation with the main supplier. It is $p_1=0,07$. In the opposite group it is 1,5 smaller.

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Table 6. Influence of the location and relations with the closest competitor to establish cooperation by the industrial companies with technological parks in the Silesian and Pomeranian province in the years of 2010-2012

	Technological parks					
	Silesian province			Pomeranian province		
	p_1		p_2	p_1		p_2
	σ	t	χ^2	σ	t	χ^2
Location of the competitor						
Local	-0,71x-1,35					
	0,02		0,09			
	0,19	-3,84	17,74			
Regional						
National	0,6x-1,75					
	0,12		0,04	0,29x-1,36		
	0,15	4,02	15,81	0,15	1,97	3,77
Abroad						
Relations with the competitor						
Lack of contact						
Cooperation						
Rather hostile	0,46x-1,33					
	0,19		0,09			
	0,2	2,29	4,95			
“Neighbourly”						
<p>p_1 – predicted probability of establishing cooperation with the technological park under the influence of the given type of distance from or the given relation with the competitor</p> <p>p_2 – predicted probability of establishing cooperation with the technological park in the other group of companies</p> <p>σ - asymptotic standard error of the parameter estimator of the independent variable, i.e., location of the competitor or relations with the competitor</p> <p>t – value of the t-Student distribution of the estimator of the parameter of the independent variable, i.e., type of distance from or the given relation with the competitor</p> <p>χ^2 – value of chi-square test of the estimated model</p>						

Source: own research based on conducted survey

In the Pomeranian province importance in establishing cooperation with parks is found in the relations only with the supplier. In case of maintaining with them only essential contacts, the chances for the occurrence of this phenomenon are 5% and are 2,2 times smaller than in the group of subjects, which keep close, “neighbourly” or reluctant relations with the supplier. Cooperation with suppliers increases the chances for searching new solutions in the parks by 2 times, because they amount to $p_1=0,12$, and in the opposite group $p_2=0,06$.

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Table 7. Influence of the location and relations with the closest supplier to establish cooperation by the industrial companies with technological parks in the Silesian and Pomeranian province in the years of 2010-2012

	Technological parks					
	Silesian province			Pomeranian province		
	p_1		p_2	p_1		p_2
	σ	t	χ^2	σ	t	χ^2
Location of the supplier						
Local	-0,63x-1,43					
	0,02		0,08			
	0,22	-2,9	10,38			
Regional						
National	0,31x-1,67					
	0,09		0,05			
	0,15	2,16	4,64			
Abroad	0,66x-1,63					
	0,16		0,05			
	0,2	3,3	10,03			
Relations with the supplier						
Essential contacts	-0,39x-1,21					
	0,05		0,11			
	0,18	-2,12	4,9			
Cooperation	0,18x-1,68					
	0,07		0,05	0,12		0,06
	0,09	1,99	3,48	0,15	2,26	5,34
Rather reluctant						
“Neighbourly”						

p_1 – predicted probability of establishing cooperation with the technological park under the influence of the given type of distance from or the given relation with the supplier
 p_2 – predicted probability of establishing cooperation with the technological park in the other group of companies
 σ - asymptotic standard error of the parameter estimator of the independent variable, i.e., location of the supplier or relations with the supplier
 t – value of the t-Student distribution of the estimator of the parameter of the independent variable, i.e., location of the supplier or relations with the supplier
 χ^2 – value of chi-square test of the estimated model

Source: own research based on conducted survey

In the Silesian province, the importance in the process of establishing cooperation with technological parks lies in having the main recipient on the national market and keeping close, or neighbourly relations with him. The recipient located on the national market increases the probability of establishing cooperation with parks 2,5 times compared to companies, which recipient has its seat locally, regionally or abroad. These chances increase also 4 times when the relations are close with the recipient. Staying in “neighbourly” relations with recipients makes the probability of es-

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tablishing cooperation with parks smaller, than in case of other types of relations altogether. It is $p_1=0,03$ and it is almost two times smaller than in the other group of entities.

In the Pomeranian province the importance in the selection of technological parks is played only the possession of the recipient in a close distance. The chances for the cooperation to occur are 7% and in this case are 1,7 times smaller than in the opposite group.

Table 8. Influence of the location and relations with the closest competitor to establish cooperation by the industrial companies with technological parks in the Silesian and Pomeranian province in the years of 2010-2012

	Technological parks					
	Silesian province			Pomeranian province		
	p_1		p_2	p_1		p_2
	σ	t	χ^2	σ	t	χ^2
Location of the competitor						
Local	-0,29x-1,19					
	0,07		0,12			
	0,14	-2,01	4,2			
Regional						
National	0,48x-1,76					
	0,1		0,04			
	0,15	3,29	10,82			
Abroad						
Relations with the competitor						
Essential contacts						
Cooperation	0,43x-1,86					
	0,3		0,08			
	0,17	2,46	6,62			
Rather reluctant						
"Neighbourly"	-0,5x-1,46					
	0,03		0,07			
	0,2	-2,41	6,78			
p_1 – predicted probability of establishing cooperation with the technological park under the influence of the given type of distance from or the given relation with the competitor p_2 – predicted probability of establishing cooperation with the technological park in the other group of companies σ - asymptotic standard error of the parameter estimator of the independent variable, i.e., location of competitor or relations with the competitor t – value of the t-Student distribution of the estimator of the parameter of the independent variable, i.e., location of competitor or relations with the competitor χ^2 – value of chi-square test of the estimated model						

Source: own research based on conducted survey

Conclusions

The analysis of the impact of technological parks on the innovation activity in the industry in the regional grasp showed that they play an important role in the process of implementation of new solutions in the analysed companies.

Comparison of the developed region (the Silesian province) with the region characterised by the intermediate industrial system (the Pomeranian province) illustrated differences in their impact. In the Silesian province, parks support to a greater degree the innovation activity than in the Pomeranian province. Therefore, there was approximated the evolution of impact of the effectiveness of technological parks in terms of the level of development of the region. Despite the differences in the development, what is satisfactory is the fact that parks increase the chances to conduct the research and developmental activity in both analysed regions and the implementation of new manufacturing methods in the Silesian province and new products in the Pomeranian province. For these are the most desirable manifestations of innovation. Particularly important is the R&D activity, which conduct predicts the creation of completely new solutions, and not copying innovations created abroad.

The evolution of the activity of parks is particularly visible in the stimulation of cooperation established in order to implement new solutions. In the studied regions there is also observed the influence of parks on the innovation cooperation altogether. However, when examining the influence of these support institutions on the specific types of cooperation, only in case of the Silesian province we can talk about the occurring regularities in this area. This is due to the fact that the innovation cooperation is a type of cooperation, which takes place most often in highly developed countries. In Silesia, with the exception of cooperation with suppliers, the values of probabilities for particular types of cooperation are shaped on a very low level. This means that it is in the embryonic phase. However, it is satisfactory that in this region appeared cooperation with competitors, which may predict the natural development of clusters and cooperation with entities from the area of science, what indicates the first signs of knowledge transfer from science to economy and commercialisation of the results of research results. In the Pomeranian province there is noticeable only a small impact of parks on cooperation with foreign scientific entities. It results from this that in the area of innovation cooperation there appears the evolu-

tion characterised by the transfer from the complete lack of interest with this type of activity in the region with the intermediate industrial system to its first symptoms in one of the most developed provinces in Poland.

In case of analysis of determinants, which influence the decision about establishing cooperation with technological parks, it is observed that the greatest consistency characterised the distances from and relations with the competitor, recipient and supplier of companies in the Silesian than the Pomeranian province. This results from the fact that for the first ones there were estimated more models meeting the conditions of the statistical significance.

In general, it can be assumed that companies entering into cross-regional network relations favours the selection of the technological park as the catalyst of the innovation processes. In the Silesian region this found its confirmation in the distance from the competitor, supplier and recipient, and in the Pomeranian region from the competitor and recipient.

In the Silesian province having a competitor and supplier on the local market results in the reduction of chances for establishing cooperation with technological parks. The situation is opposite when the company has a competitor and recipient on the national market, and the supplier on the national or foreign market. In the Pomeranian province the situation is similar, however, less regularities were stated (i.e. statistically significant models). Clearly stimulating for the establishment of cooperation with parks is the possession of a competitor in the country, and destimulating of the recipient on the local market. Such force systems can be justified by the claim that the need to overcome the spatial barriers in the search of the supplier or recipient requires additional effort from the companies. Some assistance in this process can be sought in the support of technological parks. Additionally, it can be emphasized that the interest in technological parks are shown by companies from the sector of at least medium-low technology. In the studied regions with the increase of the level of technique used by companies their number is decreasing. A smaller number of potential competitors, suppliers and customers caused the companies to search them outside the region. For this reason, there can be observed relations between the vertical and horizontal relations outside the region and the interest in technological parks.

To establish cooperation with technological parks, significant are the relations with the competitor, supplier and recipient, however, due to the smaller number of regularities it is difficult to determine the general rule of the influence of relations on the cooperation with these institutions.

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In the Silesian province the cooperation with the supplier or the recipient results in the increase of chances for using the services of technological parks. While neighbourly relations make them decrease. In the Pomeranian province, necessary with the supplier make the chances for the cooperation with parks decrease, and the hostile relations with the competitor and cooperation with the supplier make them increase. At this stage of the studies, due to the small number of models, it is difficult to clearly interpret this state of affairs. It can be assumed that cooperation brings the companies tangible benefits, so it is not surprising that cooperation along the supply chain encourages to its further development and results in entering into agreements with technological parks. Following this line of reasoning one could try to explain that in the Pomeranian province maintaining only essential contacts with the supplier is a manifestation of the lack of interest in cooperation, and thus results also in the lack of interest in cooperation with parks. In the same region, the fight with competition causes the search of new resources to build the advantage on the market and thus encourage to cooperation with the parks, which are the source of innovation in the region.

In the light of the above conclusions it can be assumed that the research hypothesis was confirmed. Technological parks increase the chances to implement innovations in the studied regions. There are also visible divergences associated with different levels of development of provinces. In Silesia (developed region) parks to a greater extent stimulate the innovation activity than in the Pomerania (average developed region).

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Does the Outsourcing Affect Labour Costs in Enterprises? Evidence from Firm-level Data

JEL Classification: *J30; L24; L60; L80*

Keywords: *labour cost; materials outsourcing; services outsourcing; Poland*

Abstract: This empirical paper examines an impact of materials and services outsourcing on labour costs in two groups: industrial and construction enterprises, and services enterprises in Poland in the period 2005-2013. The analysis of this dependence was based on data of Central Statistical Office included in financial statement F-01/I-01. The preliminary analysis and econometric model showed that Polish industrial and construction, and service enterprises applied both types of outsourcing, but services outsourcing had more important effect on labour costs than materials outsourcing. However, the depreciation cost understood as technological progress had the biggest impact on labour costs, especially in industrial and construction firms.

Introduction

The last few decades were marked by the growing popularity of outsourcing understood as separation of specific processes or functions outside and transferring them to capital-dependent or capital-independent domestic and foreign suppliers. This solution resulted in the reorganization of enterprises and their resources. The area of human resources is one of the areas of direct impact of outsourcing which in the short term experienced job

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losses and relocating the workplaces to foreign or domestic location, layoffs or possibly moving them to the supplier. Quantitative reduction and qualitative adaptation in the level of employment was followed by decline in the overall level of labour costs, i.e. reduction of the fixed costs and enhancement of variable costs depending on the production volume. However, in the long term effects of outsourcing on employment, wages, and labour productivity were different in economy and company scales, i.e. positive (eg. Linden et al., 2011, p. 223-240;), scant or neutral for the economy, although positive for highly skilled workers (Crino, 2010, pp. 253-256.) or negative for semi-skilled or less specialised work (Baumgarten et al., 2013, pp. 132-152; Egger et al., 2001, pp. 257- 272). These examples of publications are based on data from developed countries, such as USA, UK, Germany. In regard to the Polish economy, the impact of outsourcing on the area of labour resources, particularly labour costs, seems to be relatively poorly recognised. Most of researchers primarily analyse the impact of final goods on trade and on international outsourcing (measured as exports and imports of intermediate goods) on employment and wages (Egger & Egger, 2002, pp.83-96; Egger & Streher 2003, pp. 61-72), on industrial specialization among Central and Eastern European Countries and directly on wages (Esquito, 2006). The authors focus on Poland, Slovakia, and Hungary, analysing the issue separately for each country due to the specific characteristics of each of them.

Above-mentioned studies are steered towards the international dimension of business activities expressed in the impact of international outsourcing and offshoring on selected characteristics of the labour market. Meanwhile, outsourcing phenomenon has a much broader scope because in practice many Polish firms, especially small and medium-sized, opt for an outsourcing contract with suppliers in the domestic market. In such situation, measuring outsourcing with import and export of intermediate goods is not justified, since it does not reflect the scale of the whole phenomenon, especially domestic outsourcing. Thus, there is a need for a different way of measuring, such as the cost of intermediate consumption i.e. intermediate materials and services used in the process of estimating the level of outsourcing in the particular country.

The purpose of this article is to review the impact of outsourcing on the formation of labour costs in Polish companies, as well as analysing the strength of the relationship between these variables. In the context of the paper I formulated hypothesis that only partial growth of labour costs is connected with increasing level of outsourcing in Polish enterprises.

The essence of outsourcing and methodology of its measurement

The literature lacks clarity in the approach to define and measure outsourcing. The term is either used interchangeably with offshoring or treated as a separate concept. (compare Amiti & Wei, 2005, pp. 307-347, Olsen, 2006; Zorska, 2007, p. 36) Therefore, in this article I assume that outsourcing is a separating of specific parts or even all of the processes / functions from the structure of the organization and transferring them to be carried out by external and dependent or independent business entities. Such a broad definition makes outsourcing cover two areas. The first one is the purchase of intermediate goods and services from external domestic and foreign suppliers. The second area is the transfer of workplaces to proximal and distal foreign locations and to domestic suppliers who produce semi-finished goods or perform services, e.g. Information Technology, accounting, human resources, security services, logistics, sales force, customer service, and other services to the principal. Given the definition of outsourcing above I apply terms used in literature, such as: domestic outsourcing, international outsourcing, offshore outsourcing, offshoring, nearshoring, onshoring, shares services centers/ BPO centers, which all are forms of outsourcing chosen by enterprises seeking ways to improve economic efficiency. Depending on the needs enterprises embrace one or several forms of outsourcing and the results of their activities in the area treat as: materials outsourcing reflected in the cost of intermediate materials, and service outsourcing recorded by the accounting as the cost of outside services.

Although the precise measurement of this phenomenon and its selected forms is difficult due to the incompatibility of the financial reporting to its character, the analysis of mandatory financial statements submitted by the enterprises identified economic categories that describe both the total outsourcing phenomenon in Polish enterprises as well as its international aspect. It should be noted that the international aspect of outsourcing, measured by import of intermediate goods, is included in the category of costs of materials and outside services from the financial reporting point of view, which indicates the implementation of outsourcing.

It is also worth referring to the classic Cobb-Douglas production function and its modifications, which show that the production depends on the capital, labour, technical and organisational progress, and random factor inputs. Assuming that outsourcing is a management tool now widely used in enterprises, I consider it one of the factors of organisational progress affecting production. Thus, companies can enhance the production by in-

creased employment and investment in fixed capital (including technologies) in order to improve labour productivity and the reorganization of functions associated with the outsourcing of parts of them, or mixed forms, and therefore affect the internal labour market. Theoretically speaking, with growth in production in the long term the company may increase outsourcing simultaneously maintaining or slightly increasing the number of employees, who often have higher qualifications. Such solution may contribute to the growth of labour costs. If we divide outsourcing into the outsourcing of materials and services, they might have different impact on labour costs.

The analysis of this dependence requires a look into the category of labour costs, which is a component of operating costs of the company. Given the availability of empirical data and the definition of the cost of labor present in the public statistics of the Central Statistical Office of Poland and Eurostat labour costs include: employee compensation, with wages and salaries in cash and in kind, employers' social security contributions is and employment taxes regarded as labour costs minus any subsidies received, and vocational training costs. (Koszty ... 2012, pp. 13-14).

The cost of labour is relatively heavily determined by the size and type of employment, but other factors may also have the impact on its level. They are: the increase in demand for more or less skilled workers, the supply of specific resources on the market, the presence of employer or employee market, the current level of labour costs in a particular region or type of business, the level of charges resulting from the employment of the employee. The aspects of the labour costs is complex and requires specific data to conduct studies. This paper takes into account general labour cost without separating them from one another.

Methodology of the research

To verify this type of economic phenomena, including outsourcing, three types of approaches are applied: the static approach based on resources (employment, the asset value), the dynamic (cumulative) approach based on cost or business flows, and the mixed approach. The physical effect of the use of outsourcing by the company is the purchase of intermediate goods in order to carry out the manufacturing processes. In order to define variables in the econometric model I assumed the approach suggested by Kalinowski (2002, pp. 167-185), who studies the production functions based on the categories having the nature of streams. This approach

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allows to keep proportionality while comparing data. According to it, three basic factors can be identified: labour (L), capital (K), outsourcing (OUT). Costs of labour were used to measure the amount of labour (L), and depreciation costs from tangible and intangible fixed assets were used to measure capital (K). Costs of materials and raw materials (excluding energy costs) and cost of outside services decide about the value of outsourcing (OUT). These categories of costs in terms of half-year and annual data in current prices are available in the financial statements F-01 / I-01. In order to make a comparison of the course of variables over time, current prices data have been submitted to the estimation of deflators: price index of sold production in the group of industrial and construction enterprises, and an indicator of consumer goods in the group of service companies given by the Central Statistical Office (2014).

In accordance with the applicable rules of reporting I assumed that the international aspect of outsourcing measured mostly by the import of intermediate goods and services is included in the total value of outsourcing measured by categories of intermediate consumption. The value of sold goods and materials at purchase price and energy costs are not included in costs of consumption of intermediate production. The first category is connected with the main profile of the trading companies and is related to purchase goods for resale, while the second category, the energy, is ordered from external suppliers from the beginning. I am aware that some of the costs of materials and supplies/ raw materials and ordered services are also not associated with outsourcing. Nevertheless, due to the incompatibility of reporting to measuring this particular phenomenon, I accept these cost categories as derivatives of outsourcing in the form of business operations streams associated with it.

For the analysis of this issue the following unpublished data will be used: industrial and construction entities (PKD 2007 - Sections B, C, D, E, F), and services (section G, H, I, J, K, L, G, H, I, J, K, L, M, N, S) from the years 2005-2013 of the categories mentioned above at current prices, or the number of employees working in semiannual section, provided by the Central Statistical Office (GUS). Due to the nature of the activity the following service sections were left out: the field of education (Section P), health care and social assistance (Section Q), and culture, entertainment and recreation (section R). The category of the number of employees was subject to labour cost category, which includes both wages resulting from the employment relationship (ok) as well as nonemployment contracts.

Covering semiannual periods to analyse the impact of outsourcing on labour costs allows increasing the number of periods N from 9 to 18 and conducting the empirical verification using a non-linear econometric model transformed to a linear model based on sufficiently large data set. Modeling is preceded by a preliminary analysis of the dynamics of the basic variables in the annual intersection connected with the outsourcing of materials and services, labour costs, the number of employees, and production. An attempt will be made to determine the strength of the impact of outsourcing on labour costs in groups of enterprises mentioned above using an econometric model. To estimate the significance of the function of model parameters the classical least squares method of linear regression will be used.

Review of the literature

The current literature describing theoretical considerations and empirical research results focuses mostly on the aspect of the impact of offshoring or international outsourcing on employment, labour productivity or wages in one particular economy or selected few. It should be noted that the level of labour costs affects business efficiency, and is one of the key factors for offshoring, nearshoring, or onshoring.

When outsourcing includes both purchase of intermediate goods and services from external suppliers and the transfer of workplaces, moving to a foreign location is economically justified in case of lower total costs of implementation (i.e. labour costs, transportation costs, costs of providing the next batch of goods, complaints and repairs, etc.) of outsourced processes. As for national supplier locations, the lower cost of the service or the higher quality of the services provided at a given price by an outside company matter. For example, Egger & Stehrer (2003, pp. 61-72) and Egger & Kreckemeier (2008, pp.116-132) outlined that international outsourcing causes inequalities in the area of employment and / or wages. Application of outsourcing gave birth to social fears of losing jobs and worsening the situation of workers in the labour market as a result of transferring the production processes, and later services, from highly developed countries to developing countries. Despite the decrease in the relative wages in developed countries, relative wages increased in service firms from developing countries (cf. Arndt 1997, pp.71-79; Kohler, 2001, pp. 31-53).

Hence, looking through the prism of enterprises, outsourcing in the short term is equated with a reduction in the level of employment and a reduction in payroll costs in enterprises. However, the long-term impact of outsourc-

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ing on wages, as the main component of labour costs, can be varied. Feenstra and Hanson conducted several studies on this issue. Their research showed that in 1972-1979 and 1979-1990 outsourcing was positively correlated with changes in the relative employment of non-production workers, while weakly negatively correlated with changes in relative, average, and annual wages of non-production workers (Feenstra & Hanson 1996, pp. 240-247).

One of the main issues being discussed by researchers in another study was the impact of outsourcing on wages of skilled and unskilled workers. While examining the impact of import of intermediate materials (i.e. international outsourcing) on the wages of workers in the United States in the years from 1979 to 1990, Feenstra and Hanson (1996, pp. 240-247) recognised that this solution positively affected the wages of skilled American workers. When analysing the impact of US outsourcing (driven by Foreign Direct Investment) to Mexico, they found that wages of high-skilled workers increased in relation to low-skilled workers both in the USA and Mexico. (Feenstra & Hanson 1997, pp. 371-393)

In subsequent studies, these authors indicated that outsourcing and expenditures on new technologies such as investments in computers have an impact on wages. Their calculations showed that outsourcing is responsible in 15%, and modern technologies in approx. 35% for an increase in the relative wages of non-productive workers. (Feenstra & Hanson 1999, pp. 907-940) Hijzen also came to similar conclusions (2007, pp. 188-205). He noticed a significant impact of international outsourcing on wage inequalities, but also stresses that technological change is the main factor that affects these inequalities.

Amiti and Wei (2005, pp. 308-347; 2009, pp. 203-220) also did not find evidence that service outsourcing from the US and UK dramatically reduced job growth. Nevertheless, based on the British Household Panel Survey, Geishecker and Görg (2008) showed widening of the wage gap between skilled and unskilled workers in the UK that outsourcing was responsible for. The most highly skilled workers received higher wages with outsourcing growth.

The examples above are related to developed economies which made decisions about international outsourcing or offshoring workplaces to developing countries and countries in Central and Eastern Europe. Egger and Egger were also interested in the impact of international outsourcing on wages in Eastern European countries, among others, took (2002, pp. 83-96) They investigated how international outsourcing (measured as intermediate

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trade) affected real wages in fourteen NACE two-digit industries of seven Central and Eastern European Countries (CEEC) such as Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovenia, and Slovakia over the period 1993-1998. Using wage regressions they showed that intermediate goods export negatively affected wages in CEEC manufacturing, while the intermediate goods import had significantly positive impact. The authors explained that the difference in wage was caused by two opposite reasons. On the one hand, outsourcing to developing countries of CEE potentially raises the demand and consequently the growth of wages. On the other hand, the proportions of the work force may change because of the changes in labour demand. Highly skilled workers may be offered jobs that are inadequate to their qualifications and therefore receive lower wages. Furthermore, EU-CEEC trade in final goods did not contribute to significant wage growth in real terms in 1996 in all countries, and in particular on Slovak and Polish wages.

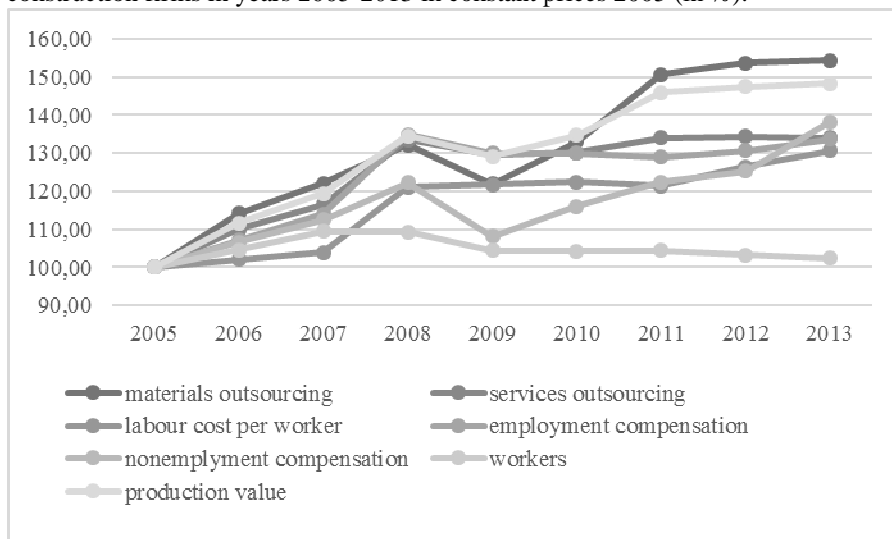
Another study of Egger i Streher (2003) investigated the wages effect of outsourcing (measured as import and export of intermediate goods) in Poland, Czech Republic, and Hungary. The result of their research was that outsourcing caused a growth in the ratio of the wage bill of the manual and non-manual workers with more benefits for the second group. In addition, the second group of workers was more engaged in exports of intermediate goods than imports.

Considerations proposed by Egger and Streher were developed by Esposito (2006). He analysed the impact of final goods trade and outsourcing on the patterns of specialisation in manufacturing separately in Poland, Czech Republic, and Hungary in the period 1996–2004. Despite of production value, export and import of final and intermediate goods, he also took into account the annual average growth of the relative wage bill and its components: the relative employment and the relative wage. Econometric analysis of the impact of trade and outsourcing on relative wage bill of non-manual and manual workers in Poland partially confirmed that outsourcing measured as intermediate goods trade brought benefits for manual workers specialised in the production of labour intensive intermediate goods. In Czech Republic the shift of specialisation was similar, but productivity of manual labour was higher than in Poland. In contrast to Poland and Czech Republic, Hungary focused on the completion of imported intermediate goods using nonproduction workers more intensively. And that meant more benefits to this particular group of workers.

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Above-mentioned studies show that the aspect of the impact of outsourcing on labour costs in highly developed countries is not a new phenomenon in the English literature. However, in regard to the entities operating in Polish economy it is a very poorly explored phenomenon. It should be noted, however, that one of the first studies of 250 large companies operating in the Polish economy conducted in 2005 by the Conference Board has shown that they are relatively willing to implement outsourcing of functions related to e.g. Information Technology, supply chain, and personnel management. (Grześ 2007, pp. 99-100). Outsourcing in Polish industrial and construction industries and service entities intensified lately. These changes were also followed by changes in the internal labor markets, as shown in Figures 1 and 2.

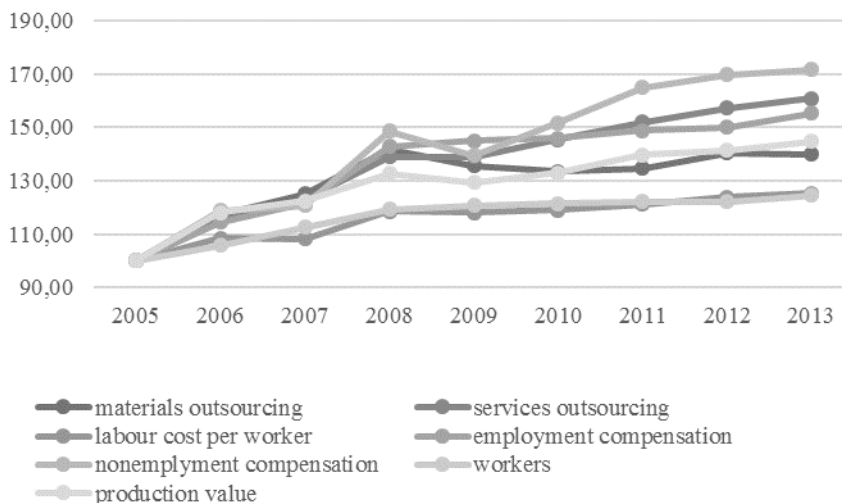
Figure 1. Growth rate of outsourcing and compensations in Polish industry and construction firms in years 2005-2013 in constant prices 2005 (in %).



Source: Own accounts based on unpublished data of Central Statistical Office.

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Figure 2. Growth rate of outsourcing and compensations in Polish service firms in years 2005-2013 in constant prices 2005 (in %)



Source: Own accounts based on unpublished data of Central Statistical Office.

Shown in Figs. 1 and 2 data demonstrates that the analysed period can be divided into two sub-periods: the first period being 2005-2008 and the second 2009-2013. Basically, the first period is characterised by an increase in all the categories included in the analysis. It was only the second period that significantly differentiated the surveyed entities. Analysis of the curves of two basic forms of outsourcing, i.e. materials outsourcing and services outsourcing depends on the specific business entities' activities. In the analysed period, outsourcing in industrial and construction enterprises increased to 55p.p., while service outsourcing increased to 35p.p. .

What is more, the real growth of outsourcing services has sustained at similar level from 2008, while an observation of business practice indicates that entities are (very) interested in this type of outsourcing. This means that market competition on the market of outsourced services has led to lower their prices. Regardless of the recent financial crisis, they were less affected comparing to materials outsourcing, but after 2009 industrial and construction enterprises have again focused on outsourcing materials, slightly reducing employment, and varying forms of employment and labour costs. From 2009 nonemployment compensation has grown from 108% to 138.2%, while employment compensation has remained at the level of 130-133.6%. It confirms that entities have used nonemployment

contracts (written order, contract work) more often or have hired employees through temporary work agency.

The curves in Fig.2 show that service entities have also used outsourcing to improve sales. They were relatively more often used in service outsourcing than in materials outsourcing. It means that they signed contracts with subcontractors to carry out services for their principal. Whereas it can be noticed that this group of entities was less sensitive to the effects of financial crisis than the first described group. Outsourcing of services and materials has grown progressively during this period (i.e. at the level of 0.5-4.0pp.), much less affected by crisis.

Service entities excel at relatively large increase in the number of employees and in nonemployment compensation. Number of employees in enterprises increased in the studied period by 24.5 pp.. Meanwhile the number of workers in the first group increased to 109.38% in 2008 and then dropped to 102.37%. Nonemployment labour experienced the highest growth to 171.5% from 138.19% in industrial and construction entities. It confirms that service entities willingly benefited from nonemployment forms of workers' hiring.

Emirical verification of influence of outsourcing on labour costs in Polish enterprises in the period 2005-2013

Conclusions from the preliminary analysis of the theory and the relationship between the variables: production value (Q), labour costs per worker (Lcw), materials (OUTm) and services outsourcing (OUTs), depreciation (D), workers (W) for two groups of Polish enterprises were a base to verify an impact of outsourcing on labour cost per worker. Scatter plot of these variables, their application to the Cobb–Douglas production function, and assumption about constant elasticity with decreasing marginal productivity gave a legitimacy to estimation of function as follows:

$$Y = \alpha_0 X_1^\alpha * X_2^\beta * \dots * X_n^\gamma * \varepsilon \quad (1)$$

where: Y is dependent variable, X_1 , X_2 , X_n - independent variables, ε –error term $\alpha_0, \alpha, \beta, \gamma$ are estimated parameters.

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This nonlinear function was transformed into a linear function as follows:

$$\ln Y = \alpha_0 + \alpha_1 \ln X_1 + \beta \ln X_2 + \dots + \gamma \ln X_3 + \varepsilon, \quad (2)$$

I assumed that the above-mentioned independent variables can affect labour cost of industrial and construction (I model), and services (II model) firms as follows:

$$L_{cw} = F(\text{OUT}_m, \text{OUT}_s, Q, D, W) \quad (3)$$

Following the stages of building an econometric model based on time series (Gruszczyński et al. 2006, Kufel 2011) and using software GRETL I estimated structural parameters of function transformed into the linear regression models (I and II) using method of least squares (OLS).

Then I conducted a statistical verification of each of the econometric models using tests that assessed the significance of structural parameters, the fitting of the models to empirical data, normality of the error term, multicollinearity of the independent variables, heteroskedasticity and autocorrelation of the error term, the linearity of the analytical form of the model. Tests, as Kufel (2011, p. 119) says, confirm that estimated econometric model is high quality and we can use one to interpret correctly the results.

In order to verify models I assumed significance level $\alpha = 0,05$. Taking this into account, I conducted selection of independent variables, eliminating the variables with the highest p -value that had the greatest probability of error. Also calculated linear correlation between all variables indicated very high level (above 90%) of dependence between labour cost for 1 worker (L_{cw}) and production (Q), but multicollinearity of other independent variables with variable Q showed that this variable is multicollinear with them. Additionally, the estimated parameter of this variable proved to be statistically insignificant and was excluded from an equation. Hence, the model of two groups of firms is as follows:

$$\ln L_{cw} = \alpha_0 + \alpha_1 \ln \text{OUT}_s + \beta \ln D \quad (4)$$

As a result, I selected the independent variable and recalled two econometric models which are presented in Table 1 and Tab. 2.

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Table 1. Estimation model of nonlinear transformed into linear regression of function using OLS for equation (4) for industrial and construction firms in 2005-2013, N=18 half-year periods and $\alpha=0,05$; dependent variable (Lcw) = labour cost per 1 worker

Item	Coefficients	Standard error.	t-Studenta	p-value
const	-14.4867	0.9807	-14.77	<0.00001***
Services outsourcing OUTs	0.3972	0.0451	8.808	<0.00001***
Cost of depreciation (D)	0.6269	0.0718	8.724	<0.00001***

R-squared R2	0.96116	Multiple of R	0.995
The sum of squared residuals	0.005129	Standard error	0.01849
F(2, 15)	185.6155	Value p for test F	<0.000001
LM-nonlinearity test	3.014	Value p for test LM t	0.2216
Value p for normality of the error term Chi-squared	0.40918	Value p dla testu Breusch-Pagan	0.8785
VIF	1.523	Durbin-Watson Stat.	1.88
Value p for test of autocorrelation of order	0.9815	Value p for test of stability parameters CUSUM	0.0047 (instability of parameter VI-XII.2013)

Notes: significance levels: * $\alpha < 0,1$, ** $\alpha < 0,05$ and *** $\alpha < 0,01$

Source: Own accounts based on unpublished data of Central Statistical Office.

From the data in Tab. 1 and 2 it can be inferred that the adjustment of two models to empirical data is very high (above 90%). Conducted multicollinearity of independent variable revealed that this problem does not exist because value of VIF (Variance Inflation Factor) is below 10 (Gruszczynski et al. 2009, s. 58; Kufel 2011, s. 65). It means that correlation between independent variables does not interfere with the quality of the constructed econometric model. Also tests of significance of parameters (test t-Student, F-Snedecora) and other tests verifying the quality of the estimated model have confirmed that this model can be used to evaluate obtained estimates.

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Table 2. Estimation model of nonlinear transformed into linear regression of function using OLS for equation (4) for service firms in 2005-2013, N=18 half-year periods and $\alpha=0,05$; dependent variable (Lcw) = labour cost per 1 worker

Item	Coefficients	Standard error.	t-Studenta	p-value
const	-6.3328	0.4508	-14.05	<0.00001***
Services outsourcing OUTs	0.3673	0.0267	13.74	<0.00001***
Cost of depreciation (D)	0.17202	0.04329	3.973	<0.00001***

R-squared R2	0.979895	Multiple of R	0.9772
The sum of squared residuals	0.00873	Standard error	0.011174
F(2, 15)	365.5492	Value p for test F	<0.000001
LM-nonlinearity test	1.44575	Value p for test LM t	0.485354
Value p for normality of the error term Chi-squared	0.06501	Value p dla testu Breusch-Pagan	0.44973
VIF	2.526	Durbin-Watson Stat.	2.06
Value p for test of autocorrelation of order	0.82829	Value p for test of stability parameters CUSUM	0.6631

Notes: significance levels: * $\alpha<0,1$, ** $\alpha<0,05$ and *** $\alpha<0,01$

Source: Own accounts based on unpublished data of Central Statistical Office.

Our estimated models of labour cost for 1 worker are affected by services outsourcing and technological progress measured as cost of depreciation. The variable of materials outsourcing has been recognised as irrelevant despite its high rate of growth especially in group of industrial and construction firms. This aspect requests further analysis of factors which influenced the value of this variable. Obtained results suggest that we can conclude with the probability of 95 % that 1% increase in services outsourcing contributed to increasing the labour cost per worker at the similar level of 0.367-0.397 in two groups, ceteris paribus. Depreciation cost that is derived from the investment in fixed capital had more differential impact on labour cost per worker. 1% increase in depreciation cost resulted from a 0.626% increase labour cost per person in industrial and construction firms while 1% increase in depreciation cost of service firms has caused only a 0.172% increase in labour costs.

Conclusions

The theory and empirical research of outsourcing and labour costs present different approaches to analysing this aspect. This dependence is discussed very often in the context of international outsourcing or offshoring jobs from developed to developing countries.

This paper looks at this relationship from a different perspective because it divides outsourcing into materials and services outsourcing. In order to measure these phenomena a cumulative approach was applied because it is based on adequate operating costs in half-year periods. This empirical study proved that both groups of Polish enterprises used outsourcing in their activity. Share of these types of outsourcing depends on specifics of the company. Preliminary analysis showed that industrial and construction firms used more often materials outsourcing but they still embraced services outsourcing. On the other hand service firms increased services outsourcing. It was also noticed that labour costs grew in both groups of firms. The growth of these costs was caused by nonemployment compensation in higher degree, especially in service firms.

Econometric analysis showed that labour costs were affected by services outsourcing and depreciation cost. The influence of the second variable had bigger impact on labour cost than services outsourcing, which suggests that Polish firms invested more frequently in fixed capital. This solution contributes to limitation of employment, but not necessarily to reduction of labour costs. This issue is very complex and requires further research taking into account specifics of labour costs.

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Management System of Knowledge Workers in the Contemporary Enterprise

JEL Classification: *A11; D83; M12; O15*

Keywords: *knowledge worker; competitiveness; enterprise; management system*

Abstract: Changes in the 21st century are happening more quickly, unexpectedly, not always in the way desired for the smooth functioning enterprises are turning up. It is domain of the globalization, where new events - chances or threats, cause challenges of the market, before which at present permanently all enterprises are being put. More and more he depends on immaterial resources of the enterprise which they constitute about his strategic potential. Companies form and are developing abilities, is exchanging them for competence which are becoming a base of their competitiveness. In this process he is becoming crucial conditioning, not that much what optimum, but competent managing the intellectual capital, of which meaning in the last period still is growing, and joint employing all organizational units is deciding on the market success. Some work demands a lot of the knowledge, of experience and the independent and custom thinking than other. It is essential for all employers in order to notice these differences creating the principle of the management new kategorii of specialists, having a useful knowledge for functioning of the enterprise - with knowledge workers. Therefore an attempt to show the management system is a purpose of this article with knowledge workers in contemporary enterprises, based on conducted examinations, at turn 2013 and of 2014, in 100 large firms, acting in the area of the Baltic Sea Region.

Introduction

Diametric changes about technological, economic, social and political character in final years changed direction of the development of the global economy entirely. We became involved in times, in which abilities of recruiting and the knowledge exploitation are becoming a base of building the competitive position and the economic success. Current enterprises in order to try to cope with the acting globalization must become on the ball to results. In order to reach it they should closely cooperate with outside and internal customers on partner principles, to be reliable in surroundings (to have an opinion honest), to integrate one's staff which should be enterprising, actually selected and managed inwardly.

Therefore in the 21st century for enterprises of the contemporary economic market, isn't already practically able to build his competitive edge in the support about with not a road, well behind it is going, not entirely the competent workforce. They must also understand, that the qualified staff employee, having a significant influence on market forces of the enterprise isn't a cost, or even a store, with only capital without which in surroundings, of which constant changes are an only certainty, none will already advise himself the organization.

Knowledge workers at present are responsible for creating the innovation what is supposed to translate into the growth of the development of their enterprise. They aren't only initiating and of exclusively coming into existence of new releases or also services but are creating corporate strategies, appointing directions of his development.

How T. H. Davenport noticed for the modern economy knowledge workers are specific harness oxen of economic progress. He also claims, that if companies are supposed to become more profitable, if strategies are supposed to be a success, if the society is supposed to develop - it will happen this way only, when knowledge workers will perform their work in the more productive and effective way (Davenport, 2005, p. 3-4).

Digressing at length whether given employee, belongs to knowledge workers in the enterprise or also no, we must above all describe the role and the influence on functioning of the entire company him. Could be constantly develop the enterprise it must know in order to build the management system with them which will take care before everything for their development and for exploiting crucial competence. It is the element of ordering the future, but also the change in the modus operandi and most importantly in the thinking of the society as a whole.

Methodology of the research

Role of the human capital in the conduct of operations increasing the competitiveness of the enterprise on the market she is indisputable and constitutes the crucial element of his innovative capacity. Due managing the very capital is giving to the possibility of raising the own effectiveness as well as is enhancing also innovative possibilities. This phenomenon causes, that both the knowledge management and the personnel management have a basic overlap a man is which.

An author of the article just concentrated on it, conducting an examination, on turning point 2013 and of 2014, in 100 large firms, acting within the Baltic Sea Region - the examination was conducted as part of own examinations carried out by the author of the article. For the purposes of this study which constitutes only a small proportion of wholes of examinations, being supposed to be drawn up and discussed in the separate publication, two groups of respondents were provided with analysis: of managers of middle and senior management (decision-making persons) and of crucial employees for the company (were these are persons indicated by departments of the human resources management based on analysis and consultation). Essentially 328 employees took part in the first research stage - 250 persons on positions managerial and 78 marked out as crucial, which two separate questionnaires of questionnaire forms which following types of questions contained were prepared for:

- closed off alternative and closed off filtering,
- closed off which are exploiting the nominal and order scale,
- determining the rank of the importance of considered subjects,
- half open in the form of conjunction,
- so-called test which let the reply of respondents check the frankness,
- test "Self-portrait of Stein" - being used for the identification of needs of respondents and testing the level of expectations,
- of the question to the identification of dehumanizing factors - managements used for determining issues associated with communicating or also a role in the whole process.

A fact that in no examined enterprise comprehending the knowledge worker functioned is meriting attention what much hampered the research process, because an identification of these persons needed to make the attempt what in Polish conditions turned out to be most difficult. But, after establishing criteria and conditioning affecting to the membership of the given employee in the group of knowledge workers, it is possible to estab-

lish that in 38 studied subjects (what constituted the 38% of the examined group), managed to identify such persons in number 41, that is less than 13% of all examined persons.

Enterprise on the global market

Operating enterprises in our times are coming across on their road of the development more and more difficult and more complicated turbulences of surroundings. He belongs to them above all: increase in the aggressiveness manifesting itself with increase in the novelty and the speed of the changes along with the complexity and intensity of surroundings, competitive new demands connected with the dynamic processes of globalization whether unprecedented to such a scale technological progress. Therefore in order to be a success, as not a time he manifests itself with only staying of the current position at the market, already only not has effectively to exploit every enterprise had material or financial stores, but also the potential of one's employees which systematically is forced to effect the analysis of environment which his company operates in. Times of building the market majority based on the cheap labour force were gone into the oblivion. All these elements cause, that companies during entire of one's development process are subject to a constant evolution, incessantly adapting their cells and methods of action to changing market conditions.

The process of globalization of enterprises is only a consequence of changes in practice, which occurring at present in the world economy. It doesn't result from changes above already exchanged, associated with the technological progress, but happening changes in the everyday life of ordinary people - a quality of the social and political life is changing what is also changing the situation on the international arena.

The globalization of enterprises causes internationalizing them what means involving enterprises in the production and commercial international activity and the possibility of the service package full of the benefit (Adamkiewicz, 2010, p. 389):

- high flexibility of enterprises, relying on the ability of accommodating itself to the process of globalization - implementing the strategy of the globalization in enterprises is much simpler than fulfilling for her by the government, trade unions or scientific units,
- attaching importance to the need for the growth in manufacturing by the society what contributed to the dominance of fulfilling enterprises of expecting customers,

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- uselessness of world analyses of statistics of commercial flows between states on account of the fact that the part from them is held among enterprises,
- treating the global economy as the system of the slow exchange and flows doesn't correspond to real processes,
- loss of the control by governments over the majority of factors and processes determining the economic development of the country in contrast with transnational enterprises which are in the state to control both the course and the scale of processes.

Crucial categories of the future in the management these are a diversity and a flexibility, an adaptive-ness, an ability to respond to the environment and directing the customer at meeting expectations, in order to products and services of enterprises satisfied his needs. Quickly changing technological, social conditioning and economic surroundings company are creating new challenges for creating management systems. The still growing technological complexity and the need of the diffusion of information and the knowledge require implementing new solutions in the technology enabling her to use (Grudzewski & Hejduk, 2011, p. 95).

Contemporary enterprises operate in economy conditions based on the knowledge and must seek tools which on this base would let them to the improvement or keeping their competitive positions. They must happen absolutely elastic and to base one's action on the quality of immaterial stores which more and more are conditioning the value of business data.

In conditions of the knowledge society a growth in importance of immaterial stores is taking place, in it of the intellectual capital, particularly the human capital. A role of knowledge workers to which they are paying for the thinking also exceptionally grows. Getting the appropriate quality of immaterial assets, in it of the human capital and them have an effective application great significance for companies since enable (Olak, 2011, p. 172):

- keeping appropriate relations with customers and the effective and efficient service of new groups of customers and markets,
- implementing innovative products and services, expected by target groups of customers,
- fast and profitable producing products and providing individualized services about the best quality.

Enterprises so that survive and stay at the market, must can predict and accurately assess their situation, i.e. the ability of effective action and the ability of the development in constantly changing surroundings, as well as

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still make determining decisions: way, form, pace of the accomplishment, scope, depth complexity of structural changes. They are it because current efficient and effective indicators of not only surviving the enterprise and restoring the balance for him in changeable surroundings, but also formulating by him dynamic aims providing for him functioning, getting the competitive edge and the subsequent development (Grzebyk & Kryński, 2011, p. 115).

Trying above dissertations to sum up it is possible to state that on one hand competing of enterprises, on the other competing of surroundings in which they are functioning are a main indicator of the current situation on the market. So in order can become known on such a peculiar market, companies must be characterized by an internal adaptability to changing permanently conditions, not omitting the flexibility which constitutes the temporal indicator in this process of conducted adaptations. That new concept is also putting building the competitive edge pressure on using immaterial resources in all action and omnipresent and all at the same time of essential knowledge.

Identification of knowledge workers in enterprises

Causing analysis and observation of functioning of contemporary enterprises under the angle of what is happening around them it is possible to distinguish a few fundamental tendencies. For the first appearing changes they are more and more non routine and unusual earlier in the past. Secondly the permanent increase in intensity of surroundings proves that keeping interaction among the enterprise and his partners is consuming energy more and more. And thirdly causing very increase in the speeds of the changes which they are stealing in surroundings growing his complexity.

Therefore, in the appearing latest models of enterprises these are people which have a rich knowledge, which appropriate used enables into an optimal manner to use remaining resources of the company, are becoming main assets for her.

Contemporary enterprises are as a rule smaller, the employment in them is less stable, the time of the employment can confine itself to the accomplishment one, of specific project. Therefore they require the knowledge of performed principles from the employee of tasks without the need for detailed briefing before carrying each of them out. Enterprises of the 21st century are aspiring to the cost cutting reducing the number of employees

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employed on the job at simultaneous ensuring the store of essential qualifications for the continuity of his functioning (Antczak, 2004, p. 99).

However P. F. Drucker is of the opinion that in the future more and more a division of professionally active persons into two groups will be visible: of specialists equipped with the knowledge and employees providing services. In the modern knowledge society old hands, that is educated practitioners which are able to use the knowledge will be leading groups for the purposes of the production (Drucker, 1999, p. 82).

Similarly B. Mikuła which the division of the structure of human resources into three fundamental groups is putting forward is capturing the matter: of knowledge workers (combining above average technical competence from intellectual), staff (differing in it from the first group, that his participation in creating and making available to the knowledge is limited) and of participating partners in the process of the value creation (Mikuła, 2010, p. 26).

T. H. Davenport is defining the knowledge worker as the employee having the highest level of the expert knowledge, creating includes educations or experience, but the main purpose of his work, distribution or applying the knowledge (Davenport, 2005, p. 10). Next P. F. Drucker determining products of the work of the knowledge worker thinks that physical objects, but a knowledge and ideas aren't a result of their work (Drucker, 1986, p. 122). However G. Davis and A. Parker writing about the work based on the knowledge, they are giving, that it is a human intellectual made work in the purpose of generating of useful information. During this work knowledge workers are finding data, are using the knowledge, are involving mental models, applying the concentration and the attention (Davis & Parker, 1997, p. 26).

Of definition of this group of employees one could quote still more. However he remains the main dilemma still in what way to identify employees which aren't knowledge workers. This issue is giving rise to controversy a lot, because since the productivity of knowledge workers is supposed to decide about the competitive edge of enterprises in the contemporary economy, correct identifying peculiar trademarks is necessary both of object of their work (of the work based on the knowledge), as well as of certain set of features and the predisposition of personal knowledge workers as the group. On this base it is possible only to draw up and to implement action - to create the right operating environment - which will let get the potential out of this group of employees, and make their knowledge like most productive. From here it is also necessary of having a knowledge

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about determinants membership of employees in the group of knowledge workers.

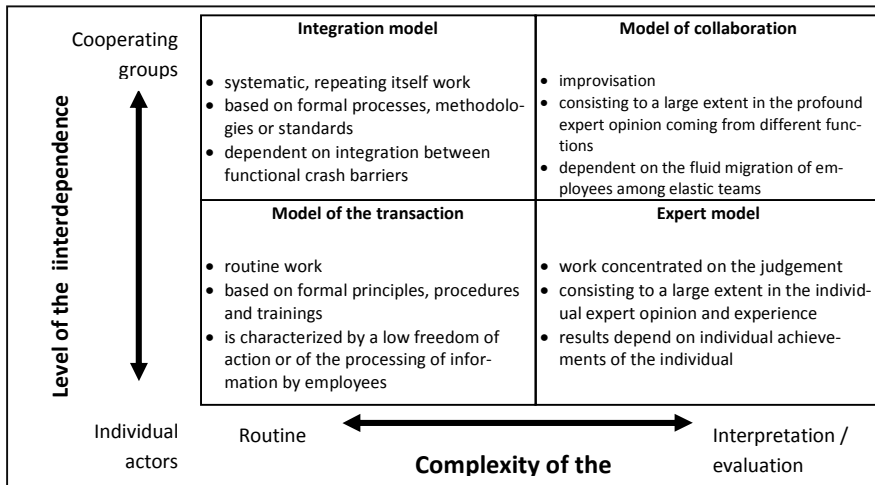
To sum up, causing the synthesis of definitions proposed by researchers and based on own empirical examinations, the author of the article made the attempt to determine following conditioning and criteria of the membership of given persons in the group of employees of knowledge:

- they are a main purpose of the work of knowledge workers (the work based on the knowledge) creating, distributing or applying the knowledge (considering manual operations which require the advanced and theoretical knowledge highly),
- the thinking is filling the most of the time for knowledge workers which are devoting for the work,
- mainly ideas and a knowledge are a result of the work of knowledge workers which most often constitute the contribution to the work other,
- by knowledge workers they constitute the base of the performance of work knowledge, expert opinion, experience, education,
- problems which they are untying and chances which knowledge workers are exploiting at their work are most often new, unusual, non routine,
- knowledge workers are seeking, are processing and are making up information or data which they are able to take the meaning out and to withdraw on their base necessary actions,
- the work of knowledge workers demands the innovation, the creativity, the knowledge of solving problems, the system thinking, the greater concentration and focusing its attention.

In this place it is worthwhile appealing T. H. Davenport which becoming part of a current of dissertations about the work based on the knowledge and the productivity of knowledge workers, created the ranking of employees on account of the amount, the quality, the application and the knowledge creation, which is accompanying operations performed by individual groups of employees. Ranking presented by him (Picture 1) very well he is giving back what he called for to P. F. Drucker and is bringing us closer to the agreement on the question of diversifying employees on account of the participation of the knowledge in their work.

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Picture 2. Classification of processes containing the knowledge



Source: Davenport (2005, p. 27).

Explicitly it results from the picture that certain types of the work require a lot of the knowledge, of experience, expert opinion, autonomy, independent, custom thinking than other. From the other side at present the majority requires tasks even if of minimum level of the thinking and the knowledge, but not all these alone kind and to the same scale. He/she is admitting employers so that notice these differences and take appropriate actions. From one side it is important in order to raise the productivity of these groups of employees which are most numerous in the organization (such action most often in practice brings itself about for traditional managing employees of the industrial era - of the cyclical evaluation and planning the development of employees and managing the structure). On the other hand, if companies want to compete on the global market, companies must attract and appropriately motivate employees which, thanks to using their knowledge, are exaggerating about the permanent market success - and what's more there are exactly knowledge workers.

Management system with knowledge workers in enterprises

The knowledge stored by people has a special value for the organization due to the scope and limitless possibilities of for her configuring. It is possible to describe her as follows (Kasprowicz, 2001, p. 127):

- The scope of one's knowledge of every employee is different, irrespective of the diagnosed potential of the work of each of them. The sum is giving broader bases of making right organizational decisions in the end to their individual knowledge.
- Towards the one which he already has. She can come from outside the organization (e.g. studies), can also be a swimming knowledge in acquired organizational experience (contacts with other employees, trainings). Combining both types of the knowledge is inspiring new perspectives and constitutes sources of information, impossible to generate with applying only one of them.
- The knowledge of every employee is in the constant process of changes. It results from everyday experiencing new situations and doesn't constitute only a new quality in legacy systems of the knowledge, but is a base of future actions.
- Every employee with his knowledge is sources of innovations in the company. The internal knowledge of the organization subjected to innovative processes is becoming a source of the competitive edge for the organization, because is unique, inappropriate to other conditions and difficult to copy.
- Enriching the knowledge of the employee is a base more distant in accordance with his development principles: for them more you know, all the more you can learn.
- The hidden knowledge of employees constitutes the competitive advantage of the organization. Selection of people about attractive features of the intellect and stores of knowledge concealed and so is becoming a challenge for the organization. Developing procedures selection, allowing to get to know exploiting diagnostic techniques is becoming necessary the structure of the knowledge and the guild of individuals, as well as adapting to it techniques of the individual development.

It is possible also to tell the managerial staff of regarding the knowledge as the store and inspiring for her in the enterprise facilitation is one of the most general aims of applying the knowledge management for seeking practical applications of this store (Probst at all, 2002, p. 40).

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Therefore management system with knowledge workers which has a lot of knowledge management common to the system, according to the author's of this study it is possible to treat them as the complex of centres, methods, principles, data, people, as well as networks to accept interrelations which let and to realize strategies of enterprise data.

One should also assume that it is complex systems from many subsystems, which subsystems are dominating in / responsible action too:

- bravely oneself of knowledge workers with information / with other employees enterprises know,
- transfer of knowledge from knowledge workers to remaining employees of the enterprise,
- understanding the knowledge handed over from knowledge workers,
- picking up and using the knowledge handed over.

One should in addition remember that the potential which the given knowledge worker has is from one side unique, as well as highly professional. Many ingredients make it up, among others: education, experience, abilities, acquaintance of the industry, business contacts, professional reputation and other. Such an employee is for the enterprise priceless, and can offer his competence almost in every nook of the globe, overlooking to distances, time zones and cultural differences (Kłak, 2010, p. 318).

With reference to the above, bearing in mind in the today knowledge workers are possessing the key knowledge, competence and skills, individual management system built in every enterprise with them (individual because the knowledge of individual employees is unique what is also marking, that unique behaviours and expectations of her owners can be) should be created based on universal assumptions:

- partner interactions - without hierarchical structures,
- creating mechanisms of the transfer of knowledge, at permanent of encouraging sharing the knowledge (with opinion of the author, of employees which aren't sharing knowledge because they cannot, don't want whether don't have conditions, names cannot receive the knowledge worker),
- aspiring in the direction of the trainee organization, initiating conditions supporting the organizational learning,
- stimulating initiatives amongst employees having at their disposal knows,
- for using tools for system building the human potential - main strategic objectives are due managing the human capital.

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Still how M. Kłak claims, building the management system with knowledge workers, settling many appearing dilemmas with which during the routine work enterprises building their competitive edge based on competence of knowledge workers are contending is necessary (Kłak, 2010, p. 319-320):

1. How to trust specialists, for which the work in the company is a next stage very often in the career and acquiring new abilities, communicating tip-offs, often priceless for market competitors?
2. How to recruit, to hold well to offer specialists which know more than anyone else in their activity and easily can find even better situations vacant?
3. How to encourage handing over and sharing the knowledge, not causing growing feeling loss of the uniqueness and meaning as the sole owner of determined stores of knowledge?
4. What elements to build the space of the intellectual mobilization and the enterprising activity from?
5. How to enforce and to assess effects of performed tasks, since for managers is a narrow know-how lacking both the acquaintance of all accepted consequences and accepted solutions?
6. Which way to guarantee, so that the specialist exploits all had personal competence at his work, came to the deepest decks of his experience and reflections, demonstrated the full intellectual and creative commitment, creating the new knowledge and carrying her out in the form of , functional, organizational technological innovations etc.?
7. What values to appeal in exceptions, forcing unbound specialists to the additional effort and sacrifices emotionally with the organization to?
8. How to evoke enthusiasm and enthusiasm amongst self-confident specialists, for which the professionalism means the self-control and the emotional distance towards partners and for the employer?

Suming up in the process of setting the individual management system by knowledge workers, enterprises, according to the author's of this study, should also be based on following universal principles:

1. Involving the entire staff, in the broad way, in business affairs - what to lead should for the participation in the management.
2. Creating and keeping the organizational culture set to strengthening is holding prisoner between employees.
3. Introducing the opened and flexible organizational structure.

4. Implementing new principles of the remuneration (of course as far as possible) which will let the job evaluation, of her results or also employing.
5. The approach towards every employee must be individual, including in the context of motivating and improving.
6. Leaving the big margin for employees for own action what the great scope of the had autonomy will cause at the work.
7. Change of the management style - from the manager to coach/ of the coordinator/ of the moralizer.
8. Consent to create unofficial teams, working on some complicated task, solving a many-sided problem.

Conclusions

Taking into consideration all above dissertations concerning managing knowledge workers in the enterprise, it is possible to notice also concrete objectives which a created management system is supposed to reach with this group of people. They are it:

- change of culture organizational on "teaching culture oneself",
- cost cutting of functioning of the enterprise - improving his productivity, qualities of service/products, or customer services,
- introducing the innovation in the enterprise (and managing them),
- development of new activities,
- the development of had employee staffs, including the improvement in their motivation and satisfaction from the work,
- improving the communication,
- making more flexible organizational structures of the enterprise,
- improving outside cooperation,
- proper management of knowledge, that is: the access, documenting, the transparency, distribution and even the sale of the knowledge.

Analyzing above targets of which undoubtedly in consecutive research stages the author will make a success to clarify articles, a conclusion that they are practically identical with objectives of the strategic management is knowledge in the enterprise, what next conducting this action together allows to state for needs, clocking is eating the one-off.

Heading too B. Mikula, for fundamental assignments on the scope of the strategic management know it is possible to rank (Mikula, 2011, p. 29-30):

- consolidating the sense of direction to the knowledge in the mission and the vision of the organization,

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- strategic analysis of the environment of the domestic enterprise, including monitoring, analyzing, assessing and reporting his stores of knowledge personalized, codified and consolidated and networks of the inside organizational relation between his component parts, level of the self-organization, organizational climate,
- strategic analysis of the external environment (closer and more distant), based on still obtained information, with particular reference to of knowledge of surroundings (of partner companies, competitors and organizations not being competitors, in it of research-developmental institutes, consulting companies, universities) and networks of the relation in surroundings, assessing get information and reporting,
- creating the vision of the knowledge,
- formulating the knowledge strategy,
- establishing gaps of the knowledge and the relation,
- establishing barriers of filling gaps of the knowledge and the relation,
- choice basic and of assisting strategies of the knowledge management for gaps necessary for filling of the knowledge and manners of the forming of desired relations,
- selection of methods and tools and people for the implementation of strategies of the knowledge management, determining essential financial means and organizational conditions,
- determining the dominant approach to determine the construction and operation of a knowledge management system (social or technological),
- backing up the strategy of the knowledge management with the forming of the relation with surroundings, with restyling of tasks of knowledge management, structure of the organization, roles, processes and the information infrastructure and communications, model building of the climate and the organizational culture orientated to the knowledge,
- the assessment of the level of achieving established purposes and the correctness of taken action towards stores of knowledge, the economic assessment of the knowledge, the intellectual capital and conducted action from the scope of the knowledge management.

To sum up a question, how in practice to transfer competence of identified knowledge workers which thanks to the created unique system constitute the basic immaterial source of the enterprise, into his competitive position on the market still remains. Seeking the answer to that question, will be keeping the author of the article company in the further research process which is supposed to describe activities of the company, to which exactly knowledge workers are enjoying considerable influence these areas.

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Security Assessment and Optimization of Energy Supply

JEL Classification: *Q40 ; Q47 ; C45 ; C53*

Keywords: *energy supply; security; neural networks; operating reserve*

Abstract: The question of energy supply continuity is essential from the perspective of the functioning of society and the economy today. The study describes modern methods of forecasting emergency situations using Artificial Intelligence (AI) tools, especially neural networks. It examines the structure of a properly functioning model in the areas of input data selection, network topology and learning algorithms, analyzes the functioning of an energy market built on the basis of a reserve market, and discusses the possibilities of economic optimization of such a model, including the question of safety.

Introduction

A shortage in energy supply may take various forms and particular attention should be paid to: voltage non-compliance with applicable standards, i.e. excessively low voltages, temporary network overloads, power outages, and long-term supply shortages due to blackouts (Marsadek & Mohamed, 2013, p. 466). Because energy supply shortages result in economic losses, a number of measures are used to estimate them (for example Total Social Cost – TCS) and to evaluate the market's capability to satisfy demand (for example Effective Load Duration Curve – ELDC, Loss Of

Load Expectation – LOLE, and Expected Energy Not Served – EENS).¹ Whichever method of evaluating the stability of the energy system is adopted, forecasting the occurrence of undesirable incidents is a key element of energy security and economic optimization. Modelling the behavior of the energy market in terms of the abovementioned shortages in energy supply is possible owing to the use of AI tools, such as Artificial Neural Networks (ANN). The forecasting of undesirable incidents should also take into account the system of reserves, whose role consists in supplying corresponding levels of production capacity in the case of unexpected operating conditions, such as damage to components of the energy system infrastructure or increase in demand. The aim of the study is to analyze the possibility of applying ANN to assess energy supply security and to analyze various reserve market models in terms of economic optimization.

Methodology of the research

The authors conducted an energy market analysis based mainly on literature analysis. References were made to studies performed in many parts in the world and in various markets in order to ensure the applicability of the presented methods to more than a few selected energy markets. Apart from the literature analysis, the authors also used their own empirical research conducted over many years in specific energy markets, with particular focus on the Ontario region.

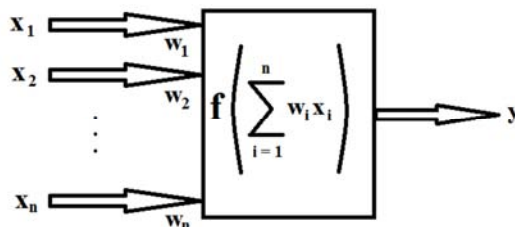
Principles of Artificial Neural Networks

As the name suggests, ANNs are mutually linked artificial neural cells. The definition of a neuron was developed as early as the 1940s, and figure 1 presents the general structure of a single cell. It features a number of inputs (labelled x_1 to x_n) and corresponding 'weights', the latter being real numbers. Any signal that reaches a cell is multiplied by the corresponding weight. The products of all the inputs are then summed, and the total is transformed using an activation function. In the learning process, the weights are subject to numerous modifications, which consequently improves the responses of the ANN. We may say therefore that the intelligence of the network is contained within the neuron weights. The functional and learning processes of ANNs are frequently described algorithmically

¹ More information can be found in Jasiński (2011).

in the subject literature. This study focuses on the possible practical applications of ANNs rather than the IT and algorithmic details of constructing an actual network simulator.

Figure 3. Structure of a single neuron



Source: own development based on Ukil (2007, p. 80)

Selection of input data for the model

The basic element that determines the quality of the forecast is the set of input data that describes the modelled phenomenon. Traditional econometric models require some indication of the type and degree of these relationships. An undeniable advantage of the use of ANNs is their ability to independently search for links between explanatory variables and explained variables. The key task is, therefore, the selection of the most appropriate input data to suit a given forecast. In terms of forecasting energy demand or pricing, the type of explanatory variables depends on the time horizon adopted. Long-term forecasts use such aggregates as GDP, while short-term forecasts focus more on weather-related data and short-term consumer behavior (i.e. related to watching popular TV programs like the Super Bowl). Jasiński (2014, in-press) and Jasiński & Ścianowska (2014, in-press) have examined information regarding the selection of input data, depending on the adopted prediction type.

Other explanatory factors are also required for analyses related to the risk of disruptions to the energy supply. The subject literature takes particular interest in the weather factor which, although often applied in most short-terms demand forecasts, in this case the volume of data required generally depends on the number of transmission lines. In other words, each transmission line usually has at least one corresponding atmospheric variable that describes the weather in which that given line operates (Marsadek & Mohamed, 2013, p. 474). A problem that can arise in the case of highly extensive transmission lines is that different atmospheric conditions may

apply to its different sections. In such a situation, the input data should be complemented with a larger volume of variables, and there are no restrictions in this case regarding explanatory variables. However, the general principles of creating ANN models suggest that the quantity of input data should tend to be low in order to provide the model with only relevant data. This is confirmed in the studies by Marsadek & Mohamed (2013), in which the authors achieved an improvement of model quality by reducing the number of explanatory variables from 161 to as few as 23 for selected models, based on Principal Component Analysis (PCA).

The second type of data input is that usually derived from monitoring systems and includes information on the load on transmission lines. The actual number of variables usually depends on the number of buses (Marsadek & Mohamed, 2013, p. 474).

The third type of data comprises technical and statistical information related to the functioning of the energy distribution system, including network parameters and response times in the event of errors (Kim & Joo, 2006).

The subject literature covers both those models based on variables of the abovementioned groups and those functioning solely on the basis of a selected type of information. For example, modelling the risk of voltage drops is possible using only data for input voltage rates on the transmission lines (Chen et al., 2006). Of course, using only this type of variable at the input of the model would not forecast a network failure, as the modelled variable would require reference to the most relevant explanatory data.

Network architecture and learning method

Forecasting models are characterized in this case by the variety of architecture applied. For example, Multilayer Perceptrons (MLPs) are prevalent in energy price and demand analyses, and are the most popular type of ANN. Although also constructed on the basis of MLPs (Chen et al., 2006, Swetha & Sudarshana, 2014), models used to estimate the risk of supply shortages are often based on other solutions as well, such as General Regression Neural Networks (GRNNs) (Marsadek & Mohamed, 2013) and Radial Basis Function Networks (RBFNs) (Rashidi & Rashidi, 2004). Both types of ANN are derived from MLPs, but with extensive modification applied to them. Jasiński (2003) gives more information on their structure

Irrespective of the type of ANN, the goal is to optimize the remaining parameters of the model. In the case of an MLP this determines the number

of hidden layers and also the number of neurons in each (the number of cells in the input and output layers depends on the number of explanatory and explained variables). Furthermore, each cell should have an appropriate activation function selected and, in most cases, its parameters as well. It is usual to construct all cells in a given layer on the basis of identical transformations. RBFNs and GRNNs do not require the determination of the optimal number of layers, as this parameter is always preset: the former have three layers whilst the latter have four.

One of the most popular MLP learning methods is backward propagation of errors (BP). However, as shown in both the literature and empirical studies conducted by the author, in many situations other gradient methods are worth applying as well. Among the ANN training algorithms, the Levenberg-Marquardt method (Swetha & Sudarshana, 2014) and conjugate gradient method appear to be particularly useful.

Prognostic models are sometimes built on the basis of several networks rather than a single one. Such an approach is justified when there is the need to model several explained variables. Theoretically, ANNs can forecast many output variables within a single network; however, experience shows that satisfactory accuracy can only be achieved when forecasting a single variable. Therefore, each of the modelled values should be forecast using a single ANN. Such an approach was applied to determine system stability where initially a short-term (one-day) forecast was made for power system load.² The obtained data, with concurrent knowledge of up-to-date values, were used for the next step in error estimation. Afterwards, the obtained information was used as MLP input data to predict the random component of power system load. Another network (RBFN) determined the stability margin on the basis of the expected stochastic part of the load and expected future load. The margin was added to the MLP network in order to minimize its forecast error (Ukil, 2007, pp. 146-147).

There are many possibilities for cooperation between ANNs sharing the same and different architectures, as well as between ANNs and other AI tools, such as the Genetic Algorithm (GA). GA support, or similar evolution strategies (ES), may be independent (without ANN) or used to assess power systems (Samaan, 2007). Another possible technique consists in using the models independently, and then verifying whether they all indicate the same conclusions.

² Such forecasting can be successfully conducted using an ANN, although other techniques may also be used.

The role of reserves in providing power system security

The deterministic security of a network is the ability of the power system to endure unexpected circumstances without the necessity of halting operations related to satisfying demand, except in cases of voluntary waiver. There are two types of security-provision actions used for power systems: preventive and corrective.

Preventive actions include repartition of already established supply volumes under the conditions preceding the failure, whilst corrective actions include introduction of quotas for selected types of demand in specific conditions (Aghaei et al., 2009). This means that reserves are resources that can facilitate implementation of preventive and corrective actions to restore security.

Reserve maintenance services, called Ancillary Services (AS), can be classified as follows:

- Ten-minute spinning reserve (TMSR);
- Ten-minute non-spinning reserve (TMNSR);
- Thirty-minute operating reserve (TMOR).

The first two categories involve the capacity of units connected and units not connected to the system to provide increased energy volume for 10 minutes, whereas the third involves the capacity of units connected and units not connected to the system to provide increased energy volume for 30 minutes.

In order to utilize the supply reserve from active units, their resources must be synchronized with the network and must be able to reach the expected production level in a short time frame. The actual volume of the operating reserves is the volume of production capacity above the level resulting from demand, which ensures supply security and is available for distribution in case of system failure. Requirements concerning the volume of reserves are based on the highest possible supply volume that can be lost. The available operating reserve volume is activated to secure an energy supply in the event of system failure. Thus the supplied energy replaces the volumes that were lost as a result of the failure.

The substitute energy may be delivered in two ways:

- from active production units that operate below their maximum level of production capacity,
- from inactive production units able to begin operation and produce energy quickly (Likover, 2014).

The reserve planning strategies may take different forms (Baldick et al., 2005). The most popular form utilizes a sequential approach to ordering reserves, whereby the process of scheduling reserve maintenance services proceeds after an energy supply plan for a separate market has been prepared (Liu et al., 2000). Under this method, the reserve-related services are planned by quality, in descending order. This market model was adopted by independent systems operators (ISO) in California in 1998, but it proved to be vulnerable to manipulation by the market participants.

The flaw of this method, related to the functional separation of the energy market and the reserve market, is particularly visible when the original plans concerning energy supplies do not allow supply at an appropriate level of production capacity to satisfy the requirements in terms of reserves. In such a case, the market operators must inevitably apply for participation in a system to a power plant that offers energy at a higher price, which evidently leads to deterioration of social well-being and results in a loss to the entire economy.

The second method of scheduling energy reserve orders involves the simultaneous planning of different types of reserves in line with the demand level, but still on a market separated from the energy market. By this method, the reserve market, which is thus attributed with the character of substitute goods, is known as a disaggregated parallel market (Afshar et al., 2008).

The role of the auction market in providing security and economic optimization of the power system

The third method, used by such operators active on the East Coast of the United States as: PJM, New England and New York, involves system operators offering reserve provision services through planning, parallel to actual energy supplies. This facilitates optimization of each node by, for example, balancing the energy market, and satisfies the requirements for each service connected with reserve maintenance. The pricing of energy and reserves proceeds concurrently, and includes lost opportunity costs resulting from the unavailability to supply other products (Liu & Liu, 2007).

The issue of energy has been analyzed in a number of studies as it combines important aspects of power system security and efficiency. Scientific papers on energy and reserve planning by authors such as Singh and Papalexopoulos (1999) describe the auction market for ancillary services in California and their distribution, while also presenting the relationships

between individual markets. While Ma et al. (1999) proposed a zone-based reserve model, Gan and Litvinov (2003) and Wu et al. (2004) analyzed the requirements for maintaining reserves throughout the system as a whole. Authors such as Afshar et al. (2008) presented the process of determining the level of energy reserves and described the methods of arriving at their optimum values, based on delivery costs and benefits that accrue from their availability.

The majority of studies assume that the distribution of sufficient amounts of reserves across the remaining units is a sufficient condition to return the situation to normal. However, what also needs consideration are problems connected with network security, such as transmission line overload, bus voltage limits, and reserve distribution cost estimates. It is of fundamental importance here to address the question regarding the availability of Independent System Operators (ISO) in terms of resource distribution to ensure system security (Aghaei et al., 2009). In their attempts to answer this question, authors such as Aganagic et al. (1998), Alvey et al., (1998), and Cheung et al., (2000) assessed transmission network models with constrained transfer for individual lines with pre-defined reserve levels for selected nodes or areas.

Nevertheless, ISOs have continued to struggle with the issue of determining a method of employing all possible resources to combine system safety and fair settlement policy. This issue is particularly valid for units which are considered to be the expected providers of sufficient system reserves even though they could sell their energy at higher prices on an aggregated parallel market (CAISO, 2008).

In order to overcome these problems successfully, an aggregated, parallel market framework has been developed for many products to mitigate the deficiencies of the sequential system. It also accounts for payments designed to compensate for lost opportunity costs to encourage energy providers to comply with the requirements for maintaining reserves. Adopting an additional objective function within the settlement procedures which takes into account system stability, as part of the non-linear multiple-objective constrained optimization problem, means that generation costs and safety indicators are considered competitive goals. The issue of combined energy markets and reserves has been addressed by way of Mixed Integer Non-Linear Programming (MINLP), which reconciles security concerns with commercial aspects of market settlements.

Market settlements are usually handled by the operators, who are responsible for determining the set of accepted purchase and sale proposals

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and the resulting market settlement prices. Therefore, the data concerning unit liabilities, production and consumption levels, as well as energy and reserve prices, are all the outcomes of the optimization procedure. These outcomes are determined by the purchase and sale proposals submitted by the market participants who are known to the market operators before the settlement procedure is initiated (Aghaei et al., 2009).

During the multiple-objective optimization of the settlement procedure for combined day-ahead energy markets and reserve auctions, the primary objective function is to reduce the costs of the provided energy and reserves (AGC, TMSR, TMNSR and TMOR), as well as the lost opportunity costs (LOC) for hourly delivery. In view of the above, it is assumed that generators submit price quotations on the basis of marginal costs. In the energy market these take the form of multiple blocks and on the reserve markets they take the form of a single block for all types.

Another important task of the ISO is the selection of the settlement procedure. In the most extensive form the generators are paid both on account of both lost opportunity costs and availability within the framework of reserve orders, i.e. the so-called A+L model. When system demand for different types of reserves is not satisfied, some generators have to reduce production in order to satisfy system demand as far as reserves are concerned. The lost opportunity cost due to the created reserves is defined as the cost of profit which would probably be gained by a generating unit if its generating powers were engaged in the energy market (Aghaei et al., 2009). This multi-criteria model also includes the category of the price of lost profits, which is the difference between the price possible on the independent energy market and the energy market shared with the reserves market.

In deliberations concerning the amount of payments for generating units based on the A+L model, in order to use LOC in the equation for costs offered by generators, prior to the optimization of function one needs to consider the issue of energy transmission. It is assumed here that an energy system should be managed so that all the levels of bus voltage are within acceptable ranges, and that none of the transmission lines in the system are overloaded.

In a market settlement procedure, the issue of system security in terms of taking into account voltage drops and transmission line overloads involves the use of indicators while formulating additional functions of purpose for the multi-criteria issue of optimization. It is assumed that one should aim to minimize those indicators defined as: the difference between the values of voltage in particular buses and the reference level to the refer-

ential and as a relation of flow of power for particular levels of lines connecting buses to their maximum flow capacity (Aghaei et al., 2009).

In the end, the settlement price means the highest accepted price offer as the marginal cost of a particular unit in a bus if it is selected in the energy market:

$$\rho^{\text{MCP}} \geq Z_{i,u} \rho_{i,u}^e$$

where:

ρ^{MCP} – is the highest accepted quote defined as marginal cost,

$Z_{i,u}$ – is a binary variable, which has the value of 1 if a particular unit in the bus is selected to undertake activity on the energy market, otherwise the value is 0,

$\rho_{i,u}^e$ – offered price of energy for unit u in bus i (Aghaei et al., 2009).

Conclusions

Modern solutions regarding the modelling of the energy market can be effective in the field of predicting energy supply shortage. The precision of the forecasts requires the suitable construction of a model, which in the case of an ANN means the appropriate selection of explanatory variables, network topology, learning method and other parameters. It should be expected that the quality of the forecasts can be increased through the further optimization of the model components, such as by means of applying mathematical methods to modify the input data.

Production capacity reserves are a fundamental instrument ensuring the safety of a power system. The possibility of using them within the framework of both preventive and corrective measures for security allows the system to survive undesirable events, without the necessity to cease handling demand.

However, the necessity of ensuring stability of the supply parallel to economic optimization of the activities in the system resulted in the need to seek a settlement procedure on the auction market which would allow the achieving of both these objectives at the same time.

The experiences of independent system operators in that regard show that payments received by generators should take into account the necessity of covering the lost opportunity costs, the costs of providing availability of resources within the framework of reserve orders and issues related to the security of supply of particular units.

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**Intellectual Property Rights and
Appropriability of Innovation Capital:
Evidence From Polish Manufacturing Firms***

JEL Classification: *O31; O34*

Keywords: *innovation capital; appropriability mechanism; intellectual property rights; patent; knowledge production function*

Abstract: This paper tries to find how firms use IPRs in the form of patents to protect innovation capital and find determinants of their effectiveness. The research is based on a large sample of 2960 Polish manufacturing firms that were engaged in developing and/or implementing a product or process innovation in the years 2010-2012. Besides descriptive statistics which show firms' attitudes toward the effectiveness of patents and their determinants, I apply the knowledge production function to find a link between patent propensity, R&D and innovation performance. Descriptive analyses show that Polish manufacturing firms rarely use patents as the appropriability mechanism which results in the low level of their perceived effectiveness. It also turns out that the perceived effectiveness of a patent depends on a firm's size, the innovation type and technological opportunities. In turn, the results of the knowledge production function estimation allow me to conclude that an increase in patent propensity affects the firm's innovation performance positively.

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Introduction

Innovation capital constitutes to draw the attention of scholars and practitioners, because the ability to innovate is a source of a firm's value and growth in a knowledge based economy (Sullivan, 2000, pp. 4-22). Innovation capital can be broadly defined as a bundle of a firm's knowledge assets that render services in the process of new knowledge (innovation) creation and commercialization. Due to the semi-public good characteristics of knowledge, the possession of monopolistic power over innovation capital is feasible but never perfect. As a consequence there are different appropriability mechanisms, combining formal methods in the form of intellectual property rights – IPRs (e.g. patents) and informal methods (e.g. secrecy, lead time, product complexity) which can be used by economic agents to protect the innovative knowledge they create. The lack of appropriability mechanisms would lead to underinvestment in research and innovation, and hence, inefficiency of firms and economies.

Although there is a vast body of literature on the reasons behind a firm's choice of appropriability methods and the effectiveness of their use (see López, 2009, pp.1-32), most of these studies focus on subjective measures of benefits of various appropriability tools. Only a few studies deal with innovation performance and try to relate it to the firms' preferences for the particular appropriability method. Thus, the purpose of the paper is to fill this gap in the literature by determining how the utilization of intellectual property rights (IPRs) in the form of patents allows Polish manufacturing firms to appropriate profits from innovation. A model used in this research is a knowledge production function, in which two main components of innovation capital, i.e. patents and research and development (R&D), are included among the regressors. Additionally, I use descriptive statistics to analyze the perceived effectiveness of patents toward increasing the competitiveness of product and process innovations.

Methodology of the research

In this study, anonymized micro-data from the survey of innovation activities of Polish manufacturing enterprises in the years 2010-2012 were used. The survey was conducted in 2013 by Polish Statistical Office. Enterprises having more than nine employees participated in the study. The enterprises were selected on the basis of the Polish Classification of Activities which is consistent with the statistical classification of economic activities

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in the European Community (NACE Rev. 2). The types of questions used in this survey were based on the Community Innovation Survey - CIS. The interpretability and validity of the CIS questionnaire were verified by extensive piloting and pre-testing before implementation within different European countries (Laurent & Salter, 2006, pp.131-150). The sample of innovation active firms used in this analysis includes 2960 entities that were engaged in developing and/or implementing a product or process innovation in the years 2010-2012.

The elements of innovation capital analyzed in this study are patents and R&D used in the process of technological innovation introduction. In the case of patents, each firm was asked to respond to a question about the effectiveness of patents for increasing the competitiveness of product and process innovation. The respondents were given four ordinal categories: 4-not used, 3-low, 2-medium, and 1-high effectiveness. Moreover, the study exploits information on the number of patent applications to the Polish Patent Office in 2010-2012. As far as R&D is considered, information feeding into analysis is R&D intensity measured as the ratio of R&D expenditures divided by the total sales.

To assess perceived effectiveness of patents, means of firms' responses to the question about the effectiveness of patents for increasing the competitiveness of product and process innovations are calculated. The results are presented by the firm's size, the innovation type and technological opportunity. Additionally, a two-sample t-test is used to compare the means. Apart from descriptive statistics, the method of analysis is the generalized structural equation modeling-GSEM (Rabe-Hesketh et. al., 2004, pp.167-190). Our empirical model consists of two equations. The former is estimated using the Tobit model, also called a censored regression model (Greene, 2008, pp. 871-872), where the dependent variable is innovation performance (INN), which is explained by the percentage of a firm's sales corresponding to products new to the market. The choice of the Tobit model results from the nature of the dependent variable which is, by definition, (double) censored, i.e. it ranges between 0 and 100. Although the choice of the dependent variable makes sense in terms of appropriability analysis, it limits our analysis to only product innovators ($n=2062$). The model includes the R&D intensity (RDI) and the number of patent applications (PATENT) among regressors. The latter is estimated as the Poisson regression where the dependent variable is the number of patent applications and the R&D intensity is included as the regressor. The use of the Poisson regression

results from the preponderance of zeros and the small values of the patent variable. The two-equation model is specified as follows:

$$INN_i = \alpha_{11}PATENT_i + \alpha_{12}RDI_i + \alpha_{13}TO_i + \alpha_{14}S_i + \varepsilon_i$$

$$PATENT_i = \alpha_{22}RDI_i + \alpha_{23}TO_i + \alpha_{24}S_i + \varepsilon_i$$

TO and *S* appear as control variables in both equations. The first variable relates to technological opportunities quantified by patent statistics at the industry level. I use the OECD's industry classification, i.e. high-technology and medium-high-technology, medium-low-technology, and low-technology. Patent applications are then averaged over the industry. The second variable is the firm's size divided into three categories, i.e. small (*S_S*), medium (*S_M*), and large (*S_L*). Since the size variable is categorical variable, dummy coding is used. It compares each level of the categorical variable to a fixed reference level (i.e. the small firms).

The concept of innovation capital

Innovation capital is a term that arises from a conjunction of two seminal economic concepts, i.e. capital and innovation, and is interchangeably used with such constructs as innovative knowledge assets (He & Wang, 2009, pp. 919-938) and innovation-related intangibles (Lev, 2001, p. 18). Innovation capital was introduced to the economic and managerial nomenclature for the first time by Edvinsson & Malone (1997, p. 1-23) in their intellectual capital – IC – model. They describe innovation capital as renewal capabilities of a company in the form of intellectual properties and other intangible assets used to create and introduce new products and services to the market. This definition *sensu largo* has been specified by a few authors (e.g. Wagner & Hauss, 2000, pp. 709-712; McElroy, 2002, pp. 30-39), who adopted different perspectives (i.e. technological, organizational or sociological).

According to Kijek (2012, pp. 52-68), innovation capital consists of two groups of knowledge assets necessary for innovation. The former pertains to codified technological knowledge in the form of innovative intellectual property rights-IPRs and stock of R&D knowledge. The latter relates to knowledge embodied in the organizational routines/practices, norms and thinking of employees. Codified technological knowledge is knowledge about how to produce new products and install new processes, which com-

prises know-what (e.g. a description of ingredients or specification of a new product) and know-why (e.g. technology of a new product manufacturing). The combination of know-why with employees' knowledge forms know-how (e.g. a practical use of new technology). As suggested by the reward theory of patents, exclusive rights to new facts (know-what) and new technologies (know-why) in the form of patents are deemed effective for securing the return from inventions and provide sufficient incentives for firms to conduct risky investments in R&D (Zaby, 2010, p. 2). In line with this approach, the increase in commitments to R&D does not precede increased patenting but is simultaneous with it (Basberg, 1982, pp. 163-171).

It is important to notice that a patent does not always allow the firm to obtain a monopoly over the market. For example, human insulin can be produced either by applying enzymes for eliminating a specific amino acid from the structure of pig insulin or by genetically- modified bacteria, so neither of the patent owners of these inventions, i.e. Novo Nordisk and Genentech, have a monopoly over the insulin market. Moreover, the formal system of IPRs allows the firm to extend its technological knowledge base by the acquisition of external knowledge in the form of patents and utility models or not patented technological know-how.

Innovation capital differs from physical assets in a few important aspects. First, innovative knowledge assets are, in general, non-rival, as they can be deployed at the same time by many users. This is especially true for know-what and know-why. However, multiple use may reduce the market value of knowledge by increasing its supply to the market. Another peculiarity of innovation capital is the fact that it generally requires large initial investments, while the cost of its use is negligible. For example, the development of a drug is expensive and takes a long time, but doubling its production does not require any change in the underlying R&D and patents (Lev, 2001, p. 23). Last but not least, a difference between innovative knowledge assets and physical assets is the availability and the enforceability of property rights (Teece & Augier, pp. 3-27). Physical assets are generally well protected and property rights enforcement is relatively easy. In the case of intangible assets, property rights are limited (patents, designs, trademarks, etc.) and their enforcement is relatively difficult.

Appropriability of innovation capital

As mentioned previously innovative property in the form of patent is regarded as an element of innovation/knowledge-based capital (OECD, 2011,

p. 2; Kijek, 2012, pp. 52-68; Edvinsson & Malone, 1997, pp. 1-23). Patent gives the owner monopoly rights to use an invention for a given period. Patents and other forms of IPRs allow the owner to receive an adequate returns from its creation by placing the IPRs in the public domain. In the light of the above, a patent is regarded as a mean of appropriability, since it is a building block of the firms' capacity to retain profits from knowledge embedded in invention or innovation (López, 2009, p. 2). A lack of appropriability mechanisms in the form of patents could lead firms to underinvest in innovation capital. Although this paper focuses on IPRs, it should be noted that there are other informal appropriability mechanisms including secrecy, lead time, product complexity etc. which may be used when legal protection is not feasible or efficient.

Theoretical and empirical papers suggest that the effectiveness of IPRs in protecting innovative knowledge is related to either internal or external factors. The most thoroughly examined internal determinant of IPRs use is the type of innovation. Cohen et al. (2000, p. 10) reveal that patents are reported to be more effective for product innovation than process innovation by U.S. manufacturing firms. This finding is unsurprising since knowledge about process invention is less publicly available than that of product invention, so patent infringements are more difficult to detect for process innovation. Another important factor that affects the propensity to patenting is a firm's size. Many authors state that the application of patents increases with the firm's size. For example, Gonzalez-Alvarez & Nieto-Antolin (2007, pp. 280-295) find that Spanish firms of larger size were more willing to patenting. In turn, Hanel (2008, pp. 285-309) proves that medium and large-sized firms employ all IPR elements more frequently than small firms. The reason for these findings may be twofold. First, in the line of Schumpeter's (1942, pp. 131-134) arguments, large firms have access to financial resources which are necessary for obtaining, maintaining and monitoring IPRs. Moreover, small firms may be in an unfavorable position when it comes to enforcing their IPRs. Second, large firms are deemed to be better equipped with tangible capital and human capital, which allows them to introduce original innovations requiring legal protection. Last but not least, an internal determinant of IPRs addressed in the literature is a firm's R&D intensity. Most of the studies find a positive relationship between R&D and patent propensity (Duguet & Kabla, 1998, p. 14; Hall & Ziedonis, 2001, pp. 101-128). However, there is also evidence that R&D expenditures make no contribution to patenting (Arundel & Kabla, 1998, pp. 127-141). In a similar vein, Megna & Klock (1993, pp.

265-269) argue that patents and R&D are distinct measures of intangible assets. These contradictory findings may result from the fact that in-house R&D is neither sufficient nor necessary as an explanation for patenting. For example, firms may as well acquire patentable knowledge at the market. Moreover, firms engaged in R&D may use different appropriability methods instead of patenting.

In the case of exogenous factors affecting the effectiveness of patent use, it is assumed that firms operating in various manufacturing sectors rely on different appropriability mechanisms. In their seminal paper, Levin et al. (1987, pp. 783-831) find that in chemical and pharmaceutical industries patents are deemed to be more effective in appropriating benefits from innovation than in other industries. Similarly, Harabi (1995, pp. 981-992) proves that in such sectors as chemical and cosmetic products and agricultural equipment, a patent is regarded as an effective tool of appropriability.

Effectiveness of patents in Polish manufacturing firms

A first look at the perceived effectiveness of patents indicates that patents are, on average, regarded by Polish manufacturing firms as being lowly effective (Table 1). While interpreting this result it should be noted that the perception of the relative strength of the patent depends on its use and availability. The availability of patent is a function of specific characteristics of an invention, such as novelty, non-obviousness and industrial applicability. Therefore only inventions which meet these requirements can be patented. Unfortunately, most of the product and process innovations introduced by the sample firms do not fulfill the criteria of patentability. Similarly, Hurmelinna & Puumalainen (2007, pp. 95-112) confirmed the hypothesis of a relationship between the strength and the use and availability of different IPRs. As mentioned previously, the use of patent is connected with a firm's size and economic potential. The results confirm this supposition, since the perceived effectiveness of patents increases monotonically with the size of the firm. Moreover, firms with both product and process innovations rank effectiveness of patents higher than firms with only process innovations and firms with only product innovations. However, we find no significant difference in the perceived effectiveness of patents between firms with product innovations and firms with process innovations. This finding is contrary to the results of other studies (e.g. Hanel, 2008, 285-309) which show that patents are more effective for product innovations than for process innovations.

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In the light of the results from Table 1, significant differences in the effectiveness attributed to patents are found when dividing firms by sectors. Firms located in medium-high-technology sectors deem patents more effective than firms located in low technology and medium-low-technology sectors. Nonetheless, analyzing sectoral differences in the perceived effectiveness of patents, it should be noticed that there is a large variability in firms' perceptions of patents effectiveness within particular sectors. This variability can be explained by the fact that firms may also pursue patents for other objectives than for appropriability (protecting objectives), e.g. blocking or negotiation motives (Blind et al., 2006, pp. 665-672).

Table 1. Perceived effectiveness of patents by a firm's size, innovation types and sectors

Size of firm			
Small-S (n ₁ =440)	Medium-M (n ₂ =1710)	Large - L (n ₃ =812)	Means difference
3,7	3,46	3,28	S>M***; M>L***; S>L***
Innovation types			
Product - PT (n ₁ =673)	Process -PS (n ₂ =721)	Product and process - PT_PS (n ₃ =1389)	Means difference
3,41	3,39	3,29	PS>PS_PT***; PT>PS_PT***
Sectors			
Low-tech- LT (n ₁ =878)	Medium-low tech- MLT (n ₂ =1030)	High and medium-high- tech - HMHT (n ₃ =1053)	Means difference
3,51	3,41	3,34	LT>MLT***; MLT>HMHT***; LT>HMHT***

Note: *** denotes that means are different at 1% significance level.

Source: own calculation on the basis of data provided by the Statistical Office in Szczecin¹.

The descriptive analysis presented above is of limited use when we are interested in finding a qualitative relationship between R&D, patents and firms' innovation performance. In order to fulfill this task, we apply the knowledge production function - KPF originally developed by Griliches and Pakes (1980, pp. 377-381). In their model the link between R&D and patent is called the "knowledge production function". Empirically, we use

¹ The Statistical Office in Szczecin is not responsible for any conclusions in this publication.

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an extended version of the KFP which connects both R&D and patents to a firm's innovation performance. Our version of the model regards patent as an intermediary input in an innovation process. Due to the complexity of knowledge/innovation production process we use a system of two equations. The first equation connects R&D and patents with innovation performance measured by the percentage of sales corresponding to products new to the market. This measure of innovation output allows us to assess the extent to which the use of patents is associated with retaining profits from knowledge embedded in innovations. The second equation models a link between R&D and patents. According to innovation capital theory, we introduce R&D investments among the regressors in our two equations, since we assume that R&D affects the firm's performance directly and indirectly via patents.

Consistently with the literature in this area, I control for technological opportunities and a firm's size. The expectation is that firms operating in a sector with plenty of technological opportunities are assumed to be more innovative. Such an assumption is supported by findings of Evangelista and Sirilli (1998, pp. 881-889) who report that technological opportunity appears to be the most important driving force of innovation across a sample of Italian firms. As regards the firm's size, it is expected that large firms have access to financial resources and sophisticated equipment necessary for innovation activity. However, the advantages of scale and scope exhibited by large firms in the past seem to be less important nowadays. Many firms are now following an open innovation approach, sourcing much of their innovation externally (Chesbrough, 2003, p. 22).

Table 2 shows the results of the generalized structural equation model estimation. As expected, firms' R&D intensity appears to be influencing innovation performance positively, as the parameter for the variable is positive and significant. As far as the patent variable is considered, the results indicate that there is a positive relationship between the number of patent applications and innovation performance. Similarly, Hall et al. (2013, pp. 603-629) find that firms' propensity to patenting is positively associated with innovation performance measured by sale due to product innovation. It is important to notice that the patent variable is the "stronger" variable than the R&D variable in the first equation. This finding supports the claim that patent is an effective mechanism to appropriate the returns from product innovation in the sample firms. Relating to the second equation in our model, the R&D intensity has a positive impact on patenting, which is a similar result to that of Licht & Zoz (1998, pp. 307-338).

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Table 2. GSEM estimates of the knowledge production function

Variable	Coef.	Std. err.	z	p> z
INN<				
IRD	0,33	0,11	3,01	0,00
PATENT	1,15	0,51	2,23	0,03
TO	19,41	6,65	2,92	0,00
S_M	-5,71	2,67	-2,14	0,03
S_L	-1,71	2,87	-0,60	0,55
CONST	-6,03	3,36	-1,79	0,07
PATENT<				
IRD	0,02	0,00	9,22	0,00
TO	2,79	0,30	9,36	0,00
S_M	1,46	0,26	5,64	0,00
S_L	2,41	0,26	9,38	0,00
CONST	-3,91	0,28	-14,11	0,00
Log likelihood	-7925,47			

Source: own calculation on the basis of data provided by the Statistical Office in Szczecin².

The analyzes also show that technological opportunities at the industry level increase firms' propensity to patenting. This can be explained by the fact that technological knowledge disclosed in patent applications builds the stock of general knowledge which may be useful for other investors of the same field. The same holds true for the innovation performance. Turning to the second control variable, the results suggest that medium and large firms are more likely to apply for patents than small firms which is consistent with our expectation. In the case of innovation performance, the size effect is equivocal. It turns out that medium-sized firms have smaller sales corresponding to products new to the market than small firms. However, the size effect disappears in the case of large firms.

Conclusions

This paper produces a few important contributions for the theory and practice on appropriability of innovation capital. First of all, it focuses on both the perceived effectiveness of patent and the relationship between patent and innovation performance. The research results show that Polish manufacturing firms rarely use patents as an appropriability mechanism. It has a direct impact on the perceived effectiveness of patent, which is relatively low. It is worth noting that the perceived effectiveness of patents increases with the firm's size and availability of technological opportuni-

² The Statistical Office in Szczecin is not responsible for any conclusions in this publication.

ties. As regards the innovation performance, two components of innovation capital, i.e. R&D and patents, positively affect the percentage of sales corresponding to products new to the market. These findings suggest that Polish firms should invest resources in R&D activities and try to apply for patents if it is possible.

The paper is not exempt from some limitations. The main drawback pertains to the fact that firms usually introduce more than a single innovation in a given period and use a set of different appropriability methods. So it is difficult to isolate the impact of a particular appropriability tool (e.g. patent) on innovation performance. To overcome this limitation, future research should focus on an innovation-level analysis and include a broader set of appropriability mechanisms in the knowledge production function.

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Network Organizations and Corporate Social Responsibility

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Keywords: *enterprise; Corporate Social Responsibility; competition; image; network businesses*

Abstrakt: Network organizations largely determine the competitive advantage today. Collaboration between companies and their success is based primarily on the image and trust. Increasing competition, also on the Polish market, will force corporations to apply socially responsible practices, also in the context of cooperating with local businesses. The concept of corporate responsibility (CSR - Corporate Social Responsibility) is in Polish conditions, relatively little popular concept and the rare practice, especially among domestic enterprises. The situation is different at the Western Europe markets or in the USA. Companies operating in these markets are obliged to adapt the business standards to expectations of various stakeholders, and also contractors.

Inroduction

Nowadays, the development of enterprises largely depends on the relationship with other various operators. This situation explains why so many companies, establish cooperation with other entities in order to improve their competitiveness.

In the globalized world, business networks developed largely through subcontracting which is a particular form of outsourcing and includes direct contacts and bidirectional exchange of knowledge and information between the two parties to the contract. (Taymaz & Kilicaslan, pp.633-645).

The benefits of these network relationships apply to both international corporations as well as small (often local) firms which provide various services for the former ones (Gorynia, 2005, pp. 222-235). The tendency of corporations to enter into the network structures depends on the motives influencing investment decisions in the hosting country, the type of technology used by multinational corporations, the degree of autonomy of entities and the sector in which the corporation operates (Przybylska, 2010).

Certainly, business networks can create and they do create a group of small businesses, or medium sized businesses, but from the point of responsible business , it is particularly important to discuss the relationships that are created by the large In case of international corporations, network relationship management is a part of the supply chain, and the more complex is the chain, the more " fuzzy " is responsibility for the external effects of functioning of such enterprises (Ćwik (Ed.) 2011, p. 22) .

To give an example, the well-known Swedish clothing company H & M cooperates with a network of over 700 independent suppliers in Europe and Asia. The company has been criticized for human rights violations, particularly the rights of workers, as well as for environmental pollution (CentrumCSR, 2013, p. 23). It has been shown that the technique of manual and mechanical sanding is still used in factories producing for H & M despite the evidence that such actions lead to fatal lung disease including silicosis (CentrumCSR, 2013, p. 23).

Also, Samsung Group, which employs more than 340 000 people, is accused of numerous abuses in the area of production, including using highly toxic substances in the production process without proper protection and without informing employees of this fact and the use of child labor in companies associated with Samsung (CentrumCSR, 2013, p. 29). Importantly, these charges apply to both factories belonging to these corporations as well as to their suppliers.

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R. H. Robbins discusses the problem of corporate fraud in the context of the so-called Polanyi paradox. He stresses that besides the direct cost of the product (the price on the package), there are external costs that are passed on to stakeholders cooperating with the company, and finally to employees and the local community, where suppliers are located (Robbins, 2006, pp. 177-182).

Using Wal-Mart as an example, he explains the high cost of low prices of goods offered in the American retail chain. In his opinion, the corporation is so competitively priced because it puts tremendous pressure on their group of more than 21 thousand suppliers, forcing them to reduce the cost of production and labor. Consequently, the reduction in employment, low wages, unsafe working conditions and environmental degradation, are the costs of goods not included in the package, and the greater it is the lower the prices of the goods drop (Robbins, 2006, pp. 180-181). Moreover, this practice is copied by other companies, which have to cope with the realities of competition imposed.

Therefore many global problems due to the external effects of the market and is part of the cost covered by the customer of goods and services (Robbins, 2006, p. 181).

Methodology of the research

The question is whether under strong price pressure, in terms of complex network relationships, socially responsible actions are justified? Where does the responsibility of the principal manufacturing and services end?

The thesis of the dissertation is that the socially responsible actions in the network organization determine the long-term development of companies in a highly competitive market and the analytical-descriptive method has been used in this dissertation.

Cooperation within the network organization

Network organization is *a modern form of organization showing the way to organize relations between companies or (and) the units of a single company. Its existence was made possible by reducing transaction costs and transport as a result of the revolution in communications technology and shipping* (Mikuła, 2006, p.75).

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About network organization, according to the above, we talk in the context of the corporate network, as well as in the context of independent businesses cooperating with each other.

J. C. Jarillo, however, presents different approach, indicating that the network organization can cooperate with independent companies in which one company plays the role of chief inspector who is in charge of organising the flow of tangible and intangible assets between companies (Jarillo, 1995, p. 8).

Cooperating with each other, organizations often change into the form of a business network in which the complex relationships and dependencies come froms competition, and often become a source of competitive advantage of the company (companies) in the market. In confirmation of the above M. Ratajczak - Mrozek indicates a continuous interaction and interdependence of network connections (as well as infinity in the context of the internationalization process) as a source of competitive advantage in foreign markets (Ratajczak, 2010, pp. 52-76). Long-term relationships between networks through strategic sharing of resources, entities and activities - reduce the risk and uncertainty of the functioning of the market; affect the speed, flexibility and activities innovation, as well as reduce operating costs. Looking at the international situation, they help access foreign markets by reducing all sorts of barriers (Ratajczak, 2010).

K. Przybylska mentions the additional positive effects of the operation of small businesses within international networks, such as, (Przybylska, 2005, p. 118):

- increase in the reliability of the company in foreign markets,
- increase in the size and intensity of joint business within the network,
- chance to gain knowledge about foreign markets,
- chance to improve the financial conditions of the company,
- chance to change the way owners and managers of small businesses think and act.

It seems that for Polish small businesses, the last two benefits are not to be underestimated due to the financial and mental barriers that often accompany the development of national companies. On the other hand, for international corporations network relationships are an essential part of the supply chain.

Network links may relate in practice to supply, sales, cooperation with enterprises running competitive businesses (Burt, 2001, p. 110). These areas correspond to terms: backward linkages, forward linkages and horizontal linkages.

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In practice, the subject of network connections can be any field of economic activity, for example, logistics, marketing, design, modernization of the products; provision of technical equipment and specialized staff ; transfer of modern technology, etc .

For local businesses - because of the frequency of occurrence and the potential benefits - particularly important is cooperation so called backward linkages .

Below are the measures taken by multinational corporations to develop and deepen vertical network relations „backwards“.

Table 1. Measures by foreign affiliates to create and deepen linkages

Finding new local suppliers	<ul style="list-style-type: none"> - Making public announcements about the need for suppliers and the requirements that firms must meet on cost and quality. • Supplier visits and quality audits.
Transferring technology	<p>Product technology:</p> <ul style="list-style-type: none"> • Provision of proprietary product know-how. • Transfer of product designs and technical specifications. • Technical consultations with suppliers to help them master new technologies. • Feedback on product performance to help suppliers improve performance. • Collaboration in R&D. <p>Process technology:</p> <ul style="list-style-type: none"> • Provision of machinery and equipment to suppliers. • Technical support on production planning, quality management, inspection and testing. • Visits to supplier facilities to advise on lay-out, operations and quality. • Formation of “cooperation clubs” to interact with suppliers on technical issues. • Assistance to employees to set up their own firms. <p>Organization and managerial know-how assistance:</p> <ul style="list-style-type: none"> • Assistance with inventory management (and the use of just-in-time and other systems). • Assistance in implementing quality assurance systems. • Introduction to new practices such as network management or financial, purchase and marketing techniques.
Providing training	<ul style="list-style-type: none"> - Training courses in affiliates for suppliers’ personnel. • Offering access to internal training programmes in affiliates or abroad. • Sending teams of experts to suppliers to provide in-plant training. • Promotion of cooperative learning among suppliers.
Sharing information	<ul style="list-style-type: none"> - Informal exchanges of information on business plans and future requirements. • Provision of annual purchase orders. • Provision of market information. • Encouraging suppliers to join business associations.

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Giving financial support	<p>Providing special or favourable pricing for suppliers' products.</p> <ul style="list-style-type: none"> •Helping suppliers' cash flow through advance purchases and payments, prompt settlements and provision of foreign exchange. •Long-term financial assistance through the provision of capital; guarantees for bank loans; the establishment of funds for working capital or other suppliers needs; infrastructure financing; sharing of the costs of specific Project with suppli.
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Source: UNCTAD (2001 b, p. 214).

The growing importance of vertical linkages "backward" is due to changes that occur in the design of technology resulting in the need for frequent modifications of production factors and products (Przybylska 2001). In addition, this type of network links is a key channel of technology transfer, which in international relations and local businesses is a significant advantage for the local businesses.

Technology transfer alone, however, does not guarantee the company its long-term improvement at the market are crucial for small and medium-sized companies participating in this type of network relationships is the the capacity to absorb technology and learn through using of a particular technology (UNCTAD, 2001 a). Only after meeting these conditions it can be expected to see positive changes in technology in the local businesses.

The tendency for using the abovementioned transfer in multinational corporations depends to some extent on the level of product compilation. Foreign entities producing standard products using non-proprietary technologies, choose local suppliers and do not need to develop any of their skills (Belderbos, at al., 2001, p.189-208). On the other hand, in places where the products are specialized and technology is advanced, branches develop production in their home countries or establish cooperation with selected suppliers in the host country who are able to meet the high demands of corporations (Belderbos, at al., 2001, pp.189-208).

In addition to the possible benefits of vertical cooperation „backwards”, negative outcomes may also appear at the enterprise level, for example, the co-operator could be pushed to development " track " which may result in the reduction of social and environmental standards, and also in the ongoing pressure for cost, which has already been mentioned in the introduction of the article (Hansen & Schaumburg-Muller, 2006, p. 15).

Responsible relationships in the network organization

The increased role of network links can be observed in the retail sector and is largely due to an increase in the role of the brand. Trade mark, as

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defined by the agency AC Nielsen, belongs to the retail or wholesale, and applies only to products sold by the company or under the direct control of the company (Colla, 1997, p. 161).

The fundamental role of the own brand in the retail chains development is not only linked to the functions it is playing in pricing and assortment policies, but is also associated with a very important trend in retail , so-called " blurring " the formats of stores (eg . Tesco in three formats under the same banner). The result of such practices is the increasing role of the store's own brand. The major role is played by products with a store's label. Products which meet the requirements of the customers of the company, are a kind of added value that ensures the loyalty of those customers and helps to create a positive image of the entire brand network (Krall, 2001, p. 4).

What is more, having a strong own brand allows corporations to put more pressure while negotiating with brand manufacturers and in the result, to get favorable terms of the financial transaction. Strong commercial brand may pose a risk of withdrawing manufacturer's brand(the danger is greater the weaker the manufacturer's brand is) from store chains. Manufacturer dependence on commercial corporations also comes from a double function, which they often have in these entities, namely, providing its own brands for the network, and manufacturing (contractor) the trade brands for these corporations (contractor of outsourcing services).

The example given above shows the complexity of network relations and a growing need for outsourcing, understood as a tool not only used to reduce costs and restructure, but also as a tool used to increase innovation and to get strong competitive market position.

Nowadays, because of outsourcing, companies can enter new markets faster, without the need to build necessary, expensive and time-consuming powers. Moreover, external suppliers guarantee their clients flexibility and quick reactions to meeting consumers needs. It is very important for businesses competing at today's markets.

However, the success of outsourcing projects is a result of the competence of managers and professionals who are responsible for its implementation on the receiving end of service but also for competence and preparation of suppliers who implement them.

Skillful management of such relationships in the times of increasing public pressure and increasing consumer awareness, requires not only being cost effective, but implementing integrated performance in which the social, economic and environmental effects of network relations are included.

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The issue of responsibility for the consequences of the company's activities is evaluated by the economic science, philosophy (especially ethics) and the social sciences, which in practice causes much controversy. However, it can be specified that in the literature there are two main approaches to definitions of corporate social responsibility (CSR): (Nakonieczna, 2008, pp. 56-58):

- ethical dimension of the concept, *where the concept is defined as ethical business behavior towards society including the business's ongoing commitment to act ethically and contribute to economic development while improving the lives of workers and their families, as well as the local community and society* (Światowa Rada Biznesu ds. Zrównoważonego Rozwoju);
- the economic dimension of the concept, *where social responsibility is treated as part of a strategy of the company, institutionalized and rationalized, and could become a new source of competitive advantage.*

The second approach, which is also more popular, corporate social responsibility is treated as an element of thought-out strategy. Attention is drawn to the fact that the current competitive market situation requires enterprises to support a competitive advantage using unusual factors, also taking care of groups associated with the company allows to generate loyalty among potential customers in relation to the company's brand. On the other hand, neglecting the needs of these groups may contribute to the so-called consumer boycott (Nakonieczna, 2008, pp. 56-57).

Companies' (and their workers) attitude to the social responsibility tasks is closely related to the organizational culture of the company.

Organizational culture can be understood as a *system of commonly shared beliefs, values, which develops in organization and controls the behaviour of its members* (Klimkiewicz, 2011, p. 137): The way of understanding and taking responsibility for existing business is dependent on mentioned values, which are part of the culture and connections between this culture and the company's strategy.

Core values relevant to this concept, promoted by the organizational culture are in practice (Klimkiewicz, 2011, p. 137): the company's responsibility for the consequences of its operations, reliable communication with internal and external environment, environmental protection, fulfillment of obligations to employees and contractors, promotion of ethical behavior of stakeholders, transparency of taken actions, creative attitude of the staff, the freedom of decision-making and dialogue within the organization.

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Moreover, there are three levels of organizational culture development in the context of dependence between creating values and CSR.(D. Wheeler, D. Colbert, R.E. Freeman):

- level 1- compliance culture - where relations with stakeholders (public, business partners, employees) do not play an important role, and culture is adapted only to the basic standards required by the public
- level 2- *relationship management culture* - where organization understands the importance of systematic communication with business partners, but the process of building relations is not the part of long term strategy development of company but is created based on recognition of current needs of stakeholders
- level 3- *sustainable organization culture* - where organization recognizes interactions between its actions and the environment and therefore is more focus on the integrating and multiplication of social, ecological and economic values.

The three levels mentioned above reflect three possible CSR strategies which are based on different values rooted in the organizational culture. This means, at the first level to adapt to the requirements, at level 2 response to the needs of stakeholders and at level 3- an attempt to respect and implement social, ecological and economic values while making business decisions. Taking social responsibilities by the company at the international level requires from the company to consider the cultural differences in each of the hosting countries.

This fact was often used to justify the actions taken by companies for using the so-called double standards of corporate social responsibilities.

Focusing on corporate responsibility to the communities in highly developed countries was explained by cultural relativism. Based on what was said above, the international environment can not accept one right system for the entire evaluation process.. Different countries have different ethical standards – therefore, morality is relative and depends on culture and society. If, therefore common global system of moral judgements can not be specified, it is also not possible to create one system and standards of corporate social responsibility (Nakonieczna, 2008, p. 49).

This approach however has not found many supporters; the idea of cultural relativism was negated by the development of human rights and their practical application and as well as with the collapse of the bipolar international order (Michałowska, 1994, p. 259). Considering this approach, the minimum obligations in the area of corporate social responsibility should

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be based precisely on the fundamental international human rights (Donaldson, 1989, p. 62).

The problem of corporate responsibility in the era of globalization largely deals with business relations, including a complex supply chain. It is connected with mentioned earlier outsourcing and it makes it necessary for companies to define the social commitments for their actions and for actions taken by other entities. In Polish law civil liability for taking unwanted actions is governed by the rules in article 415-449 in Civil Code. Articles 415 and 146 of Civil Code imposes the obligation to repair any damage caused by their actions, even to a legal person.

From the point of view of civil law, any illegal action can be defined as the behavior that is illegal and leads to injury. (Ćwik (Ed.), 2011, p. 26).

It is very important for standards of social responsibility, to assume that the illegal action is not only an act prohibited by a legal obligation, but also breaking the rules of social intercourse (Ćwik (Ed.), 2011, pp. 26-27).

Inciting, aiding and conscious use of the damage caused to another person are also considered as the own actions (Ćwik (Ed.), 2011, pp. 26-27). Intentional action is crucial in such situations and it is why the manager of the company can bear responsibility, for example for inciting his subcontractor to take illegal actions against stakeholders or for tolerating the subcontractor's negative practices in his own interests.

However, the responsibility for actions taken by others (tasks assigned to another entity) refers directly to the activities of subcontractors. The company that assigns certain tasks shall be liable for damage caused by the contractor, unless the company proves that does not take responsibility for faults in the selection of the contractor or the contractor is a professional in the area of given task (Ćwik (Ed.), 2011, pp. 27-28). That legislation protects companies that work professionally with companies dealing with the specific task, which in turn means that in the event of injury the responsibility is on the contractor side only. This raises a problem in terms of responsibility in the supply chain; commercial corporations in relationships with manufacturers of commercial brands often puts rigorous cost; however, the responsibility for the quality of manufactured goods remains with the contractor of outsourcing services .

Illegal activities with the participation of international corporations on Polish market (but especially in underdeveloped countries) occur quite often. Often companies , which usually declare the use of corporate social responsibility, in practice, take actions that strike in the basic needs of their stakeholders. According to the report of Supreme Chamber of Control

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(NIK), the multinational corporations FMCG (fast rotating) in relationships with contractors on Polish market, dictated contracts, ignored the terms and dates for payments, which in practice led to a situation where the economically weaker producers had to pay foreign partners (NIK, 2002, p. 21). Other abuses are, for example : dictating the terms of delivery by the retail chains, including charging suppliers with the costs of transport and storage; charging producers for not ordered promotional campaigns, or imitating popular brands by own brands (NIK, 2002, p. 21). Imitating popular brands means to build an opposing own brand. In practice, the brand imitation refers to the selection of products name, form, size, design and colours of the packaging. Such a large similarity in marketing characteristics is to lead to confuse consumer.(T. Domański, 2001, pp. 127-128).

These kinds of practices, very rarely find their final at court. Producers fear to make the situation worse or even to end the cooperation with foreign corporations, often agree to such activities.

Meanwhile, to improve the competitiveness of companies that base their development on complex network relationships, building lasting and socially responsible relationships is crucial. Firstly, strong network relations, built on trust, reduce transactional costs and create the framework to achieve a competitive advantage in the market. Similarly, lack of trust in partners reluctance to exchange strategic resources between partners, the need to incur additional costs associated with additional control and protection from cooperator, opportunism and loss of valuable time because of rotation of partners (a consequence of the lack of trust).

Building long lasting relationships with partners requires actions to be based on the principles of CSR. Responsible, honest business practices are not only the chances for prospective and profitable network relationship, but also the chances for new business opportunities for the creation of innovation , the benefits for the image of the entire organization network and larger favour from customers and employees.

On the one hand, responsible business relationship is the socially desirable practices of a company, but on the other hand also company's efforts focused on ensuring ethical behavior of ones who are involved in the supply chain. The management of such relations requires consideration of codes of conduct which provide guidance to suppliers and employees. These codes of conduct and standards contained in them should reflect the actual individual needs of the company and its environment, including also its subcontractors , and therefore should be established on dialogue and mutual

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understanding between the company and subcontractors (Ćwik (Ed.), 2011, p. 30).

The effectiveness of codes and standards in business relations largely depends on the monitoring of their compliance. It is crucial how it is carried out - Are they independent audits? How often are implemented? Do they relate only to first-order suppliers or also their subcontractors? Are the results of the audits known by the public? What actions are taken in case of suppliers constantly breaking human rights and exerting negative impact on the environment? Is the monitoring oriented on activities which increase awareness CSR of suppliers? (Ćwik (Ed.), 2011, pp. 30-31). The answer to these questions is essential to comment the company's commitment to the principles of responsible business.

In Poland, the concept of corporate responsibility is not very popular, and the opinion is that companies look at it with a distance rather than with an interest for important area of their business. This is evidenced by various studies on the awareness and involvement in this area of management, as well as on awareness of the consumers. It is worth looking at the study of management of the project *Corporate Social Responsibility - a report from the first part*, ASM, 2013, or the report *Responsible business in Poland. Good practice.*, 2013, by the Responsible Business Forum. The research shows that the implementation of CSR in the Polish market is the matter of declaration, and audits of entities involved in the supply chain are rather selective. This is evidenced by the abuses of corporations in the domestic market (presented in the text in the example of FMCG) breaking the principle of fair competition and cooperation on the market. Serious limitations in this issue are also visible on the side of consumers. It is well illustrated by the results of research carried out in 2010 by the Responsible Business Forum, where the majority of respondents showed little interest in fraud in the production process in geographically distant countries and could not answer what they associate with the responsible supply chain (Ćwik (Ed.), 2011, p. 63-64).

However, it can be said that the situation on the Polish market is slowly changing. Standards for suppliers and balanced approach to materials sourcing are important evaluation criteria for the companies in the rankings of responsible companies, or for the creation of, so-called ethical stock indices - The Respect Index, established in Poland in 2009 should be mentioned here. For many firms producing for export The Respect Index is an important differentiator when applying for contracts for export (Ćwik (Ed.), 2011, p. 14).

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The importance of reputation on the Polish market will depend on the intensity of competition and on the publicity of negative and positive business practices, on promotion of the concept of CSR, and above all on the level of consumer awareness, as they hold the power to influence the companies.

Conclusions

In the era of globalization, the success of companies consists of a complex network connections between entities. It can have a horizontal character (co- competing companies) or vertical (for example, supplier - recipient service).

The second form of integration is growing strongly because of outsourcing and is the subject of criticism and the synonym of low social and environmental standards.

In the times of social pressure (especially in the developed markets) , the companies declare to shift from the priority of cost efficiency and using various marketing procedures trying to communicate the message about their commitment to responsible business. However, these are often selective activities which at the international level are called ,double standards' of social responsibility.

The problem of company responsibility for taken actions, including also responsibility for actions of other companies involved in the supply chain, is essential to clarify the obligations of corporate social responsibility.

The importance of reputation risk in a complex supply chain is increasing. In many of the examples we have seen that consumers often are not familiar with, whether the company has its own factory, or cooperates in with suppliers. The suppliers abuse is identified by consumers with the retailer (*Wywiad z profesorem N. Craigiem Smithem...*, p. 2).

The implementation of the rules of socially responsible actions is designed to limit the risk and is directly related to the organizational culture of the company. The most important here are values rooted in the culture of the organization and the ability to link this culture with the strategy adopted by the company.

Socially responsible activities (throughout the supply chain) become a market requirement, but on the other hand they bring numerous benefits to those who implement them. They provide a basis for improving the competitiveness of enterprises by reducing transaction costs, additional oppor-

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tunities to create innovative solutions, reducing opportunistic actions, increase loyalty of consumers, employees and contractors .

The importance of socially responsible activities in Poland is small, but this situation is slowly changing and it is influenced by actions taken to promote this approach in business and increase of the role of the so-called ethical stock market, which are important characteristic for the company when applying for contracts .

However, the key role in promoting CSR in Poland is played by social attitudes. Indeed, consumers have a great opportunity to change the way companies operate in the market .

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Reporting Process Standardization in B2B System

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Abstract: Reporting understood as a process provides the output in a form of data and information presentation, which is one of the important aspects of a business management system. The effectiveness of processes and decision making by a management depends on the access to actual and relevant data, provided in the form of transparent reports. This also has an impact on the effectiveness of cooperation with business partners in the B2B model.

Therefore, the challenge for most companies is to convert unstructured data to understandable information that can later be used in the process management. There is little reporting tools, which functionality not only allows to download data from the relevant systems, but also for their conversion to a format suitable for users. As a result, enterprises are often forced to make quickly reports based on data imported from a variety of applications.

The aim of this paper is to present the results of analysis the possibilities of standardizing the data reporting process in the B2B system, which was carried out in one of the stages of a project "Development of a modern and advanced B2B system based on Internet technologies as a result of R&D." As a result, it was recommended the reporting tool for the B2B system optimal for the user. The basic analytical criteria for the development of process standards were: tool efficiency, facility for a user, data formats for which the tool exports data.

Introduction

In the current economic circumstances the demand for non-standard information in enterprises resulting from the complexity and dynamics of the processes, changes in the model of doing business activities, market needs of organizations and influence of the environment on their activity has definitely risen. The research done by SAS Institute (<http://bi.pl/publications/art/10-business-intelligence-skad-przyszedl-dokad-zmierza>) indicate, that in the few next years the importance of practical application of advanced analytics in business processes is going to grow up.

A large number of data managed by companies requires complex cross-sectional analyses. Managers expect reports presenting a given issue from many perspectives, and at the same time, in a clear and comprehensible manner. Moreover, the decision-makers want to receive analytical reports prepared in a short time and on the basis of the most recent data. Automation and virtualization of business processes allows to easily and quickly access data, and then, transform them into management information by means of business intelligence tools, which use the resources coming from integrated databases. Business practice shows, that the managers are interested in data, which come either from internal enterprise resource planning system, or other systems supporting external processes based on B2B relations.

The analysis of reporting tools, which functionality allows not only to extract data from internal systems of an enterprise, and external ones used by business partners, but also transform them into format suitable for users, shows that availability of those tools is limited. As a result, enterprises are often forced to prepare partial reports on the basis of data imported from various applications.

Taking into account the above, the aim of the paper is to present the results of analysis of reporting process standardization possibilities in B2B system, which was made as one of the stages of "The development of state of the art and advanced B2B system based on Internet technologies as a result of research and development works" implemented by OPTeam SA under the Regional Operational Programme of the Lubelskie Voivodship in 2007-2013". On the basis of the analysis, a recommendation in order to design a reporting tool in B2B system optimal for a user was prepared. The paper is structured as follows: Section 2 introduces and justifies the research method, Section 3 gives some background on Business Analytics (BA), Business Intelligence (BI) and data reporting in the enterprise man-

agement based on B2B model, Section 4 presents eXtensible Business Reporting Language, Sections 5 and 6 discusses the results of the study and recommendations for B2B system created in the project, Section 7 provides conclusions.

Methodology of the Research

The main aim of the paper allowed to define the following objectives:

- identification of reporting tools' functionalities;
- identification of technological solutions used in reporting tools available in the market, which may be applied in establishing standard for "reporting" functionality in B2B system designed in ASP.NET environment.

A comparative analysis of functionalities and reporting tools technologies, which allowed to choose the optimal tool for designed B2B system, was applied as a research method. The reporting tools analysis was based on the following criteria:

- access to data through Internet browser
- range of specialized tools for report's designing
- data export formats
- simplicity for end-user
- access to reports through a browser
- supported browsers
- available programming interfaces
- best practice support
- licence cost and terms.

The methodology of research allowed making conclusions and recommendations, which were used as input data in designing of reporting functionalities in the B2B system.

Meaning of Business Analytics and Data Reporting in Enterprise Management in B2B Model

Changing market, more and more aware, demanding and better informed clients, complexity of processes, enterprises operating on the basis of integrated management systems, implementation of new business models based on B2B relations – all of these contribute to growing importance of analytics, and the competitive advantage of enterprises becomes more and more determined by quick use of data and information through relevant business analyses and providing managers ready reports in a short time.

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Literature research show (Bartlett, 2013; Davenport & Jeanne, 2007; McDonald & Tina, 2007; Stubbs, 2011; Ranadive, 2006; Zabin & Gresh, 2004, Davenport, 2006; Pfeffer & Robert, 2006; Davenport & Jeanne, 2005; Bonabeau, 2003, pp. 116-123; Davenport et al, 2001, pp.117-138) that Business Analytics (BA) has been known for many years. Supported by Business Intelligence (BI) tools, it is focused on modeling, analyzing and interpreting data by using quantitative and computational techniques for finding solutions to very complex problems, leading to a rational decision making. It has to be understood as the process supported by various applications in the enterprise management includes exploring many ways for tackling problems faced by managers. It helps in the clarification of objectives and priorities, suggesting and defining the alternative strategies for the optimization of benefits. This involves the various professional tools for the business decision making, which are becoming very important for better returns in the modern rapidly changing markets, constantly facing the increasing competition. These tools are based on the computing power to study the available data, and to achieve right results, optimum performance, and a high degree of success.

In the recent years Gartner started promoting Business Analytics (BA) term instead of Business Intelligence (BI), which based on its own definition, should comprise aspects related to providing comprehensive analytical tools (BI and Data Warehousing), and their methodological and effective use in order to better implement strategies in actions and performance management (<http://www.gartner.com/it-glossary/business-analytics>).

According to A. Januszewski, BA and BI terms are currently used interchangeably. IT companies use BA in order to define various types of tools (data warehouse platforms) and analytical applications used for corporate performance management (Januszewski, 2008, p. 14).

Business Analytics based on BI has the following importance in the enterprise management:

- assessment of enterprise's past activity and using it as a basis for making suggestions allowing to effectively use internal resources and opportunities appearing in the environment,
- preparing data in order to make decisions improving enterprise's activity and its results in the future. (Rostek & Witek, 2010, p. 82).

According to Davenport, competent usage of business analysis in enterprise management process, allows the company to better recognize its potential and limitations, and simultaneously gain advantage over competi-

tors. He classifies core conditions of effective competitiveness as a result of BA use (Davenport & Harris, 2007):

- using results of business analysis in making decisions by the managers at different management levels (strategic, tactic and operational),
- applying not only methods of descriptive statistics, but first of all, forecasting and optimization methods in organization management,
- using business analysis in carrying out processes and business functions of a company,
- permanent development of used tools, methods, techniques and analytical data in every area of the company management.

From the company perspective operating in the B2B model, the process of carrying out business analysis meets the same criteria. The range and meaning of BA are extended, because the enterprise needs to take into account other data resulting from external processes carried out in cooperation with business partners. As a result, the company assesses activity in terms of resources and benefits which may be achieved through cooperation with partners. Owing to this, the synergy effect achieved by applying B2B system is high, which has a significant meaning in the market.

BA results are presented in reports, which currently also get a new dimension and meaning. To a great extent, it is conditioned by changes of business models, evolving towards B2B. Therefore, data reporting transforms from a communication and monitoring tools of internal management into a tool of knowledge, observation and experience exchange used in managing external processes, carried out in cooperation with business partners. Reporting coming from B2B model influences the company's image. It makes company's activities transparent in the eyes of customers and cooperating partners. Thus, appropriately targeted reporting process becomes an element of company's strategy and its business partners.

The classification of reports depends on such factors as: possibility to introduce changes, range of report's application and the way in which data are presented (Rostek, 2008, pp. 31-42). The same classification of reports is also applied in B2B systems.

According to the first criterion, reports are divided into:

- static - comprising standard documents, made available to a user to be printed out automatically or generated and sent automatically by IT system. A user is only their reader;
- dynamic – created for individual needs of a user. Depending on user's skills and granted authorisations, dynamic reports are created by them on their own or delegated to their employees. If a dynamic report is

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available in standard reports set, it will be automatically found in static reports set.

According to their application range, reports are divided into:

- functional, which include all reports documenting operational activity of an enterprise,
- updating reports allowing to collectively introduce and update data directly in data base structures. The most common application of this type of reports are: editing and adjusting data groups and clusters, introducing rates and parameters values, defining size and value of aims, data correction;
- technical reports, generated by IT division in order to: monitor the IT system's work, servers performance, controlling disc space usage, monitoring activity of users in the system, supervising data quality in the system.

Taking into consideration the data presentation manner, reports are divided into:

- two-dimensional – they are documents instances, which document presented phenomena in flat tables. They usually provide standard information with low level of details. These are reports created by the developer, generated at one's request or refreshed automatically, the most frequently shared through web browser;
- multi-dimensional - based on pivot tables structures, giving a user a possibility of interaction based on drilling-down, rotating, cutting and sorting presented data. They appear in static and interactive form, they are rich in graphic, charts and diagrams. (Rostek, 2008, pp. 31-42)

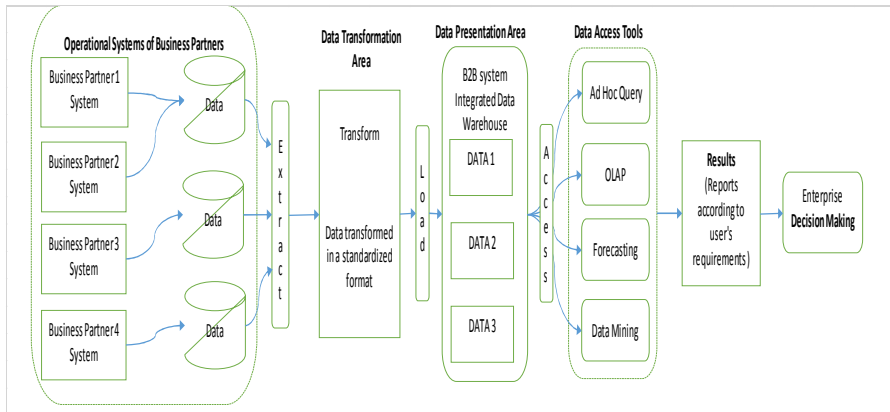
The above division is significant when developing B2B system, because from the perspective of IT specialists, the information on needs of end-users influences developing reporting functionalities in the system.

Data Warehouse and Analytical Transformation

In B2B system, the data warehouse has a special meaning because it is considered as the “heart” of the Business Analytics and the data reporting. It is based on combining data from all business systems cooperating in B2B platform. The B2B data warehouse is a source of relevant, up-to-date resources that after the analytical transformation become the valuable information for the company in a process of creating a competitive, market, economic strategy and making decisions.

Figure 1 shows the logic and basic elements of an analytical transformation process for the purpose of reporting in B2B system.

Figure 1. Analytical transformation process in B2B system



Source: own conception based on Inmon, 2002; Kimball & Ross, 2002.

From the B2B model point of view, operational systems are used by collaborating companies to run the business processes. They provide all necessary data for the purpose of electronic transformation. In enterprises, data are usually in wide range of sources:

- related, object, hierarchical and net data bases,
- text files,
- calculation sheets,
- XML, HTML, SGML files.

Some of the data can come from outside and open sources, e.g. Internet, commercial data warehouses, as well as sophisticated sources, e.g. photos, maps, written documents, recordings, etc.

Integration, one of the most important and most difficult aspects of data warehouse, is based on removing contradictions and excess information from data coming to warehouse from operational environment, what allows to achieve a uniform image of data stored by an institution (Jarke et al., 2003)

The data staging area consists of both a storage area and a set of processes that work on this data. These processes are called extract-transform-load (ETL) and consist of:

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- data extraction, in which data is copied from the operational source systems into the staging area,
- transformation, in which the data from the various sources is combined and transformed in a common format,
- loading, in which the data is loaded in the presentation area that is responsible for organizing, storing, and making these data available to be accessed by other systems.

Data access tools are the applications that actually use data stored in the presentation layer in order to deliver the information for which Business Analytics system has been built. The type and complexity of data access tools can vary. Examples are reporting tools, which process standardized reports, forecasting tools, which use the data to identify trends, and online analytical processing (OLAP) tools, which quickly provide answers to analytical queries.

In data warehouse tools provide services, which allow users to access data stored in it. Most opinions of users and their assessment of experience of working with data warehouse will be shaped by the fact how well those mechanisms meet their needs. Users are significantly varied in terms of their technological skills. Data warehouse should support a full range of technical skills and analytical complexities of users.

Type of users determines a category of informational needs. It occurs, that the same person needs to gain information coming from a few categories, however, there are cases, that a given person plays one role for most of the time. In present business environment, roles are often swapped due to great dynamics of changes occurring in it.

XBRL as a standard of reporting in business

Business information is created on the basis of data generated in different forms, in terms of content, structure, as well as a medium. In the B2B cooperation model there is a necessity of setting a standard, which will ensure:

- simplicity of processing data into information in IT system,
- transparency and unambiguity of data;
- possibility to collect and compare data coming from different enterprises and different IT systems.

It has been proven, that first requirement is met by most systems, because they create data in electronic form. Transparency and unambiguity is not easy to achieve. When analyzing reports from different systems, which

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contain figures equipped with similar word label, it cannot be clearly stated that a given value was calculated in the same way and means exactly the same in both cases. In order to achieve this, reports should be provided with numerous comments clarifying their context and computation method. Data formats, even if many of them use XML, are entirely incomparable. Reports received by enterprise's system may be at most stored in shared repository, engaging a person for every content-related analysis. A solution commonly used so far has been imposing one specific format by a recipient of data. This way a certain level of data comparability is achieved.

Taking into consideration the above factors, XBRL (eXtensible Business Reporting Language) was created, which is an open standard, designed to exchange business information contained in reports.

XBRL is currently dedicated to reporting data contained in financial statements, used mainly by companies listed on stock exchange. Accuracy of created taxonomies in comparison with prevailing specification may be checked through validation by means of the XBRL validator, which has a documented conformance with XBRL 2.1. Conformance Suite specifications.

The basic feature of XBRL is unambiguous identification of report elements semantics through relating every of them to a certain dictionary called an XBRL taxonomy. The language is based on XML and similar technologies and owing to this, it is not related to any hardware or software platform. The XBRL standard extension means:

X for eXtensible: flexible, easily adjustable. According to this rule, extending means adjusting the standard to one's needs;

B for Business: XBRL relates to economic life. At first it was meant to have been applied only in financial reporting, however with time it turned out that it may be successfully applied in a wider range;

R for Reporting: a standard is created to report business facts. More precisely, XBRL language can identify economic facts and events – such as net sales, net revenue, entertainment expenses – in such a way, that they can be unequivocally interpreted by diverse group of information recipients;

L for Language: XBRL is a standardized language comprehensible to computer processes (<http://www.xbrl-pl.org>).

XBRL is composed of two parts:

- dictionary – XBRL taxonomy, containing references to other available dictionaries,
- facts – XBRL instances, that is a set of proper information.

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In XBRL report every fact is accompanied by an XML tag, which meaning is described in attached dictionary, created according to XBRL specification. XBRL taxonomy based on XML schema describes not only formal features of particular tags, but also expresses their semantics. Apart from specifying attributes of particular tags, it is necessary to define relations between them. Knowledge of XBRL taxonomy report ensures a possibility to check syntax and semantics by verifying e.g. whether summaries are obtained through summing up particular components.

According to law regulations of different countries, taxonomies include up to more than ten thousand interrelated concepts, and often expanded by enterprises which create their own taxonomies. XBRL is an XML dialect using XML Schema and XLink technologies. Owing to this, some concepts may derive from and relate to others. Type of relation is defined by XBRL specification, which allows greater unambiguity. Simple relations act similarly to previous references tags in HTML, while extended ones allow defining relations.

XBRL report is composed of an instance containing reporting of facts and taxonomy, which constitutes a dictionary defining concepts, to which information and classifications of relations between the concepts are related and which may also include rules necessary for calculating data.

Dictionary concepts are placed in XSD (XML Schema Definition) (<http://www.w3.org/TR/xmlschema11-1>). So-called linkbases are used to fully describe them. In XLink specification there were defined (Reimschuessel-Was, 2009):

- Labels Linkbase – defines labels of concepts to be used when visualising report instances. Provides support for taxonomy language versions;
- Reference Linkbase– defines references to external sources, defining a given concept, e.g. legal acts in force;
- Definition Linkbase– defines relations between concepts such as: „general-special” (relations of generalisation), „essence-alias” (indicating a different meaning of the same concept), „requires-element” (indicating that one element requires appearance of the other);
- Presentation Linkbase – describes how concepts are made, that is their hierarchy, order and organisation in a form of e.g. table rows. It allows formatting a report later on. It is composed mainly of parent-child relationship defined by means of extended references with a proper ‘xlink:arcrole’ attribute;
- Calculation Linkbase – defines summaries and simple computations by assigning to every concept a weigh attribute value “+1” (a value is add-

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ed) or “-1” (subtraction) and indicating an upper level concept that the lower elements should sum up to;

- Formula Linkbase – describes more complex computations and business rules, based on the latest recommendation of XBRL International on formulas.

XBRL distinguishes two types of concepts: an item and a tuple. The difference is in appearance of child elements, which happens in case of complex concepts. Every concept has attributes:

- Substitution Group - attribute used to distinguish types of concepts;
- Name – unequivocally defines a concept in terms of a scheme. Moreover, concepts may have identifiers (id);
- Type – defines type of value which may be adopted by a given concept. XBRL specification defines available types;
- Period type – obligatory for simple concepts, it takes the following values: instant and duration. It allows to classify concepts into those having a value as of date (e.g. stock balance) or during a certain period of time (e.g. costs);
- Balance – additional attribute applied for concepts originating from accounting, such as Monetary Item Type and defines debit or credit nature of accounting;
- Label – names of concepts significant to the recipient of reports are used to visualise reports. They are stored in a separate Labels linkbase, what allows to create language or multi-language versions of taxonomy without disturbing their basic content.

Creating XBRL is organised into a few steps:

- 1) Defining a dictionary (a taxonomy)
- 2) Mapping – every concept of a report has its counterpart in taxonomy
- 3) Modelling one’s own taxonomy.
- 4) Tagging – attributing tags. It is the most important part of doing a report. It consists in mapping internal sources of data onto dictionary tags. Attributing tags may be conducted manually (using spreadsheet), by means of specialized software, which will create and save attributing by linking taxonomy tags with our data, taking into consideration sources of these data, or even directly in IT systems which are to generate data.
- 5) Report generating – means instances’ creating. With mapping at one’s disposal, an instance may be generated automatically.

To conclude, XBRL reports are documents built by means of XML language of flat structure, and tags labels, which are quite complicated and not always clear for their user. At present, they are usually meant to be pro-

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cessed by software. Taking into account needs of enterprises and managers, they should be also available directly to interested and competent recipients.

Reporting Tools Overview

There are many tools available in the market. Reporting modules are an inseparable part of web systems. Reports are varied in terms of their nature due to users' needs, e.g. market analysis, financial, sales or manufacturing-related statements. Many systems include standardized report packages. However, it turns out that the complexity and individuality of business processes in enterprises and between them generates a need for creating ad hoc reports by the users themselves.

Traditional IT tools allow to design simple statement, however, they are not useful in multidimensional analysis. That is why special applications have been created, dedicated to data analysis such as e.g. Oracle Discoverer, which use the idea of pivot table. Multidimensional analyses are usually conducted in an interactive way. Tools dedicated for it are usually interactive to such extent, so that they could come in handy to users who have no IT experience. Except for reading data, they also generate formatted results, ready to be printed out.

Choice of a tool, which was recommended to be applied in the designed B2B system, was preceded by analysis of IT solutions for data reporting available in the market, and its results are presented in the table below.

Table 1. Analysis of reporting tools available in the market from the perspective of their usage in B2B system

	Oracle BI Publisher	XtraReport Suite DevExpress	Microsoft SQL Server Reporting Services (SSRS)	SAP Crystal Reports
Structure	<p>The tool is built of three separated layers:</p> <ul style="list-style-type: none"> • data- are directly retrieved from the format or transformed into XML. The same data representation may serve to create reports in various arrangements and national languages; • graphic layout – in a form of a scheme defining 	<ul style="list-style-type: none"> • A tool working in .NET environment, which simplifies the process of designing reports and delivering them to an end-user. • XtraReports Suite platform is composed of suites for the following environments: • WinForms - fully integrated with MS Visual Studio development solu- 	<p>Based on a three-level architecture composed of the following layers:</p> <ul style="list-style-type: none"> • database – database layer is composed of bases of report server and data source. During native installation of Reporting Services two databases of report server are created (for metadata of reports and parametrization of 	<p>An advanced report generator, optimized for working in business environment. The most recent versions have common architecture of access to data, reporting and delivering information.</p> <p>Crystal Reports tool has been designed to be integrated with already existing functions related to data, networks and applications. It has an open and multilayer architecture, composed of:</p> <ul style="list-style-type: none"> • database layer • tool layer • presentation lay-

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	<p>appearance, containing tabs related to elements of XML data representation, many layouts may be created for one data representation;</p> <ul style="list-style-type: none"> languages – fixed text elements may be automatically extracted from report's definition, saved in standard format and submitted for translation into other languages. For every defined layout, a report can be created in every language into which translation has been made. 	<p>tions suite for Windows Forms;</p> <ul style="list-style-type: none"> ASP.NET - a set for developing reports in ASP .NET AJAX and ASP .NET MVC environments; WPF - a set of solutions for developing reports in WPF environment; Silverlight – a set of solutions for developing reports in Silverlight technology. 	<p>report server);</p> <ul style="list-style-type: none"> Report Server - it plays the key role in the structure of the tool. As a proxy layer it is responsible for handling customer requests and managing the environment. The main function of Report Server component is: communication and programming interface (API) in a form of Web Service .NET; user's interface (Report Builder) – built similarly to MS Excel or PowerPoint interface. Report Builder is a ClickOnce application implemented through web browser. 	<p>er.</p>
<p style="text-align: center;">Functionality</p>	<ul style="list-style-type: none"> Separating data definitions from report layout definitions; A wide range of predefined types of data sources; Aast possibilities of formatting report layout (PDF, HTML, MHTML, RTF, PPT); Availability of a handy customer tool <i>Template Builder for Word</i> supporting formatting in RTF, MS Word, Adobe Acrobat , MS Excel; It has a complete system for creating, initiating and scheduling reports. 	<ul style="list-style-type: none"> Switchable thematic motives; Lingualism; Document preview on order; Searching for a text in report document; Registering events of user interaction, except for ASP.NET environment; Applying Watermarks in text and/or images, except for ASP.NET environment; Map of the document (list of tabs) Extended panel of report's parameters. 	<ul style="list-style-type: none"> Using ready tools to create reports A possibility to place designed reports in ASP.NET applications and Windows Forms Creating simple and advanced reports on the basis of a vast access to data sources; Reports may be created by end-users Handy formatting and clear data presentation Data visualisation by means of charts and graphics Data access from the web browser's level Remote and easy access to important information Export of data that a report is composed of into files of different formats, including 	<ul style="list-style-type: none"> Creating reports in different layouts with interactive implementation function; Applying cross tabulation in order to create reports in a faster and better way; Standard data fields and fields defined by a user; Modelling scenarios „what happen if” directly in reports; Browsing and exporting reports to Adobe PDF, MS Word, MS Excel, RTF, XML formats; Reliable visualisation and interactivity due to embedded Adobe Flash (SWF) files; Sorting, filtering and formatting inside a report without a necessity of renewed search in database; A possibility to drill-down to transactional data level while keeping safety at report's and user's level; Publishing reports on the Internet; Conveying reports in a company by means of an e-mail, fax, electronic files transfer or as a print-out;

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	<ul style="list-style-type: none"> • It manages rights and analyses report results online in a way similar to work with pivot tables in Excel; • A built-in functionality of delivering reports through most frequently used channels by electronic mail or fax; • Bursting, that is division of one file (or other form) of result report in order to distribute it among many recipients; • Handling multiple languages and currencies; • Availability of preparing and then modifying report layers by decisive persons on their own; • Report implementation process is approximately 2 to 3 times quicker when compared to tools requiring coding in Java language; • Using common J2EE architecture; • A wide range of choice in terms of system software for an implemented project • High flexibility in building reports, efficiency, scalability and reliability of the tool. 		<p>MS Excel, MS Word, PDF Acrobat Reader</p>	<ul style="list-style-type: none"> • Access to files at any time or place due to a browser dedicated to Crystal Reports software, also without Internet connection; • Assigning access rights to users and groups of users.
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Report designing	<ol style="list-style-type: none"> 1. Defining of data model 2. Specification of report's parameters with an option to define values acceptable for these parameters 3. Defining report's layout templates 4. Determining definitions of language versions 	<ol style="list-style-type: none"> 1. Modeling data with usage of grouping, filtering and sorting options 2. Defining report's parameters. Report may be initiated after conveying all parameters or with usage of default values for input parameters. 3. Defining report's appearance. Every element of XtraReports report has its own set of properties defining its appearance. 4. Saving reports. XtraReports reports placed in web applications may be converted into many popular formats, without any components of outside companies. 	<p>There are two possible paths of developing reports:</p> <ol style="list-style-type: none"> 1. Report Builder is destined for a user. It allows a user to perform the following tasks on their own: <ul style="list-style-type: none"> • formatting reports and filling them in with captions • defining new fields and computations defined with usage of a model • previewing, printing and publishing reports • exporting data constituting a report into files of various formats, including i.e. MS Excel, MSWord, PDF Acrobat Reader formats. <p>A user chooses report layout template, containing predefined data sections (tables, arrays or graphs). Then, a user places chosen data elements in a project's view and defines limits allowing to filter report's source data. A model contains all information, needed by Report Builder tool to automatically generate a query and collect required data.</p> <ol style="list-style-type: none"> 2. Server Data Tools is destined for developers. Its key element is Report Designer, which facilitates developers defining sets of data for a report on the basis of various data sources, designing report's 	<ol style="list-style-type: none"> 1. Choice of data source (a broad access to databases, sheets and files in different formats). Most of data sources may be configured by means of Database Expert dialog box, which allows to choose how tables are connected including relations between them. 2. Defining the form of constructing a report (by means of a creator, basing on the model of another report, from scratch); 3. Defining objects' features (fields presenting data) 4. Formatting objects 5. Defining operations on data
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			<p>layout, and then displaying report's view directly in development environment before placing it on a report server. Developers may quickly and easily create reports using Report Wizard or build more complex reports using Report Designer. After finishing working on a report, a developer may display its view and place it on report server directly from Report Designer tool level.</p>	
Access to data	<ul style="list-style-type: none"> • Relational data are collected by means of SQL queries • Data in XML format • Data from Web Services; • It is possible to buffer data sources. It allows to create a report on the basis of various graphic layout templates without the necessity of renewed data collection from a source. 	<ul style="list-style-type: none"> • Collecting many sources data • Depending on a type of a source there are different ways of connecting data. • A report may be linked to data from database, XML file or any kind of structure created while making a report. • Irrespective of type of data and a source, report's object is related to data source by DataSource properties. 	<ul style="list-style-type: none"> • Versatile functionality for different data sources, which may be defined at server's level (Shared Data Sources) or may be contained in a report. • One may create reports using relational and multidimensional data from databases of SQL Server, Oracle, Hyperion software and others. • Due to data processing extension in XML format, data from any XML data source may be collected. • In order to develop non-standard data sources, functions with values kept in a table may be used. 	<ul style="list-style-type: none"> • Databases: PostgreSQL, Sybase, Ingres, IBM DB2, Microsoft Access, Microsoft SQLServer, MySQL and Oracle • transactional database Btrieve • spreadsheets, • text files • XML, HTML files • Lotus Notes, Microsoft Exchange and Novell GroupWise databases <ul style="list-style-type: none"> • SAP: BW, Info Sets, Tables and Business Objects Universes • any other data source available through web services.
Programming interface	<p>Reports may be initiated interactively by using websites of XMLP Enterprise server. Due to available interfaces,</p>	<p>Reports development is made in MS Visual Studio environment. The creation process is standard, as when</p>	<p>It has two types of interfaces: simple for users (Report Builder) and advanced for developers (Report Designer), which</p>	<p>Reports are designed in MS Visual Studio environment. It ensures a possibility of creating interactive data compilations stored in different bases. Reports related to</p>

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	<p>a developer of an IT system, by using XMLP, may fit reporting into their system while keeping the full control of this mechanism.</p>	<p>building Windows Form application or web application. Reports' creator is built in Visual Studio environment. It ensures a fully integrated edition of reports similarly to developing applications with usage of forms. Reports may be embedded in applications and web sites built in ASP .NET environment. A report published on the web or web application is available to preview and print-out on the customer's part – a user initiating a report.</p>	<p>allows developers to create highly dynamic reports, giving users a possibility to interact with data and analyse them thoroughly. Each of the interfaces has influence on report development process.</p>	<p>web and desktop applications may be made available from Crystal Reports for MS Visual Studio. NET. The tool allows to develop an application with drilling functions and filtering information according to a user's needs. Instead of coding, Crystal Report Designer interface may be used, which will ensure quick and professional creating and formatting reports. In order to use full scope, reports should be built by means of Crystal Reports software, and then definitions of reports in .rpt files should be placed in web application.</p>
Web browser support	<p>Reports may be initiated:</p> <ul style="list-style-type: none"> • interactively by using XMLP Enterprise web server; • directly by giving a URL address, and conveying mandatory parameters; • programme-based by means of API interfaces (Application Programming Interfaces) for Java language. 	<p>XtraReports supports browsers:</p> <ul style="list-style-type: none"> • Internet Explorer 7+ • Firefox 2+ • Chrome 1+ • Safari 3+ • Opera 9+ 	<p>Only Internet Explorer ensures a full functionality. The other browsers give only a limited set of options, not allowing e.g. to print or zoom a document. An administrative tool Report Manager also initiated through a browser works only with Internet Explorer 7+.</p>	<p>Crystal Reports available on the web applications preserve availability of full functionality in browsers:</p> <ul style="list-style-type: none"> • Internet Explorer • Safari • Firefox • Chrome • Opera.
Comments	<ul style="list-style-type: none"> • Lack of dedicated documentation for system's administrators; • Lack of dedicated monitoring tools available in the system itself. • Business Intelligence Publisher is acquired according to Ora- 	<ul style="list-style-type: none"> • Scaling documents only in WinForms environment. • According to present licencing rules reporting components XtraReports for ASP .NET may be acquired in a dedicated platform or in one of many available DevExpress 	<ul style="list-style-type: none"> • Ensures high interactivity of reports; • Equipped with cache memory; • It is free of charge when works on SQL database server. Using Reporting Services requires having SQL Server licence. • Many organisa- 	<ul style="list-style-type: none"> • Developer's version of Crystal Reports for Microsoft Visual Studio ensures a function of direct development of reports in .NET applications. • Web application is a server application, which allows many users to simultaneously access reporting tools directly or indirectly from application layer. • Web applications,

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	cle licencing rules.	toolboxes.	tions use SharePoint solutions to improve cooperation between employees, partners or even customers. When Reporting Services services are configured to work in SharePoint Integrated mode, users may publish or upload to SharePoint library reports, model reports, resources or shared files of data sources. This allows to build a reporting function in intranet SharePoint solution.	which are distributed outside require additional licences. Depending on Crystal Reports version, there may be differences in licencing rules. <ul style="list-style-type: none"> • In case of B2B solutions which work in outside environment licencing method is expensive.
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Source: own research.

Traditional and interactive tools are suitable for creating documents or data summaries. In case of the B2B system, this type of reporting tools turn out to be little useful because they enable making mistakes. B2B system generates a need for creating more advanced and extended studies, being a compilation of many different summaries, related by text and graphics. It is from the fact, that it is used by various users from enterprises cooperating in the B2B model.

Recommendations for standardization of reporting in B2B system through websites

B2B web application as an IT tool allowing to work using web browser operates on enterprise's data, shares and exchanges data online with IT systems of other enterprises, which act as business partners. In order to take decisions quickly, managers need quick access to these data, which are initially registered by means of ERP systems. Managers having vast skills and knowledge need an intuitive, and at the same time powerful tool, enabling them to browse through data and find answers to critical questions, without the necessity to have detailed technical knowledge of data sources. Making a prepared report available in an effective and easy way is a task

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for software, which allows to distribute reports through web browser. B2B web application would be incomplete if it was not equipped with reporting functionality. The evaluation results in terms of applying reporting tools in B2B system are presented in the Table 2.

Table 2. Evaluation of usability of applying reporting tools in B2B system

Evaluation criterion	Oracle BI Publisher	XtraReport DevExpress	Microsoft SQL Server Reporting Services	SAP Crystal Reports
Access to data	*****	*****	*****	*****
Range of specialised tools for developing reports and its potential	***	*****	*****	*****
Compatibility with browsers	*****	*****	**	*****
Efficiency	****	****	****	****
of data export formats	***	*****	*****	*****
End-user experience and interface	****	*****	*****	****
Costs	*	*****	***	*
Programming interfaces and their flexibility	****	*****	*****	*****
Best Practices support	*****	*****	****	*****

Legend:

- ***** - very good
- **** - good
- *** - satisfactory
- ** - low
- * - very low

Source: own research.

Analysis of reporting tools in terms of their usage for designing and sharing reports in the B2B system allows to recommend XtraReport DevExpress solution due to its:

- optimal set of tools for designing reports

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- full integration with project environment .NET
- wide range of data resources
- variety of export formats
- optimal communication with user and interaction
- compatibility with web browsers
- attractive licensing manner when taking into consideration price/quality relation.

Conclusions

To make right decisions in a dynamic business environment, organizations must access at the right moment exact and complete information from various domains of their activity, in the right format for the specific purpose. The operational systems are not the adequate environment for obtaining all this information. Essentially, Business Analytics (BA) or Business Intelligence (BI) tools are very useful because they enable data mining generated from the different sources and their presentation in the form of reports tailored to the needs of users. They depend on a complex data warehouse that collects all required data.

Reporting understood as the process of which the output provides data and information presentation is one of the most important aspects of process management. Creating reports is an important sphere of activity for many enterprises. The effectiveness of the work of managers, business analysts and employees depends largely on access to current and relevant data, provided in the form of clear reports.

The B2B system supporting business processes also must have a reporting functionality. The research made for this purpose show that on the IT market there are a few professional reporting tools useful for creating advanced business reports. For the B2B system created in ASP.NET environment, the core analytical criteria for making the reporting standards were tool's productivity, ease of use by the user, data formats for which the tool exports data. The best reporting tool was XtraReport Suite DevExpress.

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Application of Modern Information Technologies in Prevention of Corruptive Practices in an Organization

JEL Classification: *A11; A13; M14*

Keywords: *corruption; corrupting practices; ethics; information technology*

Abstract: The issue of corruption has recently become one of the most significant problems raised on the international scene. The discussion, currently conducted in different environments, places the issue of corruption in the centre of particular interest. In the world of research on corruption and its various forms there are multiple studies conducted by the representatives of different science disciplines. The researchers of management studies investigate corruption at both the individual and organizational level. The aspects of application of different methods and techniques by means of modern technologies are an important area of research on various aspects of corruption. The aim of the article is to analyse the possibility of application of modern tools in prevention of corrupting practices in an organization, particularly at the universities.

Introduction

Corruption is an important and current issue, having a significant impact on the activity of organisations, enterprises on the domestic and interna-

tional markets. It is deeply rooted phenomenon on the Polish market. The analysis of the subject literature focuses on the key problem: how to effectively prevent corruptive practices in organisations? This phenomenon is complex and it should be continuously analysed due to the dynamic changes and globalisation processes. These processes constitute important challenges for the organisations in dealing with the issue of corruption and they are becoming a force driving the proliferation of corruptive practices.

Information technologies play a significant role in counteracting corruptive behaviours. They are an effective tool in the fight against corruptive practices, both in the public and private segment. Information technologies can effectively strengthen anti-corruption activities in organisations.

The objective of the article is the analysis of possibility to use modern information technologies in prevention of corruptive practices in the organisation, especially at the universities. Universities can play a significant role in education of current and future managers within the scope of ethical and anti-corruptive behaviours in the organisations. To achieve this goal, the article focuses on discussion of the essence of corruptive practices in organisations, presentation of applicable information technologies and tools supporting prevention of corruptive practices. It also presents the possibilities of use of various methods and information technologies in the anti-corruption education programmes.

The article is a result of the preliminary studies conducted within the scope of the research project entitled “Analysis of application of modern information technologies in the process of implementation of the education principles against corruption in higher schools”.

Methodology of the research

The methodology of research presented in the article has been developed based on the assumptions adopted and objectives set within the scope of the research project entitled “Analysis of application of modern information technologies in the process of implementation of the education principles against corruption in higher schools” implemented by the team at the Faculty of Organisation and Management of the Silesian University of Technology. The results of preliminary studies presented in the article form a part of the planned comprehensive research process.

The objective of the studies presented in the article is:

- characteristics of corruptive practices in organisations,

- identification of types of information technologies and tools supporting prevention of corruptive practices in organisations,
- identification of possible applications of information technologies in the anti-corruption education programmes on the selected example.

In order to achieve the assumed goals, there were preliminary studies of qualitative nature carried out, based on:

- *desk research of literature and documents* - this method was applied to analyse data regarding the essence of corruptive practices in organisations as well as types of information technologies,
- *case study* - this method was applied for the purpose of preliminary description of one of the selected universities within the scope of methods and solutions used in the education process in relation to anti-corruptive and ethical practices.

Further studies within the scope of the implemented project will regard mainly the possibility of application of the modern information technologies in the didactic process for the purpose of development of moral competences of the students, performance of comparative analysis of universities as well as development of recommendations in this area.

Essence of corruptive practices in an organisation

Definition of corruption gives rise to multiple difficulties for the researchers since this phenomenon covers many practices the ethical borders of which are not easy to determine. The great interest in corruption of various communities on the international scene results from multiple complex phenomena, including, but not limited to, new reports on corruptive practices in the business world that compromised the trust in entrepreneurs (especially corporations), previously perceived as an important element of democratic societies - an aspect of contemporary capitalism (Stachowicz-Stanusch, Sworowska, 2012, pp. 97-116).

Literature does not prove a clear definition for the notion of corruption, there is no uniform, cohesive and universal definition of the this phenomenon. "The very notion 'corruption' (Lat. *corruptio* = bribery, depravation, rottenness) has expressly pejorative connotations, indicating concealed deviations from the established legal order and ethical practices (Stachowicz-Stanusch, Sworowska, 2012, pp. 97-116). Corruption is usually associated with unethical practices, antisocial behaviours, dysfunctional deviation, poor organisational practices and unproductive conduct (Ashforth et al., 2008, pp. 670-684). Whereas, Cragg defines corruption as "effective or

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ineffective attempt to exert influence on a person responsible for a decision or an order, on bases other than objective premises, with intention to provide benefits or promotion of this person, a third party or group to whom the given person is related personally, due to obligations, officially or through own, professional or group loyalty” (Cragg, 1998, pp. 122-141). It seems significant to emphasise the awareness that corruption should be treated both as a condition as well as a process of open-ended and multi-aspect nature (Ashforth et al., 2008, pp. 670-684). Ashforth et al. suggest that the manner of definition of corruption depends on the context in which it is placed as well as the perspective assumed by the definer and the purpose of its definition.

A significant aspect in defining corruptive practices are cultural differences, reflecting the local cultural values. It is difficult to evaluate the behaviour of people from one culture with application of standards from another culture. The conduct patterns and business practices differ depending on culture, therefore corruption accusations can be culturally insensitive (Stachowicz-Stanusch, Sworowska, 2012, pp. 97-116).

Despite the vast number of definitions of corruption in literature and cultural differences, it is possible to indicate multiple universal tendencies underlying these phenomena, such as use of power, egoistic orientation of the entities participating in corruptive activities or negative results of corruptive activities for the society (Akindele, 1995, p. 55-69). We can also speak of several common forms of corruption, such as bribery that occurs most commonly in collectivistic countries and be of different significance for the societies (Johnson, 2008). Another form can be fraud, nepotism or falsification of information. The source of such practices in case of individuals is the tendency to use lies for the purpose of protection of privacy, and in case of groups - for the purpose of protection of the collective or family (Stachowicz-Stanusch, Sworowska, 2012, pp. 97-116).

Acceptance of corruptive practices, counteracting attempts or active use constitute the manifestations of activities of enterprises in relation to corruption (Mroczek et al., 2013, pp. 34-41).

Presence of corruptive practices has a negative impact on the perception of the particular organisations, countries. It is a common view that corruptive practices result in the decrease of effectiveness of the economies, for example: (Gupta, 1998), (Voyer & Beamish, 2004, pp. 211-224). The influx of direct foreign investments that constitute one of the key factors of economic growth can be limited. Based on the complex business relations between the entities, the enterprises might also deal with corruptive practic-

es of their partners. Different practices in organisations in the particular countries in relation to corruption can result from the different nature and level of corruption depending on the country.

The enterprises should develop rules of conduct in relation to corruptive practices, thus influencing the institutional surrounding, for example: (Branco & Rodrigues, 2007, pp. 5-15).

The analysis of possibility of application of various instruments, tools and methods of prevention of such negative practices is an essential issue in terms of counteracting adverse corruptive practices in organisations. A crucial tool for limitation of corruption in organisations can be application of principles of social corporate responsibility (CSR). Currently, this concept is associated not only with care of the environment, justice and social order, but also with ethical practices of business entities. The notion of social responsibility means broadly understood responsibility of the private, public and non-governmental segment. Implementation of this concept can have a tremendous impact on development of ethical stances and counteracting corruptive practices. The research conducted by A Simha and A. Stachowicz-Stanusch are worth mentioning here as they analyse the perception of the ethical climate and ethical practices on the sample of Polish organisations and relations between the ethical climate and practices connected with managerial efficiency. The studies showed a positive relation between success and ethical conduct (Simha, Stachowicz-Stanusch, 2012). Managers should try and promote principled cultures and behaviors, which would yield in positive and beneficial outcomes (Stachowicz-Stanusch, Simha, 2013, pp.433-446). Grudzewski et al. bring also attention to the development of trust management in the organisation as an essential element of corruption limitation (Grudzewski et al., 2008, pp.7-20). In order to improve the effectiveness of activities aimed at preventing corruptive practices, it is also advisable to consider the knowledge management systems as well as use the increasingly developing modern information technologies.

Information technologies supporting prevention of corruptive practices

A significant challenge for the organisation is prevention of corruptive practices with the use of effective and efficient instruments, methods and IT tools. Many studies regarding the problem of corruption indicates the increasing meaning of application of modern information technologies. Information technologies, especially via the Internet, are used for the pur-

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pose of various manners of counteracting corruption (Trutkowski (Ed.), pp.7-22). They allow to increase the transparency of official procedures for the public opinion, enable use of a more effective system of reporting on the existing irregularities (*whistle-blowing*), facilitate the access to information for the society (Walecki, 2006). Development of technology allows for easier, faster and more effective communication. Implementation of IT solutions can facilitate the access to certain knowledge resources, e.g. through the Internet where various information resources necessary for the employees to perform the tasks entrusted to them are collected, or the internal electronic circulation of documents allowing to monitor the course of affairs dealt with by the particular employees

Information technologies and social media can effectively strengthen anti-corruption activities in organisations through, including, but not limited to:

- improved transparency of activities,
- facilitation of access to information,
- increased disclosure of information through publication of information on the undertaken actions and decisions,
- simplification of communication between the organisation and society,
- elimination of potentially corruptogenic interactions between the employees and clients,
- improvement of procedures connected with public procurements, tenders.

Educational and information campaigns addressed to the certain groups are also very important, on the one hand forming proper social attitudes and, on the other, directed at information of the society on the cases of corruption. It must be remembered that building of social relations with the stakeholders must be treatment as a long-term strategic objective that should contribute to building of a long-term and trust-based relation (Machnik-Słomka & Bojar, 2013, pp.57-72). An important role in social education is fulfilled by mass education campaigns, employing modern information technologies, social marketing tools, social media.

The term *social media* refers to a broad set of communication tools using the Internet technology going beyond the previous social communication, including: blogs, microblogs, social media websites, i.e. Facebook, nk.pl, YouTube and other, tools for on-line conversations, on-line social games. Thematic social media portals, trade communities, professional communities, discussions forums, opinion websites, etc. are gaining increasing importance. Currently, due to the broad availability of the Inter-

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net technologies, the social media have become an important place of information exchange, changing in a significant manner the methods of communication of organisations, communities as well as individuals. Kaplan et al. define the social media as a “group of applications based on Internet solutions, founded on ideological and technological bases Web 2.0, allowing for creation and exchange of contents generated by the users” (Kaplan et al., 2010, pp. 59-68). Web 2.0 technology is a specific approach to the construction of Internet websites where the users fulfil at least an equivalent function as the designers and owners of the websites in terms of their creation (Koszembar-Wiklik, 2013, pp. 361-370). Social media fulfil an essential function in the anti-corruption education, both due to their range as well as force of impact. To a great extent, they allow to promote information on corruption as well as develop social awareness.

The activities preventing corruptive practices can involve, among other things, the following information technologies, social media:

- websites containing valid and full information, e.g. within the scope of tender proceedings, publication of financial data, reports, etc.
- information platforms with electronic data bases,
- virtual surveys and *on-line* forms used for the purpose of obtaining fast and necessary information as well as facilitation of transfer of information and communication. On-line applications facilitate dealing with and tracking the course of matters,
- electronic mail, facilitating communication with the clients. E-mail is a fast form of communication, leaving a permanent trace and easy for archiving,
- discussion forums kept on Internet portals,
- blogs and microblogs used for exchange of information as well as increasingly frequently used by the organisation for image and marketing purposes,
- social media websites.

**Possibility of application of information technologies
in the anti-corruption education programmes**

The problem of corruption in the recent years is also broadly referred to the issue of education, especially in terms of education of future managers. In the subject literature one can observe a great interest in the ethical aspects in the activities of schools, universities, for example: (Chapfika,

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2008, pp. 43-49), (Evans & Weiss, 2008, pp.43-66), (Wankel et al., 2011, pp. 19-45).

The priority within the scope of education should be sensitisation to the issue of corruption, limitation of social tolerance for corruption as well as promoting of ethical patterns of conduct. In the process of implementation of principles of education against corruption it can be helpful to use contemporary technologies, IT tools and communication techniques that can be employed by universities. These include, among other things, websites, social media portals, modern e-learning platforms, network and Internet technologies, e-teaching. An example of application of an IT tool at multiple Polish universities is the Internet anti-plagiarism system (plagiat.pl.), allowing the universities to counteract illegal copying of theses by means of the implemented anti-plagiarism procedures.

The results of the studies conducted within the scope of the project “Analysis of the state of knowledge within the scope of methods and techniques employed in the education process at the level of technical higher schools, taking into account the social principles of responsible teaching” implemented at the Silesian University of Technology indicated, however, that the most commonly applied methods and modes of teaching at the universities within the scope of corruption are: lectures, case studies, research projects, round table discussions with multiple interested parties. Whereas, the most commonly used methods and tools include modern Internet and IT tools, modern communication methods, i.e. e-learning, blogs and Internet communities (e.g. facebook) and other.

The proper education programmes play a crucial role in the anti-corruption education. Participation of universities from various countries in the international initiatives regarding ethics and counteracting corruption as well as development of common education programmes in this matter is of great importance. These include, among other things, the initiative “United Nations Global Compact” of the United Nations within the scope of which the principles of responsible management education have been developed (PRME). The PRME principles are guidelines for the academic institutions in terms of introduction in the manager education programmes and research topics of the social issue of corporate responsibility and they are to function based on the global idea and good practice exchange platform (<http://www.unprme.org/about-prme/the-six-principles.php>). The PRME initiative serves as a framework for gradual, systemic change in business schools and management-related institutions, based on three distinctive characteristics of the initiative: continuing improvement, a learning net-

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work, and reporting progress to stakeholders (<http://www.unprme.org/about-prme/index.php>). Within the scope of the UN Global Impact initiative, there was a project implemented entitled “Sensitizing Future Business Leaders: Developing Anti-Corruption Guidelines for Curriculum Change”, aiming at development of common anti-corruption guidelines (“Toolkit”) to change the education programmes. This project was developed by the Working Group (Academic Anti-corruption Working Group). The effect of the undertaken actions was to develop a uniform tool of implementation of the PRME principles. The guidelines have been integrated in single Anti-corruption Guidelines (“Toolkit”), containing comprehensive instructions for education at the level of higher schools - anti-corruption practices, making ethical decisions. Development and implementation of such education programmes constitute an important tool changing the attitude of the managers, entrepreneurs who, in the course of their work, should make all effort to observe ethical principles of conduct.

An example of a university in Poland that conducts activities for the benefit of education against corruption is the Silesian University of Technology, in particular the Faculty of Organisation and Management that is engaged in implementation of multiple international initiatives within this scope. The Faculty of Organisation and Management of the Silesian University of Technology was (from the initiative of prof. dr hab. Agata Stachowicz-Stanusch, as the head of the international research team (Academic Anti-corruption Working Group) within the scope of the project entitled “Sensitizing Future Business Leaders: “Developing Anti-Corruption Guidelines for Curriculum Change” implemented by UN Global Compact PRM) one of twelve facilities around the world participating in the pilot project of implementation of Responsible Management Education (PRME) in higher education. The result of this project was, among other things, development and implementation, according to the “Toolkit”, at the Faculty of Organisation and Management of the Silesian University of Technology, of the monographic lecture entitled “The essence of and preventing corruption in an organisation”. The university is engaged in and conducts research works connected with sustainable development, CSR, anti-corruption practices. Within this scope it also conducts activities for the purpose of partnership and dialogue with stakeholders, it organises conferences, publishes articles, textbooks, books. The Silesian University of Technology is also the founder of the Association “Śląskie Centrum Etyki Biznesu i Zrównoważonego Rozwoju” (Silesian Centre of Business Ethics

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and Sustainable Development” established in 2014 from the initiative of the staff of the Faculty of Organisation and Management. The idea to establish the Association is connected with the global postulate of ethical consideration in the business activity as well as the conviction that it is possible to combine economic objectives and ethical standards. The main objectives of the statutory activity of the Association is: creation of ethical business by means of integration and support of business environments, interdisciplinary scientific and ethical advising, support for enterprises in development of organisational culture based on ethical values, development and popularisation of notions of sustainable development and corporate social responsibility, advising within the scope of implementation of the assumptions of standard ISO 26 000, support in development of CSR strategies, development of applied ethics, promotion of principles of rational and sustainable management based on the modern management methods as well as use of environmentally friendly technologies, cooperation with governmental and self-governmental administration bodies for the purpose of promotion and support of ethical business and sustainable development (<http://www.polsl.pl/Wydzialy/ROZ>). The Silesian University of Technology is also one of the Polish universities with implemented anti-plagiarism system.

There is an increasing number of universities in Poland that join the actions aiming at anti-corruption education and ethics, addressed to the current and future managers responsible for development and implementation of ethical principles of conduct in business.

Conclusions

Activities preventing corruptive practices in organisations must be undertaken in several dimensions, including, but not limited to, establishment of appropriate legal and institutional standards and solutions, controls, detection of corruption and penalising as well as through education of the society. In recent years one can notice multiple anti-corruption undertakings in each of these dimensions implemented by various organisations, national and self-governmental institutions, non-governmental organisations, media, universities. The issue of corruption is dealt with by multiple international organisations on a global scale. This is specifically shown by the initiatives of the United Nations presented in the article.

Information technologies and social media should be perceived as means improving anti-corruption activities and treated as an element of

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implementation of broader programmes, anti-corruption campaigns, taking into account long-term activities. They should be used mostly for the purpose of increasing responsibility of the managers, reduction of possibilities of corruptive practices, ensuring transparency of activities, facilitation and communication and social consultations, increasing access to information and facilitation of control and supervision.

One must, however, remember about certain hazards entailed by the new technologies that can, simultaneously, create new corruption possibilities. The use of modern information technologies should be integrated with deeper changes in the manner of functioning of the organisation, implemented systems and processes as well as increase of trust, ethical practices in organisations, implementation, for instance, of principles of social responsibility.

A significant role within the scope of anti-corruption education can be fulfilled by the universities that should adjust their education programmes to the changing requirements of the business environment, applying effective methods of communication by means of modern Internet and IT tools.

The preliminary research results presented in the article inspire to supplementation and improvement of the current state of knowledge. Further studies could contribute to development and implementation of these methods and techniques, in particular in the anti-corruption education programmes.

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Asymmetry of the Information and the Knowledge Between Owners and Workers in Large Family Companies, as the Determinant of their Success

JEL Classification: *G34*

Keywords: *information; knowledge; asymmetry of information; asymmetry of knowledge; large family companies*

Abstract: In the majority economic areas of the world, family businesses are the overwhelming majority, it is certain in the case of small and medium-sized businesses. Large family companies – in opposition to common opinion – are not the economy margin. It is other way round, they are not directly identifiable as a family companies. Family companies often reached global success in just decades.

Introduction

The theory is, and it is probably true, that for the question, who and what is at fault for this state of affairs? We want to answer on Camus's ground outlined in the "Stranger of Camus", recalling the Mejsbaum's set-

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tlement in Amor Fati (Mejbaum, 1983), that the first cause, without giving the excuse, is IT/ICT¹.

The technology development of processing information and the transfer of information is a main factor in the changes taking place in the area of management and in the area of social transformation. Like the unlimited exchange of information and, as Giddens wants, Einstein's shorten the time and space in communication between individuals and organizations post changes the traditional order of things. An influence of current resulting reports from the legislated order, the tradition, biographical order of the individual and the organization is deteriorating, and a dialectical cooperation of global, regional and local is developing (Giddens, 2002). This is what the modern world restricted freedom, development (such as individuals and organizations), it was restricted, limited access to information². Post modern "significance" is separated from "significant" (Bauman, 2000). Following Kuhn's concept of paradigm, and diverge from development of knowledge within the distinguish areas for exploration of interdisciplinary solutions (Morgan, 2001). We are changing the current methodology of research, we are moving away from the typical pattern: subject – object recognition, in favour of subjective assessments, without preliminary assumptions to his current situation, where is verbalization enhanced by image, sound, and other benefits associated with the research topic.

Changes, that occur in the area of social phenomena, known as post-modernism³, do not occur regardless of the changes occurring in the economy, known as post-industrialism. Beck and Giddens consider that in the post-industrial era, and the postmodern perspective vagueness, opaqueness, smoothness, chaos, high degree of risk are the inward features of late modernity. Alteration, temporariness are natural states in the area of the identi-

¹ A breakthrough which caused and causes changes in the sphere of the management (of course without excluding others) is the Internet. Start of the Internet began from generating data movement by only four applications: electronic mail (e-mail), letters, newsgroups, FTP – File Transfer Protocol. The Internet has become an important factor of changes in the conditions of competition, the boundary conditions for market entry.

² Means of communication, exchange of information allow the transmission of information, regardless of its material original carrier: image, photo, sound, text, newspapers, books; information transfer take place almost immediately, without the need to indicate the path which crossed over the network; The Internet has caused the elimination of concepts: time travel information, information transfer, distance; in the context of communication, reduce in terms of time and space, even more reduce section of space-time almost to zero.

³ Bauman defines it as the era of postmodern or post-modernity, Giddens as the late modernity.

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ty of the individual and the organization (Bauman, 2000). Globalization, which previously identified expanding markets, moving production to lower cost, unlike local economies will no longer be a significant parameter that specifies the behavior of the future organization, because there are no boundaries, no barriers to entry, no space and time restrictions specifies the ubiquity of the organization, as a natural condition.

In the era of modernist (post-industrial), where we have unlimited access to information, we can not see the difference between the surroundings near and far, and the global surroundings. In the decision-making process, in the assessment of odds and risks, we are taking into consideration those areas of surroundings that correlate with the objectives of the individual and the organization; in the process to formulate development strategies.

A separate problem is that information (knowledge) became itself a commodity and with negative phenomena of exploitation administrative rules, an outlier for to the changing socio-economic conditions, to the appropriation of ideas, patents, inventions, marks and everything what possible, with purpose not always of honest market transition⁴.

How is an asymmetry of information and knowledge, affect the behavior of the individual within the organization? The uncertainty is no longer momentary regret, a condition that you can mitigate or even removed, best captures the problem, statement of Peter Drucker: *we have just one of these important historical periods, occur every two or three hundred years, when people no longer understand the world, and the past is not enough to explain the future* (Cameron, 2003, s. 11). Perceived the end of order, end of sequence "established once and for all", it causes only nervousness, which as says Baudrillard, this differs from the old fears, which brings usually hectic action, revolt, that is dispersed, not-focused, without certain starting points, with "non specific" ailments (Bauman, 2000, s. 44), finding escape not in a reflection on the rationalization of possible choices, not in the optimal choice for the future, but in pragmatic choice, which refer to self-interest of unit or organization in the near future and without pretensions to distance future.

⁴ Lyotard, in relation to departure from the two meta-story of the emancipation of humanity through knowledge and progress, as science has become valid, indicates a change of state of knowledge, when societies enter a new era: postmodern (culturally) and postindustrial (economically). Non-validate meta-stories deprive knowledge status of the objective in itself. Knowledge ceases to be owned by narrow sectors of society, it becomes a consumable good, product and the main tool of global competition.

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You would think that from the point of view of the unit (organization), a new, unpredictable – chaotic in the long time horizon – postmodern reality defies any rational description. You would think that postmodern "Brown's cocktail"⁵ composed of units (organizations), is not working according to specific rules and only potentially undergo statistical description.

How in this "cocktail" are companies functioning? How in this "cocktail" are family companies functioning?! In the majority economic areas of the world, family businesses are the overwhelming majority, it is certain in the case of small and medium-sized businesses. How does the situation look in the case of large family companies? It should be noted that large family companies - in opposition to common opinion – are not the economy margin. It is other way round, they are not directly identifiable as a family companies. This state of affairs, result among others from the fact of the status of these firms as listed companies, suggesting the dispersion of capital. Out of a few hundred largest companies listed on the Paris stock exchange more than 60% has the family advantage (controlling interests)⁶. Similarly, above 50 % companies listed on the stock market in Frankfurt. Even bigger percentage of large family companies (the overwhelming majority) is listed on the stock exchanges in Tokyo, Beijing, Hong Kong and Seoul.

Family companies often reached global success in just decades. Large (of course small and average also) family companies in the majority are not subject to a scheme of the duration: initial stage, growth stage, maturity stage and stage of death, they have a temporal dimension multigenerational. Management boards of non-family companies (shareholders) generally have a short planning perspective, limited to the term of office⁷. With this, limited to term of office (of potential next choice) prospect, short-term goals are a priority. A family company sets goals often generational, where long-term option of profit is preferred to the success refer to one term of office⁸.

⁵ The reference to Brown's movement is not accidental. Brown's movement, it is chaotic movements of particles (molecules), particles dispersion phase -suspension in liquid or gas, caused by collisions with molecules in dispersion phase, performing continuous inert thermal movements. Brown's movement are intensified, when the viscosity of the liquid particle size of a suspension is smaller, and the and the temperature is higher.

⁶ Among the largest in the world include Ikea, Porsche, BMW, Carrefour, Michelin, Auchan, Aldi, Dr Oetker.

⁷ Similarly, as parliamentary democracies.

⁸ The family companies have been coping best during crises.

Types of family companies

Chaebol (<http://en.wikipedia.org/wiki/Chaebol>), there is a large firm or a conglomeration, concentrating companies with different profile of activity. The most important feature of Korean corporations, including those that form the brand known all over the world, there is their family character. However, they should not be equated with typical family companies for example on the European continent. Chaebols are for example Samsung⁹, Hyundai and LG. These conglomerates are giving an employment to hundreds of thousands of people worldwide; most of them are not connected with family of company founder with blood ties. What is the uniqueness of these family companies? One of its features is a specific management structure. Regardless of whether chaebol is one large corporation, or whether it is a conglomerate of companies operating under the same name, each of them is owned or is controlled or managed by at least one family. Most often this is the same family, which in the 1950s in the last century it was taken over by one of the Japanese companies. It should be noted that in Korean culture, the family means exclusively people bound with blood bonds, relatives (in other Asian cultures, the concept of a family member can be extended to those adopted). Another important feature of chaebols is a way of understanding the issue of ownership: owner of the concern has usually only shares in the three or four largest companies. However, thanks to family relations (e.g. through the creation of management subordinate companies with close family members) they can take control of another

⁹ Samsung achieves annual revenues that exceed the GDP of many countries. In 2006 he was 35th place of the largest economies in the world (characteristic that chaebol which is not a country, after all is there between them – this indicates the properties of the organism's perceived economic, apparently on a par with structures of the country, as a separate and independently functioning entity). Samsung strongly affect their surroundings, not only on economic development and policy, but also on the media and the culture of South Korea. Meanwhile, their beginnings were modest: in 1938, Lee Byung-chull founded in Daegu trading company with 40 employees. The company changed several times their profile (in the direction of the food industry, and then the textile industry) and location (moving to Seoul and returning to Daegu). Lee whilst expending the company put pressure for industrialization, which he based on Korean companies-conglomerates. He created with them long-term ties by protecting them from competition and financial support, he was using the same procedures which later applied the Korean Government to all chaebols (the protectorate seems to be a universal economic mechanism of South Korea). As a result, Samsung, from small business has grown into a network of 83 companies, currently producing among others, mobile phones, LCD monitors, medical devices, biotechnology drugs and batteries for electric cars.

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concern, which then supervise subordinate companies. The third feature concerns is the nature of depending companies: chaebols often create them in order to ensure the production of components for export. Therefore, both the management level and economic characteristic for chaebols is centralisation.

The specificity of concerns is also based on creating not only internal, but also external networks of connections and the relations. Strengthening the social and economic position in the chaebols range and between them, and between chaebols and groups which exercise power often takes place through marriage. Around the relationship between the families forming the Korean elite has accumulated a lot of myths. To be the most enduring belief of exceptional unity of this social group, which is helping her build a strong position so that it would be able to even put the interests of country. Part of this myth is the belief in the inevitable antagonisms between the archaic structure of chaebols and created by them networks, and desire of Korea to liberalise the economy and the need to conduct reforms. Chaebols do not represent a single business model, although all are based on the same structure and they came into existence in similar conditions. Also, you cannot refer to them as it is in Western culture, as examples of clusters. They should not be seen as isolation from their historical and civilization roots. The clusters are based on the voluntary cooperation of independent companies with a similar profile, and chaebols is the result of a strong identification with the family unit, family with the company and the company with country. Chaebols do not allow adoption people from outside the family.

Zaibatsu (<http://en.wikipedia.org/wiki/Zaibatsu>), it is a Japanese family cartel financially – industrial. This expression was used in the 19th century and the first half of the 20th century with reference to large banking – industrial groups controlled by single families. Four largest zaibatsu were even from the Edo period. These were: Mitsubishi, Mitsui, Sumitomo and Yasuda. Zaibatsu play an important role on the Japanese political scene, having a major impact on political parties and the Government. It is understood that the Zaibatsu were liquidated during the American occupation. However, total liquidation of zaibatsu was never carried out, it resulted among others from fear of the communism; Asano, Furukawa, Nakajima, Nissan, Nomura and Okura, Matsushita, Mitsubishi stayed. It is understood that the heir to the zaibatsu became keiretsu. In Japan, there have not been fundamental changes associated with large corporations. Despite the formal connections, horizontal associations of the type keiretsu, farther vertical

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structures of managing exist in the shadow, at the head of which is family, characteristic for zaibatsu.

Chinese family companies are characterized by a vertical model of decision making. Their specificity lies somewhere between chaebol and keiretsu. The companies have generation character, however they aren't creating one conglomeration. They aren't competing with themselves.

The big mafias to be treated as family conglomerates, the more, that profits of the black economy in the majority of countries are counted in the GDP. The structure of the decision are similar to the structure between the chaebol and the zaibatsu with very hierarchical with structure of making decisions. They are working, as the conglomerate with the difference that the revenue from one area of black economy, are being invested in a second legal area. These large mafia conglomerations have a family character, with this difference that there are adopted outstanding and well-deserved individuals to the family. You can specify the following conglomerates mafia:

1. Serbian mafia. Deals with drug trafficking to the west, gambling, theft, armed robbery and killings to the order. The activities of gangsters go far beyond the boundaries of the country. You can meet them in Germany, France and the United Kingdom. Close cooperation – by rejecting historical conflicts – keep with Albania. Mafia members are recruiting together gasterbeiters (foreign workers) to Germany. They are taking the racket in addition into their pocket. In the ranks of this criminal organization have three main subgroups: Vozdovac, Surcin and Zeman. They are controlling and monitoring of smaller groups. Currently are about 40 of them. The most profitable activity for Mafia is drug smuggling through the Balkans from Latin America to Europe.

2. Mara Salvatrucha - MS 13. Los Angeles has more than 1,350 gangs. This, however, is the cruelest. Experts are reporting that Mara Salvatrucha is most quickly spreading gang of criminals which continues to grow in strength. They derive profits from drug trafficking, prostitution and rackets. Characteristic of gangsters with Mara Salvatrucha are tattoos. With their colourful bodies can be seen all resumes. On their heads they paint the Devil's horns, swastikas, daggers and vulgarisms - signs MS 13. On the back are symbols showing the specialization, for example the grenade refers to the technique of the underlay of the explosives.

3. Solntsevskaya Bratva, also known as the Solntsevskaya Brotherhood, it is the largest and the most dangerous criminal organisation throughout Eurasia. The name comes from the South-western suburbs of Moscow. The group was founded in 1980. On her head was Vyacheslav Ivankov, nick-

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named the Japanese previously successful wrestler, Sergei Mikhailov, also a former wrestler and Semyon Mogilevich, recidivist and the black-market money changer. In addition, its ranks with former KGB officers, and personnel from the main Intelligence Board. Mafia works according to the schema spy grid. Their residents are in 50 countries around the world.

4. Albanian mafia spent its Renaissance at the beginning of the eighties of the 20th century. They got even a nickname of Colombia of Europe or "Kosowo Nostra". It was presented as most efficient criminal organization on the continent. Its structure quickly progressed. It is estimated that the Albanian gangs count hundreds of gangsters. Their members are ruthless and vindictive. Do not tolerate desertions and they are having no scruples.

5. Yardies, the group was founded in the fifties of the last century. Is made up primarily of incoming immigrants from Jamaica to Great Britain. Most of them after arriving on the island could not find work. To survive, instead of legal work, they are started doing thefts and robbery. They constantly fight other groups. There are, however, not so highly organized. They aren't starting negotiating with the guardians of public order, and their influences don't reach government spheres.

6. Sicilian Cosa Nostra also known as The Mafia. Beginning of the Italian mafia started in the second half of the 19th century. Part of the structure was moved to America. Italian Palermo remaining till today, as the heart of the famous Sicilian Mafia. Currently brings together 80 families, from whom each controls the designated district. Gangsters penetrate primarily to social life, but also political. Depend on drug trafficking and extortion collection, mainly shop owners and entrepreneurs. In the Mafia is immutable law of over 50 years. The pattern of mafioso is dictating by ten commandments, which contains for example the prohibition against going to taverns and clubs, the fraternization with policemen or looking around for wives of friends. The guiding principle is, however, true devotion to the mafia. The clan of the American Cosa Nostra is about 24 families, operating in different cities. Today the Sicilian mafia has been running around the world, mostly in Colombia, Bolivia, Russia, USA and Italy. In this regard, is considered the largest of this type criminal organization.

7. The Calabrian N'drangheta is being called the most powerful mafia of Italy. Long time ago they outshone the famous Sicilian Mafia. Now it is gangsters of Calabria a public enemy for Carabinieri. Its tentacles spread to Canada, Australia and South America. The members of the group are more or less related. Often arrange marriage between themselves to strengthen ties and not to introduce new people to the clans.

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8. Mexican - La Eme, is the oldest and largest Mexican prison gang in the United States. The mafia members are prisoners of Mexican origin living in the eastern part of Los Angeles. The Group was formed in the 1950s. it features racist anti-black views.

9. Colombian drug cartels. The famous cartels are organising the production and smuggling of white powder. They are doing everything to control the market and ensure safe transport. Smugglers armed up to teeth are transporting the clean drug by aeroplanes and boats to the hundred of ton to the USA and Europe.

10. Chinese Triads Chinese Triads formed as an underground organization in the 17th century, for the purpose of debunking the Manchu Dynasty. In the 19th century, the lofty goals of the organization were taken to the side, and the group began criminal activity. The hallmark of the Chinese mafia is a dragon tattooed on the body. It's a sign of understanding, wisdom and strength. Today it is estimated that in China operates from a few hundred to more than 5,000 Triad groups, each of which can count up to 40 thousand of members. The largest group of international importance is Shin-hai, which brings together more than 10 thousand people and is very active in Taiwan. According to estimates by the Chinese police, every year in the country legalizes 200 billion yuan, accounting for 2% of GDP.

11. Japanese Yakuza its roots date back to 1600 when samurai terrorised small villages. Local vendors and merchants connected in groups and fought the enemy attacks. Later became a refuge for any poor people, repeat offenders and other life freaks can feel invited. The group began to grow in strength at the beginning of the 20th century. Then they went down to the underworld. They began to put pressure on listed companies, forcing them to pay extortion in exchange for ensuring quiet operation of companies. Currently in Japan are three large subgroup of the mafia. Sumiyoshi-rengo of Osaka, concentrating about 6 thousand of members, Inagawa-kai has its head office in Tokyo and Yokohama, and it has more than 5 thousand people and the Yamaguchi-gumi, which has 20 thousand members and works in Kobe and Osaka. In addition, 18 different groups are still acting and concentrating about 90 thousand of half-members, waiting for recruitment to the ranks of the mafia. Members of Yakuza have distinctive tattoos all over the body. For trademarks they chose animals whose images are tattooing for themselves on the back.

Typical family companies are European, South-, Middle-, North American and family companies of former colonies in Africa, East Asia, South-East and part of South Asia, and Australia with New Zealand.

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Not typical family companies. To this group belong companies, which are investment funds, which at the very top of the pyramid are shareholders of the family. The ownership structure is hierarchical. The owner of the fund are other funds, which are owned by the next other funds, etc. At the end of this chain is specific family. An example of such a group of funds with one group of families who are the owners of these funds, there are four investment firms from the United States¹⁰, representing in their hands several dozen of percent of the most important assets in the world¹¹:

1. State Street Corporation is an American Financial Corporation based in Boston, one of the world's largest providers of financial services for institutional investors with assets exceeding 15 trillion dollars.

2. The Vanguard Group is an American company operating in the investment management industry, responsible for the assets of 1.6 trillion dollars.

3. BlackRock is one of the world's leaders in the field of asset management. Under his keeping has assets with a total value of more than one trillion dollars.

4. FMR LLC (Fidelity Investments) is one of the largest trust funds and one of the largest financial groups in the world. Under his keeping have the assets to pay for a total of one trillion dollars.

¹⁰ The representatives of these funds sit in FR (Federal Reserve) and have an absolute majority of the votes.

¹¹ State Street Corporation, Vanguard Group, BlackRock and FMR LLC (Fidelity Investments) are among the 10 shareholders holding 100% of the shares in some of the largest companies in the u.s.: JP Morgan, Wells Fargo, Bank of America, Citigroup, Goldman Sachs, U.S. Bancorp, Bank of New York Mellon, Morgan Stanley. The Federal Reserve, consisting of twelve banks, is represented by a large seven-man board, where there are representatives of each of the four companies, as well as being present, as shareholders in all other firms. To the companies controlled by these four companies include: American International Group, AT&T, Boeing, Coca-Cola, Exxon Mobil, General Electric, General Motors, Hewlett-Packard, Intel, International Business Machines, Johnson Johnson &, McDonald 's, Microsoft, Pfizer, Procter Gamble &, Verizon Communications, Wal-Mart Stores, Time Warner, Walt Disney, CBS, or NBC. For example: State Street serve about 40% of investment funds in the United States and 37% of the pension funds. In Japan, its share of the fund market is about 30%, while in Germany, Canada and Britain about 20% (Morgan, 2001).

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Crisis Diagnosis in Anti-Crisis Management Process in a Company

JEL Classification: *M10*

Keywords: *crisis; diagnosis; anti-crisis management process*

Abstract: Crisis concept links up to its appearance area. Some different kinds and levels of crises have been found: we face with global, mainly nature cataclysm crises, state economic crises, corporate crises and individual or psychological crises. The research area of this paper is micro level, i.e. corporate crises or crisis in a company. However, it is emphasized that company is a sociotechnical system, performing in a complex environment, therefore crisis in a company is closely related to global and state crises, e.g. economic crises, which often cause the corporate crises, and to individual crises what can appear as crisis reason as well as crisis consequence.

The relevance of the crisis situation diagnosis is confirmed by the diagnosis decisions designed and applied in the business practice, audit reports, bank assessment methods and company's own concernment. The aim of the research is to define crisis development stages and possible preventive means and to design the crisis diagnosis system in the anti-crisis management process in a company.

The paper deals with four stages of crisis development: prodromal crisis (CP), acute crisis (CA), and chronic crisis (CC). Crisis resolution (CR) is the final goal of any crisis management. When crisis is overcome, its performance stabilizes and a company starts to grow. Therefore the main point in company's management process is to notice barrier when company's performance starts going down in order to foresee the result which can cause crisis situation in a company.

Introduction

Crisis concept links up to its appearance area. We face with global, mainly nature cataclysm crises, state economic crises, corporate crises and individual or psychological crises. The research area of this paper is micro-level, i.e. corporate crises or crisis in a company. However, it is emphasized that company is a sociotechnical system, performing in a complex environment, therefore crisis in a company is closely related to global and state crises, e.g. economic crises, which often cause the corporate crises, and to individual crises what can appear as crisis reason as well as crisis consequence.

Crisis is often considered as a negative phenomenon (Rosenblatt, 1989), however it is noticed that there is a strong link between crisis and changes, which reflects a positive crisis impulse for successful company's development. Solutions of crisis situation mostly depend on the efficiency of crisis diagnosis mechanism. *In this context the crisis diagnosis conceptualisation problem and analysis of this phenomenon highly remains topical in social, economic as well as management aspect.*

The relevance of the crisis situation diagnosis is confirmed by the diagnosis decisions designed and applied in the business practice, audit reports, bank assessment methods and company's own concernment. In order to prevent, anticipate, and respond to crises quickly once they occur, anti-crisis management is necessary (Starosta, 2014). However, if it is impossible to prevent a crisis, then it is necessary to apply appropriate measures in order to minimize its negative effects. The aim of the research is to define crisis development stages and possible preventive means and to design the crisis diagnosis system in the anti-crisis management process in a company.

Methodology of the research

Theoretical analysis: selection and discussion of theoretical material and descriptive material.

Crisis Prevention in Different Crisis Development Stages

There are some different interpretations about diagnosis in the scientific literature. It is revelation of nature and causes of a particular phenomenon (Darling, Kash, 1998); identification of some features (Oxford Dictionary, 2015); identification of some signals (Gouillart, Kelle, 1995); problem

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identification (Darling, Kash, 1998); identification of the symptoms, which determine the problem (Smith, 1995), etc.

It is seldom happens that the same symptoms appear in some companies. Therefore it is claimed that crisis diagnosis is a complex process, which defines some different symptoms which determine difficulties in the company performance. Crisis diagnosis process helps assess the company state and determine factors influencing on it.

In this work crisis diagnosis is the application of some different, usually financial, means to evaluate the state of a company and to notice the features of a crisis. Crisis diagnosis is very important because it enables to evaluate the real state of a company and to make decisions for further company performance.

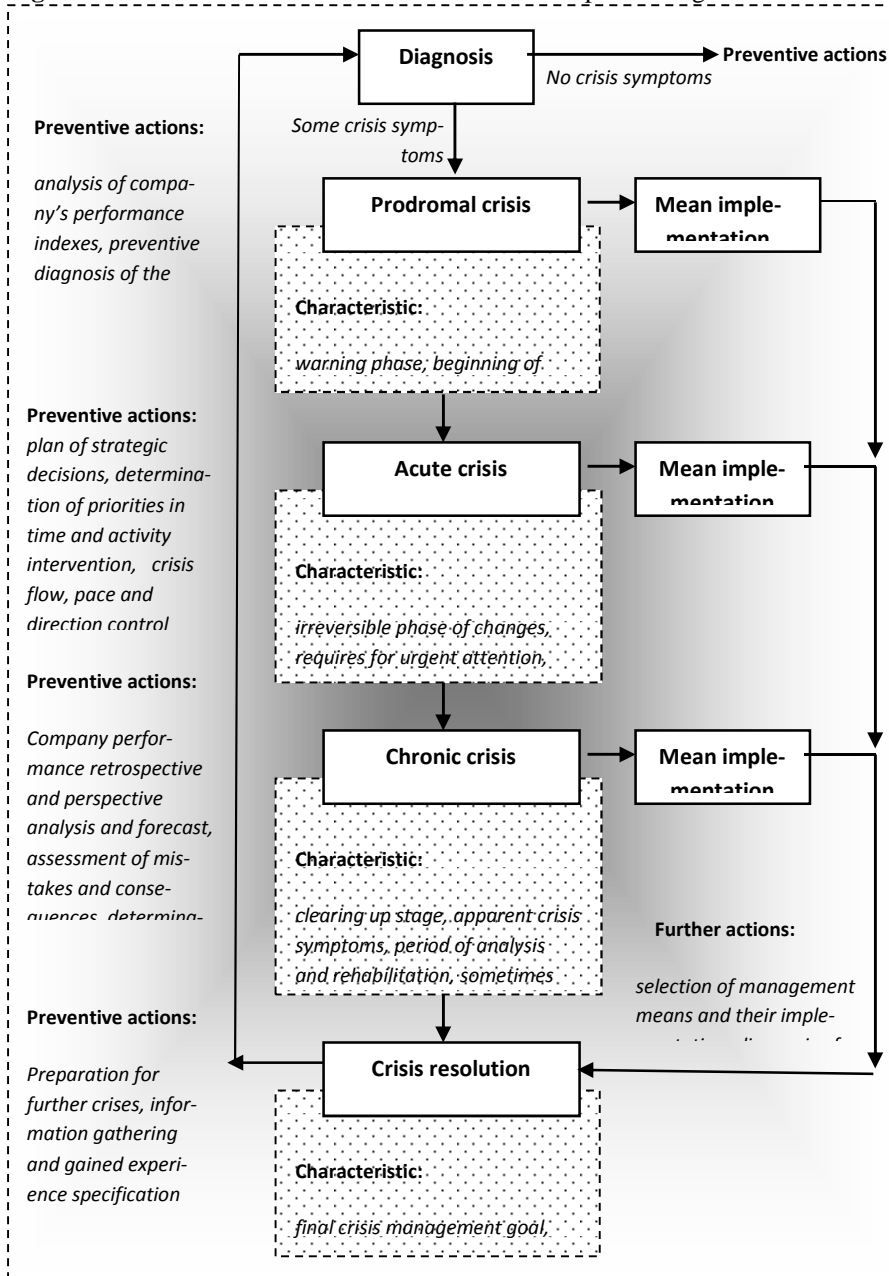
Crisis diagnosis appeared as the researcher goal and research object since 1932, when FitzPatrick (Murphy, 2006) analysed and compared 20 going companies with 20 failed ones. He published the research results in the journal *The Certified Public Accountant*. He did not carry out the statistical analysis, but he analysed financial rates and their changes. This interpretation was the first ever published complex rate analysis.

To do crisis diagnosis and to prevent company from a critical development it is very important to define the causes of a crisis as well as the stage of crisis development, which will help choose anti-crisis means for situation stabilization.

Offer (1996), Mitroff (1996), MacKenzie (1994), Fink (2002), Paraskev (2006) define four stages of crisis development: prodromal crisis (C_p), acute crisis (C_A), and chronic crisis (C_C) (see Figure1). Crisis resolution (C_R) is the final goal of any crisis management. When crisis is overcome, its performance stabilizes and a company starts to grow.

Prodromal crisis (C_p) stage is related to the preventive phase. In business some warning signals are always flashing. It does not matter what kind of organization, profitable or not, there are many factors what can touch business if the necessary means were not applied in time. In prodromal crisis phase the threat appearance and bankruptcy possibility is not very high, because having made a preventative rate diagnosis of the company performance it is possible to notice and to recognize the first crisis signals and to prepare the action plan to prevent it.

Figure 1. Crisis Prevention in Different Crisis Development Stages



Source: Offer, 1996; Mitroff, 1996; MacKenzie, 1994; Fink, 2002, Paraskev, 2006

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Therefore in this stage it is relevant to perform crisis situation diagnosis. If the right moment is missed and situation is not assessed properly, crisis can struck a company and its performance and management cannot avoid big loses.

The other crisis stage is acute crisis (C_A). Having diagnosed crisis situation in a company and having determined the symptoms of the acute crisis the urgent attention is needed. In this stage it is impossible to recover all loss. The loss size depends on the opportunity to manage it. This crisis stage can destroy the whole company's structure. If in a prodromal crisis stage a crisis can be noticed out, so in the acute crisis stage it can break out suddenly. Therefore it is relevant to apply diagnosis actions and notice the first crisis signals in the prodromal crisis stage yet, before it turns into acute crisis (Darling et al., 1996).

In the acute crisis stage the management actions can only control the loss. Suitable reaction and strictly planned actions allow mitigate its effects and avoid bankruptcy. Appropriate action intervention creates preconditions for preparation and allows controlling the flow of the crisis, speed, direction and its duration. In this stage it is necessary to control the crisis in so far as conditions allow. If this is not possible, it is possible to reduce the impact of the crisis by providing intervention time, setting out the priorities for actions on the effects of certain objects.

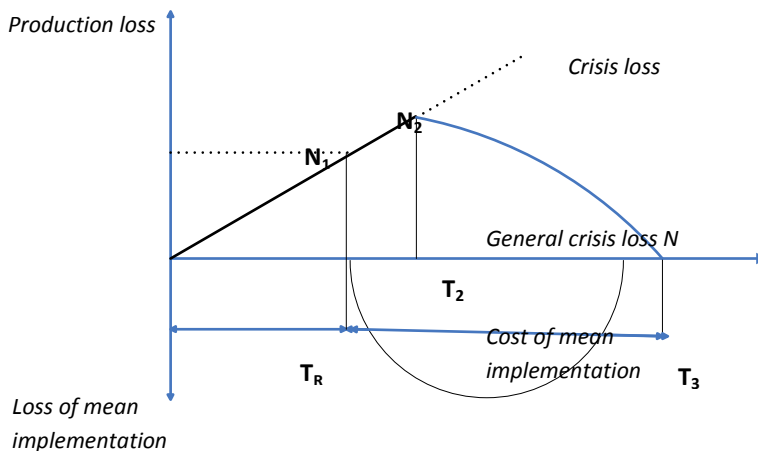
The fundamental difficulty in controlling an acute crisis, even ready for it, the latter is the speed and intensity, which occurs precisely at this stage. Speed depends on the type of crisis, and the intensity is determined by its possible result. If it is possible to provide the speed and intensity of the crisis in the prodromal crisis stage, the better conditions can be created to prepare for crisis management and control, when it reaches the stage of the apparent dynamics. Length of time in terms of acute crisis often takes the least time, but its effects are felt the most.

The third crisis stage – is chronic crisis (C_C). If the company has not carried out a detailed investigation and crisis diagnosis, delayed negative phenomenon becomes ingrained in the company and can have the inevitable end of company's performance. Effective crisis management, diagnostic measures, and competent leaders with due solutions help the company survive, although the losses are inevitable. This period is important for emergency preparedness for future analysis of failures, decision making and so on. It can also be a financial coup time, company management turmoil, company merger or bankruptcy of time. Longstanding crisis phase can take unlimited time, and it can reduce the company's solution fit. For some

companies this could be the beginning of a recovery, the other - the collapse.

Crisis resolution (C_R) is the final goal of crisis management. When a company faces a crisis, its management plan must be drawn up based on the best estimates of the decision scenario. At this stage, the best performance of resolution scenario is designed in the estimated trajectory. Once the crisis is overcome, the company growth starts, its activity stabilizes and planned results can be achieved.

Figure 2. Model of Crisis Loss



Source: made in reference with Ansof, 1989.

In Figure 2 see the importance of the crisis diagnosis. If the crisis phase is clarified in the prodromal crisis stage the potential loss is smaller. If the crisis is clarified later, then it becomes ingrained and its resolution requires substantial cost increase (see Figure 2).

In order to secure successful and permanent company's activity, it is important to rationally value its financial condition constantly. Scientists tried to find integral method, which credibly allows predicting companies financial problems in time. Applying bankruptcy prediction models is one of the most simple as well as accurate ways for predicting bankruptcy of enterprises. With the help of these models, the threat of bankruptcy could be noticed several years before bankruptcy actually starts. In this paper

after the analysis of bankruptcy prediction importance and bankruptcy dynamics in Lithuania, bankruptcy prediction models commonly used in scientific literature are given in a systematic way. If all suggested methodologies are analysed, every enterprise can find the most appropriate methodology to value the stability of its activity (Rugenytė, Dagilienė, Menciūnienė, 2010).

Crisis situation causes loss N . The earlier crisis is clarified and the best measures are taken to eliminate it, the lower the total loss of the crisis is and lower disposal costs are. Furthermore, the failure process can be very different from one company to another, i.e. different sequences of failure factors are possible. Based on the findings, owners of a company can have a clearer view of time dimension inherent in corporate failure and the impact of their own actions on bankruptcy (Burkšaitienė, Mažintienė, 2011).

Crisis Diagnosis System in Anti-Crisis Management Process in a Company

The anti-crisis management essence is highlighted: the means to avoid crisis have to be accepted until entering into the crisis „bottom“. When dropping trend arises, it is necessary to adjust strategy, evaluating that soon critical events will appear. The financial resources must be used to cover losses, which arise from critical situation in order to avoid bankruptcy.

Anti-crisis management is a system that includes the application of methods diagnosing enterprise bankruptcy threat and the implementation of measures overcoming the crisis (Garškaitė-Milvydienė, 2014). Anti-crisis management success depends not from that, how authority is prepared. The aim should be that the crisis would not last very long and the most importantly, it would not reach the high amplitude. A particular threat in the company performance has deep crises, after which lack of resources to reach the pre-crisis level. Therefore diagnosing a crisis is essential to identify its level of depth, what will lead to further decisions in selecting means and resources on crisis liquidation and restoring the company performance or starting the bankruptcy process or event liquidation (Sakalas, Virbickaitė, 2011).

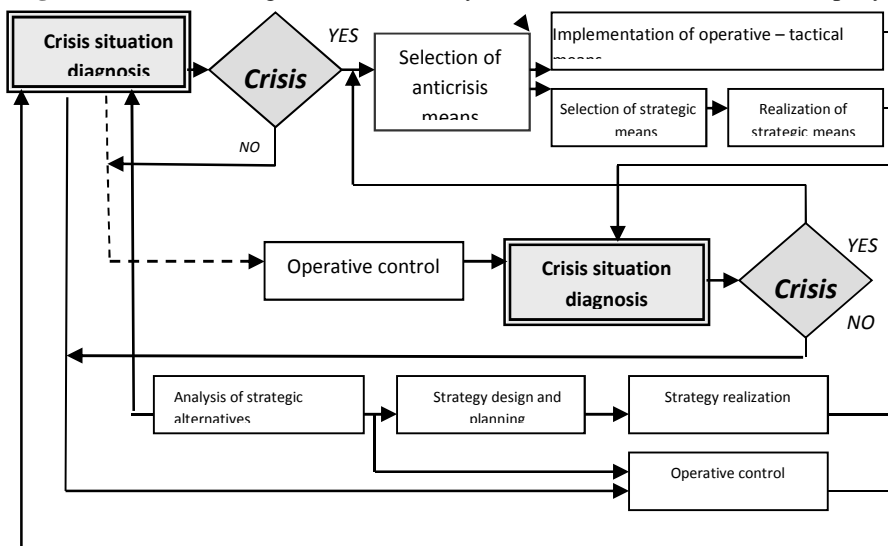
Having analysed the crisis characteristics it can be claimed that crisis situation observation model is necessary to apply in any company. Crisis diagnosis can help foresee what strategy to apply: defensive or offensive. So three main requirements are indicated in the diagnosis system:

- novelty of the crisis phenomenon recognition;

- reliability of the results;
- diagnosing process continuity.

The anti-crisis management scheme including the diagnosis system is shown in Figure 3.

Figure 3. Model of Diagnosis Watchout System of Crisis Situation in a Company



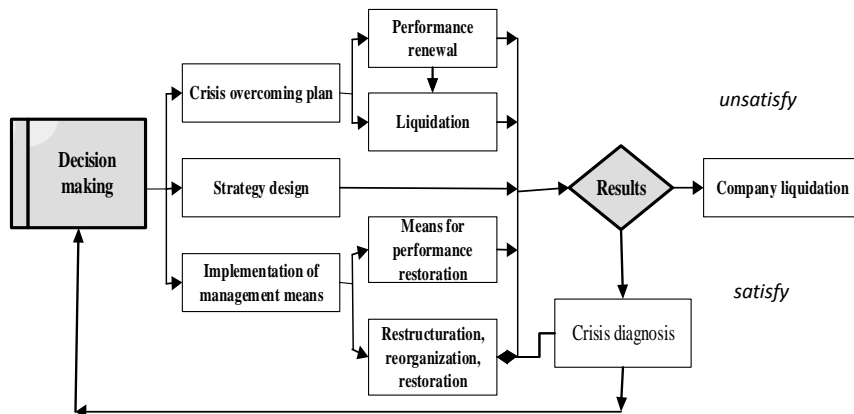
Source: Fomin (2003).

Having determined a crisis in a company, the main reasons must be defined what caused it, then crisis stage and crisis complexity must be assessed. Having formed a plan to overcome crisis and decided to renew or liquidate the performance of a company, a new strategy development begins with the selection of the management means and their implementation in a company's performance (see Figure 4).

Mistakes and issues arising from the analysis of the situation within the company (if they are not noticed in time) intertwined with the mistakes in assessing future environmental conditions and human behaviour. Any organization must be able to capture and correct their mistakes in time to the moment when they begin to undermine to reach the organization goals. In other words, the situation is determined by the choice of the appropriate strategy selection. In accordance with the above mentioned authors theory (Ansof 1989; Fomin, 2003), it can be said that the company management may recognize a wide variety of methods, but specific company manage-

ment methods in the competitive fight can strongly vary, and the differences appear in the particular circumstances, at some point in time.

Figure 4. Crisis Overcoming Programme



Source: own work.

If the signs of a crisis situation are noticed, the company must take certain actions and steps to stop it and restore the company's activities. In the scientific literature (Kovalev, Patrov, 2007; Mackevičius, 2005; Kurosheva, 2002) two groups of measures are found: operational and strategic. Operational measures are applied to eliminate the deviations from planned and reached level, i.e. to remove the negative changes in the company's activity (Lalonde, 2004; Milesi-ferrites, Razin, 1998; Practice in Tamošiūnas, 2003). Strategic measures include staff training, competitive market research, demand and supply analysis (Peters, 1995), the provision of resources, introduction of new technologies (Perrow, 2003), the country's economic situation in the study (Perrow, 2003) and others.

Four types of the company failure process are observed: fundamentals of failure, detecting failure, exit of failing company and bankruptcy or recovery. Between these four types of company failure process, there exist major distinctions in terms of the presence and the importance of specific causes of bankruptcy, i.e. incorrect steps made by management, incorrect steps in the corporate policy and the importance of external factors. The interest for the analysis and for the understanding of business failure can notably be explained by the fact that a large number of stakeholders are concerned with the firm's activity and with its evolution over time (Burkšaitienė, D.; Mažintienė, A. 2011).

Conclusions

Having generalized the analysis of company's management capabilities in a crisis situation, it can be said that the system of crisis diagnosis in a company is the company's management information system in decision-making process, as it decides the company's internal investigation of the state task employing many indicators, facilitating the work of the head analysing a large amounts of information and when deciding on further action plan. This confirms that the head of a company has to get the necessary and reliable information on the crisis situation in the enterprise, the depth of the crisis in time. It is therefore essential for the management of the company to capture threshold, which is responsible for a certain combination of company performance, in terms of joint unfavourable outcome, and that the crisis will determine crisis situation in a company.

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**The Involvement of Employees in Knowledge
Management in the Light of the Research
Results**

JEL Classification: *D83*

Keywords: *employees involvement; knowledge management; process; activity; behaviour*

Abstract: The development of information technology, increase demand for mental work, shortening product life cycle and competing of the quality meant that knowledge is widely considered to be one of the most important resources of the organization. Taking into account activities related to the process of knowledge management (such as the acquisition of knowledge from the environment, identifying its in the organization, knowledge sharing) and their sources (internal and external stakeholders) can be noted that any knowledge management requires the involvement of employees. Based on the analysis of the employees engagement was found that managing knowledge should be supported by the affective commitment and focused on work organization and environment. They exhibit a specific behavior. Recognizing this problem for interesting the empirical research was carried out. Their goal was to identify the prevalence of involvement of employees in knowledge management and the desired employee behavior in the various activities of this processes. The study conducted among enterprises of Lubuskie province. The research used a survey method. It was found that the surveyed enterprises implement the activities related to knowledge management in a selective manner. In the light of the adopted criteria only one (out of 102) of the surveyed companies could be considered as knowledge management. It also seems that the

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attention is not focused on the creation of knowledge but its acquisition and protection. Taking into account the results of research on behavior conducive to knowledge management can be concluded that the climate for creativity exists at the level of teams but not the organization.

Introduction

Gaining a competitive advantage by the company largely depends on the effective management of knowledge in it. This process is directed to both the environment and the interior of the organization. It is related to the acquisition of knowledge, which is possessed by external stakeholders (customers, suppliers, competitors) and its creation in the company, disseminating protection among the organization members, that is keeping knowledge in the company. It is interesting to decide which of the processes of knowledge management exist in the organization, what actions are taken to disseminate them. The results of the research conducted by A.K. Gup and V. Govindarajan (1991), proved that the effectiveness of actions connected with knowledge management depends on acquiring information, evaluating its value, sharing the knowledge, its absorption. These processes are participated by employees. That is them who reveal other types of behaviour in those processes, get involved in a different degree in completing activities, make an attempt of a different amount — (cf.: Saks, 2006, p. 602; Smythe 2009, p.634; Juchnowicz, 2010, p. 35). Let us observe that it is important both during each process related to knowledge management and among them – these processes integrate, depend on one another (the knowledge is protected by the new one, which is created on the basis of the acquired knowledge or becomes the result of the environment analysis).

Analyzing the forms of employee involvement it is possible to state that knowledge management is supported by the involvement in work, organization and the environment, that is undertaken in each area and affective involvement, i.e. resulting from the willingness to be part of the organization and therefore causing higher activity than the one resulting from responsibilities and established norms (see: Stankiewicz and Moczulska, 2014). It is worth learning the behaviour proving the forms of involvement mentioned and thus significant for knowledge management.

The purpose of the article was to determine the prevalence of knowledge management in the company and the employee behaviour important for the implementation of processes related to knowledge manage-

ment. To realize it, the empirical research was carried out. The article presents the results.

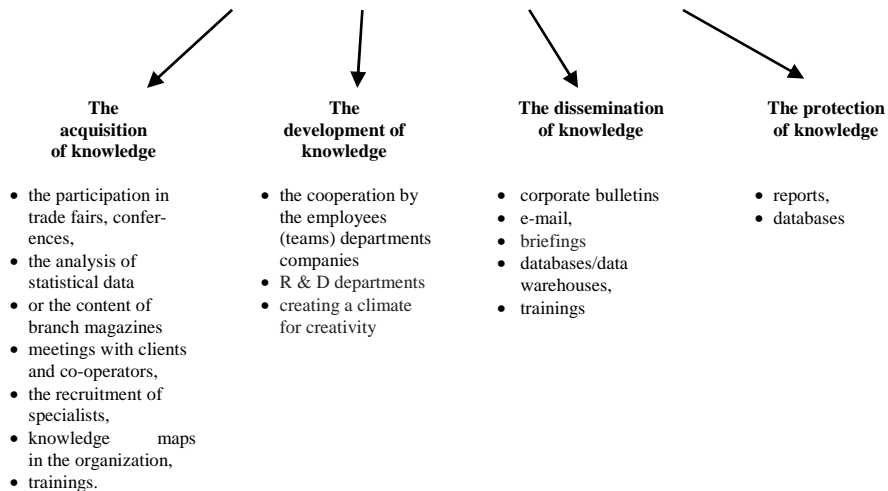
Employee behaviour essential for knowledge management

Knowledge management, is, according to K. Perechudy (2005, p. 64) "solving existing and anticipating future problem situations associated to some extent with the disposal of knowledge, due to which it becomes possible to efficiently generate and use it in order to meet the needs of increasingly demanding customers on a more and more competitive market". As pointed out by many authors, knowledge management, conducive to achieving a competitive advantage, includes various processes. In the paper the classification after W. Karwowski (2010) is accepted, which distinguishes four basic: the acquisition of knowledge, its development, dissemination and protection. For the purposes of the further consideration we present the understanding of these processes.

The acquisition of knowledge is based on collecting information of the needs, expectations of external stakeholders on the one hand and assessing current activities of the enterprise and its representatives, on the other - the data on the functioning of competition (Jemielniak and Koźmiński (Ed.), 2012). The process involves the observation and making interaction with the environment. These actions can be implemented either as informal discussions during meetings with clients and co-operators, and can also include the participation in trade fairs, conferences, the analysis of statistical data or the content of branch magazines. Acquiring knowledge concerns the identification of the knowledge held by employees as well. Knowledge maps, created on its basis, can be used, among others, for the assignment of competent personnel for the new tasks, helping other members of the organization or choosing people to created teams (Eppler, 2001). The activities mentioned are related to another process - *the development of knowledge*. It should be complemented by organizing trainings and the establishment of cooperation by the employees of different teams, departments or companies. The first ones support deepening the possessed competence, the second - by sharing knowledge, exchanging and connecting it, contribute to the implementation of effective solutions in a various degree and/or to promoting the formation of new ideas, concepts and solutions. The consequence should be the awareness of the possessed knowledge (Jemielniak and Koźmiński (Ed.), 2012) the transition from tacit knowledge to explicit one (Nonaka, Takeuchi 2004) and from the basic to the innovat-

ed knowledge (see: Zack, 2002). Let us note that the effectiveness of knowledge management requires the *dissemination* of information obtained during the process of acquiring and developing it (Jashapara, 2006). It can take the form of a message sent by e-mail, published in corporate bulletins, submitted by the supervisor, as well as the data entered into computer programs (databases, data warehouses) and organized trainings. Their subject matter should concern not only issues related to the implemented solutions, the tasks performed (knowledge), but also to develop skills essential for knowledge management associated with sharing it, selection and transfer of information, teamwork, creativity and with the behaviour favouring the nondisclosure of knowledge to people outside the organization. The last of skills contributes to the implementation of the fourth of the processes - *the protection of knowledge*. It also involves the saving of created solutions, archiving data and information. The actions that can be used in different processes of knowledge management were presented in Figure 1.

Figure 1. Measures used in the particular processes of knowledge management
Processes of knowledge management



Source: own elaboration based on: Probst, Raum i Romhardt (2004), Evans (2005), Jashapara (2006), Jemielniak, Koźmiński (red.) (2012).

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Analyzing individual knowledge management processes, it is necessary to notice in them the importance of technological systems (flow of information, data archiving and access to information), structural solutions (Zack, 1999; Grudzewski and Hejduk, 2004). At the same time, it is worth noting after Jashapara (2004) that the information and data is the basis for knowledge, and it belongs to the man and therefore it is an entity, as Falzgavić writes (after: Morawski, 2006), that its use, and due to its quality, will depend on it. It seems, however, that the technology can support knowledge management, but its effectiveness depends on the skills and behaviour of employees. Among them the following ones should be mentioned (Evans, 2005; Jemielniak and Koźmiński (Ed.), 2012):

- conducting observation,
- searching for information and data, processing and selecting it,
- readiness to learn, learning,
- making decisions and taking over responsibility,
- providing information,
- sharing knowledge,
- focus on problem solving,
- openness to changes,
- openness to new knowledge and the views of others, including the ones differing from their own,
- the ability to listen,
- the ability to conduct a dialogue,
- breaking stereotypes, ways of thinking,
- willingness to experiment, take risks.

Let us note that the mentioned types of behaviour are related to the tasks assigned by the work station (the first four) and the running of the organization (the other of the above). They relationships with other employees - in the environment as well.

It should be emphasized that the types of behaviour are associated with the effort, which often exceeds the one resulting from the duties. They are based on patience, determination in the pursuit of the goal. They prove the positive attitude to the organization, a desire to be its member and not just an employee who works in the enterprise, as they must or think they should¹.

¹Respectively presented: affective commitment (wants), normative (should) and duration (must) – Meyer and Smith, 2000.

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It seems that knowledge management is supported by affective commitment and focused on the work organization and environment. The supposition became the basis to carry out empirical research.

Methodology of the research

Due to the fact that knowledge management is a relatively new concept of management, and that has been a decline of employee involvement, the research identified knowledge management processes and employee behaviour for the acquisition, creation, dissemination and protection of knowledge in the enterprise. The first was identified by determining the activities carried out in the organization (Fig. 1), their themes, goals, which they were used for, (what they concerned) and frequency. The second one was referred primarily to such issues as: the flow of information, knowledge sharing, establishing cooperation, mentoring, listening to other people's opinions, attitudes toward: risk, emerging ideas and conflicts. The attention was paid to the perception of these types of behaviour among colleagues, superiors and to the values applicable in the enterprise and the rules adopted in the organization that have an impact on the effectiveness of knowledge management and the direction, level, intensity of involvement of members of the organization.

The research used a survey method, with the structured and standardized questionnaire. For the analysis one hundred and two companies in the Lubuskie province were qualified. These include companies of any size - micro (27%), small (26%), medium (20%) and large (25%). There were enterprises from the branch of: government (25%), real estate, renting and services related to business activities (22%), trade and repairs (16%) and industry (11%). Considering the object of the study it is worth noting that employees who completed the survey, regardless of the level of education (secondary - 60%, higher - 40%) and their position (serial - 45%, special - 40%) indicated that they continue to expand their knowledge.

Employee participation in knowledge management in the light of the research results

The obtained results of the research showed that the workers of almost all companies surveyed were aware of its mission (97%), ongoing objectives (96%), the direction of development (89%), expectations of the superior in terms of daily tasks (92%) and the objectives related to them (92%).

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Less, because in 75% of organizations, they knew where to get the necessary information - who and what for (in general) is engaged in the organization. Among the reasons for the situation it can be indicated, among others, that 55% of the enterprises encourage employees to "wander" between departments in order to exchange experience and the fact that although in 78% of the surveyed companies there is a database containing the information related to its operation, serial employees have access to all the data contained in it only in 12% of the organizations, and in the specified range – in about half of them (51%).

It was found that the surveyed enterprises analyzed various sources of knowledge. This is done mainly when the situation demands. Almost a third part of the companies (31%) constantly takes into account the views of customers and employees, quarter (25%) - the actions of competition, a fifth (19%) – the opinions of subcontractors. Customers, employees, competitors and trends in technology are the source for acquiring new knowledge quarterly in 10% of companies surveyed. It is worth noticing that in several questionnaires of the surveys, at the same issue, information² was reported that the particular situation did not concern the company due to the nature of its business. These were companies from the branch of administration (library, government offices) and healthcare. Similar responses were granted in the enterprises operating in education and administration for such sources as: competition, suppliers and technology. Does the situation mean that these businesses are not focused on knowledge management? Do they not see the importance of interaction with the environment? Do they not really distinguish stakeholders (e.g. not recognize the company providing office supplies for a provider and a city dweller for a client)? Or maybe overconfidence is recognized?

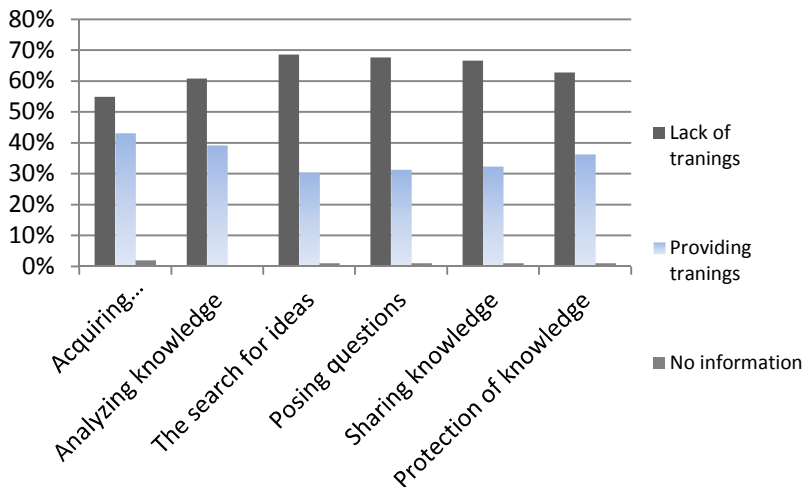
The results of the research proved that the employees of more than half of companies participated in the training required by law (e.g. health and safety - 56%) and associated with the performance of the duties / responsibilities (52%) two or three times in the last year. It was also identified that such courses were not organized in 35% of the surveyed companies. The opposite situation can be described in terms of trainings aimed at developing the competencies essential for knowledge management (chart 1). The enterprises in which they were organized (usually up to three times a year -

² These were handwritten annotations of respondents - in the questionnaire it was not possible to choose the "not applicable".

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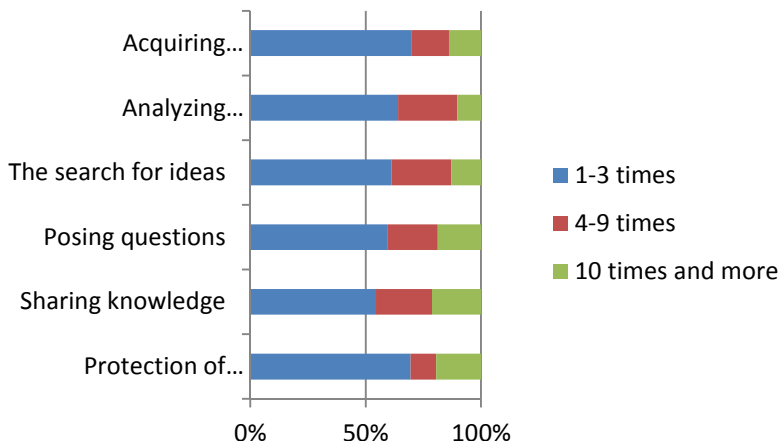
chart 2), the skills was shaped related to obtaining information, data (30%), analyzing the knowledge (25%) and its protection (25%).

Chart 1. The subject of trainings organized in the surveyed enterprises



Source: own study based on the results of research.

Chart 2. The frequency of trainings to develop competencies related to knowledge management in the surveyed enterprises



Source: own study based on the results of research.

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Similar results were obtained for meetings concerning the functioning of the organization. Half of the companies (52%) did not organize those whose aim was to share knowledge, in the 42% - related to the business of the enterprise. The main objectives of the meetings in organizations in which they are held frequently (up to three times a year) were: necessary changes (39%), the ability of the company, problems, the implementation of goals (38%), company operations (37%), the methods of work performance (35%) and knowledge sharing (25%). The information on decisions taken at the meetings, the accepted solutions was distributed in the organization during meetings (60%), through messages sent by e-mail (38%) or publications placed in corporate brochures (27%). The consequence of the meetings was also to organize trainings (45% of the companies) and to update the database (30%).

Taking into consideration the results on meetings and trainings, it is worth awarding the results showing cooperation. It was mainly taken in order to achieve the objectives of the company (68%), improve the organization of work (66%) and to solve specific problems (59%). The creation of new solutions, services, products, became the essence of cooperation in the case of 38% of the surveyed companies. The indications on the frequency of making cooperation should be considered to be interesting – it was done 10 times or more, or from one to three times a year. The largest frequency (45%) was related to cooperation in teams, smaller (32%) – with people from different departments in the organization and the lowest (11%) with other companies. The second, much lower frequency (up to three times a year) was observed in the fourth part (23%) of the companies as undertaken in teams and at the enterprise level, and in sixth (16%) - with other companies. Similarly, as in the case of sources of obtaining knowledge, it was noted that in several administration and health care institutions cooperation is not only not organized, but its establishing is excluded. Does this prove the existence of competing climate in these organizations? Or maybe the groups of different status?

It should be highlighted that the results of cooperation were disseminated less frequently than the results of organized meetings. The main tools for transferring knowledge were identified as: e-mail (49%), a company newsletter (33%), updating the database (28%) and the methods of knowledge dissemination included: information meetings (26%) and trainings (22%).

When analyzing the survey results - the subject of trainings, their frequency, the universality of cooperation, the use of sources of knowledge, and its dissemination, it seems that the surveyed companies are focused on

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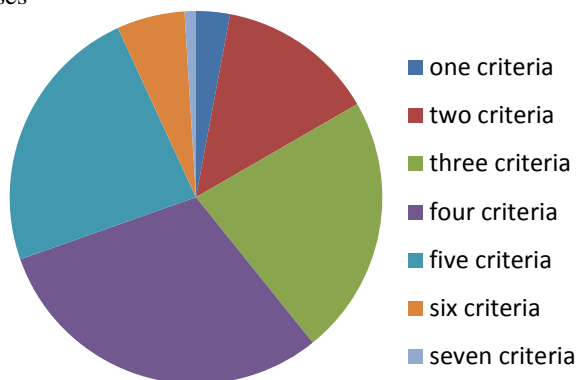
the use of knowledge rather than creating it, and that they lack comprehensive knowledge management.

Since knowledge management refers to the implementation of specific processes, analyzing the data, we assumed that the company that manages knowledge is the one which uses them at least on a minimum level, i.e. meets the following criteria:

1. At least once a quarter obtains the information on the market from at least three different sources.
2. Organizes trainings, including at least once a year on the development of competencies essential for knowledge management.
3. At least four times a year organizes meetings related to the company business.
4. At least once a year allows the establishment of cooperation.
5. Shapes the climate of creativity, which means the presence of at least half of the accepted types of behaviour essential for knowledge management (concerning the participation of employees in decision making, communication, errors and creative thinking).
6. Disseminates knowledge, that is provides the results of the meetings and collaboration using a minimum of two of the five studied sources.
7. Protects knowledge by creating a database.

Chart 3 presents the universality of activities related to knowledge management in the studied companies. Only one of them can be described as managing knowledge.

Chart 3. The number of knowledge management activities carried out in the surveyed enterprises

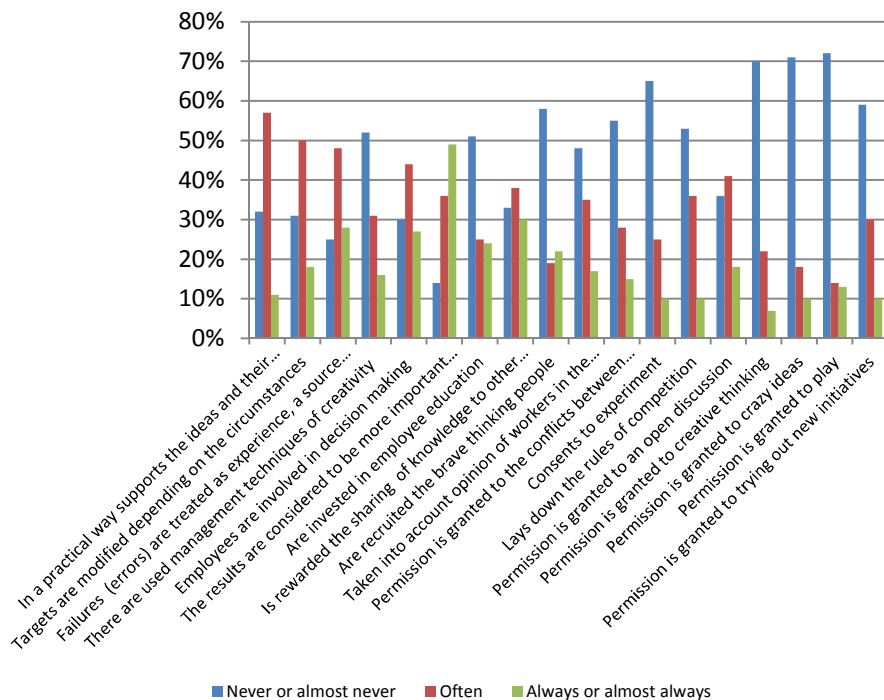


Source: own study based on the results of research.

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Taking into account the types of behaviour that were identified in the surveyed companies it is necessary to emphasize the difference in the activities relating to creativity. In approx. 40% of companies surveyed (chart 4) - always or almost always – the results are considered more important than the way to achieve them, boldly minded, brave workers are recruited (30%), and failures are considered to be a source of experience.

Chart 4. Types of behaviour existing in the organization

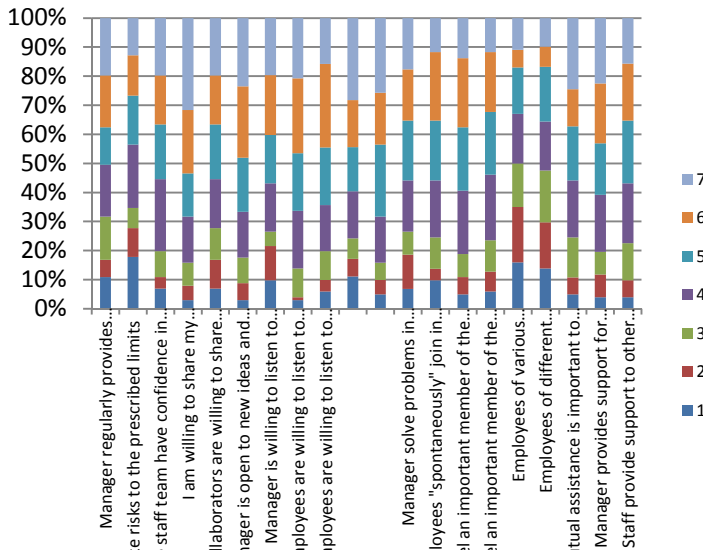


Source: own study based on the results of research.

At the same time it is not allowed for: creative thinking, crazy ideas, experimentation, as well as knowledge sharing with others is not awarded, or defining the principles of competition is omitted. Let us note that this can cause cognitive dissonance among employees, and thus limit their creativity, grassroots and spontaneous presentation of ideas, solutions and undertaking relevant activities. The presented results of the research show that

the majority of companies does not pay the attention to the consistency of actions between particular processes. This is evidenced by the results for the preferred values in companies. Such values as: customer focus, their expectations, requirements, achieved satisfaction and a desire to succeed, honesty, commitment, quality of work were present at almost 80% of the companies. At the same time - taking into consideration the results presented so far - the preferred values were not reflected in the actions and types of behaviour. It is worth noting that the trust and effective communication with the "top-down" and reversely proved to be the values least indicated (58% of the surveyed companies) within the current values and also was the most common (37%) ones considered desirable.

Chart 5. The perception of the behaviour of colleagues and superiors



Source: own study based on the results of research

Considering the identified types of behaviour that affect the relationships between employees it was found that (chart 5): employees are willing to share their knowledge with other team members (54%), perceive their co-workers in a similar way (37%), but are less likely to indicate the exchange of information between departments (30%). The respondents listen

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to different views of the members of the team (45%) and believe that this also done by their superior (41%). Many of them are considered a manager as a person who does not ignore problems (42%), focuses on the provision of support (38%) and gives the same (44%). This leads to the conclusion about creating a climate of cooperation among teams.

Let us reveal the involvement of employees. It was defined on the basis of: (1) attitude to work, (2) exhibited activity and (3) expression of the behaviour. In every third surveyed company work was seen as pleasure (no compulsion or obligation), in every fifth there was a manifestation of at least two of the five following types of behaviour: knowledge sharing with others, risk-taking in the specified range, openness to feedback from others, establishing cooperation, and in every tenth the activity was demonstrated associated with the performance of tasks resulting from the work position and actions relevant for the functioning of the organization.

Conclusions

In the surveyed enterprises two important issues can be pointed to, observed in the field of knowledge management. The first one concerns the occurrence of paradoxes, described by G. Probst, S. Raubst and K. Romhardt (after: Evans, 2005), which include implementing the activities in a selective manner, and thereby often contradictory. For example, employees are trained, but at the same time they are not permitted to use their knowledge, experts are employed, but hiding what they know ahead of other employees. In the surveyed enterprises it seems to be a paradox to employ creative people, and then creating conditions restricting the release of their creativity, the limited dissemination of results of very often undertaken cooperation or considering knowledge sharing to be a value and the lack of appreciation of those who shape their behaviour on its basis. This is important especially that on the basis of the analysis of the results of the research it can be concluded that the surveyed enterprises carry out activities aimed at the acquisition of knowledge (trainings, environment analysis). Cooperation is the use of knowledge rather than creating it. These actions can contribute to the maintenance on the market, but it is unlikely that only due to them the market advantage is obtained.

An important issue is to support the processes of knowledge management with systems implemented in the organization. One of them is technology that - according to - K. Klineciewicz (Jemielniak and Koźmiński (Ed.), 2012) when it is identified with knowledge management, can limit its

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effectiveness. The overestimation of information systems (including databases) can lead to problems in the form of restrictions of contacts, separation of knowledge from its use, the necessity of putting pressure on the sharing of knowledge and underestimation of the importance of tacit knowledge. Although it is certainly not possible to consider if the indicated errors concerned the surveyed companies, let us note that for the desired value it was recognized in many of them communication and confidence, the behaviour associated with knowledge management was not appreciated, knowledge was rarely disseminated, especially representing the result of cooperation, and most of them used information systems (databases).

On the basis of presented results of the research it can be concluded that effective knowledge management requires treating it not as a set of different tools, methods, but through the processes constituting a coherent whole, requiring a comprehensive approach. The surveyed enterprises lacked it.

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R&D Activity and Core Business Efficiency on the Example of Technology Companies

JEL Classification: *L25; L63; L86; O32*

Keywords: *research and development; core business efficiency; technology sector*

Abstract: Taking as a basis for discussion the Schumpeter's innovation theory, this paper analyses the relationship between enterprises activity in the field of research and development and their efficiency at the core business level. This analysis was performed in two ways – with the assumption shift in time between research and development activities and companies business efficiency and without it – using the Spearman's rank correlation coefficient. The sample was accounted for 252 companies from the technology sector, whose shares are traded on NYSE or NASDAQ, and the analysis time period consisted of three years (2011-2013). Results obtained in the course of analysis generally indicate lack of strong relationship between distinguished categories. Noticeable, but only at moderate level, positive correlation was found in both considered approaches only in respect of relationship between the intensity of expenditures on research and development or y/y change of these expenditures and gross margin on sales. Therefore, it seems to be relevant to extend this research at least in such directions as: identification and characterization of factors determining efficiency of companies research and development activities, as well as examination considered relationship taking into account business diversity within the sector and wider time shift between realized research and development activities and various measures of core business efficiency.

Introduction

Considerations concerning relationship between enterprises activity in the field of research and development (R&D) and their business results can be classified as one of the most popular research topics in the literature over the last few decades. Their basis is considered to be the Schumpeter's theory of innovation (Schumpeter, 1950), according to which the innovation (which one of the main expressions are R&D activities) provides foundation for company's long-term growth and success in market economy. Despite many studies in this area the interest in this topic remains at a high level, because multiplicity and pace of changes taking place in the companies themselves and their close and distant environment, creates the need for continuous verification of conclusions reached earlier, as well as it supports undertaking research in new directions. In this regard it should be noted that the studies undertaken so far have mainly been focused on evaluation of the relationship between the enterprises activity in the field of research and development and changes in their basic output values such as revenue from sales or net profit. It is necessary to add here too, that this evaluation is generally positive, which is quite well documented in the literature (e.g., Morbey, 1988; Klette, 1996; Hanel, 2002; Artz *et al.*, 2003; Feeny & Rogers, 2003; Tsai & Wang, 2004; Ramirez & Hachiya, 2008; Chang & Su, 2010).

At this point it is worth noting, that the improvement in company's performance can be a result of extensive management (increasing the involvement of resources, eg. labor force or tangible assets) or intensive one (releasing of reserves existing in possessed resources), however requirements of rational business activity corresponds better to the second of these management options, because it is characterized by more favorable efficiency measures, such as labor productivity, assets turnover or return on sales (Bednarski, 1979; Jonek-Kowalska, 2013).

Intensive management is usually equated with technical and organizational progress, adopting most often form of innovation process, which one of the early stages are research and development activities. Therefore, in considerations about the relationship between technical and organizational progress, innovation and research activities, it is often assumed, that progress is a function of research development, suggesting at the same time that the greater the expenditures are on that activities, the higher the rate of progress is and more dynamic innovation processes (Lichtarski, 1999).

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At the same time, however, in the literature, this relationship with respect to the enterprise efficiency (which is a result of technical and organizational progress) is poorly documented, and after all the efficiency, rather than changes in individual financial data, is one of the main factors of companies competitiveness and their reputation among existing and potential stakeholders (Jonek-Kowalska & Michalak, 2012; Szwajca, 2014; Gorczyńska, 2010).

Therefore, as the main objective of this article it was adopted to examine the relationship between enterprises research and development activities and their efficiency at the core business level, which is first and the key determinant of this activity outcome, materialized in the form of various innovations. For the purpose of achieving this objective, two hypotheses were verified.

H1: There is a positive relationship between enterprises activity in the field of research and development and their efficiency on the core business level.

H2: Positive results of enterprises research and development activities on their efficiency on the core business level can be shifted in time.

The first of the hypotheses mentioned above is a direct result of recommendations formulated in the literature, regarding the relationship between research and development activities and companies business efficiency. The basis for formulation of the second hypothesis was the specificity of research and development activities, which one of the main expressions is generally indefinite period of materialization, often counted not in months or quarters, but in years to come. Thus, the impact of this activity on the core business efficiency is not necessarily associated with the period of incurring expenditures on research and development.

Data, assumptions and research methodology

Due to the availability of data on research and development expenditures, in determining the research sample the focus was on companies from technology sector, whose shares are traded on NYSE or NASDAQ. Additional, besides the data disclosure on research and development costs, research sample selection criteria were: company's annual reporting period

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from January to December, financial statements prepared in accordance with SEC standards expressed in US dollars, and finally availability of company's profile, along with basic financial data, on the yahoo.finance.com portal (the main source of data). As a result, the research sample consisted of 252 companies.

The time range of the analysis was limited to a period of three years (2011-2013), which was dictated by the availability of data on the yahoo.finance.com portal.

In order to verify the research hypotheses, first the criteria for assessing involvement of analysed companies in the research and development activities and the criteria for assessing their efficiency at the core business level were distinguished. In case of research and development activities the focus was in particular on one of the key indicators in this area, proposed in the Frascati (OECD, 2002) and Oslo methodology (OECD/Eurostat, 2005), which is an intensity ratio of expenditures on research and development – (R&D)IR (relation costs of research and development to sales revenue). As a complementary assessment criteria in this area were used growth y/y indices of expenditure on research and development – ${}^v(R\&D)Exp$ – and mentioned above intensity ratio – ${}^v(R\&D)IR$. Moreover, in order to take into account continuity of research and development activities in periods longer than one year, as additional criterion was adopted also the average value of its intensity ratio in a period of two or three years – $Avg.(R\&D)IR$.

With respect to the analysed companies as the core business efficiency criteria into account were taken: the gross profit margin – GPM (relation of gross profit to sales revenue) – total assets turnover – TAT (relation of sales revenue to average total assets) – and their growth y/y indices – vGPM , vTAT . Therefore, assessment of efficiency had both static (relation effect to expenditure) and dynamic (changes of static performance measures in time) dimension.

Limitation in evaluation of companies efficiency only to their core business area is primarily dictated by the fact that it is the first and also the main area of business, from the perspective of both sales revenues and costs, to look for materialized effects of R&D activities in the form of various innovations brought into service (product, process, marketing and organizational). Additional factor in favor of limitation to this area is possibility of falsification the efficiency indicators calculated on the basis of further profit/loss levels in income statement as a result of one-off events (restructuring costs, impairment costs, foreign exchange differences, gains

or losses on investments), which in case of core business are unlikely to occur.

The above measures were then used to investigate the relationship between the researched technology companies R&D activity and their efficiency at the core business level. Due to the finding of normal distribution lack for some of considered variables series, in order to verify the hypotheses it was decided to use the Spearman's rank correlation coefficient given by the formula:

$$r_s = 1 - \frac{6 \sum_{i=1}^n d_i^2}{n \cdot (n^2 - 1)}, \quad d_i = Rx_i - Ry_i \quad (1)$$

where:

- r_s – the Spearman rank correlation coefficient,
- d_i – difference in paired ranks,
- n – number of cases.

According to the general interpretation of correlation coefficient indicated above, values closer to -1 and 1 indicate strong correlation between examined variables (respectively negative and positive), and values close to 0 indicate its lack.

For correlation calculation between previously identified variables the Statistica software was used, getting additional information about the statistical significance of obtained results with p-value at 0.05 level.

In order to verify research hypotheses in the first place it was assumed to calculate for different annual periods of the study a correlations between:

- (R&D)IR,
- ^v(R&D)IR,
- ^v(R&D)Exp,
- and adequate for these periods:
- GPM,
- TAT,
- ^vGPM,
- ^vTAT.

Then, in case of second research hypothesis verification, for correlation coefficients calculation a list of variables regarding involvement in research and development assessment was extended by the average values

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of expenditures intensity – Avg.(R&D)IR – within two (2011-2012 and 2012-2013) and three (2011-2013) years, and in case of variables regarding efficiency assessment, it was founded to take values shifted by one or, if possible, by two-year periods.

Overall summary of presented above assumptions concerning verification of formulated hypotheses is presented in table 1.

Table 1. Assessment criteria pairs for research hypotheses verification

	GPM_2011	GPM_2012	GPM_2013	TAT_2011	TAT_2012	TAT_2013	^v GPM_2012/2011	^v GPM_2013/2012	^v TAT_2012/2011	^v TAT_2013/2012
(R&D)IR_2011	H1	H2	H2	H1	H2	H2	H2	H2	H2	H2
(R&D)IR_2012	—	H1	H2	—	H1	H2	H1	H2	H1	H2
(R&D)IR_2013	—	—	H1	—	—	H1	—	H1	—	H1
^v (R&D)IR_2012/2011	—	H1	H2	—	H1	H2	H1	H2	H1	H2
^v (R&D)IR_2013/2012	—	—	H1	—	—	H1	—	H1	—	H1
Avg.(R&D)IR_2011-2012	—	H2	H2	—	H2	H2	H2	H2	H2	H2
Avg.(R&D)IR_2012-2013	—	—	H2	—	—	H2	—	H2	—	H2
Avg.(R&D)IR_2011-2013	—	—	H2	—	—	H2	—	H2	—	H2
^v (R&D)Exp_2012/2011	—	H1	H2	—	H1	H2	H1	H2	H1	H2
^v (R&D)Exp_2013/2012	—	—	H1	—	—	H1	—	H1	—	H1

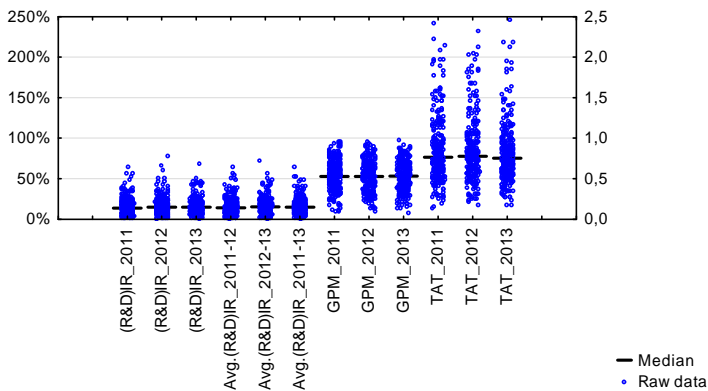
Source: Own work.

Results

In order to verify mentioned in the introduction research hypotheses, in the first place for the companies forming research sample there were collected financial data (sales revenue, gross profit on sales, research and development costs, total assets) and calculated specified in the methodological part of the article criteria for assessing their activity in the field of research and development and efficiency at the core business level. The dispersion of their values in each period of analysis, which approximates the specifics of analysed technology companies, is shown in Figures 1 and 2.

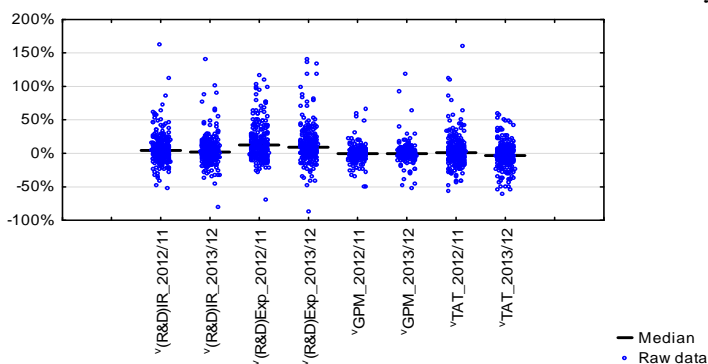
As it can be seen, the value range of each assessment criteria in case of considered technology companies is quite substantial – the largest for TAT, the smallest for the (R&D)IR – what partially can be explained by the business variation within this sector – in the yahoo database, technology sector consists of 32 industries (sub-sectors) (see: <http://biz.yahoo.com/p/8conameu.html>).

Figure 1. Raw data and median of analysed technology companies static assessment criteria in the field of R&D activities and core business efficiency



Source: Own calculations based on data from www.yahoo.finance.com

Figure 2. Raw data and median of analysed technology companies dynamic assessment criteria in the field of R&D activities and core business efficiency



Source: Own calculations based on data from www.yahoo.finance.com

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Simultaneously, however, it should be noted, that in case of static assessment criteria (Figure 1) there are generally approximate ranges of raw data in each period of analysis, while in case of dynamic assessment criteria (Figure 2) some deviations from the main range. This has, of course, its impact on median values, which, in relation to can be seen the static criteria are at similar level in each period of analysis, and in case of dynamic criteria show slightly greater differentiation (Table 2).

Table 2. Median values for each assessment criteria

	2011	2012	2013
(R&D)IR	13,6%	15,1%	15,0%
GPM	53,1%	53,0%	53,1%
TAT	0,765	0,776	0,755
	2011-12	2012-13	2011-13
Avg.(R&D)IR	14,3%	15,5%	15,1%
	-	2012/11	2013/12
^v (R&D)IR	-	4,2%	1,9%
^v (R&D)Exp	-	12,6%	9,1%
^v GPM	-	-0,4%	-0,2%
^v TAT	-	1,2%	-3,3%

Source: Own calculations.

With a set of considered variables the first research hypothesis H1 were verified. For this purpose, using Spearman's rank correlation coefficient (1), the relationship between indicated in the methodological part of the article criteria for assessing companies activity in the field of research and development and their core business efficiency in the same periods was calculated. Calculations were carried out in two ways – regarding all cases (A – All Cases) and eliminating outlier cases (WO – Without Outlier Cases). Obtained results are presented in Table 3. With bold lettering were highlighted ones, that are statistically significant with p-value at 0.05 level.

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Table 3. Spearman's rank correlation coefficients regarding verification of the hypothesis H1

		(R&D)IR			^v (R&D)IR		^v (R&D)Exp	
		2011	2012	2013	2012	2013	2012	2013
GPM	A	0,381	0,380	0,395	-0,096	0,000	0,332	0,210
	WO	0,390	0,385	0,410	-0,099	-0,039	0,316	0,169
TAT	A	-0,052	-0,054	-0,142	-0,116	-0,110	0,039	-0,041
	WO	-0,013	-0,062	-0,128	-0,090	-0,052	0,038	0,007
^v GPM	A	-	0,011	-0,036	-0,227	-0,140	0,125	-0,036
	WO	-	0,019	-0,035	-0,201	-0,101	0,137	-0,038
^v TAT	A	-	-0,125	-0,167	-0,406	-0,420	0,340	-0,246
	WO	-	-0,132	-0,163	-0,359	-0,386	0,340	-0,206

Source: Own calculations.

Taking into account obtained results it can be concluded, that in case of analysed technology companies the hypothesis H1 is only slightly confirmed. Noticeable, but only at moderate level, positive correlation between the research and development activities of examined companies and their efficiency at the core business level in the same period occurred only in relation to the pairs formed by the gross margin on sales and the intensity ratio of expenditures on research and development or y/y changes of this expenditures. In other cases, obtained results indicate the absence of noticeable correlation or even a negative one (mainly it concerns total assets turnover and its y/y changes).

Following the assumptions described earlier in the methodological part, in the same way the hypotheses H2 was verified. Obtained results are presented in Table 4. With bold lettering were highlighted ones, that are statistically significant with p-value at 0.05 level.

Just as it was in case of the hypothesis H1 verification, also in relation to the hypothesis H2, obtained results only slightly confirm its truthiness. Noticeable, but again only at moderate level, positive correlation between research and development activity of analysed companies and their time-shifted efficiency at the core business level was only for pairs formed by the gross margin on sales and the intensity ratio of expenditures on research and development, its average value in periods of two and three years, or y/y changes of this expenditures. In other cases, obtained results indicate the absence of noticeable correlation.

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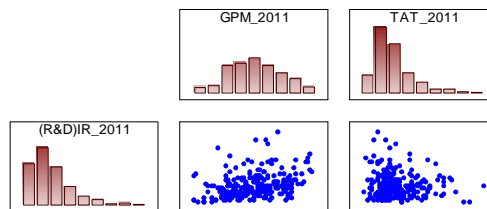
Table 4. Spearman's rank correlation coefficients regarding verification of the hypothesis H2

		(R&D)IR			Avg.(R&D)IR				^v (R&D)IR	^v (R&D)Exp
		2011 /2012	2012 /2013	2011 /2013	2011-12 /2012	2011-12 /2013	2012-13 /2013	2011-13 /2013	2012/11 /2013	2012/11 /2013
GPM	A	0,402	0,393	0,411	0,395	0,407	0,407	0,409	-0,098	0,322
	WO	0,410	0,396	0,417	0,414	0,425	0,415	0,426	-0,119	0,281
TAT	A	-0,013	-0,104	-0,077	-0,033	-0,091	-0,091	-0,116	-0,042	-0,093
	WO	-0,005	-0,100	-0,056	-0,040	-0,082	-0,117	-0,103	-0,019	-0,066
^v GPM	A	0,086	0,012	0,025	0,046	0,021	0,021	0,000	-0,071	-0,059
	WO	0,082	-0,001	0,016	0,039	0,018	-0,013	-0,001	-0,089	-0,068
^v TAT	A	0,007	-0,038	-0,061	-0,061	-0,054	-0,054	-0,098	0,144	-0,244
	WO	-0,025	-0,054	-0,054	-0,089	-0,050	-0,101	-0,093	0,136	-0,227

* P_{(R&D)A} – Period of R&D Activities; P_{CBE} – Period of Core Business Efficiency
Source: Own calculations.

As a supplement, and also results confirmation, that were discussed above, in Figures 3, 4 and 5 are shown scatterplots of each assessment criteria pairs with their values distributions.

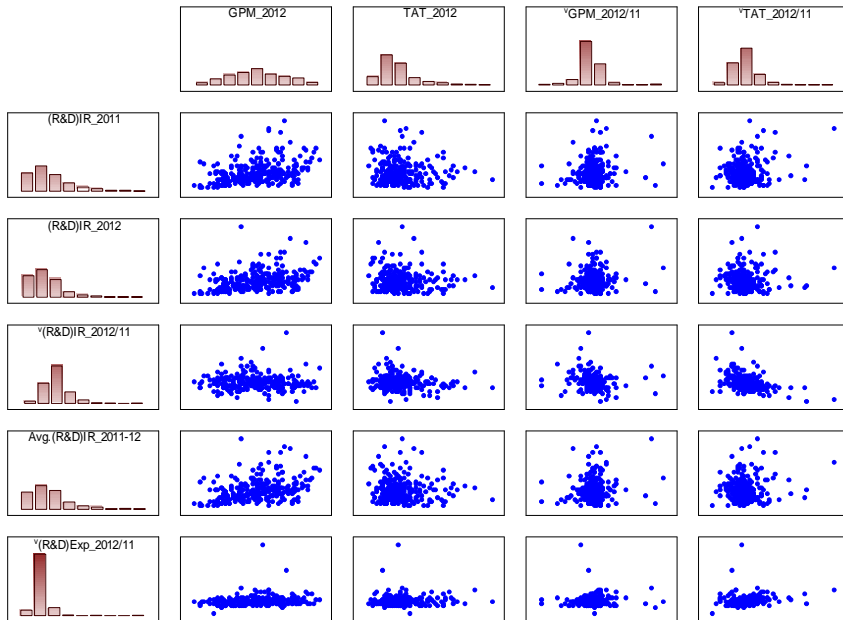
Figure 3. The Scatterplots of assessment criteria pairs from the viewpoint of efficiency measures for the year 2011.



Source: Own work in Statistica

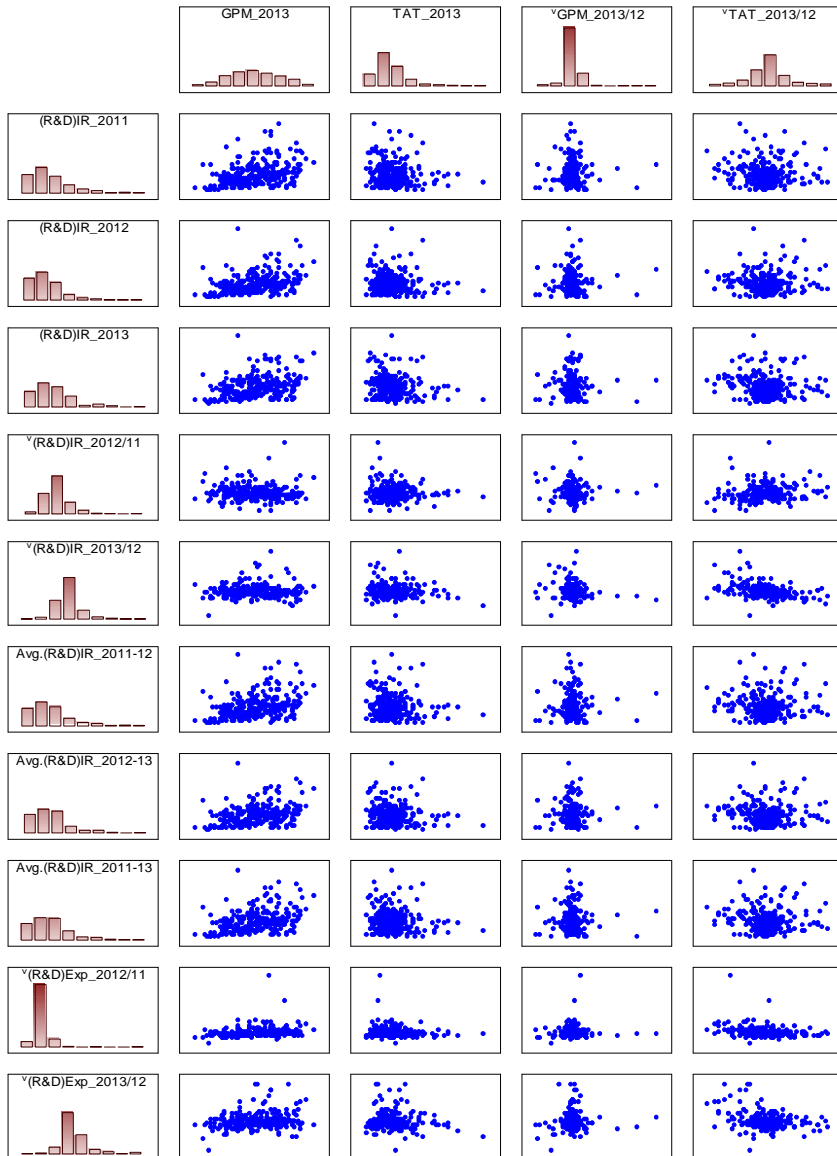
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Figure 4. The Scatterplots of assessment criteria pairs from the viewpoint of efficiency measures for the year 2012.



Source: Own work in Statistica

Figure 5. The Scatterplots of assessment criteria pairs from the viewpoint of efficiency measures for the year 2013.



Source: Own work in Statistica.

Conclusions

Although the results of performed analysis cannot be considered as an indication of the complete lack of any correlation between the research and development activities of technology companies and their efficiency at the core business level, but at the same time, they highlight the significant differences in the situation of entities within the considered sector. On one hand, this diversity can be a result of only false homogeneity of particular technology companies business specificity (as it was noted earlier, within considered sector is up to 32 industries), and on the other hand (in particular in relation to the hypothesis H2) of adopting too short period shifts between expenditures on R&D and measures of efficiency.

Therefore as justified can be considered deepening the research in this area, focusing firstly on the research sample selection level not on general sectors of the economy, but more homogeneous, in terms of their characteristics, industries (sub-sectors), and secondly on the data time series extension to more than three years.

At the same time, regardless of the abovementioned possible reasons for the differentiation of entities situation in relation to their engagement in research and development activities and efficiency at the core business level, its occurrence can also be identified with some factors specific to the individual companies, thus in some of them R&D activity is more efficient (characterized by higher rates of profitability and productivity, and their improvement over time) than in others. Deepening the research in this direction can also be regarded as justified, especially in the context of R&D efficiency impact on companies market assessment or their reputation assessment from the perspective of different interest groups.

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**Comparative Analysis of Innovative Activity
Determinants in Companies of Small and
Medium Enterprises Sector in Brazil
and Poland. Results of Empirical Researches**

JEL Classification: *O10; O30; O50; O57*

Keywords: *innovative SMEs; determinants of innovation activity; SMEs in Brazil and Poland*

Abstract: The basic goal of this article is an attempt to conduct comparative analysis of innovation determinants in companies of small and medium enterprises sector in Brazil and Poland. The comparison shall enable evaluation which determinants stimulate and which are barriers to innovativeness development in the SME sector in the researched countries. Additionally, such comparison shall indicate if and in what way the economical potentials, cultural differences and different historical conditions of the economic development of the researched countries influence the determinants of the innovative activity of the SME sector.

The Authors put forward the following research hypothesis: H1: The determinants forming the innovative potential are similar for Brazilian and Polish companies of SME sector. In order to examine the hypothesis, the Authors have browsed the world literature on the subject of innovative actions determinants in companies with a special consideration of SME sector companies, they have presented the present condition of innovativeness in SME sector companies in Brazil and Poland (an Internet questionnaire has been used in the research) and they have conducted

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own empirical researches on the determinants influencing the innovativeness level. The received results have been subject to basic statistical comparative analysis and on this basis with the logical induction the Authors have made conclusions on the determinants of innovative activity in researched companies

The article includes the results of all the empirical researches conducted by the Authors in the years 2009-2013 and generally available data considering the innovativeness level in the researched countries.

Introduction

The basic goal of this article is an attempt to conduct comparative analysis of innovation determinants in companies of small and medium enterprises sector in Brazil and Poland. The comparison shall enable evaluation which determinants stimulate and which are barriers to innovativeness development in the SME sector in the researched countries. Additionally, such comparison shall indicate if and in what way the economical potentials, cultural differences and different historical conditions of the economic development of the researched countries influence the determinants of the innovative activity of the SME sector.

Simultaneously, it needs to be stressed that this article does not intend to identify directly the innovativeness determinants in relation to the companies of SME sector operating in Brazil and Poland.

The economies of Brazil and Poland are characterized by different regional and historical development conditions. Brazil has the seventh largest economy in the world¹ and the largest economy in South America. It is considered a rising market and many analysts give it prospects of becoming the world's fourth economy (next to China, India and the United States)². The economy of Brazil is mainly based on services and the exploitation of natural resources (grains, oil, gas, coal, iron ore, etc.).

The economy of Poland, in scope of GDP, is the sixth economy in the European Union and the 20th economy in the world. The economy of Poland is still an economy of mix-ownership nature: within the last twenty years it has been transformed from the centrally controlled economy (socialist) into market economy. Privatization of the vast majority of small and medium State companies and a new liberal law considering the establish-

¹ Country Comparison: GDP (purchasing power parity) In: *The World Factbook* [online]. CIA. [access on 24 Feb. 2013].

² Larry Elliott: GDP projections from PwC: how China, India and Brazil will overtake the West by 2050. *The Guardian*, [access on 14 Mar. 2013].

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ment of companies has enabled the construction of the private sector of the economy, which is presently the main motor of the economy in Poland. The Poland's economy is of balanced nature (the ratio of the production sector to the service sector). However, within the last years the sector of services has been developing rapidly.

Despite obvious differences considering potentials of both economies and the differences in regional social and cultural conditions - both countries have a relatively low innovativeness level. This applies to both total economy and to the activity of the companies from the SME sector.

Summary Innovation Index, the indicator calculated each year by the European Commission for the Union member countries and for 10 non-member countries, in case of Brazil and Poland is on a low level, especially in comparison with the Index leaders (EC EUROPA, 2014).

It should be stressed here that both Brazil and Poland are at the beginning of the development process based on the increase of innovativeness and competitiveness of own economies and thus there is a long way between them and the competitiveness leaders in the world aspect (or the European innovativeness leaders in case of Poland). According to the experts, economic and social potentials of Brazil and Poland indicate that the innovativeness should increase dynamically in the countries. That is why it seems crucial to research determinants of companies' innovative operation and specify the factors stimulating the innovativeness and those that block its development. Additionally, conducting the researches for the companies of SME sector is exceptionally important since the innovative activeness of the SME sector companies is not registered in detail by the state statistical offices in Brazil and in Poland (they only register the innovative activeness of the companies classified as medium and big) - the researches provide important data enabling making conclusions on the innovativeness of this exceptionally important sector of economy.

The outcomes of the researches shall help in revealing strong and weak points of the innovative activeness of the SME sector companies of the researched countries and in the long run they shall indicate the ones conditioned by regional factors, typical for the economy of the given country. The undertaken actions are the result of common initiative of the researchers from the Szczecin University (Poland) and Santa Maria Federal University (Brazil). The cooperation includes the researches on the innovativeness of the SME sector companies.

Staring the implementation of the researches the Authors put forward the following research hypothesis: (H1): The determinants forming the

innovative potential are similar for Brazilian and Polish companies of SME sector.

In order to examine the hypothesis, the Authors have browsed the world literature on the subject of innovative actions determinants in companies with a special consideration of SME sector companies, they have presented the present condition of innovativeness in SME sector companies in Brazil and Poland and they have conducted own empirical researches on the determinants influencing the innovativeness level. The article includes the results of all the empirical researches conducted by the Authors in the years 2009-2013 and generally available data considering the innovativeness level in the researched countries.

Determinants of innovative activity of SMEs. Review of the literature

All over the world small and medium enterprises (SME) play the key role in forming economies. The literature presents the general opinion that the balanced development of SME sector is crucial for the economy and is an obligatory condition for the economic growth. Among others, it is caused by the following:

1. SME generate over 60% of new employments.
2. SME enable transformation of the industry form traditional production forms to advanced technologies (Dibrell et al., 2008, pp. 203-218; Freel, 2003 pp. 751-770; Audretsch, 2001, pp. 37-51).
3. SME of the sector significantly contribute to the development of the global market (Salvato et al. pp. 282-305, 2007; Acedo & Florin, 2006, pp. 49-67; Karagianni & Labriandis, 2001, pp. 5-29; Lituchy & Rail, 2000, pp. 86-97).
4. SME play a key role in the development of innovations aiming at the increase of the competitiveness (Low & Chapman, 2007, pp. 878-891; Audretsch, 2001, p. 37-51).

The issue and importance of the innovativeness in the processes of forming competitiveness of companies is presently beyond question. This aspect, supported by numerous researches, is widely elaborated in the literature on the subject (see Janasz & Koziol, 2007). The changes taking place in the modern global economy and the increasing complexity and unpredictability of the environment impose on the companies continuous search for new ways of ensuring competitive advantage. One of the methods is to introduce innovations, which has become a domain of not only big companies, but also of the SME sector companies. In this aspect the efficient in-

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novative activity plays a key role in the development of SME sector companies and consequently also in the development of all national economies.

The literature on the subject includes a wide elaboration of the issue of innovative activity's determinants - both in case of big companies and the companies of SME sector.

Companies' ability to create innovations is generally described as the innovative ability or innovative potential (see Fagerberg, 2004).

The innovation of a given country's economy is mainly determined by the innovation of companies that operate in the economy. The innovation of the companies is influenced by internal factors (including, above all, potential and resources of a company, plus intellectual capital, material, financial and organizational resources). Additionally, the development of enterprise innovation abilities is influenced by the particulars of the industry and sector, where the company operates and external factors (including national conditions [e.g., legal regulations related to innovation support activities] and region-specific conditions [e.g., legal, culture, economic and technical factors]) (Jasiński, 2004, pp. 45-63).

Analysis of all of the modern models of enterprise innovation (see Norek, 2012, pp. 77-84; Tidd & Bessant 2011) and research on the scope of innovation determinants (Lager, 2011) reveals that the key factor that regulates efficiency in the innovation processes is internal the enterprises' innovation potential.

The theory of innovation potential is based on the concept of company resources. This concept, developed at the beginning of the 1990s, assumes that a company's ability to develop all of the aspects of activity is closely related to the possessed resources. Edith Penrose (1959) was an early proponent of this outlook. Her publications have revealed the role of resources in the formation of company competitive advantage and the increase theory (Hall & Rosenberg, 2010).

A detailed analysis of the factors that determine company innovation potential is subject to numerous studies and scientific publications. It seems that the most global view of the factors that determine company innovation potential was suggested by Birchall & Armstrong (2001, pp. 37-45), who created a model of innovation conditions that includes the following factors: external environment, internal environment, innovation process, and development management.

A similar opinion was presented by McCosh et al. (1998, pp. 175-193), who analyzed the wish list of company managerial staffs and listed conditions required for the effective realization of the innovation processes: cul-

ture supporting innovation, creativity enforced by the market, the will and ability to learn, and the ability to profit from company's competences to conduct innovation processes.

Tidd et al. (2001) held a somewhat different view of innovation determinants and focused in particular on internal organizational factors that stimulate the innovation processes. The most important include, among others: visionary leadership, appropriate organizational structure, recruitment, the willingness to engage in the innovation process, ability to conduct teamwork or the readiness to learn and adopt new solutions.

A comprehensive concept of innovation potential factors was presented by Gloet & Samson (2013). They pointed out, among other: strategy, leadership, change, customer focus, pro-innovative organizational culture, knowledge alliances, quality processes, learning and innovative HR orientation.

In the Polish literature, the analysis has been presented, among others, in works by Białoń (2010), Poznańska (1998) and Żołnierski (2005).

The most precise seems to be the interpretation suggested by Żołnierski (2005), who suggested that a company's innovation potential is determined by the internal innovation potential as well as the access to external sources of information necessary for the innovation process. According to Żołnierski, the internal innovation potential includes, among others:

- company staff (knowledge, experience, qualifications, competencies and the method of managing available resources),
- research and development (separate research and development units, research and development work, outsourced work and the research and development work conducted with other companies or institutions), and
- applied technologies (IT technologies, machines, equipment and the related innovation level).

In sum, innovation ability or potential determine a company's ability to create innovations (see Żołnierski, 2005). By analogy, it may be stated that the lack of innovation potential is a barrier to the companies' effective innovation processes.

In addition to the definition of the essence and the role of innovation potential in the innovation process, an issue is the measurement of individual determinants of innovation potential.

A considerable part of factors that significantly affect the innovative capacity of a company (particularly as related to external factors) are difficult to measure or to quantify, which, to a large extent, makes it difficult to

analyze and evaluate these issues precisely (see Mangiarotti & Mention, 2014; Fagerberg, 2004).

A company, in practice, can influence only internal factors in the process of conscious formation of innovative capacity and the creation of a strategy related to innovative activity for the long term. For this reason, ability to analyze and evaluate internal factors that constitute enterprise innovative capacity become extremely important. Recently, discussions about the determinants that affect enterprise innovativeness and methods of innovativeness measurement have gained significant meaning. This discussion, supported by numerous publications, has both the academic and practical dimension, as it is economic practice that is remarkably interested in effective tools for the measurement and evaluation of innovative capacity and the effectiveness of innovative processes that occur in companies (see Cooke, 2011; Prahalad & Krishnam, 2011). Large enterprises have developed efficient methods and tools used for practical evaluation of the own innovative capacities (Tidd & Bessant 2011). Examples of such tools are innovativeness audits conducted in enterprises, innovativeness benchmarking or measures included in balanced results cards (BCS; McKeown, 2008). In the case of SME companies, the analysis and evaluation of the determinants of innovative potential, because of less data availability, is definitely more difficult.

The indicated multisidedness and complexity of the phenomena that form the innovative capacity of enterprises forces one to search for optimum methods by which to analyze and evaluate this area. This problem particularly applies to SME sector enterprises. Various publications have suggested new methods for the measurement of innovative capacity and potential of the enterprises that precisely account for the special character of operations performed and the effect of the regional conditions on the innovativeness of the enterprise. New proposals for the measurement of innovative potential very often assume different measurement methods for different sizes of companies (Rosebusch et al., 2009; Martinez-Ros & Labega 2002) or groups of companies (e.g., service companies; Skaalsvik & Johannessen, 2014; Kaplan & Norton, 2009; Kanerva et al., 2006) or high-tech companies (Dibrel et al., 2008; Ettlie, 2006; Miles, 2004). The Authors of these proposals have indicated that in the implementation of the innovative process in companies belonging to various industries or sectors, there are such great differences that the use of one method of innovative potential measurement very often leads to incorrect results. Such a situation

forces one to conduct in-depth studies designed to capture the actual innovative potential of companies.

The level of innovativeness of economy in Brazil and Poland with particular emphasis on the SME sector. Overall assessment

The innovation theme is treated by the Brazilian government in conjunction with the technology theme, being primarily responsibility of the Ministry of Science, Technology and Innovation (MCTI). MCTI's priorities are to expand and consolidate the National System of Science, Technology and Innovation, promote technological innovation in enterprises, promote research, development and innovation in strategic areas and promote science, technology and innovation for social development.

In order to achieve its main goal Ministry as well as its position as a strategic component of economic and social development of Brazil, the MCTI is structured into four main departments: Department of Policies and Programs of Research and Development, Department of Science and Technology for Social Inclusion, Department of Technological Development and Innovation and Department of Informatics Policy (Brasil. Ministry of Science, 2014).

Among the main sources of funding of MCTI, there is the National Council for Scientific and Technological Development (CNPq) - which fosters scientific and technological research and the training of human resources for research in the country and the Financier of Studies and Projects (FINEP), which promotes and finances innovation and scientific and technological research in companies, universities, technology institutes and research centers.

With regard to performance indicators, Brazil still lacks depth and has no consistent tools. Quoted by the government itself as a task of constant improvement, the indicators used various methodologies congregate manuals used worldwide as: Manual Family Frascati, Oslo Manual, Manual TBP, Canberra Manual and Manual of Patent. In general, these indicators show the country's position in relation to applied financial and human resources, training grants, scientific production, patent, implementation of product innovations and process by Brazilian companies as well as international comparisons.

With this, the best tool that provides an overview of Brazilian companies on issues related to innovation refers Innovation Research (PINTEC) (see Brasil. Pintec, 2014) that since 2000 is held every three years by the

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Brazilian Institute of Geography and Statistics (IBGE) in partnership with the Ministry of Science, Technology and Innovation. The research aims to build national and regional indicators of innovation activities of Brazilian companies. Its focus is on the factors influencing the innovative behavior of firms, the strategies adopted, the efforts, incentives and innovation outcomes.

The IBGE study uses the definition of innovation contained in the Oslo Manual and follows the logic of the questionnaire used by Eurostat, the official statistical agency of the European Commission for the Third Community Innovation Survey. The concept of technological innovation is translated as placing on de market of a product (good or service) technologically new or substantially enhanced, or even the adoption by the company of a technologically new or significantly enhanced production process market.

Their results are presented by sectors of activity and size of the company, identifying the nature and intensity of innovative activities, the degree of novelty of the changes implemented, the sources of information used and interaction with suppliers or buyers.

The questionnaire used in the survey incorporates key concepts of innovation economics in its evolutionary aspects. The innovation refers to product and/or new process (or significantly improved) to the firm and are not necessarily new to the market, may have been developed by the company or by another company/institution. May result from new technological developments, new combinations of existing technology or utilization of other knowledge acquired.

Among the various data collected by the survey, stands out the rate of innovation of Brazilian firms, which corresponds to the ratio between the number of companies who claim to have introduced at least one innovation in the period considered and the total number of companies in the sectors surveyed by Pintec. Thus, the rate of innovation can be considered a measure of the resulting effort of enterprises to deploy innovations.

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Table 2. Rate of innovation in the extractive industry and manufacturing (1998-2011)

Reference period	Rate of innovation	Rate of product innovation	Rate of innovation of new products for the domestic market	Rate of process innovation	Rate of innovation of new process for the domestic market
1998 - 2000	31.52%	17.58%	4.13%	25.22%	2.78%
2001 - 2003	33.27%	20.35%	2.73%	26.89%	1.21%
2003 - 2005	33.36%	19.53%	3.25%	26.91%	1.66%
2006 - 2008	38.11%	22.85%	4.10%	32.10%	2.32%
2009 - 2011	35.56%	17.26%	3.66%	31.67%	2.12%

Source: IBGE (Pintec).

According to the data obtained in the five editions of the survey conducted by IBGE, we observe that, in the last reporting period (2009-2011) occurred for the first time, a decrease in the rate of firms of the manufacturing sector, with a decline from 38.11% to 35.56%. The global recession of 2009 and the appreciation of the Brazilian currency (R\$ real) against the U.S. dollar negatively influenced the development and implementation of innovations in enterprises of the country. Moreover, competition from Chinese products also contributed to the stagnation of some Brazilian industrial sectors.

Another important point to note refers to the scope of the Survey of Innovation applied by the IBGE. Among the requirements for participation, it is necessary that the company has ten or more employees, excluding the study, therefore, micro companies with up to 9 employees. Therefore, this research is relevant also for allowing the participation of enterprises with up to 9 employees, since this portion is not represented in official studies and surveys on innovation indicators of the Brazilian government.

Thus, it is verified that there is no officially in Brazil a tool to assess comprehensively the effectiveness of innovations implemented by micro enterprises in the country, once the adopted research reaches only a portion of this group. According to a study released in 2011 by the Central Register of Enterprises of IBGE, in 2009 Brazil had 4,309,463 micro enterprises, which represented 88.9% of establishments registered in the country.

Within the years 2006 – 2013 huge investments have been made in order to increase the innovativeness of the Polish economy. The investments have been implemented in the form of the Operational Programme Innovative Economy (OPIE), financed from the EU funds and from the state funds. Total value of the investments within the framework of the pro-

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gramme was 10.18 billion EUR, including 8.65 billion EUR from the EU budget and the rest from the state funds³.

The main priority within OPIE were actions related to investments in innovative undertaking (15.08 billion PLN), researches and development of modern technologies (6.24 billion PLN), infrastructure of research and development area (5.32 billion PLN), information society – increase of the economy's innovativeness (3.84 billion PLN) or diffusion of the innovation (1.82 billion PLN)

According to the situation as for October 2013, within OPIE 13,277 projects have been approved for total amount of 40.15 billion PLN. Such support level is unprecedented in Polish history.

Simultaneously, such a great scale of investments in the innovativeness of the economy forces to perform an extensive analysis and assessment of the undertaken actions. One of the assessment possibilities is the efficiency evaluation in relation to the dynamics of changes in innovative activity of Polish companies. The Authors of this article has focused on the evaluation of the innovative efficiency of SME sector companies.

A series of reports on the innovativeness of Polish economy has been issued recently (Rybiński 2011, Hausner 2012, Baczeko 2012). The reports critically evaluated the innovativeness of Polish economy and analyzed various aspects of the problem.

The Rybiński's report evaluates nine components influencing the level of Polish economy's innovativeness and reveals that Poland is rapidly losing its distance to other countries in the area of innovativeness.

The Hausner's report elaborates weaknesses of the Polish development policy and reveals the lack of mechanisms stimulating innovativeness. The Hausner's report provides data indicating the low level of Polish economy's innovativeness and points out a series of causes of the situation, among other: the lack of strategic leadership, bureaucratic procedures, identification of the UE funds expenditure with the development policy, low evaluation level of the EU funds expenditure. Similarly, critical opinions are included in the Baczeko's report.

Also the reports issued by foreign institutions provide critical evaluation of the Polish economy's innovativeness level. It may be exemplified with the reports: Union Scoreboard and World Economic Forum.

³ Retrived from www.poig.gov.pl (10.10.2014)

In the report, the value of the innovativeness index dropped for Poland from 3.5 to 3.3 within the last six years, and in the global innovativeness ranking Poland went down from position 44 to 66.

The mentioned reports focus on the whole Polish economy and do not provide a detailed analysis of the innovativeness of SME sector companies.

Research method and characteristics of the population used

The starting point for conducting empirical research was the Authors' hypothesis: (H1) The determinants forming the innovative potential are similar for Brazilian and Polish companies of SME sector.

In order to confirm or negate the hypothesis, the Authors have conducted empirical researches of the innovative activities' determinants in the SME sector companies in Brazil and Poland. An Internet questionnaire including 23 questions divided into 8 categories has been used in the research.

The structure of the research tool (questionnaire) is based on the innovativeness audit methodology elaborated at the University in Hamburg⁴ and used for researching innovative potential of companies. The applied research method is based on the analysis of the innovative processes taking place in companies - with a special consideration of the nature of innovative processes taking place in SME sector companies. A widely described in the modern literature (see Kotsemir & Meissner, 2013; Graf, 2006; Vahs & Burmester, 2003) and used in practice the network model of the innovative process is used by the Authors as the model innovative process - it divides the innovative activity into stages and vividly stresses company's cooperation with the surroundings. The analysis of the process enables indication of eight areas of company's activity which substantially determine the innovative activity. The identified areas covered all the company's innovative activity stages and allowed for the division into external and internal determinants. The following areas of company's operation have been researched in detail:

1. Analysis of the internal and external situations of the company,
2. Issues concerning the search for ideas with regard to innovation,
3. Issues concerning project planning with regard to innovation,
4. Financing of innovative projects,

⁴ Since 2009 Szczecin University and the University in Hamburg have been implementing partner researches considering innovative potential of companies.

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5. Innovation culture and strategy of human resources development,
6. Company internal communication and its organization,
7. Issues concerning diffusion and transfer of innovation into the market, and
8. Issues concerning implementation of innovative projects.

The questionnaire was addressed to owners or managers responsible for development and innovative activity in the researched companies. Closed-end questions were scaled from 1 to 5 (where 1 – meant the lowest value and 5 – the highest value). Some of the asked questions considered the self-evaluation of the quality of innovative activity, some of them required providing specific numerical and financial data. Obviously, the Authors are aware that the self-evaluation may be of subjective nature and it makes the generalization of the conclusions more complicated - however in case of the majority of quality information this method of collecting information seems to be the only option.

Preparing a research tool and a range of research, Authors conducted a detailed review of global research in the field of innovation potential and drew upon the experience of other Authors. In particular, Authors took into account the results of research carried out by Miller (1983, pp. 770-791) and Zahra & Wicklund (2010; research on the level of innovation), Koberg et al. (2003, pp. 21-45; research on communication in organizations), Cameron & Quinn (2003; research on organizational culture). During the preparation of a research tool, the Authors used the achievements of Polish researchers: Zastepowski (2010, Conditions for building the innovation potential of polish small and medium-sized enterprises) and Mazurek-Kucharska et al. (2008, Social determinants of innovation of enterprises). Detailed methodology and the full scope of the study are described in other publications (Norek 2011).

The received results have been subject to basic statistical analysis and on this basis with the logical induction the Authors have made conclusions on the determinants of innovative activity in researched companies.

In case of SME sector companies in Brazil the research was of pilot nature and addressed only a small number of companies. The Authors are fully aware that such a small number of the researched companies is not representative to all the SME sector in Brazil and does not give grounds for general conclusions. Nevertheless, the conducted research provides initial picture if the determinants forming innovativeness and enables making deeply basic conclusion and provide an answer to the question considering the validity of conduction further researches of the area.

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The target population of this study were Brazilian companies from the Software and Services sector linked to the Brazilian Association of Software Companies (ABES). The choice of this population occurred because it refers to a sector focused on innovation.

First, the Authors contacted the ABES and requested permission to apply the research with directors and managers of associated companies. After approval, the questionnaire was elaborated in an online platform and its link was published on the association page, including a brief explanation of the study and an invitation to participate. The disclosure occurred in early December 2013 and the results were awaited by mid-January 2014. Only 36 valid responses were received: 6 of Software Companies (16.66%), 28 of Software and Services Companies (77.78%) and 2 Companies of Hardware, Software and Services (5.56 %).

Regarding the classification of companies, the Authors adopted the definition used by the Brazilian Institute of Geography and Statistics (IBGE) and the Brazilian Support Service for Micro and Small Enterprises (Sebrae), which uses based on the number of employees: 0-19 - micro enterprise; 20-99 - small enterprise; 100-499 - medium enterprise; 500 or more - great company. So, the division in this study were as follows: 16 micro enterprises, 14 small enterprises and 6 medium enterprises. Terms of geographical distribution, 3 companies are located in the Midwest of the country, 2 companies in the Northeast, 25 companies in the Southeast and 6 companies in southern Brazil.

In Poland 200 companies from three regions were selected for the analysis: Zachodniopomorskie - medium innovation performance voivodship, Podkarpackie - low innovation performance voivodship, Mazowieckie - high innovation performance voivodship.

Table 3. Structure of the research sample

Size of the companies	Brazilian sample	% Brazil	Polish sample	% Poland	Total %
Micro	16	44.44%	79	39.50%	40.25%
Small	14	38.89%	94	47.00%	45.76%
Medium	6	16.67%	27	13.50%	13.98%
SUM	36	100.00%	200	100.00%	100.00%

Source: own elaboration

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They were selected in a purposeful manner to ensure an appropriate research structure: 45% of production companies, 55% of service companies. The division due to the size of the examined companies was as follows: 39% micro enterprises, 47% small enterprises, 13% medium enterprises. The sample for comparative researches was standardized with statistical methods taking into consideration the structure of individual provinces' economy: size of the company and dominant type of the conducted activity. The Authors are fully aware that the analyzed sample is not representative, however it is an amount sufficient to perform the analysis and make conclusions. The research was conducted during the period from April 2013 to August 2013. Structure of the research sample is presented in Table 2.

**Comparison of determinants of innovative activity of SMEs
in Brazil and Poland.**

On the basis of the conducted researches of the eight (described above) areas of the innovative activity, the Authors have calculated an average indicator describing innovative activity of the researched companies. For the MSE sector companies in Brazil the indicator was 3.735 and for the Polish companies it was 3.487. The companies of the SME sector in Brazil reveal far bigger, in broad sense, innovative culture in relation to Polish companies (the difference of the results for the area is 0.9). It seems that the aspect is directly transferred to (related with) a better internal communication of Brazilian companies (difference is 0.99), project planning (difference is 0.2) and as consequence it results in better general implementation of innovative projects (difference is 0.29).

Polish companies reveal greater abilities of financing innovative activity (difference is 0.14) which is related to a great possibility of financing innovative projects with the EU funds.

The remaining research areas reveal similar results for Brazilian and Polish companies - difference around 0.1. Despite the above-mentioned differences, the results may be considered similar (unimportant differences) and confirming the proposed research thesis.

Table 3 presents the means grouped by categories, according to the research design.

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Table 4. Aggregate Values for Innovation Capacity of Surveyed Enterprises

N		Mean of category		Issues in each category
		Brazil	Polish	
1	Analysis of internal and external situation of the company	3.90	4.0	3
2	The search for innovative ideas	3.77	3.8	4
3	Planning projects regard to innovation	3.70	3.5	3
4	Financing of innovative projects	3.36	3.5	3
5	Innovative culture	3.80	2.9	3
6	Internal communication	3.99	3.0	2
7	Control, diffusion and transferring innovation	3.67	3.8	3
8	Implementation of innovative projects	3.69	3.4	2

Source: own elaboration

Analysis of the internal and external situations of the company

As regards internal and external analysis, firms were asked if take into consideration the market incentives to develop new products or services, if they have the ability to expand the company and if work in cooperation or partnership with institutions to support implementation of new innovative projects. The highest average was verified in the account related to external stimuli item (Brasil M =4.22, Polish M =4.37), demonstrating that the companies surveyed are concerned and alert to the market, the competition and the public incentives when developing new innovative products or services. The possibility of expanding the activities resulting from the introduction of new products is also significant - it received higher mean (Brasil M =4.00 Polish M =4.1). The lowest average was related to work in cooperation with institutions or companies (Brasil M =3.50, Polish M =3.72), demonstrating that most of the SMEs surveyed do not develop joint projects, which could leverage your business and increase their innovative capacity.

The search for innovative ideas

In this topic, respondents were asked if the opinion of customers and employees is important for the development of new products, if the company usually hire market research or experts in innovation and if the company has a established channel for collecting opinions of customers and employ-

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ees. Highest average was observed in the importance of MSEs attach to opinions from customers to develop new products (Brasil M =4.33, Polish M =4.35) demonstrating a market-driven orientation. Was also high for the average found related to employee opinion item (Brasil M =4.19; Polish M =4.25), demonstrating that the owners are attentive to the team. Relating the formal channels for collection of opinion, the average was not significant (Brasil M =3.30, Polish M =3.31). This finding indicates that the collection of feedback from clients and employees usually occurs informally in much of the SMEs. The companies surveyed also said they usually do not use market research or opinion of external experts in the search for new ideas (M =3.27, Polish M =3.29). This can be explained by the lack of resources of the enterprise, because this kind of assistance requires investments that most businesses do not have.

Planning projects regard to innovation

Related to planning, was asked if SMEs have the capacity and knowledge to evaluate new ideas, if they have criteria for knowing when to continue and when to stop the development of new ideas, and have a formal management process related to the development of new products or services. The highest mean was observed in the capacity of MSEs to assess the potential of new ideas (Brasil M =4.80, Polish M =4.78). In this sense, it is possible to attest that respondents consider themselves with sufficient knowledge to decision-making on issues related to the development of an innovative idea. However, the item related to the definition of criteria to decide when to stop or when to continue to develop an innovative product or service, received low values (Brasil M =3.52, Polish M =2.24). The mean related to the existence of a formal process for managing issues related to innovation nor obtain a satisfactory average too (Brasil M =3.50, Polish M =3.48). This indicates that, although most of the respondents declares that their company has the ability to assess the potential of new ideas, this evaluation does not occur in a formal manner, to previously established criteria, but informally, according to the evaluation of the owner.

Financing of innovative projects

Regarding funding of innovative projects, the means obtained were not significant. SMEs was questioned if they have resources available for innovative projects, if they have ways to assess the availability of resources and

if the company has empowered people to obtain resources. Regarding the availability of resources, it appears that most SMEs do not have the financial capacity for new projects (Brasil $M=3.33$, Polish $M=3.52$), and maybe this is the most difficult for business growth. Also it was observed that part of the companies surveyed do not have persons qualified to evaluate the need for resources in an innovative new project (Brasil $M=3.50$, Polish $M=3.62$), corroborating what was previously observed, about the lack of criteria to evaluate the viability of the one new project. Finally, the existence of qualified persons to find funds in the market, the average calculated was even lower (Brasil $M=3.25$, Polish $M=3.50$), demonstrating that the MSEs surveyed do not have sufficient resources to the development of innovative ideas and find it difficult to obtain funds financial market because of lack of qualified people, which undermines their business in the medium and long term.

Innovative culture

In this topic we aimed to verify that the innovative profile is disseminated in corporate culture, by questioning participants about the clarity of the owners in the disposition to innovate (on the top), the willingness to take risks in implementing innovative projects and whether or not recognition for those employees who contribute to the implementation of innovative ideas. Regarding the willingness to innovate starting with the owners and directors, the mean was not very high (Brasil $M=3.83$, Polish $M=2.7$), suggesting that not all owners of SMEs participants are aware of their responsibility for the development and effectivities of innovative actions in their companies. On the other hand, the willingness to take risks appears to be present in most of the participating companies (Brasil $M=4.04$, Polish $M=3.2$), demonstrating that they know the importance of taking risks for the implementation of innovative projects. The lowest mean value for this topic has been verified in recognition to employees (Brasil $M=3.52$, Polish $M=2.8$). According to the data collected, is not yet entrenched in the companies the need to reward and gratify employees who collaborate and contribute with innovative practices. This makes the staff not engaging with motivation to projects presented and its performance may be lower than expected.

Internal communication

The effectiveness of internal communication was assessed through questions regarding the use or not of technological tools to support communication and beliefs of respondents regarding efficiency and effectiveness in providing the information to company employees. On the first question, the mean was Brasil $M = 4.11$, Polish $M = 3.0$ demonstrating that most SMEs use of support and teamwork tools.

The Authors conclude that in the case of Brazilian companies, the result is determined by the fact that the study involved a software producing companies - for which the use of modern communication tools is more natural. However, the issue related to efficiency and effectiveness in the transmission and flow of this information, the average calculated was not as significant (Brasil $M = 3.88$, Polish $M = 3.04$). Whereas the research was conducted with micro, small and medium enterprise, the efficiency and effectiveness in internal communications proved to be lower than expected, because the number of employees and hierarchical levels in these companies is reduced.

Control, diffusion and transferring innovation

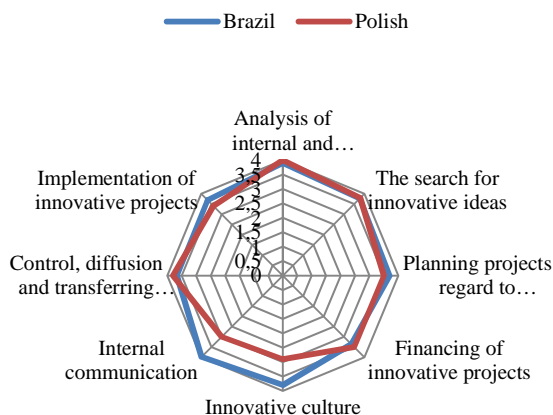
The purpose of this item was to verify the control that SMEs have the number of products/services implemented and your profitability, as well as the acceptance of its products in the market. The average found about to the control the number of innovative products implemented in recent months and/or years was Brasil $M = 3.88$, Polish $M = 3.95$. This suggests that some SMEs do not have control of what they produce, which certainly hinders the planning of goals to be achieved. Consequently, the mean is even lower in the matter relating to the control of the profitability of the products introduced in the market (Brasil $M = 3.61$, Polish $M = 3.85$), demonstrating the fragility of SMEs in matters relating to financial control of costs, expenses and profits obtained from the business. The evaluation of the acceptance their products in the market is also unrealized for a share of the companies surveyed (Brasil $M = 3.52$, Polish $M = 3.72$). Thus, they fail to improve their products/services and customer loyalty, hindering the company's earnings over the long term.

Implementation of innovative projects

Finally, the topic related the implementation of innovative products/services aimed to identify whether the participating companies have quality monitoring and costs monitoring of what they put on the market and if they are alert to the training of employees who work directly with the products launched. The first item, related to the existence of monitoring systems of quality control and cost control of all innovative products implemented, the average was low (Brasil M =3.38, Polish M =3.21), confirming the values of the previous topic. Again, we see the difficulty that companies find to monitor and measure the results of what they produce and offer to customers. Regarding the preoccupation of SMEs with training and knowledge's people directly involved in the presentation and marketing of new products/services, the value verified was Brasil M =4.00 and Polish =3.59. Considering the average calculated in the other research questions, it can be affirmed that the results found in this item is positive, making us believe that the companies surveyed are attentive to the training of those who implement their innovative products/services.

Graphical comparison of the results (clearly illustrating the differences) is shown in Chart 1.

Figure 4. Aggregate Values for Innovation Capacity of Surveyed Enterprises



Source: own calculations.

Conclusions

The obtained results enable the confirmation of the thesis put forward by the Authors - determinants forming the innovative potential are similar for Brazilian and Polish companies of SME sector. The average indicator describing innovative activity of the researched companies was slightly bigger for Brazilian companies (the difference is 0.247) - but the difference may be considered small.

Regarding Brazil, although the research findings can not be generalized - because the small number of participants, they reflect the scenario of most micro, small and medium enterprises in the country. Actions related to the search for innovation activities are not yet part of the day-to-day SMEs. According to a ranking prepared by the World Intellectual Property Organization (WIPO)⁵, Brazil ranked only 64th in the Global Innovation Index 2013, of in total 142 participating nations - an uncomfortable position, considering the country's potential.

With specific regard to this research, the results point to the financing of innovative projects as the major difficulty for the effectiveness of actions related to innovation. The lack of resources and lack of persons qualified for raising these funds in the market undermines the development of new products and new processes in SMEs. Another important factor relates to the lack of control of companies as the number of deployed products, the profitability of these products as well as their level of market acceptance. Without this control, it is difficult to planning and decision making for the future because they can not assess the current situation and the company's market position.

On the other hand, there were good averages on issues related to internal communication and analysis of internal and external situation of the company, indicating that technological tools have been used effectively and that the SMEs surveyed are attentive to the environment to which they are inserted. Individually, we highlight the importance of SMEs attach to the opinion of customers to develop new products/services, as well as the importance to external stimuli, such as competition and market.

Even though the results are below the desired level, Brazil has advanced significantly in the dissemination of subject matter and discussing issues related to innovation. In the public sphere, large amounts of funds are allocated each year to innovative projects - in its majority managed by the

⁵ World Intellectual Property Organization, "Global Innovation Index 2013", 2014. Retrieved from <http://www.globalinnovationindex.org/content.aspx?page=data-analysis>

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Ministry of Science, Technology and Innovation. In the business field, organs such as the Brazilian Service of Support for Micro and Small Enterprises (Sebrae) and the National Confederation of Industry (CNI) invest in the promotion of lectures, courses and training that guide and stimulate innovative practices. In universities, a growing number of research and models developed on the subject. The challenge, however, lies in uniting these forces and turn their efforts into practical results, which mainly improve the activities of SMEs of the country.

The conducted researches enabled forming recommendations for further researches. It seems that the obtained results should be subject to a detailed statistical and economic analysis (the applied research tool - questionnaire - was designed in such way as to provide multidimensional data enabling the analysis of innovative activities in the researched companies in various sections. Such research could result in defining importance of the influence of individual determinants on the innovative activities in the researched companies and undertaking an attempt at the construction of models describing ways of implementing innovative activities by the SME sector companies. Such researches have already been conducted for Polish companies. The Author (Norek, 2013) has presented the results at several international conferences and published them in a series of scientific publications.

Another recommendation concerns undertaking an effort to continuously monitor the dynamics of changes of innovative activity determinants in the researched companies. Such researches may reveal trends in the innovative activity of the SME sector companies and provide arguments for creating regional innovative policy. The Author (Norek, 2012) has been conducting continuous researches of the dynamics of innovative activity in the SME sector companies in Poland since 2009. The results of the researches have also been presented and published many times.

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Wall Street's Culture

JEL Classification: *E5; F3; N20*

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Abstract: Modern finance has become a very complicated field, which raises many questions about its economic and social mission. Many bankers' ignorance of complex knowledge and care for the future are hostile ingredients that transform the markets' volatility, through spillover effects, into economic and financial crisis and social anomy. What fuels the wildfire does not necessarily mean black swan events, but often it is the result of (un)conscious and (un)intended decisions of certain economic policy makers. The current financial system is discredited. It is necessary to reform the financial institutions and practices, with the core principle that money should serve the economy and society and not vice versa. In a world of financial capitalism, a world driven by money and adjacent institutions appear to be defective and unjust to many of us. The conflicts' arena must be manageable. The hopes rely on the institutions that represent financial capitalism, institutions erected by people, and where they do not work, they have to be changed.

Introduction

Reinhart and Rogoff showed dozens of crises that erupted in all parts of the world since the nineteenth century until the twenty-first century. (Reinhart & Rogoff, 2009, pp. 348-391) It seems that a crisis with a higher or lower amplitude is inevitable in the configuration of any economic system. The contagion effects of local crises could spread widely, the rebound of the private decisions of some interest groups inexorably affecting the life and the destiny of any human communities. We can strengthen all the above citing the most famous crisis of the interwar years. Liaquat Ahamed (2014) stresses that the global economy collapsed between 1929 and 1933 not because of a single trigger, but it was the result of an accumulation of heterogeneous, but interrelated, events, conducted many thousands of miles away: the German economic crisis that began in 1928, the Wall Street Crash (1929), the banking panic triggered in the United States in 1930 and the financial crisis experienced by Europe in 1931. Interesting is the fact that the author finds analogies and similarities between these past crises and other much recently triggered: the Mexican peso crisis (1994), the dotcom bubble in 2000 and the global financial crisis that started in 2007. (Ahamed, 2014, pp. 454-457)

What fuels the wildfire does not necessarily mean a “black swan” type of event, but often, as we will see below, it is the result of (un)conscious and (un)intended decisions of the economic policy makers.

For the period 1929-1933, the moral authors of economic policy decision errors are few major players. First, the politicians who took the major decisions by the end of World War I, at Paris Peace Conference, created the desire for revenge and many severe national antipathies since they established huge international debts which had a negative impact on the international financial system. For example, Germany, France and England owed together, updated, a colossal amount: US \$ 4.6 trillion. Secondly, the group of the most important four bankers of the time, the Governor of the Bank of England, the Governor of the Federal Reserve Bank of New York, the President of the Reichsbank under the Weimar Republic and the Governor of the Banque de France, excessively and stubbornly trying to revive the gold standard, was held responsible for the economic and financial distress at the time, as well as the difficulties for harmonizing international relations. Also, they were considered guilty because they have obstinately followed the economic paradigm that does not always work perfectly, namely that, in crisis, the economies automatically adjust (the famous “invisible hand” of

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Adam Smith), so no need for any intervention like “lender of last resort”. When some of them finally understood the need for concerted intervention, the gold standard was a tough obstacle and threw their economies in a generalized deflation. (Ahamed, 2014, pp. 458-460) The disaster eventually followed ... National economies were managed by an elite, unable to understand the importance of the historical moments, to anticipate the consequences of poor economic policy decisions and to decide in accordance with the “moment of grace” experienced through all over the world.

After the crisis from 1930s, the financial and banking sector was regulated excessively (Bhidé, 2010, pp. 228). But 1980s caused a paradigm shift in this ideology and a deregulation and liberalisation processes started because it was considered that an economy always ran a self-correcting pattern and behavior. Competition was stressed to be the most viable filter for every bad management on higher risk-taking and the result was the transfer of this segment of supervision from the institutional regulator to the private one, the bank alone (Turner, 2009, pp. 87). Although these trends were not universal, especially in the United States of America and United Kingdom, the bankers followed a two-step pathway: first, they were free to run for the best profit opportunities, and second, they entered a financial market with higher leveraged mortgage-backed securities, very risky behaviors as we have seen (Bell & Hindmoor, 2015, pp. 5). Other economists considered that the crisis from 2007-2008 represented the end of the “mystical Anglo-Saxon model of liberalisation and regulation” (Mackintosh, 2014, pp. 1).

It is obvious and logical that the new financial technologies have played an important role in precipitating the crisis we are experiencing, feeding the anger towards bankers, brokers, investors, speculators, fund managers, issuers of financial derivatives and, in general, towards everyone dealing with money management, who supposedly created the financial bubble to become rich and impoverish the world. In the souls of men resentment continues to smolder, together with skepticism and a vivid sense of helplessness. New social turbulences were therefore expected.

We have at least two problems: how to create a viable financial sector and what place and what role to find for it in an open society? Do current financial practices support or undermine a market democracy in a healthy society? These are topics for a serious debate, to which Robert J. Shiller (2014), the winner of the Nobel Prize for economics in 2013, invites us to discuss.

Wall Street's culture

One of the problems we quickly see is the centrality of financial innovation, from the stock market to mortgages. It supports globalization. Another one concerns the morality and the substance of the financial system, to which the roles and responsibilities of the actors are linked. Another problem aims dynamics, extreme developments at all levels. It is noticed that despite the debate, there is a profound misunderstanding on all these issues, particularly regarding the role that markets and institutions must play in the global society.

Despite Shiller's optimism regarding the capacity of financial science and of its powerful tools to help all men, doubt persists among the general public who tends to think that people in the financial world conspire to the detriment of many in their own favor, instead of having in view all the interests of all members of civil society, maybe even more of those in need. Why? Can the conspiracies in the financial world be denied? History says no. Were they made in favor of the elite? History says yes. Then, we get another serious question: do these instances of manipulation and calculated deception, have a general, systemic character, or are they just particular cases?

Modern finance has become a very complicated field, which raises many questions about its economic and social mission. The current financial system is discredited. People working here have no financial credibility; ethics and the sociology of finances have been abandoned, but the need of money remains as well as all the conditionings created by financiers for the production of money. It is necessary to reform the financial institutions and practices, with the core principle that money should serve the economy and society and not vice versa. Financial and communication technologies must be modernized to make microfinance, for example, reach the poorer. New and more flexible types of loans have to be designed. Then, if all spiritual traditions condemn interest, or usury, why do we practice it with such zeal (except for the Islamic financial system)?

We found that through some financial engineering, money can make money, in other words, money can be made without working. For this, we created a whole scaffolding of rules and instruments, institutions and a whole science. How do authors like this Shiller imagine that such a castle made of cards, such a casino economy, can withstand a la longue? Only fools and those interested can believe that. They talk about "participatory forms (!) of using the risk capital". In other words: "Give us your money to

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play the roulette.” And losses must have been socialized or subsidized from tax-payers’ money and household savings (Jönsson, 2014, pp. 373). Hence, the internet is full of sites of “crowd funding” or “spontaneous collective financing”.

Public finances have a predominant public dimension, but were largely diverted for the private interest, so they need to be reinvented, starting with their legal infrastructure. We need a new financial literacy. Who sets the rules? Politicians are the first who need to understand and write new letters. We need good macroeconomists to develop sound economic policies, a terrible challenge; we need new pension schemes, social benefits and many other institutions built on the principle of intergenerational risk sharing, but with updated rules, avoiding the famous speculative “bubbles”.

The belief that prices can not fall caused a mass phenomenon, but it must be abandoned. Such bubbles must be detected in time and defused before they infect the entire economy. Pricing models for capital assets and intricate formulas for calculating option prices can enrich you, but the financial sector is not only concerned with this, or just with risk management, but must deal with the asset of servicing the company objectives. The financial system must be democratized by extending its benefits through more imagination, innovation, skill and selflessness. Finance must be reinvented.

Michael Lewis in his latest book, “Flash Boys: A Wall Street Revolt” (W. W. Norton & Company, New York, 2014) stressed that Wall Street’s culture is harmful twofold. First, the preeminence of short-term gains despite the long-term ones always will encourage risky behaviors and, therefore, will corrupt the economic incentives. Second, many bankers don’t know what the market is going to do in the future, while they pretend to know more than they are prepared to see. Governments tried to solve these problems adopting better regulations and, in many cases, quantitative relaxation mechanisms. (Ide, 2014) This issue emphasize a dangerous feature of the financial system: many bankers’ ignorance of complex knowledge and care for the future are hostile ingredients that transform the markets’ volatility, through spillover effects, into economic and financial crisis and social anomy.

We live in a world of financial capitalism, a world driven by money and adjacent institutions which appear to be defective and unjust to many of us. It is an invented world, partly virtual and which continually reinvents itself, not always thoughtfully. The characteristic financial system must be expanded and democratized, humanized, moralized, so that its impact on or-

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dinary people can be mostly positive. In addition, the system should be more transparent, so that the information and resources to be used actively and intelligently by all interested persons almost permanently.

The current financial establishment must abandon cynicism, selfishness and aggression. The new financial inventions need rationality and humanism. Only in this way can the so blatant inequalities be reduced. Otherwise, social movements, from left or right, can reignite, leading to chaos. This brings a charge to the conspiracy between the government and the leading financial sector, plus an excessive concentration of money and power in the key financial centers, while the others perform the work. Financial kings dominate the governors like puppets for mutual enrichment. That caused the crisis.

If we do not attack its deep roots, the crisis can repeat itself. Why were the culprits not punished? The Inquiry Commission of the Financial Crisis in the US Government described the booms as “madness”. In the US, people gathered using social media, but went from peaceful demonstrations to fights with thousands of participants, whose motivation nobody understands. Is that so? No one thinks about the frustrations of those meaningless people deprived by the crisis, about the real shortcomings within its system and about the aberrant behavior of its managers. Why not adopt corrective laws and regulations?

In 2008, The Telegraph announced that “Lehman Brothers’ British staff reacted with fury when told that colleagues at Lehman’s New York office were expected to share in a \$2.5 billion bonus bonanza while they would be paid just until the end of the month.” (Butterworth, 2008) While other examples should be easy to list, some bankers considered bonus controversy an error. AIG CEO Robert Benmosche declared this scenario “was intended to stir public anger, to get everybody out there with their pitch forks and their hangman nooses, and all that—sort of like what we did in the Deep South [decades ago]. And I think it was just as bad and just as wrong.” (Daily Finance Staff, 2013) Also, it is interesting to notice that the bankers’ share of earnings in the United Kingdom, “those at the very top of the pay distribution”, hadn’t reduced during the period 2007-2011 (Bell & van Reenen, 2013, pp. F1).

The rewards for the finance people are enormous for their effort, and inequalities are blatant. In addition, governments have saved fraudulent rich bankers with money from taxes from the poor, which is downright scandalous. Is that capitalism? How healthy and how sustainable is the rise in credit of the economy? Does it solve or does it create more risks? Where are

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Ricardo's savings? Not to mention the fact that most debts are made for weapons, for self-destructive technologies. How can such systems not implode? Instead of returning to the great classical equilibrium, it is still virtually innovating. How to integrate the correct and moral behavior in the culture of Wall Street?

The irony is that, given the degree of interconnectivity of the system, we do not need less finances, but a better one, because the generalized suspicion hinders that good innovation, in healthy financial instruments. The current political climate is also an obstacle. And money can be neither better nor worse than the society it represents. Let's look in the mirror...

Fear and power

Generalized fear delays the return to a better management of the real estate risk, for instance, or a better regulation of the capital indebtedness. Unfortunately, the response to the crisis was not the innovation of correcting the system's gaps, but how to not let the guilty die and how to manage public debt after fictive liquidities were evaporated. The second Keynes did not reach maturity yet. Thus, the information revolution is still used for nonsense; countries still have different economic structures, but experience the same policies in a global hyper-concurrence on markets with typologies in extension etc. Insurance contracts must be rethought in substance. If good will existed, the financial industry would be able to regain the potential to offer hope, while using more energy and intelligence.

Financiers get to hold too much power, and their desire for power poisons. It is said that these financial elites rule the world even easier by using rapid advances in the technology of information. "Expert thinking" has become more expert and "complex communication" has become more complex. New technologies increase wealth, which increases power and even pleasure. They are the new "golden calves", fact noticed by George Akerlof (1976, pp. 599-617). Yes, there are castes that offer huge economic benefits by simply belonging to them: from good jobs, protection, business opportunities and this is present everywhere. This leads to concentration of wealth and power, but also fierce conflicts. Also, leaving such a caste may attract big trouble. Sometimes financial instruments in themselves create the caste structure and here the great danger prevails; other times they are just simple means in themselves.

Robert Shiller informs us that the capitalist financial system is still a work in progress; it is gradually improving, until there is no stone on stone,

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if we may add. It is defined as a long list of financial practices, specific roles and responsibilities. They say it democratizes! ... They did not give up usury, but the spirit of caste, including in India. Well, how else could globalization be possible? A flock and one shepherd...

Aristocracy and “High Society” of the nineteenth century is not lost, as some fantasize, but it transforms. “A more egalitarian spirit is abroad in the world, and it is supported by democratized finance” (Shiller, 2014, pp. 467). Or that, please forgive, is either stupid, or writing after orders (other cases are: Fukuyama, Huntington, Th. Friedman, Krugman and many others). President Roosevelt caused a real democratization of financial markets. But here we speak about another moral caliber and other times.

There are other ways to conquer and maintain self-esteem than the acquisition of wealth; this is not necessarily the meaning of our lives. Human potential can be fulfilled in various forms, fair and honest. Then why almost all crowd in the field of finance, trying to get rich by all means? Why is the redistribution of power and wealth produced so large-scale, without any connection to real merit? Where there is a large dose of randomness, entropy and waste increases, until the death of the system, if the principles do not change. We are at a crossroads and it is difficult to see new principles. Maybe in Asia. It is estimated that over ten years or even earlier China will overtake the nominal GDP of the United States. This is an opportunity to change the principles, with high costs, but it would be better than an implosion ... Many years ago, it was written about three implosions: the USSR, the European Union and the US, in that order. Unfortunately, the evolutions in the meantime seem to confirm this opinion.

Castes

Our economy is driven by elite monopolizing the power. Returning to the caste system, they would be the new Brahmins, who serve to the Money God. The second caste would be composed of kings and soldiers, who represent the first and keep them safe. The third is composed of those who work in various fields and pay taxes from which those in the first caste get their wealth. Finally, the last caste, the outcasts, consists of those who were disinherited by fate - about two billion people, of which half in Africa. Also, it is interesting to see that in 2012 the United States recorded about 46.5 million people living in poverty or almost 15% of total population. (Chandy & Smith, 2014, pp. 3)

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It is easy to see a strengthening of the first, second and fourth caste, and a dilution of the middle class who bears the brunt. Resources, wealth and power are increasingly concentrated in the first two levels, strongly unbalancing the system. What we had got out of here? Logically: social “anomie” and tensions.

We do not have a safety net as the states in the modern era used to have, the tax systems are less progressive, and attempts to change lead to capital flight. In the globalized capitalism, we need to provide the risk protection on our own, by private arrangement or caste. The Government can be a facilitator at most. Let us see what Shiller observes: “Democratization of finances goes hand in hand with its humanization (How exciting!). In this respect, it is important for the finances to be human (!) and to incorporate our increasing sophisticated knowledge about the human mind in its systems, its models and its predictions.” (Shiller, 2014, pp. 471) Then, he continues with “neuro-economics”. This author should take by the hand another great Nobel winner, who in 2005, in a reception speech categorically declared that, nowadays, economic crises are not possible, and he is now fighting with electrification in Africa because he has one year left out of the ten self-imposed and he must finish with global poverty! ... If our elites are like that, do you realize how imperfect is the system?

Further on quoting: “We must continue to perfect a system that provides outlets for the expression of native aggression of people, allowing them to be selfish.” (Shiller, 2014, pp. 472) That sounds at least cynical. However, the author has a quality: occasionally he tells the truth, noting the indifference towards the poverty-stricken of the last caste, with reference to the philosopher Peter Unger in his well-known book, “Living High and Letting Die: Our Illusion of Innocence”, and he is surprised that it is hard for him to notice it. However, his moral arguments, perfectly futile, are considered selfish and delusive.

Human nature would be essentially focused on an inexhaustible thirst for power. Nietzsche would be proud of such an idea, which moreover is also the basis of the two world wars. He wrote that “the will to power is the primitive form of affect (...) and it is particularly enlightening to accept power instead of individual “happiness”: there is a longing for power, for power increase (...) any driving force is will to power, there is no other physical force, mental or dynamic besides this.” (Nietzsche, 1901, pp. 11)

These should therefore be philosophical foundation. But Shiller overbids his theory by stating that “neuroscience shows many patterns of behavior in the brain, including altruistic impulses, which cannot all be derived

from any unitary “psychic force” (Shiller, 2014, pp. 236). In other words, man would be a kind of agglutination of innate and disparate mental concepts, perhaps reacting to stimuli. That's according to the new science of “neuro-economics”.

Yet Adam Smith wrote “The Theory of Moral Sentiments”, in 1742, where he does not speak at all about the will to power, but about other feelings, more noble ones, that would give an impulse to economists, including, for example, the desire to be appreciated. Then there is an enormous literature that contradicts the lust for power, especially in essentialists, phenomenologists etc. What follows from these investigations is that dignity, for example, overcomes the brutal desire of power. Smith speaks of “the zeal for approval and esteem of those who live near us, which is of so great importance to our happiness (...). We not only like to receive praise, but also to do something praiseworthy.” (Smith, 2013, pp. 18)

What did you do with economics? From holotropic it has come to be hylotropic, a false picture by human nature. But who wants to be falsified? We do not. We do not think that if we had a venal behavior we would be praiseworthy. This applies to those who actually have it.

Moral Relativism

There had been a lot of moral philosophies of surrogate type. All sorts of thieves and assassins, including economic ones, are regarded as heroes. Corruption, bribery, lying is put in a place of honor at the table with the king. Yet, capitalism is seen as the most moral system, more than any other, where power was used without consideration. Now the system is more perverse and more centralized. The financial elite absorbs all the resources from all over the world. Is it democratic?

The hostages of our age are the guarantees given in financial assets, pledge and mortgage. It is still a kind of slavery, on limit, all that remains to be sold is your work. This system of warranty, including repurchase agreements, which extends and amplifies the disease, is the one in which the crisis was born. Mortgage is still the equivalent of an exchange of hostages from feudalism, only that the hostages are our homes. But tragedies are still lived on human level.

The authors' hopes rely on the institutions that represent financial capitalism, institutions erected by people, and where they do not work, we do not understand why they cannot be changed. The problem is that they work

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well, but for the very few. The so-called “financial democracy” is nothing but propaganda...

Conclusions

Let's go back to where we started. The progress of the technology of information serves some financial elite, who acts as a ruling caste. Financial innovations are not just tools, such as technology. More than the latter, they serve structures of immoral interests at the expense of the many. Here, the structures of artificial intelligence are scheduled to serve the elite who rules the world. What exceeds human intelligence, especially in terms of goals and decisions, can be dangerous. This is good only as a tool. It must continue to offer space to our aggressive impulses and our lust for power. The conflicts' arena must be manageable. And it is amoral too, which is a great advantage to discourage the quarrelsome.

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**Perspectives of Introduction Sustainable
Procurement In Public Procurement
in Russia***

JEL Classification: *A11*

Keywords: *sustainable development; public procurement; sustainable public procurement*

Abstract: The paper is about sustainable public procurement as a new global trend in the development of a sustainable economy. The main question raised is the following: how sustainable public procurement could be implemented in Russia? The study aims to investigate the prospects of the implementation of sustainable public procurement in Russia. The author presents the findings of survey, covering public procurement practices of 51 contracting authorities and documentation analysis of 400 public tenders. The analysis of Russian legislation allows to determine the sections of procurement documentation, where different aspects of sustainability could be included. The conducted survey aims to identify the aspects of sustainable public procurement already used by public authorities in procuring practices in Russia. This paper provides the unique survey of sustainable procurement practices

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across the Russian public sector. Research also shows the prerequisites of implementation of sustainable public procurement in Russia.

Introduction

The growth of ecological tension pushed to find a compromise in human activities in the area of production and consumption. A compromise solution was found in the idea of transition to sustainable development, the realization of which eventually formed a variety of mechanisms and their respective tools. One of these mechanisms is sustainable public procurement, which is being actively implemented in the European Union nowadays and where the first results, for example, the reduction of carbon monoxide emissions by an average of 25%, are already visible (Egorova, 2011).

The purpose of this paper is to assess prospects of implementing sustainable procurement in Russia. The theoretical part of the study is based on the research articles of H. Walker, S. Brammer, E. Venanzoni, O. Perera. The research is based upon legal acts of the Russian Federation, the documentation placed at the federal public procurement portal, and the results of a survey among public customers.

The results of this paper can promote the use of sustainable public procurement in Russia, which will provide an opportunity to receive additional benefits for products and services with improved properties under public procurement. Consequently, the government would not only ensure the needs with products of higher quality, but also promote the development of sustainable production.

Literature review

The concept of sustainable public procurement is inextricably linked with the notion of «sustainable development», which first appeared in a report “Our Common Future” published in 1987. This report was the result of the work of the UN World Commission on Environment and Development (Our Common Future, 1987). According to the final decisions of the UN Conference on Sustainable Development, the concept of sustainable development is considered to be triune, as has been involved in the harmonization of social, economic and environmental development.

In this paper sustainable development is viewed as a development based on a balanced interaction of environmental, social and economic factors of development, that together form the process of effective development.

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As a global strategy the idea of transition to sustainable development was approved in 1992 at the Second UN World Conference on Environment and Development, in which the heads of 179 countries, including Russia, approved the "Agenda for the XXI Century" - a document that calls for national sustainable development strategies.

The concept of Russia's transition to sustainable development was approved by presidential decree in April 1996 (Presidential Decree, 1996). Later on its basis a document called "The main provisions of the sustainable development strategy" was prepared (Shelehov, 2002). As stated in the introduction of this document a "Strategy for Sustainable Development of Russia at its core should become an important public document that defines the development of Russia for many years ahead" (Shelehov, 2002). This document can be considered a political statement on Russia's accession to the policy of sustainable development.

At the World Summit on Sustainable Development in Johannesburg in 2002 new recommendations were adopted: to promote the development and dissemination of sustainable goods and services through public procurement. Public procurement may indeed be an effective mechanism for transition to sustainable development: each year the share of government spending on purchases is a significant part of the budget expenditure. According to the International Institute of Sustainable Development, in most countries public procurement accounts for between 15 to 20% of GDP (<http://www.iisd.org/procurement>). In OECD countries, this figure is 12% on average; countries with developing and transition economies spend on public procurement about 25 to 30% of GDP. Thus, public procurement can be considered as lever of influence on the private sector: introducing requirements relating to, for example, the parameters of efficiency or environmental safety of the purchased products, the government not only can provide itself with products and services of higher quality, but also indirectly compel producers to improve the products in the energy efficient and environmental directions (Green public procurement: problems and prospects, 2012).

Sustainable public procurement (SPP) - is a public procurement, which is organized with implementing the principles of sustainable development: economic efficiency, social justice and environmental safety.

This approach to the definition of SPP that relates the procurement process and the principles of sustainable development is used by H. Walker and S. Brammer. (Walker & Brammer, 2009). Under sustainable procurement they involve procurement that is consistent with the principles of sus-

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tainable development: ensuring a strong, healthy and just society within ecological limits and promoting effective management.

According to the definition given by the Marrakech Task Force, SPP is a process where organizations meet their needs in a way that is evaluated in terms of money on the basis of the life cycle of a product of service, and is beneficial not only for the organization, but also for society and the economy while minimizing damage to the environment (Venanzoni, n.d.).

In this definition, together with the principles of sustainable development the value throughout the life cycle is also noted, not just the purchasing cost. In the definition given by the International Institute for Sustainable Development, SPP is a set of laws, policies and practices aimed at the integration of economic, social and environmental risks in the processes and decisions of public procurement, where it comes to achieving the best value for money throughout the life cycle of product (Building accountability and transparency in public procurement, n.d.). In this definition the emphasis is also placed on the accounting value of the entire lifecycle of products purchased.

Generalizing the definitions, we distinguish the features of SPP: social responsibility; cost-effectiveness; environmental security – we now consider them elements of SPP.

The processes of implementing SPP policies are gaining pace in the international community. Adjei notes that most countries begin to act with a change in national legislation on public procurement, which, in his opinion, was a guarantee of effective implementation of SPP (Adjei, n.d.). Thus, the legal basis of SPP in the European Union are Directive 2004/17 / EC and Directive 2004/18 / EC. The detailed rules for the development of these documents are established at the European and national levels (Fletcher et al, 2009).

In Russia, from January 1, 2014 the system of public procurement is regulated by the new law - the Law of contractual relations (Federal Law №44, 2013). Analysis of this Law showed that it contains some manifestations of sustainable procurement. For example, it states the principle of stimulating innovation, providing preferences to organizations from criminal correctional system, organizations of persons with disabilities, establishes the obligation of procurement from SMEs and socially-oriented non-profit organizations in the amount of not less than 15% of the total annual supply. With regard to the accounting value of the life cycle, this Law refers to the term "contract life cycle" (Federal Law №44, ch. 16, art. 34).

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However, life cycle contracts may be concluded only in the cases stipulated by the Government of the Russian Federation, the list of which is rather narrow and applies only to certain infrastructure facilities and transport. (Resolution of the Government of the Russian Federation, 2013). Articles of the Federal Law №44 that regulate the establishment of the initial (maximum) contract price do not take into account the life cycle costs.

In practice, the implementation of SPP elements happens through integration of certain requirements in the procurement documentation. For example, since 2008 19 common criteria for products and services has been developed in the European Union, which are regularly updated. These criteria are based on existing criteria of eco-labels and on the information gathered from stakeholders representing industry sector, civil society and states.

Analysis of the of the Federal Law №44 has shown that the legislation does not contain norms prohibiting the inclusion of the manifestations of SPP in the following sections of procurement documentation: the subject of the contract, technical specifications, terms of performance of the contract. Also no prohibition occurs with the criteria for selecting the winner of the competition, and during a request for proposals stage.

Methodology of the research

To evaluate the perspectives of introduction of SPP in Russia, a research was conducted. It aimed to find manifestations of SPP in procurement practices of Russian public authorities. The research consisted of two parts: survey and procurement documentation analysis.

As we did not have a single database of procuring specialists, for the survey we used the contacting details of public authorities from the federal internet portal, and used the snowball strategy. In the selection of respondents, we consider areas to encompass representatives from all federal districts. 519 emails were sent in total. 51 people participated in the survey, including municipal customers (6%), government customers of federal (14%) and regional (80%) levels.

Survey questions were drafted similar to the questionnaire used by H. Walker, S. Brammer for international comparative study of the practice of implementing SPP (Brammer, Walker, 2011). Participants of the survey were given a list manifestations of SPP, widely spread in international practice to ensure that they compare these manifestations with their procurement practices in their organizations. The questionnaire included both quantitative and qualitative types of questions.

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The second part of the research was organized due to the assumption of the lack of awareness of the respondents, which is associated with a deficit of information on SPP in Russian sources. We also consider that it may affect the results of the study. In order to minimize the influence of the human factor the presence of manifestations of SPP was investigated by documentation analysis - procurement records published on the federal portal for posting information on public procurement www.zakupki.gov.ru.

For the analysis of the procurement documentation of Russian public customers posted on federal public procurement portal 400 contracts out of 2437 were selected (50 from each federal district). They were chosen because of their subject of the purchase, which in accordance with the «Procura+» have the greatest potential for improving sustainability parameters (Procura+ Manual, 2007). They are as follows:

- Transport
- Cleaning products and services
- Electricity
- Food and catering services
- IT products
- Building construction/ renovation

The authors of «Procura+» developed key criteria for each type of products and services listed above (Procura+ Manual, 2007). For the following research we have taken these criteria and adapted them on the basis of normative legal acts of the Russian Federation. Thus the basic requirements that contribute to sustainable procurement were formulated and the presence of which has been investigated in the procurement documentation.

Results
**Manifestations of sustainable procurement in the activities
of Russian public customers**

According to the respondents' answers, their procurement list includes products and services through which it is possible to promote the sustainable development and consumption: the purchase of paper, printed material or printing services, as well as office equipment and spare parts is carried out by 78% of the respondents; 68% procure furniture, industrial goods, handmade goods, goods for special purposes, consumables; vehicles, spare parts and services - 42%; Fuel - 34%; electricity, gas, and other energy sources - 34%. However, in procurement activities of their organizations there are only manifestations of SPP that contribute to the development of

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small and local businesses, as well as the prevention of gender-based discrimination and ensuring equal opportunities (see Table 1). Other manifestations of SPP represented in the list, do not apply to procurement activities.

Table 1. Manifestations of SPP in public customers' activities in Russia, %

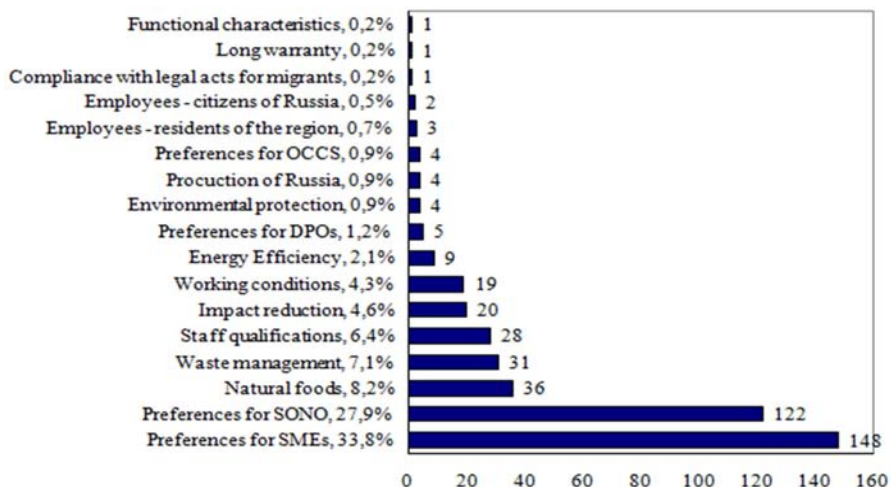
Sustainable procurement items	Absolute-ly not true	Not true	Neither true nor not true	True	Abso-lutely true
Uses a life-cycle analysis to evaluate the environmental friendliness of products and packaging	10,4	37,5	33,3	16,7	2,1
Asks suppliers to commit to waste reduction goals	2,1	47,9	35,4	14,6	0
Reduces packaging material	10,2	42,9	38,8	6,1	2,0
Participates in the design of products for disassembly	26,5	48,9	20,4	4,1	0
Participates in the design of products for recycling or reuse	26,5	51,0	18,4	4,1	0
Purchases from ethnical minority-owned enterprise	22,9	41,7	20,8	12,5	2,1
Purchases from woman-owned enterprise	4,2	6,3	20,8	54,2	14,6
Ensures the safe, incoming movement of product to our facilities	8,2	28,6	26,5	28,6	8,2
Ensures that suppliers' locations are operated in a safe manner	6,1	44,9	24,5	16,3	8,2
Visits suppliers' plants to ensure that they are not using sweatshop labour	32,7	51,0	12,2	4,1	0
Ensures that suppliers comply with child labour laws	18,8	22,9	27,1	22,9	8,3
Asks suppliers to pay a "living wage" greater than a country's or region's minimum wage	36,7	48,9	14,3	0	0
Donates to philanthropic organizations	34,7	51,0	12,2	2,0	0
Volunteers at local charities	22,5	32,7	24,5	16,3	4,1
Purchases from small suppliers	6,1	2,0	6,1	55,1	30,6
Purchases from local suppliers	2,0	2,0	16,3	48,9	30,6

Source: own work.

The analysis of procurement documentation also showed the presence of individual manifestations of SPP in public customers' activities (see Figure 1).

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Figure 1. Manifestations of SPP in the procurement documentation



Source: own work.

Providing of preferences to small businesses is the most common activity (SMEs): 148 manifestations. This manifestation significantly prevails over the others, accounting for slightly more than one-third of the amount of all forms of SPP.

These results are explained by legally established norms about the responsibility of public customer to purchase not less than 15% of the total annual volume of purchases from SMEs (Federal Law №44, article 30). In such cases, restrictions are imposed on the procurement participants; attracting SMEs as sub-contractors is considered equivalent. Similar preferences are set for socially-oriented non-profit organizations (SONO) (Federal Law №44, article 30). That also reflected in the results obtained: 122 manifestations.

The next most frequently mentioned (36 times) is the requirement for naturalness of food provided. Namely requirements for the absence of genetically modified organisms certain chemicals, food additives, dyes, preservatives and flavorings in food.

We also found manifestations of SPP regarding dealing with waste, which can be called sustainable (31 manifestation). Those include the requirements for proper transportation, storage at the site of municipal solid waste, waste management, as well as actions that contribute to, firstly, re-

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duction of the amount of waste: the requirement for suppliers to use multi-turn packaging, purchase multifunction devices; waste generation with less negative impact: the requirement to deliver products using packaging made of cardboard or wood.

The number of requirements for qualification of employees and its improvement (28 manifestations) is nearly 6.5% out of all manifestations of SPP. In particular, qualification of the participants of purchase appeared in several cases as a criterion for assessing applications: availability of the required number of specialists and other employees with a certain skill level, additional requirement was the presence of certificates for professional chefs with category no less than 4th; the requirement to create conditions for advanced training for drivers was included in the terms of contract.

The next most frequently mentioned (20 times) is a manifestation, which consists in activities aimed at reducing the negative impact on the environment and incorporates the following:

- requirement for a dispenser in detergents and cleaners;
- requirements for vehicle emissions;
- requirements for chemical elements in the composition

Thus, the requirement that the components of the composition should be biodegradable and safe for the environment was established in the technical specification. As well as the requirement of the absence of chlorine-containing components.

Requirements for the establishment of favorable working conditions and giving special attention to compliance with safety regulations (19 manifestations) account for nearly 4.5% of all SPP manifestations. For example, the duty to ensure the installation and operation of the module buildings and composting toilets was included in terms of execution of the contract.

Requirements relating to energy efficiency appeared in the analyzed documentation 9 times that make up 2% of the manifestations of SPP. In particular, the purchase of energy-efficient lamps; conformity of the equipment to the parameters of the energy efficiency standard «Energy Star», and to the energy efficiency classes - not less than Class A. Also we can note the purchase of traffic lights with autonomous operation, that are solar powered and have motion sensors that turn on automatically with the appearance of the person.

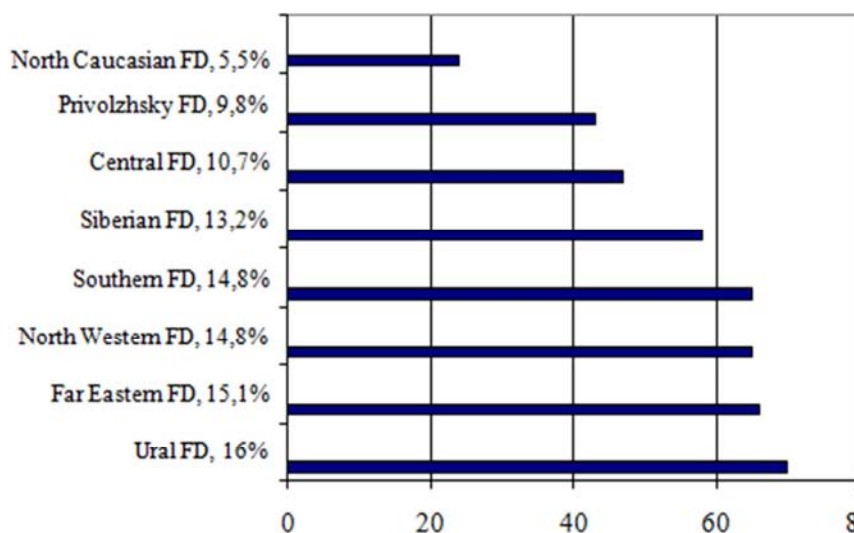
Preferences for disabled persons' organizations (DPOs) and organizations of criminal correctional system (OCCS) accounts for just over one per cent, and slightly less than one per cent respectively. The results are ex-

plained by the fact that, despite the legislative consolidation of its benefits regarding the proposed price of the contract (Federal Law №44, article 27), specific commitments on volume of such purchases (as in the case of SMEs and SONO) are not installed.

Other manifestations of SPP represent less than one percent.

Analysis of the procurement documentation showed that in general we are talking about even distribution of the number of manifestations of SPP in the territory of the Russian Federation (see Figure 2). The only exception was in the North Caucasian Federal District. The greatest number of manifestation of SPP was accounted for Ural (70 times), Far Eastern (66), North-Western and Southern (65) federal districts.

Figure 2. Manifestations of SPP based on the federal districts



Source: own work.

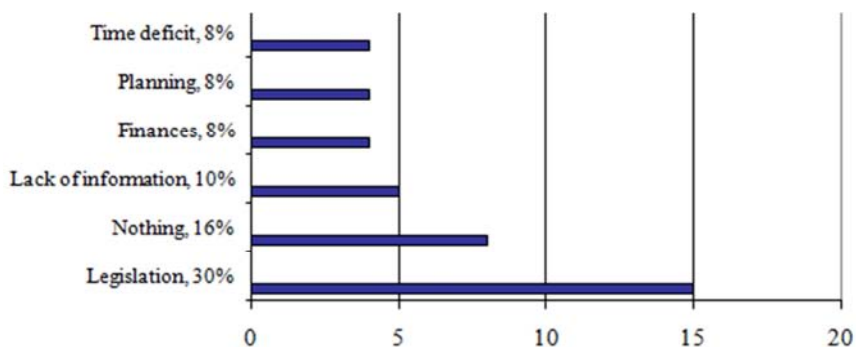
The procedure for determining the cost of procurement, used by public customers does not match the instrument of introduction of SPP - life cycle cost. The expenses that were included in the calculation of the initial contract price did not take into account the costs associated with the disposal and operating: the cost of utilities and maintenance.

The questionnaire also included questions about the factors that contribute to the implementation of SPP in the system of public procurement in

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Russia, and the barriers for this implementation. Thus, the main barriers (see Figure 3) are, firstly, the law (30% of respondents); secondly, the lack of understanding of the essence of SPP because of the lack of information about them, lack of knowledge of SPP application and, as a consequence, the lack of competent professionals (10% of respondents).

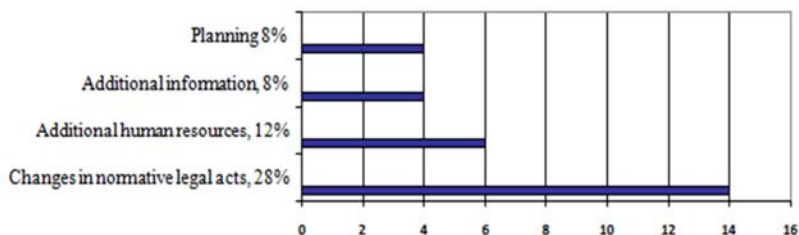
Figure 3. Factors impeding the implementation of SPP in Russia



Source: own work.

Answers about the factors that contribute to the implementation, correlate with answers about the barriers and come down to the need for changes in normative legal acts, the provision of additional human resources and raising awareness about the nature of SPP and its implementation mechanisms (see Figure 4).

Figure 4. Factors contributing to the implementation of SPP in Russia



Source: own work.

Conclusions

Conceptual ideas of sustainable development are intended to be integrated into national policy. One of the most effective mechanisms for implementing the principles of sustainable development into practice is sustainable public procurement, which brings involved countries significant environmental, economic and social benefits.

Russia was announced to join the sustainable development policy by its government in 1996. Today legislation on public procurement allows buying authorities to include the requirements of sustainable development in the individual sections of the procurement documentation. The analysis of public customers has shown that in Russia prerequisites for the implementation of SPP in public procurement do exist. Thus, individual manifestations of SPP are present in the procurement documentation.

Concluded from the answers of the respondents, the main obstacle to the implementation of SPP is legislation. Accordingly, change in the legislation is the main stimulating factor. Investigation of procurement documentation showed that public customers are more likely to use those manifestations of SPP, which are compulsory by law. Thus, indeed, making the appropriate changes to the law on public procurement - namely, the inclusion of obligations to apply manifestations of SPP - could be a major motivating factor.

The results of the survey displayed, that the raise of awareness of public customers about the nature of SPP, the process of their implementation and benefits will also contribute to the enhancing of the implementation of SPP in Russia. The issue of implementation of sustainable development policies into procuring practices is relevant for Russia, as well as relevant are studies and researches on this subject. Our research shows focus areas for state authorities for the implementation of SPP. A number of questions remain topical. For example, what measures of implementing SPP are the most effective on the basis of international experience and what kind of measures should be taken especially by Russian state authorities.

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Vino Therapy and its Impact on Health Attitudes: The Innovation Perspective

JEL Classification: *I12; O13; O30; O35*

Keywords: *vinoteraphy; wine consumption; health attitudes; cardiovascular system; innovation*

Abstract: Evidence from research has not only excluded negative consequence related to moderate consumption of wine, but associated consumption of skin, juice and seeds of grapes in any stage with a protective impact on health. Compounds of wine demonstrate anti-cancer, antioxidant and a defensive for the cardiovascular system results. The “French paradox” proves that the French suffer from 40% less heart attacks than the Americans consuming 30% more fat what is due to diet including regular modest amounts of wine. The central aspect of this logic is to turn a growing interest in wine consumption for health benefits into innovative solutions with different approaches and make for this purpose also use of areas that have undergone significant transformations over last decades as a results of global dynamical change which offer new consumption patterns seen now as driving forces for stagnating economies of the XXI century.

In an attempt to face this interesting tendency, we conducted a study aiming at determining wine consumption patterns in light of overall alcohol consumption and

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the dimension of health attitudes with perception and awareness of positive effects of moderate amounts of wine consumption on human health. Results demonstrate a still limited consumption of wine in Poland, also for health-related purposes, although a high consciousness of its benefits and application in medicine indicating an increasing awareness in this matter.

Introduction

In modern societies, adopting healthy attitudes and living healthy lifestyles has converted one of important values influencing human development and quality of life (Greenlund, Giles, Keenan, Croft, & Mensah, 2002). In today's world, healthy attitudes turn a stimulus to the development of the economy next to cultural and social values creating a kind of labour market in itself. Health is a value for a society as only healthy society allows for its growth (Efpia, 2014). This logic is largely seen in more developed societies where primary concern is focused on human and its well-being.

Current economic growth, social development, existence and entry to the market of new enterprises – all these constitute tasks of modern economy. A prerequisite to this task is to strengthen innovative attitudes on a country, regional and local levels. The concept of innovation can be considered in two aspects. Some authors understand innovation through changes in the sphere of production leading to new process resolutions and creation of new products; others interpret it much wider, believing that innovation is research and development processes aimed at application and use of improved technology and organizational solutions (Brzozowski, Kopczynski, & Przeniczka, 2001).

There are several economic and social determinants of an innovation process. Among the external factors the most important role play with no doubts market conditions. Innovations are a result of collaboration between research and development, and social needs, expressed in a suitable structure of demand. New products, on the other hand, are provided to the market under the form of supply. Innovations relate thus to the sphere of social and economic activity without which any development, structural change or improvement in economic efficiency of enterprises would not be possible in a long-term. An interesting and relevant aspect would be then to seek for changes taking place in the society through the lens of postures and attitudes toward own health finding a reflection in new market responses and structures. This mechanism shall lead us toward an analysis of the extent to

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which economic and social conditions are able to encourage or confine pro-health activities.

Vinothrapy is quite a new trend in wellness deriving from France and involving beneficial properties of grapes (Resch, 2010). Vinothrapy, according to the commonly accepted definition, means a programme of grapes, grape juice as well as gels formed on the basis of skin, flesh and pips of grapes to effective treatments (Vinothrapy, 2015). Grapes are believed to have originated from southern Europe and Middle East. Cultivation of the grape started in the pre-historic or early historic times in southwest Asia or southern Transcaucasia. Grape skin is well known from its beneficial properties to health. It contains resveratrol, a form of oestrogen, in high concentration proven to have antioxidant, anti-coagulant, anti-inflammatory and anti-carcinogen effects. Resveratrol is said to raise the levels of HDL and decrease the level of LDL in the blood, hence having a preventive impact on heart attacks and cerebrovascular accidents. Proanthocyanidins in grape skin with their vitamins and minerals fight free radicals and boost antioxidant ability of the body. These potentials may be supportive in building the immune system and fighting severe malignant diseases and other infections (Celotti, Ferranini, Zironi, & Conte, 1996; Clement, Hirpara, Chawdhury, & Pervaiz, 1998; Gehm, McAndrews, Chien, & Jameson, 1997; Jang et al., 1997; Kopp, 1998; Soleas, Diamandis, & Goldberg, 1997). Vinothrapy is a philosophy of life based on expectation of a long life which can be achieved by appropriate treatments with the use of wine, and, on the other hand, is a combination of the energy of nature with the latest scientific achievements (Włudyka, 2010). If vinothrapy includes a philosophy of life, then it reaches a significant impact on attitudes of health benefits. It is, at this points, important, to clarify, concepts, of health, health attitudes and health behaviours.

Health is understood as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (WHO, 1946, p. 100) and, consequently, provision of health care services is currently widening from being delivered to an ill person to approaching the general population, with efforts shifting beyond acute episodes to focus on health promotion, prevention and rehabilitation. Health is a multidimensional phenomenon and requires nowadays an intersectoral and network approach in order to give response to complex long-term chronic conditions (Salomon et al., 2003).

Attitude is told to represent a general evaluation of an object and, in this understanding, affect is considered the most indispensable feature of atti-

tude. Another perspective considers attitude as multidimensional, comprised of related but at the same time independent elements (Rosenberg & Hovland, 1960). Health behaviour is a specific action that has a direct impact on health (Kulmatycki, 1999). Among the distinguished health behaviours, literature finds the ones conducive to health, such as balanced diet, maintaining the purity of the body and the environment, physical activity, maintenance of good relations between people, coping with stress, and the harmful behaviours, such as substance abuse, lack of exercise, prolonged use of the computer and the TV, irrational diet (Szaruga, 2010). Research has pointed out the relation between attitude and behaviour constructs with early works indicating poor correlations and later ones turning into strong associations between them (Ajzen & Fishbein, 1977; Corey, 1937).

Scientifically proven amount of wine consumption beneficial to health suggested through research points out into (Pakulska, Rutkowska-Podołowska, & Podołowski, 2010): 1-2 glasses of wine a day for women; and 2-3 glasses of wine a day for men.

Methodology of the research

The study was carried out between March and May 2013 in the Lower Silesia region, Poland. Self-administered questionnaire was applied to visitors and guests of wineries, liquor stores, restaurants and hotels and aimed at understanding patterns of wine consumption and attitudes toward consumption of wine related with health behaviours.

The motivation of the study was twofold. Firstly, we were trying to find out patterns of wine consumption within overall alcohol consumption. Poland is not a country of a traditionally high wine consumption, however, lifestyles and approaches have been subject to adjustment and research has shown some interesting results in this matter in last years. Secondly, our objective was to determine attitudes toward health that respondents had, including general factors and those related to wine consumption.

The first part of the questionnaire contained items concerning general issues related to consumption of wine and its impact on factors differentiating health attitudes. The second part of the questionnaire sought for perceptions, knowledge and awareness of benefits of moderate wine consumption on health. Respondents were also asked whether they knew, and if so, what it meant to them, the concept of vinotherapy.

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The questionnaire was anonymous. Participants were informed about objectives of the study and possibility of the denial of the participation. The interviewer did not intervene in the data collection given the specificity of the places (e.g. restaurant) and in order to guarantee privacy to respondents, however, was accessible on the place in case of any eventual doubts.

Results

Questionnaires were initially distributed within 133 persons. From those, 16 persons refused to participate in the study and further 17 questionnaires were invalid after inspection. As a result, 100 questionnaires were validated for the study.

General issues of wine consumption differentiating attitudes of respondents

The research found that wine is preferred by women aged 36-45; women aged 46-60 demonstrated a preference to beer, and younger ones, 18-25 and 26-35 consume wine and beer in the same amounts. Men at age 46-60, similarly to women, prefer consumption of beer. Wine is consumed by most of respondents 1-2 times per week, only females aged 36-45 admitted to consume it every day what points out some increase in awareness of positive effects of wine consumption for a human body. The study shows that respondents prefer mainly red wine. This wine is consumed by both, men and women, and in all age groups. Less commonly consumed is white wine, while the least frequently is rosé, what may be due to the lack of knowledge of this wine. Preferences for the taste of wine among subjects differed, and analysis showed no clear preference. Women prefer semi-sweet and semi-dry wine while men consume mostly dry and semi-dry wine. Sparkling wine are consumed occasionally. At the moment of purchase, the determining factors appear to be: the taste (58.62% of females and 61.90% of males), colour (24.14% of females and 19.05% of males), country of origin (27.57% of females and 23.81% of males), and price (24.14% of females and 38.09% of males). At the choice, respondents are driven firstly by taste. Men are more interested in price than women.

Subjects were asked to name factors differentiating positive attitudes to health. While having known the general issue, only about 33% of

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respondents were able to list the factors. Subjective factors collected through questionnaires included health care, habits, good habits taken from home, health education, development of imagination and health-oriented culture. Objective factors mentioned by participants of the study encompassed: financial resources, knowledge, and education – including nutritional education, diet, meetings with experts, lifestyle, physical and social environment, genetics and fashion.

**Current knowledge of vinotherapy and its impact
on the formation of health attitudes**

In the present study, it was observed that current state of knowledge on the subject vinotherapy of the Poles is limited. Respondents do consume wine, but that consumption is generally related to its taste, as well it derives from social purposes. Wine is consumed for therapeutic purposes by a few respondents, solely by 6 women and 2 men. It is also important to emphasise that only two men aged 46-60 years consume wine in excessive amount (Table 1).

Table 1. Purposes of wine consumption

Gender/age	Aim	18-25	26-35	36-45	46-60	61-70	Above 70
M	taste	2	12	8	6	2	0
	company	0	10	2	2	0	2
	therapeutic	0	0	2	2	0	0
	abuse	0	0	0	2	0	0
W	taste	8	8	6	14	0	0
	company	2	4	10	4	0	0
	therapeutic	0	0	4	2	0	0
	abuse	0	0	0	2	0	0

M - men; W - women

Source: Results of own study

According to respondents, wine should be consumed: 2-3 glasses a week (a distribution of responses is similar, 37.93% of females and 33.34% of males); 1 glass a day (34.48% of females and 57.14% of males) and all other responses (20.69% of females and 9.52% of males). Among men, more than a half of respondents believed that wine should be consumed one glass a day. Among women, however, these trends were shaped differently. Some of them claimed that the recommendation would be one glass a day and some pointed out 2-3 glasses a week. Other participants also believed that wine should be consumed less fre-

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quently (Table 2). The concept of vinotherapy is therefore not widespread within the Polish society yet. Only 20.69% of women and 23.81% of men could define it. Most respondents explained that vinotherapy was a therapy (treatment) with wine. One person expanded this definition and believed that vinotherapy is “a philosophy of life based on the hope for eternal youth and long due to the consumption of wine in small quantities”.

Table 2. Recommended wine consumption according to respondents of the study

Gender/age	Frequency 1 glass of wine	18-25	26-35	36-45	46-60	61-70	Above 70
M	once a day	2	10	4	0	2	2
	1-3 times a week	0	2	6	2	0	0
	less	0	2	2	8	0	0
W	once a day	2	6	8	6	0	0
	1-3 times a week	4	0	4	4	0	0
	less	2	6	8	10	0	0

M - men; W - women

Source: Results of own study.

At the same time, respondents believed that the consumption of wine has an effect (Figure 1):

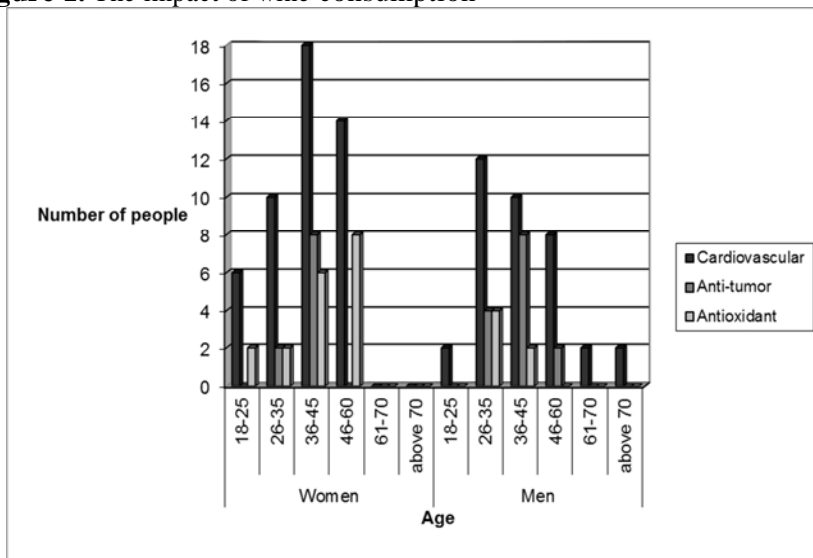
- protecting the cardiovascular system – the most frequently provided response (82.76% of females and 85.71% of males);
- anti-cancer – with only 17.24% of females but 33.34% of males;
- antioxidant – 14.24% of females and 14.29% of males

Affirmatively to the question regarding the relation between wine and positive attitudes on health responded generally participants aged 26-60 and especially men aged 46-60. Wine has prophylactic, therapeutic capacities, particularly for the cardiovascular system. Nevertheless, 28% of participants believed that wine does not have any impact for positive health attitudes and remaining 36% of respondents did not have any opinion in this matter.

Participants considered that the recommendable dosage of wine was a daily consumption – that opinion was given by 44% of the studied population. Consumption of 1-3 times per week was assumed by 22% of

respondents, while 38% felt wine should be consumed less frequently, mostly due to particular celebrative occasions.

Figure 1. The impact of wine consumption

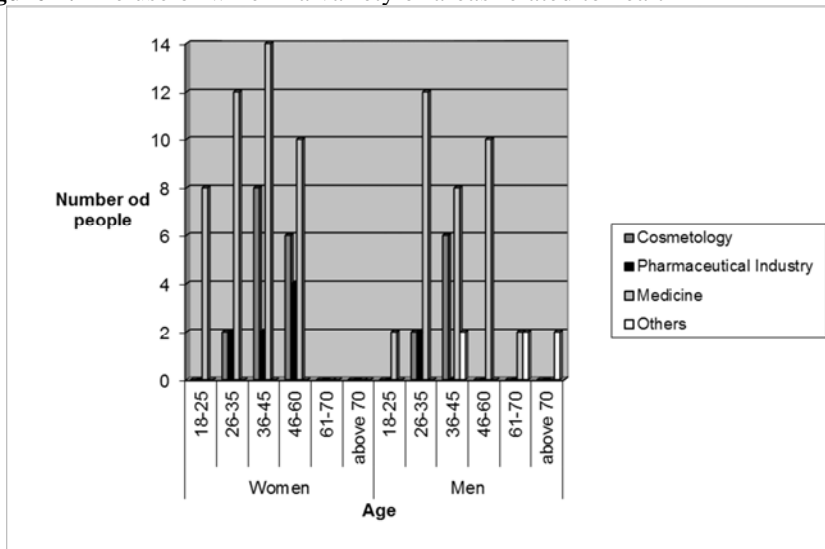


Source: Results of own study.

If considering consumption of wine specifically for health purposes, the awareness of positive effects of small amounts of wine on health is greater among women (75.86%) than men (38.09%), which is likely a result of women’s concern about health and beauty thus making use of the fact that wine contains antioxidants and free radicals (Troup, Hutton, Hewitt, & Hunter, 1994). Men notice in this respect the effect of wine on the cardiovascular system (75.86%), with a few responses for antioxidant (10.34%) and anti-cancer (6.90%).

Two questions regarded the use and the positive impact of wine on the human body, and, consequently, human health. According to participants, wine is the most widely used in medicine (75.86% of women and 76.19% of men), in cosmetology (27.57% of women and 19.05% of men) and the pharmaceutical industry (13.79% of women and 4.76% of men). Moreover, among male respondents, 14.28% mentioned some other use of wine, such as gastronomy (Figure 2).

Figure 2. The use of wine in a variety of areas related to health



Source: Results of own study.

Conclusions

The conducted study allowed us to understand the patterns of wine consumption among Polish consumers and the dimension of health attitudes related to wine consumption. In a group of possible alcohols, wine is a preferable alcohol drink for males aged 26-35 and 36-45, and females aged 36-45; females of 18-25 and 26-35 consume both wine and beer. While most respondents consume wine once a week, females 36-45 years old consume wine daily, what can be explained with an increasing consciousness of a positive impact of wine on human health. Specifically for health purposes, respondents would recommend the consumption of one glass per day. While choosing wine, women seem to pay more attention to its taste and a country of origin, while to men, taste matters as well, and they are highly more price-sensitive than women.

The understanding of the proper concept of vinotherapy is still limited in the Polish society. Nevertheless, the current state of knowledge regarding the effects of wine on health and related to it health attitudes is quite significant as over three quarters of respondents believed that wine is used in medicine. Interestingly, only a little above one third of participants was able to list some of the factors differentiating attitudes to health. Most of

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respondents indicated a positive impact of wine consumption on the cardiovascular system, there was, however, a window for other potentials, such as antioxidant effect. This shall start a discussion for future eventual possible business opportunities that vinotherapy brings.

Benefits from wine have been scientifically proven and a challenge nowadays resides in exploiting current knowledge and turning it into profitable industry and business solutions. Innovation is a driving force of the economy and a growing interest in wine consumption, also for health-related purposes, opens a door for new, different ideas. Evaluation of innovation is a prerequisite of determining the development, directions of change and strategic innovation programmes. There may be several obstacles to creating and implementing innovative solutions, with the main being those of raising funds, especially financial for implementing the innovation, and insufficient knowledge of the managerial personnel.

With this paper we intended to present the current situation of wine consumption and attitudes toward wine consumption related with health attitudes in Poland. While the concept of vinotherapy is still not widespread, the notion of beneficial effects of wine on health and its application in medicine is already significant. Yet, in practice, the consumption of wine, albeit higher over the course of last years as statistics demonstrate, is limited. We hope to have made our modest contribution to the debate of wine consumption anchored in the innovation strategy.

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**Academic Business Incubators
as an Institutional Form of Academic
Entrepreneurship Development in Poland**

JEL Classification: *D01*

Keywords: *Academic Business Incubators; academic entrepreneurship; Poland*

Abstract: The Academic Business Incubators are a significant investment in the development of academic entrepreneurship in Poland. They put the emphasis especially on local development. They are the driving force and a source of motivation to take up new challenges for young people. They allow ambitious people to combine their theoretical knowledge acquired during their studies with practical knowledge. Thanks to the Academic Entrepreneurship Incubators young people become professionals in their actions. Their acquired skills, knowledge, physical, moral and mental characteristics are an excellent basis for the development of their business. The aim of the paper is to discuss the essence of academic entrepreneurship and present issues of the Academic Business Incubators functioning as an institutional form of academic entrepreneurship development in Poland.

Introduction

In Poland, academic entrepreneurship is relatively a new phenomenon and rarely used for the development of economic activity. The literature of the subject points to a number of barriers limiting, and often preventing

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economic activity of the scientific community. They are, in particular, the inadequacy of formal and legal arrangements, limited access to financial resources and the assistance of highly qualified executives. Another barrier is the risk associated with the specificity of the market for intellectual property, problems with the estimated value of a product, the formal description of the market, as well as the clarity of property rights. The development of academic entrepreneurship is conditioned by many factors. This applies in particular to problems of the science, research and education sector, which is the source of research and development, skilled workforce, training opportunities, as well as potential entrepreneurs among staff and students. The development of local environment for innovation and entrepreneurship also plays an important role, consisting of small and medium-sized enterprises, entities offering specialized business services, and potential customers of offered products and services. Particular importance in this respect gains a support system, including institutions, organizations and various assistance programs. These are science parks, technology transfer centers, technology parks and incubators of academic entrepreneurship. One of the entities which enables the connection of business with the functioning of universities are the Academic Business Incubators whose mission is to support economic activity of the academia - students, doctoral students, staff and graduates of universities and combating unemployment and commercialization of tangible and intellectual goods. The aim of the paper is to discuss the essence of academic entrepreneurship and present issues of the Academic Business Incubators functioning as an institutional form of academic entrepreneurship development in Poland.

Methodology of the research.

The research methodology is an analysis of the literature of the subject within the scope of academic entrepreneurship and analysis of documentation on the practical aspects of the Academic Business Incubators in Poland.

The essence of academic entrepreneurship in Poland.

Entrepreneurship of the academia is understood in two ways. A popular and the most common approach is the recognition of academic entrepreneurship as any kind of involvement of research institutions, academics, auxiliary staff and administration, doctoral students and students in busi-

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ness activity (Drucker, 1992). On the other hand, “academic entrepreneurship” is defined as business activity in the field of education and its practical support for people connected with the research. This concept has a career in the whole world. It is also known by other names such as “innovative entrepreneurship”, “technostarters”, “intellectual entrepreneurship” and “technological entrepreneurship”. Besides, for the companies established by universities there are terms used such as: a university spin-off, company off campus, professors’ companies and small technology business forms (Banerski et al, 2009, p. 6).

According to L. Pasiieczny and J. Więckowski “the essence of entrepreneurship is a set of specific characteristics of people and organizations, of which the most important are creativity, sensitivity to change, searching for and implementation of innovation, willingness to take risks and responsibility. At the same time, entrepreneurship is reflected in the actions of individuals and organizations, for which, however, favorable conditions in the organization and its environment are necessary” (Pasiieczny&Więckowski, 1981, p. 136).

J. Guliński emphasizes that academic entrepreneurship can be understood in three ways (Guliński, 2000, pp. 2-4):

- as, on the one hand, any kind of involvement of the university, its students, doctoral students and staff in business, on the other hand, as the creation of companies by employees, students and doctoral students;
- as a channel of knowledge and innovation transformation, through the establishment of businesses by representatives of the academic community (on a campus or nearby), or the transfer of knowledge and innovation for a fee or free of charge;
- as the transfer of technology and innovation, which can occur via licensing (implementation) agreements, patent sales, services and expertise to the world of the economy, sharing of databases and library resources, services of the staff and research contracts ordered by the economy.

The evolution of the traditional functions of higher education, the creation of second and third generation university, which is described by J.G. Wissema in his work, the emergence of hard budget constraints and the need to make the best use of structural funds have caused the appearance and then increased academic entrepreneurship. Accordingly, J.G. Wissema concludes that in the search for different solutions, designed to enhance innovation of enterprises and bring scientific communities closer to the realities of the economy, academic entrepreneurship seems to be an attractive field for experimentation and testing. A university is assigned to a new

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role. Today, in the knowledge-based society it serves not only the role of a teaching and research center, but it is also seen as an institution with abundant source of new ideas, thoughts, research, which can often be used to start a new business. Not using these possibilities would be a waste of the country's economic development potential (Wissema, 2005, pp. 11-18). The use of knowledge, scientific achievements, skills and ideas emerging at universities in their own business is characterized by a certain degree of risk. Young entrepreneurs have to bear the costs associated with establishing and running a business from the very beginning. What is needed is considerable knowledge of procedures and legal issues related to starting and running a business. Additional barriers that may arise are issues concerning property rights, or difficulties with evaluation of results of scientific achievements. Therefore, in connection with the abovementioned difficulties in the initial phase of operation of the business, academic entrepreneurship should undergo some protection, called incubation. Business incubators are able to provide such a protection. The necessity results not only due to the reasons mentioned above, but also as the research indicates that the inventor, innovator and entrepreneur are often different people, and only in exceptional cases they have all the features together, as it was, for example, in the case of Edison, Bell, Eastman, and Dell. Students and researchers of non-economic faculties are focused mainly on the use of technology to create new products and services and not on the rules related to financial or market issues (Wissema, 2005, pp. 11-12).

Hood and Young developed theoretical principles within which competencies for success-oriented entrepreneurs need to be developed, namely: the content, skills and behaviour, mentality and personality (Hood J.&Yong J., 1993, pp. 115-135).

Matusiak indicates that another important matter related to defining entrepreneurship in the scientific community, there are issues: whether entrepreneurship is to be primarily "incubation" of entrepreneurs and businesses, or "incubation" of know-how having a potential market value, and incubation of projects, business concepts, supporting enterprises such as a *start-up* (Matusiak, 2009). These approaches are inspired by a radically different philosophy and completely different bases. The former is based on the hypothesis that it is possible, with a minimal support, to increase the number of stable in a market and competitive knowledge-based firms. The latter assumes that it is only possible to support a process of conceptualization of business projects in an organizational and financial way, while they are

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forced to find external financing themselves. The authors in this case have three solutions (Skweres-Kuchta, 2007, p. 159):

- the sale of certain projects to institutional investors;
- bringing them as their contribution in the company-funded by “business angels”;
- the creation of venture capital funds which are minority shareholders in these companies.

According to K.B. Matusiak, academic entrepreneurship is programmed “creative destruction” and its implementation requires a “specific bastion” created by (Matusiak, 2006, pp. 110-111):

- the sector of science, research and education which supplies the market with results of market research, skilled workers, and flexible training opportunities of potential entrepreneurs from the students and faculty members;
- the support system which consists of programs and institutions that support the transfer of technology and the development of the initial phases of the company;
- the local environment of innovation and entrepreneurship, which consists of small and medium-sized enterprises, specializing in business-related services, and risk financing institutions (*venture capital*).

The abovementioned elements as a consequence of interdependence and merging (i.e. a synergy effect) create conditions for the development of economic activity. Through networking based on the infrastructure and institutions soft actions are developed, causing considerable interest in finding ideas for new products and technologies.

J.G. Wissema rightly points out that recently there is an increasing importance of “knowledge” as a production factor, activating the development of new forms of cooperation between science and the economy. Hitherto existing model of scientific institutions, especially of higher education, based on education and scientific is extended by preparations for entrepreneurship (Wissema, 2005, pp. 21-39), understood as the development of creative activities that will enable independent operation in the market. Thus, the challenge for the scientific and educational institutions become, according to him, the following (Wissema, 2005, p. 21-39):

- shaping attitudes open to entrepreneurship and self-employment among staff and students;
- development of knowledge and technological and organizational solutions for the needs of the market and small and medium-sized enterprises;

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- management of intellectual property;
 - entrepreneurial management of higher education;
 - initiating partnerships and networking relationships with local business.
- In such an environment a trend is created known as “academic entrepreneurship” or in other words economic activity of academia.

The interest in the economic activity of the academic community has a number of sources. According to K. Matusiak and K. Zasiadły, they are included in: (Matusiak&Zasiadły, 2005, pp. 145-148):

- activities related to the commercial transfer of new ideas from science to the economy; here a model “inventor-entrepreneur” turns out to be particularly effective, allowing to adapt systematically to new solutions for the market and consumers' expectations;
- increasing innovative pressure, resulting in shortening the time of transition from the idea to the market application (a first-mover advantage), which is the cause of the spatial approximation of a business and a scientific institution or a university, a scientist and an entrepreneur; innovation increasingly becomes a product of the environment in which an entrepreneur operates (the innovation environment);
- an increase in the search for new forms of revenue raising of universities and research institutions by streamlining the channels of communication and cooperation with business, resulting in the sale of technology and research services;
- a stronger need for enhancing the attractiveness of educational offer by preparations for the practical use of acquired knowledge in own company;
- an increasingly demanding market, creating a difficult obstacle to overcome for ambitious graduates; self-employment is a relatively simple way to break the deadlock in this regard.

The main element of academic entrepreneurship are (as already mentioned) people with certain rare competence. M. Skweres-Kuchta emphasizes that such entrepreneurs are characterized or should be characterized by (Skweres-Kuchta, 2007, p. 160):

- inventiveness and perseverance in finding and solving problems;
- openness to cooperation and self-improvement of managed organization;
- the ability to see contact points between knowledge, technology, and often hidden market needs;
- the ambition to run one's own life, passion, vision and dreams.

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Donckels recognizes the increasing awareness of entrepreneurship as a career option as a major determinant of development activities in the field of academic entrepreneurship (Donckels, 1991, p. 35-42).

Next S. Kwiatkowski indicates the following desirable characteristics of entrepreneurial behaviour (Kwiatkowski, 2000, pp. 24-26):

- diversity of knowledge, contacts and opportunities – an intellectual entrepreneur is able to associate simultaneously in multiple environments, spheres and worlds, which brings a unique opportunity to develop and deepen the knowledge and expand relationships that constitute a potential base for expansion;
- the ability to integrate the process of collecting, selecting and processing information and the ability to make decisions, the ability to synchronize the work simultaneously in different phases of the decision-making process, which makes it possible to avoid the deposition of certain information, assumptions, hypotheses and evaluations;
- possibilities for global action, containing extensive contacts and frequent movements, which increase the ability to identify and seize the opportunities;
- the ability to find oneself in the right place and time, and to identify changes in the environment, which makes it possible to determine the actions that bring the expected results;
- identification of the role in business as an intellectual challenge and adventure, making it possible to maintain a certain distance to the role, which is a lasting source of inspiration;
- attachment to ethical and employee development issues.

Since, as it was assumed, academic entrepreneurs are those associated with universities and other organizations active in the field of the science and research and development sector, that is, academics, students, doctoral students and everyone interested in the commercialization of acquired knowledge, it is obvious that these people shall undertake the following types of activities within the business activity (Grudzewski & Hejduk, 1997):

- development of new products, technology, organization and management systems or their improvement;
- adaptation of the results of research necessary to implement the license;
- introduction to business practice of patents, utility models and improvement schemes, as well as the design and implementation of innovation.

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D. Trump claims that entrepreneurship starts with a vision, without it nothing significant is developed. What is important, however, entrepreneurship is not a genetic characteristic, and this means that it can be learnt. According to D. Trump, by one's own will, skills, knowledge, and own strength people themselves influence the course of events in their lives. These are the features that one can develop and then improve in practice (Trump, 2009, pp. 19-21).

According to Berkhout, an entrepreneur is seen as an entity bearing the risk arising from uncertainty. However, in order to reduce the uncertainty of income from self-employment, it is more and more associated with the regular part-time work (Berkhout et. al., 2010).

The development of an entrepreneurial attitude is always a very individual matter, but in the economy there are a number of divisions and types of entrepreneurship. The external and internal entrepreneurship can be distinguished. The external entrepreneurship is addressed to our environment, we have to deal with it when we are developing our own commercial venture. The internal entrepreneurship occurs when we use our characteristics and skills needed by the company, a team of people we work with.

In business practice, the company is treated as interpersonal. The predominant view is that it is a system that develops and aims at a fixed target, while improves itself. The system "enterprise" is purposeful, self-organizing and self-regulating. It provides stability and adaptability necessary for the survival and development. It is a complex system with an internal organizational structure, open, which interacts with the environment through the exchange of personnel, tangible assets, and information. It is a part of a higher order system - the regional, national, European, world economy. It is dynamic and changes over time (Moczyłowska & Pacewicz, 2007, pp. 16-17).

Gibb, on the other hand, recognizes the role of small and medium-sized enterprises in supporting the process of maintaining management of entrepreneurial attributes of young people by providing standards, role models and insight into independent business processes (Gibb, 1987, pp. 42-47).

Academic Business Incubators and the development of academic entrepreneurship in Poland

Since the mid-twentieth century, the research centers and universities have been more actively involved in the process of creating conditions for the development of academic entrepreneurship. The growing importance of knowledge as a factor of development of economic activity gives the abovementioned institutions a new role in the economy and dictates new way of their functioning. The development of new forms of cooperation between the science sector and the economy has occurred. Universities engage themselves substantively, organizationally and financially in activities developing innovation of regions, researchers undertake their own businesses, and curriculums are constructed in such a way as to enable students to acquire practical skills needed in the management of companies (Richert - Kaźmierska, 2010, p.12).

The Act on Higher Education of 2005, as amended, inscribed academic entrepreneurship as the main activity of universities in Poland. It specifies that in addition to conducting research and education of students, universities are obliged to cooperate with the economic environment, in particular through the sale or free transfer of results of research and development for entrepreneurs and promote the idea of entrepreneurship in the academia, in the form of economic activity separated organizationally and financially. The best known and at the same time most widely used institutional forms of creating and supporting academic entrepreneurship in Poland are the following (Richert - Kaźmierska, 2010, p.13):

- Career Services Centres;
- Academic Business Incubators and Pre-Incubators;
- Centres for Technology Transfer;
- Science and Technology Parks.

The main focus of university career services centers, operating at Polish universities since 1993, is to support intellectual and professional development of students as future employees. The scope of their activities include, inter alia (Internal materials..., 2014):

- creation and maintenance of databases of job offers in the market;
- conducting trainings and workshops aimed at developing skills for job search;
- developing and maintaining contacts with employers and job agencies;
- individual and group career counseling.

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In contrast to these activities, the task of the Academic Business Incubators is, above all, to support economic activity of the academic community or university staff and students who are entrepreneurs. The Act on Higher Education allows two forms of the functioning of the Academic Business Incubators:

- as university-wide units, acting on the basis of rules approved by the university senate;
- as commercial companies or foundations whose activities are governed by the relevant legal documents.

The former (an Academic Business Incubator as a university-wide unit) allows an academic center to exercise direct control and supervision over activities of the incubator. In this form, there may be difficulties at the moment of starting a company in the course of business activity, because according to the adopted solution, the university should act on behalf of the incubated companies. It often happens that universities provide a third party with a usable area, which, although it is relatively the easiest solution, it significantly limits the privilege to influence the activity of the incubator. The best solution is acquisition of the part of the shares by the university in the company running the incubator, which not only allows it to derive financial benefits, but also provides the university with the opportunity to exert direct influence on the function.

“An Academic Business Incubator is a unit managed by the university in order to use better the intellectual and technical potential of the university, offering support for economic activity of academia, university staff and students who are entrepreneurs.” (The Act on Higher Education of 27 July 2005 (Journal of Laws No. 164, item. 1365 as amended))

The history of the Academic Business Incubators functioning as the ABI Foundation dates back to 2004. They derive from the Students' Forum Business Centre Club, established in 2000 with the largest organization of employers in Poland – the Business Centre Club. At a rapid pace, the Academic Business Incubators have become one of the largest student organizations in Poland, bringing together 15 regional offices. Currently they have 48 branches located at universities throughout the country.

The Academic Business Incubators have contributed to the creation of more than seven thousand new businesses so far. Currently, a significant share of these companies become leaders in their industries, achieving a market success, including Goldenline, Photoblog, Highclass, Apeiron, Beds.pl, Chomikuj.pl, Space Technologies, RoboCamp. There are companies that took their first steps in the Academic Business Incubators. They

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currently employ several thousand people and obtain revenues in the hundreds of millions of PLN. At the end of 2010, there were 1,431 companies operated in the Academic Business Incubators, with more than 3,000 people employed (Promotional materials, 2014).

The network of the Academic Business Incubators in Poland is the largest network of incubators in Europe, which at the turn of the last few years gradually increased the number of its branches.

One important aspect of creating economic activity of academia in Poland is a project implemented by the Academic Business Incubators called "The Path to Entrepreneurial Poland". The aim of the project is to develop and implement a combined system of creating of academic entrepreneurship in Poland in the form of interacting with each other institutions, such as: the Academic Business Incubators and the Academic Business Incubators Business Links. The main objective of the project is to create a system of pre-incubation - incubation, containing pro-innovative services for people starting business activity and testing their ideas within the Academic Business Incubators and incubation services for young companies, especially technology companies that have passed the pre-incubation phase, benefited from the Academic Business Incubators and can go to the incubation phase obtaining appropriate assistance in incubators Business Links. An important issue is the fact that the project "The Path to Entrepreneurial Poland" is directed mainly to people from the academic community that do not have registered business activity or conducting already registered business activity and looking for a possibility to use incubators.

The Academic Business Incubators have achieved so far the following successes (Promotional materials, 2014):

- the network of 48 incubators at universities located throughout the whole Poland,
- the largest network of the ABIs in Europe,
- incubators have released on the market more than 5,000 companies so far,
- more than 1,600 companies operates currently in the ABIs.

A person called the beneficiary running a company within the Academic Business Incubators is provided with the following services (Promotional materials, 2014):

- bookkeeping for a company,
- comprehensive legal assistance,
- access to office space,
- the possibility of obtaining funds for the operation of the company,

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- a number of training courses, improving the efficiency of company management,
- expert care,
- assistance in creating the company's brand.

Functioning within the framework of the Academic Business Incubators allows to obtain other types of support, including:

- the right to use the trademark of the Academic Business Incubator,
- assistance in promotion and advertising, with the help of marketing agencies,
- organization of business meetings and assistance in finding business partners,
- organization of conferences, trade fairs to promote companies in the ABI.

According Ciborowski „A system of innovation can, therefore, be regarded as an institution which boosts innovation and shapes its nature. It includes the following constituent parts: science and technology system, education, research and development, and innovation policies. These have to be effectively supported by economic policy instruments whose efficiency directly translates into the performance of a particular innovation system” (Ciborowski, 2014, p. 58).

Sachpazidu-Wójcicka claims that „Considerable changes occurring in the world of economy indicate a transformation of the traditional economy into the economy based on knowledge, which relies on the highly processed products and advanced technologies. The level of the process advancement to the economy based on knowledge results in the competitiveness of particular enterprises, regions and countries. Innovativeness belongs to the primary sources of gaining competitive edge. The rhythm of creation and deployment of innovations decides on the competitive edge of Polish industrial enterprises. Companies search for the competitive edge in various areas of activity such as marketing, production, research and development, as well as in the management field. Moreover, the effective management of the processes of innovations deployment seems to be of cardinal importance. Innovative enterprises have to be distinguished by the ability of efficient deployment of innovations in terms of product, process, organization and marketing methods. The experiences of strongly developed countries prove that innovative enterprises are preferred from the level of their internal effectiveness and positive influence on the dynamics of economic development. Furthermore, business companies, in order to survive on the

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market and increase own competitive edge, have to improve their innovativeness” (Sachpazidu-Wójcicka 2014, p. 94).

Conclusions

Academic entrepreneurship in Poland has low development dynamics. The Academic Business Incubators have a significant impact on improving the situation in this respect. In order to properly develop business activity of the academic community a long-term strategy should be developed, whose aim would be to determine the future direction of development of this process. An important fact is also the selection of appropriate tools and instruments that are used to initiate economic activity throughout the academic community. The Academic Business Incubators provide opportunities for the development of economic activity of the academic community in Poland, providing the possibility of implementing innovative ideas in an autonomous or assisted business activity, they are an opportunity for effective transfer of knowledge and technology to the economy in terms of creating start-ups.

The Academic Business Incubators (ABIs) functioning as a foundation were created in 2004. Their task was to organize an innovative network of business incubators the ABIs at universities across Poland. As a result of the ABI Foundation's activities in Poland, the first and the largest in Europe network of institutions was established, providing support on the basis of Pre-incubation and Incubation of business ideas. This success in addition to the involvement of a group of young people could be achieved mainly because in the ABI an innovative on a European scale model of pre-incubation was developed. In contrast to similar European institutions it is based not only on hiring a usable area, but most of all on the opportunities to run the company on the principle of division of the incubator without setting up one's own business. A newly established venture is backed by a profiled ecosystem of services, in which anyone can start every business in the easiest, fastest and least risky in Europe way. Incubators the ABIs were already awarded in 2005 the title of The initiative of the Year, and in 2007 were nominated by the Government of the Republic of Poland to the European Enterprise Awards. On 15 May 2012 during the European Economic Congress the Polish Agency for Enterprise Development awarded the first prize to the Academic Business Incubators in the category “Innovative business-related institution”. In 2013, the ABI Foundation was nominated for the prestigious RegioStars 2014.

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The AIP Foundation offers a unique path to comprehensive support for entrepreneurship at the stage of initiating and developing one's own business activity in Poland and abroad, with the participation of universities and business partners. The AIP permanently cooperates with start-ups for which the acquisition of external financing in order to implement the results of R & D and technology transfer is an essential part of their development. In this aspect, the AIP is currently one of the largest and most important institutions for Polish entrepreneurship. As part of the current activity, it has created a few dozen initiatives, which were attended by more than 100,000 young people, there were more than 5,000 companies established and thousands of new jobs created.

The AIP Foundation is currently implementing its vision through 3 key initiatives:

- Academic Business Incubators - the largest in Europe network of business incubators (now 40, ultimately in 2015 - 50), which are places where one can in the quickest, cheapest and least risky in Europe way test own business idea in real market conditions. Currently, about 1,600 start-ups per month test their business ideas within incubators.
- ABI Seed Capital – an innovative seed fund investing in the best Polish start-ups. The Fund offers the easiest and most effective system of investing in Polish start-ups. In addition to the funds, the ABI Seed Capital also provides mentoring guru of start-ups, access to the second round of investment, including the participation of investors from the Silicon Valley. The ABI Seed Capital has made so far 49 capital entries in innovative companies each time in the amount of not less than 100,000 PLN for 15% of the shares. Further 84 investments will be made by the end of 2015.
- ABI Business Link – the network (ultimately in 2015 – 10) of the world's top business development centers for start-ups. As part of a preferential package comprehensive services are available to customers, allowing to conduct a business in a simple and effective way from anywhere in the world. In addition, the offer includes comfortable workplaces, modern conference rooms, meeting rooms with multimedia facilities and networking spaces. A showcase of the ABI Business Link are Laboratories which are a unique place, conducive to creative work. Currently, about 200 start-ups per month use the services of Business Link.

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Balanced Scorecard Concept in Romanian Small and Medium Enterprises

JEL Classification: *G30; M21*

Keywords: *Balanced scorecard; strategy; performance management; SMEs; Romanian enterprises*

Abstract: The purpose of this paper is to explore the implementation of a performance management system using the balanced scorecard (BSC) within Romanian small and medium sized enterprises (SME). This is a casebased methodological approach. This ensured that the issues were appraised in both an operational and a strategic context. The findings of this research are that balanced scorecards can be implemented within a SME context. However, the motivations for the adoption of the scorecard were both internal and external due to the heavily regulated nature of the organization. The paper analyses the application of the Balanced Scorecard (BSC) in Romanian Small and Medium enterprises (SMEs). Actions necessary for its implementation, obstacles and BSC development trends have been presented.

Introduction

Management control is a significant component of economic and social reality through which managers have the possibility of dynamic information. Real preventive findings raise the value and quality of decisions and ensures the smooth functioning of enterprises. Management control, as part of the economic information system, is a key factor in the operation, development and enterprise development, if it's well organized at all levels and organizational structures that exist within it.

Management control, conducted in the conditions of market economy, for small and medium enterprises appears as a regulatory tool, the mechanism contributing to the integration of the company in the market economy through a complex and ongoing managerial activity.

Management control is presented as:

- knowledge as a process of economic and financial situation of the company;
- as a practice, because it is an activity carried out by competent persons who uses specific techniques and methods and an organized system of information;
- as a means of study and action for internal users;
- as a factor for both security and enterprise management authority and society

The researches conducted by The National Council of Small and Medium Sized Private Enterprises in Romania (CNIPMMR) reveals that 45.24% of all investigated companies there have achieved annual plans and policies, 11.94% of the small and medium enterprises there are developing strategies on time horizons ranging between 3 and 5 years, and 44.55% of enterprises there are not planning activities (Ionescu & Plesanu, 2010, pp. 11-22).

Methodology of the research

The data collection process method adopted an approach using a case study. This research will seek to integrate the knowledge base of the functional silos of operations management and strategic management with respect to balanced scorecard.

Management Control for small and medium enterprises

The evolution of the economic environment from the European Union is marked by profound economic transformations. The diversification of production, refining demand, increasing customer demands to offer of companies have contributions, on the background of globalization of national economies, to the increased polarization phenomenon of decision's centers. Without remains immune to these phenomena, the Romanian economy is subject to important structural transformations, and economic operators are in an accelerated process of organizational and management changes in order to redefine the position and role they have in the market. The integration into the European economic space entails sustained efforts of local businesses to adopt and implement measures of economic policy, including policy for quality products and services used on the market of the European market. Although this phenomenon is manifested intensively at all levels of the economy, there are still many companies carrying on a predominantly stereotypical without possession of an appropriate business strategy, enabling them to obtain a high profit, that can reinvest in further diversification of production and a strengthening competitive position on market. The survival and development of small firms under conditions of tough competition, on the EU market is only possible when enough efforts have being done, including in financial field, for some products that have to meet increasing customers needs, particularly in quality sector.

Thus, the quality turned into a very important resource for companies. The companies do not produce any longer and anyway, but only those goods and services that meet higher level of requirements. A consequence of increasing interest for quality problem is the development and application of quality management system, which became part of the general management of the company. Implementation of quality management at companies level has been achieved in the context of increased expectations of products and services valued by the European Union market, where the certification in terms of quality has become the prerequisite to act in this market. So, the certification of quality works as a restriction at the entry on this market. Taking in account the experience of developed economies like the U.S. and Japan, many companies, even if they have programs for well-designed quality control, use of certifications in ISO quality system to increase the credibility they enjoy international markets (Ionita et al, 2009, pp. 215-224).

The role of SMEs in the Romanian economy and community

Romania located in Southeastern-Central Europe covers 238,391 square kilometres (92,043 sq mi) with its 20.1 million inhabitants, it is the seventh most populous member of the European Union. Following rapid economic growth in the 2000s, Romania has an economy predominantly based on services, and is a producer and net exporter of machines and electric energy, featuring companies like Automobile Dacia and OMV Petrom. Living standards have improved, and currently, Romania is an upper-middle income country with a high Human Development Index. It has been a member of NATO since 2004, and part of the European Union since 2007.

In Romania, the development of small and medium enterprises sector known new valences in the context of instability of the national economy. Taking in account that the backbone of an economy lies, mostly, on the quality of agents who act on the market, SME policy resulted in a direct and active support from the public authorities. At European level, approaches regarding the support policy of SME sector acquired new valences, when in March 2008, European Council sustained an initiative of the European Commission entitled "Small Business Act (SBA) for Europe", which has the objective of strengthening sustainable growth and competitiveness and the set up of a coherent framework of action for this sector (Criveanu & Iacob, 2011, pp. 2-7).

The identification and applying of best practices developed at European and international level bring, in the first stage, diverse problems from methods and techniques of production, the qualification level of personnel and the projected level of production, to the qualitative dimensions of activity. The efforts do not stop here however and the experts try to define and implement, at company's level, the concept of "quality work" and to construct a specific indicator for measuring this kind of quality at European level. This indicator should accurately reflect the changes taking place at the micro level and the impact on productivity growth, leading to methods of improving the quality of professional life for employees. Germany is the first state falls into this trend, promoting the new initiative on quality of work - INQA.

According with a recent study conducted by National Agency of Small and Medium Enterprises (NASME) in 2009, regarding the main competitive advantages of SMEs, the quality of products / services offered is the essential factor that differentiate companies.

European funding opportunities for SMEs

The European Commission define SME as: „the category of micro, small and medium-sized enterprises (SMEs) ... made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding 50 million euro, and/or an annual balance sheet total not exceeding 43 million euro” (EC, 2005). SMEs representing more than 98% of all enterprises, out of which over 92% are microenterprises’ with fewer than ten employees and accounted over 67% of total employment and over 58% of gross value added of the European union economy (Ecorys, 2012).

The Structural Funds allocated by the European Commission for the member countries should help to reduce disparities in the development of regions, and to promote economic and social cohesion within the European Union.

European Union established the general framework for managing the Community funds and each member state choose its own system. In Romania, the payment and management authorities are situated within the structure of some distinct institutions, but the Finance Ministry is the payment authority for every programme (Pîrvu & Axinte, 2012, pp. 193-202).

The efficiency of the small and medium enterprises is subject to substantiation, development and implementation of some coherent and realistic strategies that take into account both their internal potential and complex developments recorded within the business environment. The researches conducted by The National Council of Small and Medium Sized Private Enterprises in Romania (CNIPMMR) reveals that 45.24% of all investigated companies there have achieved annual plans and policies, 11.94% of the small and medium enterprises there are developing strategies on time horizons ranging between 3 and 5 years, and 44.55% of enterprises there are not planning activities. Also, according to a study conducted at European Union level, only 16.66% of small and medium enterprises develop and apply strategies (Navickas & Kontautiene, 2013, pp. 62-68).

In the Romanian crisis, small and medium enterprises continue to be the main engine of economic recovery and building a new European economy. SMEs from Romanian economy, which are deeply affected by financial crisis or wage cuts. In these economic and social conditions to maintain afloat the managers must intervene and demonstrate management skills by identifying the most important indicators that help businesses achieve the objectives (Adina-Simona, 2013, pp. 319-322).

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European Commission (EC) is sustaining the small businesses through its regional policy: helping them realize their growth potential, their importance in regional and global economy and creating a friendly business environment. More than 20 million companies in European Union are SMEs and they play an important role in the dynamics of the national and regional economy. The EC had designed special rules for these companies, facilitate their access to funding, help SMEs to get most out of the EU's Single Market, create an entrepreneurial environment, and adapt public policy tools to SMEs' needs.

Performance measurement system is a due for every company, but not many SMEs have one because of different obstacles, such as limited material, financial and human resources. There is a challenge for every entrepreneur in the decision regarding what to measure. Analyzing the answer of the respondents of the Romanian SMEs from V West Region that accessed EU funds we found out that development of production capacity, turnover and acquiring new equipments are the most used indicators for measuring the company performance. The answers of the managers are connected with the goals of their implemented projects. Most of them had accessed the community funds for developing their production capacity and buying new equipments, creation of new working place being a secondary indicator (Dias Jordão & Casas Novas, 2013, pp. 98-107).

In recent years, the model known as Balanced Scorecard (BSC) contributed to help organizations to establish actions aligned to a value creating strategy (Moore, 2003). In addition, BSC contributes to meet the shareholder, employee and customer expectations, as well as to the improvement of service, internal processes, learning and innovation. Norton and Kaplan (2001), based on a study including almost 300 executives, stated that the capability to strategy execution is, probably, more important than strategy quality.

Among the management authorities for the structural funds for SMEs are: Industry Ministry, Regional Development and Public Administration Ministry.

SMEs play in the national and regional environment a key role, the structural funds finance the increase of competitiveness and productivity of Romanian companies', in compliance with the principle of sustainable development, and reducing the disparities compared to the average productivity of EU. The size of every company contribution to the development of the region is influenced by its past, present and future performance. The structural funds could be accessed only by those companies that reach the

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performance criteria. And companies' performance indicators should have higher levels after the absorption of the unreimbursement funds. Performing like this every company will contribute to the development of the regional economical environment and to diminish the disparities between the Community regions.

A challenge in performance measurement is the decision regarding what to measure. The performance measurement should focus on most important areas of activities, of a project or an enterprise. Across the European Union SMEs play an important role and if we are watching them at a macro level, their performance is measured with three main indicators: the number of enterprises, their output via their gross value added (GVA) and the number of employees on their payroll.

Structural funds available for Romania that are oriented to small and medium sized enterprises. In this regards we performed a quantitative research grounded on questionnaire-based inquiry. The questionnaires were disseminated to enterprises located in the West Region of Romania that apply for and access European funds. Twenty-two out of 40 questionnaires distributed were returned. Compared with Management Authority, projects beneficiaries have different interest, when accessing EU funds through projects. For projects beneficiaries performance indicators should quantify: the new products or services introduced on markets, the number of new jobs created, the production surfaces constructed, rehabilitated or improved and equipped.

Performance measurement system is a due for every company, but not many SMEs have one because of different obstacles, such as limited material, financial and human resources. There is a challenge for every entrepreneur in the decision regarding what to measure. Analyzing the answer of the respondents of the Romanian SMEs from V West Region that accessed EU funds we found out that development of production capacity, turnover and acquiring new equipments are the most used indicators for measuring the company performance. The answers of the managers are connected with the goals of their implemented projects. Most of them had accessed the community funds for developing their production capacity and buying new equipments, creation of new working place being a secondary indicator, only (Adina-Simona, 2013, pp. 319-322).

**Types of strategies that are applicable within
the Small and Medium Enterprises**

The main direction of action recommended for the small and medium companies from Romania to substantiate, elaborate and successful implement some competitive business strategies are, in essence, the following (Ionescu & Plesanu, 2010, pp. 11-22):

- the creation of adequate management systems, especially under a structural, organizational and information report;
- proactive approach of the organizational change processes;
- the production of some essence mutations in the mentality of managers, entrepreneurs and employees from the small and medium enterprises;
- training the human resources in the continuously learning process, in the context of knowledge-based economy.

The diagnostic analysis of the small and medium enterprises allows the identification of the main types of strategies that are recommended or may be promoted by the small and medium enterprises in Romania in the context of the current business environment.

- The stability strategies are recommended especially to the micro enterprises which have activity duration between 5 and 10 years, from the Bucharest and Western regions, and they are conducting business in the fields of transportation, services and construction.
- The development strategies can be adopted especially by the small and medium-sized companies from the centre of the country and from the area of North West which are working within industry and construction; regarding the age of the companies, on the first two positions we find the enterprises that are over 15 years and the companies that were established in the last 5 years.
- The defensive strategies (withdrawal, liquidation, etc.) are adequate especially to the micro enterprises which have a seniority between 10 and 15 years, from the North East region, operating in the fields of transportation and trade.
- The micro enterprises show a great tendency for promoting the stability strategies in comparison with other categories of small and medium enterprises, explicable in the present period, whereas after having reached a certain level of profitability, the limited resources at Business Strategies Promoted by the Small and Medium Enterprises from Romania.. Their disposal, especially financial ones, cannot ensure the continuation of the ascendant evolution, but it offers them the possibility to maintain

their gained competitive position. It is recommended that these micro enterprises should adopt the strategy of harvest, which may capitalize the products and/or the services that have provided them achieving of that level of competitiveness. Besides financial constraints, we appreciate that an important reason of some micro enterprises' orientation towards maintaining the business on a current level and not towards its development is that the entrepreneurs and the companies' employees do not feel comfortable with the organizational changes (involving, among others, the essence of mutations in the organizational structures), and they do not have a forward-looking vision, and believing that once the company met certain economic performances, the efforts must be directed solely towards maintaining them.

- The small and medium-sized companies aim, in their great majority, to the extension of the business they run and, implicitly, it is appropriate to promote the development strategies. It is recommended that the small and medium enterprises from the industry to adopt development strategies for the product, concentration strategies and extending the market strategies. The enterprises from constructions may resort to strategies to expand the market and concentric diversification strategies (for example, widening the total of activities, for the purposes of carrying out environmental operations, housing maintenance, modernization of the interiors, etc.). The large share of small and medium companies which are aiming at the business development, as well as their presence within industry and construction represent, in our opinion, the strengths of the small and medium enterprises in Romania from the view of the European economic integration.
- Locally, the Center region is noticeable with the highest percentage of companies which may choose the development strategies. It is important to mention that in this area there are no companies that have strategic defensive guidelines. Bucharest, the most developed region in terms of the density of small and medium enterprises, is marked by the greatest share of the business strategies that can promote stability strategies; the percentage of those who have as main option the development strategy is lower in comparison with other areas of the country.

Introduction of Balanced Scorecard Concept

The present national and international business environment, in the context of the knowledge-based economy, is influenced by numerous factors

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such as: globalization, the increasing of competition and increased importance given to customer satisfaction. The traditional approach of excellence in business, which included quality, time and costs is in this era of increased competition, further complicated by the addition of factors such as the ability to innovate, the ability to respond in a relatively short time and effectively to the market changes, social responsibility, ethics and impact on the environment. It has also proven without doubt that financial measures cannot be the only considerations when evaluating performance in companies. Performance evaluation models must also include non-financial measures and values that are to some extent intangible. Excellence is regarded as being the successful combination of resources, the way of organization and the effectiveness of management.

The European Foundation for Quality Management, (EFQM) Excellence Model has proposed to include the following fundamental concepts :

- Results orientation;
- Customers focus;
- Leadership and continuity in objectives;
- Management by processes and facts;
- Staff development and involvement;
- Continuous training, innovation and improvement;
- Partnerships development;
- Social responsibility of the organization.

Using Balanced Scorecard at the level of small and medium enterprises Identifying strengths and weaknesses at a company level is not always a straight-forward issue. It depends on many factors and also on the size of the enterprise. Measuring the current status of a company, by means of reporting and collating correcting available data is a necessity in order for top management to appreciate the current capacities of the company and plan for the future taking into account the current and future prospects. Many managers, question the validity of the data collected and the relationship to long-term objectives and goals. Thus the establishment of certain indicators has proven beneficial to organizations in assessing the current state, both internally and externally offering an overview of measurable attributes that can depict the status of procedures and management pertinent to individual sectors of the company, as well as the enterprise as a whole. In addition Key Performance Indicators (KPIs) offer information on the organization's ability to respond to new developments in the products and services the company offers, as well as an overview of the company, re-

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sources relative to the key points which need intervention and improvement.

Balanced Scorecard can be defined as a management system based on performances, which offer the enterprises the possibility to follow their strategies based on and tracking .

Being small is not always equivalent with being unimportant, especially when we talk about European companies. The SMEs are an important generator of employment and growth and measurements was recognized as the backbone to any economy. European Commission (EC) is sustaining the small businesses through its regional policy: helping them realize their growth potential, their importance in regional and global economy and creating a friendlier business environment. More than 20 million companies in European Union are SMEs and they play an important role in the dynamics of the national and regional economy.

Generally, the people that works in small and medium enterprises have a high level of knowledge about the Balanced Scorecard concept. 81,5 % from this persons have heard about this concept. From this 81,5 %, 34,1 percent dosen't know details about the concept and 18,5 % doesn't even heard about Balanced Scorecard.

Romanian enterprises that use Balanced Scorecard

In a recent case study, the 170 interviewed persons mentioned a total of 63 companies that are using Balanced Scorecard, in various industries. The Balanced Scorecard's limited national use is reconfirmed by the lower percent of the respondents of this case study that are working in organisations that use the concept (17,3%).

Domains of use of Balanced Scorecard concept were following:

- Production (12,7 %);
- Financial institutions(11,1 %);
- IT (9,5 %);
- FMCG (Fast moving consumer goods) (7,9 %);
- Petrochemical industry (7,9 %);
- Telecommunications (7,9 %);
- Consultancy and training (7,9 %).

Among the companies mentioned are founded the following: AIESEC, Coca-Cola, ING Bank, Opportunity Microcredit Romania, P&G, Petrom, Phillip Morris, Rompetrol and Velux. Other industries represented by this organisations are public institutions, web design, delivering, farmaceutic

industry, hotels industry, consultancy and training, automotive industry, market research, tobacco industry and non-governmental sector.

Reasons of implementing Balanced Scorecard

The enterprises often mentioned reason for implementing Balanced Scorecard is measuring, monitoring and upgrading organisation's performance. This is also the reason for recommending the concept.

The other frequent mentioned reasons are strategy development, clarification, communication and implementation of strategy, facilitation of study at organization level, allocation of resources and selection of the projects according to strategy, facilitating the granting of bonuses based on the results/ recorded performance.

Concepts related to the Balanced Scorecard usage

The list of performance indicators grouped into perspectives is the most often used concept in conjunction with the Balanced Scorecard.

Other concepts are :

- Periodical meetings regarding the evaluation of strategy implementation;
- The Strategy Map (the map including objectives linked to cause-effect relations type);
- Mission and Vision;
- The Organizational Destination;
- Software system for generating the BSC reports (Excel or special application Business Intelligence type);
- List of strategical initiatives.

The obstacles encountered when using Balanced Scorecard

The most frequent obstacle encountered when using Balanced Scorecard is represented by the organization's members lack of knowledge in this domain. This shows also a lack of organizational culture oriented to performance and adjustment to changes, fact that explains the difficulty of utilisation and dissemination of Balanced Scorecard inside the companies that applies it.

Other obstacles encountered when using the Balanced Scorecard :

- Articulation, understanding and realising of benefits;

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- The needs of time allocated using is too high;
- The big volume of needed resources (peoples, financial investment, etc);
- Integration using other instruments/ systems;
- Technological support / technological integration.

Balanced Scorecard Implementation in Romanian Enterprises

The main steps in BSC implementation were:

- Enterprise's assessment.
- Development of enterprise's strategy.

Setting up a BSC mainframe to co-ordinate company's efforts in achieving the objectives of adopted strategy Apart from the basic indicators already used by companies (such as productivity, turnover, ratios for liquidity, profitability, activity, leverage), the tools used in the preliminary assessment were:

- Person-to-person interviews;
- The Financial Times Value Added Index (comprehensive indicator that enables benchmarking);
- The Baldrige self-assessment check list;
- The UNIDO triple-bottom-line questionnaire;
- The SWOT matrix.

The conclusions of the preliminary assessment were as following:

- In the first instance, person-to-person live interviews proved a total failure. The only result was a collection of slogans with no relevance for the case. The situation completely changed when managers were asked to give their answers and comments to the questionnaire or fill in the SWOT table in written form, in sealed, unmarked envelopes. Honest remarks and new ideas were literally pouring in. This was a pertinent signal for what executives should do to improve the situation.
- Top managers have little ideas, general accepted, about what their enterprise is, should be and what to do about it. The ideas remain limited to the social contract between the enterprise and its employees, with no reference about customers, market, stockholders.
- The participants believe there is a strategy of the enterprise but defers a more detailed answer to the executives, as they know nothing about it. Asked directly, top executives could not define a strategy that goes be-

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yond their concern for raw materials needed in the next days or getting back money from their customers as soon as possible.

- Many answers of: "It is beyond my competence" in opposition with the core idea that a modern company strategy is shared by every employee.
- The main concern is the unstable and uncertain enterprise future.
- There are no ideas about what should be done to overcome present difficulties. No suggestions. Though difficult - even impossible to quantify, it is believed that the information gathering in these confidential interviews was the most important for the future stages of the BSC implementation.

Developing a sustainable balanced Scorecard

Instead of adding a new perspective for the classical BSC, the present paper suggests to evaluate each of the four existing perspectives along the three themes of sustainable development. Once the organization vision, mission and strategy are approved, a "destination statement" for the future of the enterprise and the objectives attached to the strategy can be devised.

Table 5. Best Romanian enterprise by 2010 according to strategic perspectives

Perspectives	Economical	Social	Environmental
Financial	Increase shareholder value	Extra income sources	Better record, easier access to funding
Stakeholders	Confidence Going proactive	Transparency	Green Organization
Internal Processes	BAT	Better work conditions	Decoupling development from resources.
Learning & Growth	Continual training Gaining IT edge	Corporate culture	Awareness

Source: own work.

Perhaps the most important feature of the BSC stands in developing "strategy" or "cause-and-effect" maps, simple and obvious for every stakeholder. Strategic objectives are organized along the four perspectives and

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three strategic themes. The objectives in the figure can be inter-connected with arrows, showing the place and relevance of each objective on the way to fulfill the destination statement. These strategy maps are powerful communication tools that convey the strategic ideas to all employees, involving them in to the process, requesting their contribution and motivating them by showing what exactly happens if they do/don't their job efficiently. The managers must fill in every cell in the table with realistic objectives, relevant for their enterprise since void cells will subsequently tell everyone the value managers attach to sustainability. The next step consists in adopting a measurement system. Progress in each objective should be assessed by a straightforward system of key performance indicators (KPI) and specific targets needs to be set for each KPI. A KPI system should include: - lagging KPI – evaluated at the end of a time-period (profit, productivity, etc.); - leading KPI – challenging targets as "zero wastes", "BAT applied", etc. Both tangible (profit, ROI, etc) and intangible (creativity, good-citizenship, "green" brands) KPI must be considered. The objectives and corresponding KPI should be kept to a minimum, subjected to permanent analysis by the strategic management in order to check if they are the right ones. For each objective an action plan will be developed, allocating resources, setting deadlines and nominating responsible persons. Monthly strategy meetings (15-20 min) will ensure that the feedback is working and that all the action plans go smoothly, fining tuning the strategy, if need be. Strategic objectives are subsequently used by lower level managers to develop their own BSC, in a cascading procedure that can go down to each strategic business unit, subsidiary, branch, department, workshop, task group in the enterprise. Specific objectives, KPI and action plans take into consideration much more detailed aspects than the enterprise-level BSC. Top management involvement is essential for success but they have to listen openly and honestly to their employees and push them to generate ideas for change. This was really hard to achieve, since CEO's are not familiar to a roundtable reunion gathering their subordinates that dare to speak about enterprise's future and fate. Our experience was that turning it in a kind of "what-if game" proved successful. Subordinates spoke out knowing that their opinions could be only taken as a brainstorming exercise. As top managers should dedicate their energy on real strategic matters, concern about day-byday work is relegated to lower management – this is a subject that Romanian top managers are only starting to understand (Bețianu & Briciu, 2011, pp. 19-27).

**Case study on measuring the excellence of SMEs using
the Balanced Scorecard tool**

This case study presents the results from a questionnaire given to enterprises in the glass making field within the area of Gorj County in South West Romania. The main hypothesis was to assess the views and practices in relation to performance, strategy and goals, management options and evaluation and review. The second hypothesis was to estimate whether the BSC approach could be applied to these firms leading to new development strategies and SME improved competitiveness. The questionnaire was presented to the top manager and financial executive of the firm, in a structured personal meeting which took place at the enterprise offices. A personal meeting with top management was selected as the most efficient way to proceed with the questionnaire, since it was deemed important to include an introductory section to the questionnaire where a brief introduction to the concept and main structure of the BSC approach was presented (Todorut et al., 2013, pp. 174-180).

The questionnaire had the following questions:

- How does the company assess customer satisfaction
- How does the company assess internal processes
- How does the company formulate and apply growth and improvement
- How does the company assess its financial situation
- How does the company formulate its strategy
- How is strategy formulation associated to performance evaluation practices in the company
- Having explained the basic presumptions of BSC, how does top management view the benefits of BSC and the feasibility of implementation

Throughout the personal meetings with senior executive officers of the enterprises, it became obvious that clarification of issues relevant to BSC had to be done in order to obtain the correct response to the questions asked. Thus the following issues became part of the structured interview:

- Setting objectives targets;
- Defining and calculating indicators;
- Measuring the current state of the company;
- Measuring deviations from established targets;
- Setting some degrees of importance for each objective from BSC and the calculation of a performance percentage for each and every perspective;

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- Setting some degrees of importance for each perspective from BSC and the calculation of an overall performance percentage in the enterprise;
- Setting future initiatives and actions for increasing the company's commercial viability.

In the conditions of increased competition, the company's management team considered it necessary to apply modern management tools to assess the current state of the company, to control and improve the performance levels and establish the future improvements correlated with the company strategies. Therefore, the objectives were established, targets and indicators corresponding to the four perspectives were defined: financial, customers, internal processes, growth and improvement.

Conclusions

With notable exceptions, Romanian managers do not accept modern management techniques. They still trust the idea of executives involved in every detail, retaining all decision power (top-down management, with little attention paid to employees' suggestions for improvement). The strategy audit went smoothly only when the external consultant guaranteed full confidentiality to interviewed personnel, before they put on the table their critics and suggestions. Sustainability concerns are commonly regarded as slogans, the main problem being for next week's salaries and for not getting redundant. Communication improved dramatically during the BSC implementation. It meant also team-building, putting managers to work together, understanding each-other. Implementing BSC in an enterprise that already had quality and environmental ISO – certifications (TQM, EMS) has proven beneficial. The enterprises are on the way to become strategy-focused, having at hand a powerful management system, fully aligned to sustainability requirements. Elements of corporate culture (that existed in Romania before WWII) integrating all the beneficial components of sustainable development are just emerging in the enterprises that adopted BSC.

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Features of Energy Saving Potential in Household Evaluation

JEL Classification: *Q43; Q51; Q56; C92; D1*

Keywords: *energy saving potential; households; evaluation; behavior change*

Abstract: Scientists from all over the world recognize that energy saving in households is currently very relevant topic. Energy resources are very important factor for each country's economic vitality. Not only the country's replenishment in energy resources is important, but also the reduction of energy consumption volume.

The Objective of the study - to assess the energy savings in households potential, applying the measures, aimed at the behavior change of the population through energy-saving direction.

Methodology. The impact of behavior change of the population measures is assessed according to the criteria of efficiency and effectiveness. In order to assess the potential for energy savings in households the following methods, such as an experiment, the control group formation scenario, household questionnaire were used. The questionnaire was designed to supplement an experiment, in order of deeper knowledge of the household, to obtain more detailed information about the nature of the behavior, to identify barriers to behavior change and to select a control group of households to carry out the experiment.

Data, results and main contribution of the paper. Research shows that people's behavior, related to energy saving is influenced by a number of macro-level and micro-level factors. In the article, the assumptions of the changing behavior of

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population are analyzed and the specific measures aimed at the behavior changes of the population selection and implementation impact assessment.

Introduction

Energy saving in households is recognized by various researchers as a very important and significant research subject. Currently the researches of behavioral economics for energy saving in households play an important role for development of world's economic sciences. Energy saving in households can be realized in two directions: by changing the behavior and introducing product innovations (Steg, 2008, pp. 4449-4453; Gifford, 2011, pp. 290-302; Schiler et al., 2008, pp. 1-15). Behavioural changes are primarily related to the implementation of the principles of sustainable consumption (Abrahams, 2011, pp. 1-11; Martinsson, 2011; pp. 5182-5191; Poortiga et al., 2003, pp. 49-64; Godwy, 2007, p. 1-38; Girod et al., 2009, pp. 5650-5661). Product innovations represent the change of energy-inefficient appliances and old cars with new ones, renovation of heating systems, use of renewable energy sources for domestic use, etc. (Faiers & Neame, 2006, pp. 1797-1806; Zarnikau, 2003, pp. 1661-1672; Brownstone et al., 2000, pp. 315-338; Ek, 2005, pp. 1677-1689; Nair et al, 2010, pp. 2956-2963). Most of the studies and their authors, such as Abrahamse and Steg (Abrahamse&Steg, 2009, pp.711-720) Black, Stern, and Elworth (Black et al., 1985, pp. 675-697), De Young (Young, 1993, pp. 485-505), Olson (Olson, 1981, pp. 108-131), Stern (Stern, 2000, pp. 408-424) focused on the social and psychological factors influence on energy-saving behavior by examining impact of cognitive variables, such as values, world views on energy preservation. Other authors have emphasized the importance of social processes (Homans, 1961, 406 pp; Garmendia&Stagl, 2010, pp. 1712-1722; Staats et al., 2004, pp. 341-367) and the formation of sustainable behavior communities (Mckenzie-Mohr, 2000, pp. 543-554; 2001; Dulleck&Kaufman, 2004, pp. 1025-1032). A significant part of the studies was seeking to reveal the impact of information and different kind of feedback on energy-saving behavior (Darby, 2006; Iyer et al., 2006, pp. 988-996; Faraqui et al., 2009, pp. 1598-1608). Another important research unit includes the shaping of ethical, cultural and world-view as well as human capital dimensions of environmental behavior (Bamberg, Schmidt, 2003, pp. 264-285; Barnett&Serlet, 2008, pp. 210-224). Despite extensive researches in this area, there is a lack of a unified and on the energy-saving

potential in households based methodology for evaluation which can be adapted to each particular country.

The individual behavioral studies in fields of energy saving and sustainable consumption as well as sustainable lifestyle formation were little exercised in Lithuania, although Lithuania's dependence on imported fuels is high. Although some Lithuanian authors went deep into the energy saving in households (Balezentis, 2011, pp. 7322-7334, Cibinskiene&Navickas, 2011, pp. 144-151, Simanaviciene et al., 2013, pp. 216-226, Streimikiene&Siksnylyte, 2014, pp. 891-904), the potential of household energy consumption and greenhouse gas emissions reduction by changing population's behavior is still not assessed in Lithuania, although this should be one of the most important goals for climate change mitigation policies aimed at the consumer side.

Theoretical framework of energy consumption

In this section concepts of individual behavior, modeling them from the perspective of energy consumption are conveyed. The interface of individual behavior with energy consumption reveals conveying them. Attention in this paper is concentrated on the behavior which directly pertains to the needs for energy (electricity usage, fuel consumption), the assessment of such behavior as turning on the lights, the use of electrical appliances, cooking, washing, etc. (Streimikiene, Volochovič, 2011, p. 4118-4124). It should be noted that the authors distinguish household energy saving behavior types into two main groups: productive behavior and energy consumption reducing behavior (Abrahamse&Steg, 2011, pp. 711-720). It is important to note that these types of behavior can be considered from an economic perspective - eg. individual energy consumption behavior may be related to the monetary aspect, or, on the contrary, related to the valuable approach - eg., the energy consumption behavior can be conditioned on grounds of protecting the environment, which is of concern to individuals (Streimikiene et al, 2012, pp. 3613-3620). The assessment on the macro-level perspective, technological development, economic growth, demographic and institutional factors influence the development of our cultural behavior in the long run, while looking at the micro level and it's incoming factors such as motivation, skills and opportunities, adapt our behavior on the individual level (Abrahamse et al., 2005, pp. 265-276). It should also be noted that the behavior of individuals is influenced by certain habits and some routine which is carried out entirely without any thinking and sponta-

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neous. It should be mentioned that the influencing factors can be grouped into internal (attitudes, norms, and beliefs) and external (institutions, rules, guidelines).

Others researchers adds that in order to change the environmental behavior of individuals, it is necessary to take into account both the macro and the micro levels, in other words, both the internal and the external factors. In order to make the best choice for behavior such as reducing energy consumption, is a complex case. Nevertheless, empirical studies of energy consumption make a number of signs and evidence that the conditions laid down correctly have an impact on behavioral changes and they can also be formed by public policies (Streimikiene et al., 2012, pp. 3613-3620). Wilson and Dowlatabadi distinguish four perspectives of different characters examining aspects of energy consumption by individuals. First one, which is referred as neo-classical and behavioral economics, presents traditional economic approach, distinguishing individual choices and behavioral aspects of the economy. Traditional economics identifies individuals as consumers seeking to gain the maximum benefit where the benefit is defined as a measure of consumer choices.

The main idea of the behavioral economics, which refers to consumer choice differs from the concept of benefits by various limitations, which were clarified by the economic and psychological tests. Examining the pattern of benefit, attention is focused on the aspects of time inconsistency, system of approaches and limited rationality (Wilson & Dowlatabadi, 2007). Household savings potential studies evaluating the opportunity to save by increasing the efficiency and economy of use provide Dietz (Dietz et al., 2009, pp. 18452-18456), Martinsson (Martinsson et al., 2011, pp. 5182-5191). The greatest potential for energy savings, conducted by a study provide Dietz and others – households by installing energy saving and efficiency measures can save about 27% of the energy. Studies show that the consequences of the measures (feedback, awards) can increase the amount of energy savings. Therefore, the review of studies suggests that in order to maximize household energy saving it is important to apply certain packages of measures and to look at this issue holistically. Research shows that individual behavior with regard to energy consumption influence factors of macro and personal levels. Macro-level factors include technological progress, economic development level, demographic, institutional and cultural factors of the country, while personal factors include individual human characteristics, attitudes, beliefs, norms, motivation, skills, knowledge and habits, routines. Energy consumption behavior of the popu-

lation is mostly dependent on the habits and routine. This kind of behavior is difficult to change, because partly it is determined by the characteristics of the individual devices used, but it is more important that it is influenced by internal and external factors, such as beliefs, values, attitudes and behavior of other individuals, cultural restrictions, as well as economic initiatives and restrictions.

The empirical study analysis (Noeren, 2007) showed that the measures aimed at the habits and routine procedure changes, such as information disclosure, goal setting and feedback of energy consumption and significant social influence enables to save energy consumption in households, but most examined studies faced numerous methodological shortcomings, such as eg. there was only one type of measure used in the study or there were several measures used, but the impact on energy savings of each measure was not distinguished. Studies have shown that obtaining of regular and effective feedback on energy consumption behavior gives an opportunity for individuals to change their behavior, especially if their current behavior is not consistent with their values or beliefs. The feedback also provides much benefit, changing the attitudes of individuals, revealing bad habits and helps to avoid them.

Methodology to assess energy savings in households

As shown by the study conducted, the research for energy saving potential of households, changing the behavior has to cover both the macro and micro levels and to determine what is the potential energy savings as well as greenhouse gas emission reduction in households after such behavior change measures as information disclosure, goal setting and energy consumption feedback were realized. The essence of the assessment methodology contains impact assessment and recommendations of theoretical assumptions for the change of population's behavior, selection and implementation of specific policy measures aimed for population behavior changes. In order to assess the potential for energy savings in households caused by behavioral changes it is very important to determine the contribution of the household to energy consumption and its importance seeking goals of energy efficiency policy. Here the comparative analysis of energy consumption in household sector and correlation-regression analysis of main determinants of energy consumption trends play a very important role.

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To assess the potential for energy savings in households and new energy-saving measures, it is important to examine the existing energy-saving measures in Lithuania and to compare them with those for other countries to determine whether Lithuania's energy saving policies to encourage households for energy saving are sufficient. Here the SWOT and PEST analysis of the Lithuanian energy efficiency policies, targeted to households play an important role. As energy saving by households can be achieved both by changing behavior and introducing product innovations, it is important to distinguish these possible energy-saving options in households and to compare them according to the energy saving potential and costs. Seeking to support the selection of new energy-saving measures, it is important to compare the potential and cost of energy saving supported by these measures with policy measures, adopted in other sectors. Potential savings in households, introducing product innovations have been evaluated through the analysis and summary of studies carried out in Lithuania and results of the energy efficiency program. The most complex and longest stage of the research involves assessment of energy-saving potential in households. It consists of several key stages and includes a number of research organization and implementation techniques such as scenario building, selection of measures aimed for formation of energy-saving behavior of households and implementation of these measures in control-households.

The effect of measures implementation should be assessed by determining the energy savings achieved in households which participated in the control household groups. Another important aspect related to the assessment of energy-saving potential in households is registration and tracking of energy consumption. There for it is necessary to prepare docketts and to train households to fill them in. The analysis of treatment group's social, demographic and psychological characteristics and their impact on behavior change is important. In order to prepare the experiment and to form a control group of households, it is necessary to carry out the questionnaire random household survey, based on more detailed information about the household. A questionnaire survey is designed to complement the experiment to examine in depth knowledge about household, to obtain more detailed information about the nature of the behavior, to identify barriers for behavior change and to select a control group of households to carry out the experiment. After the evaluation of the questionnaire survey results, the control group of households is formed. It is selected on the basis of the average Lithuanian demographic indicators and statistical characteristics of Lithuanian households, such as age, household size, education, income,

living space. The experiment was carried out according to two scenarios: basic and energy saving. Under the basic and energy saving scenarios the energy consumption in households was recorded. Registration was carried out according to the prepared docket, where duration of all household activities related to energy consumption was recorded, in another docket records of aggregate energy consumption per one month were registered. Under the proposed energy-saving scenario the measures were designed to change the behavior of the household:

- each household attended seminar about energy-saving opportunities; the goal for 20% energy saving was raised,
- identifying that for energy saving achievement a number of households will compete;
- specific energy-saving measures in three areas were proposed for households: energy saving, fuel saving in transport and changes of life-style.

A feedback was ensured: one month after the goal setting the energy consumption in household was checked. After the implementation of energy-saving scenario (goal setting and proposed measures for saving) the amount of saved energy by energy-saving scenario was estimated, summarizing results of all households which participated in the experiment. The data for estimation was collected from the records in summarized monthly dockets of energy consumption. For better results, the study lasted for four months: two months in the summer and two months in the winter. Based on the test results, recommendations for the promotion of new energy efficiency measures for implementation in households were formulated.

Research

Objective of the research - to assess the potential for energy saving in households, through measures aimed at the change of individual behavior for energy-saving. Under the household we understand people, living together in one house. Concepts of family and household are different, although sometimes interchangeable. Family - a group of two or more people related by marriage, blood ties or adoption and residing together. TV, computers, furniture, food are used not so much individually as in households.

Under the basis of the average household characteristics the experiment group of participating households was formed. From the selected volunteers, who replied to a questionnaire of a survey, the households were selected so that the demographic characteristics of the study group would

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meet the proportions of Lithuanian population. From according the questionnaire determined volunteers (40 households) who responded and completed the questionnaire, households were selected so that the demographic characteristics of the research group would meet population proportions.

Tasks of the research:

- To evaluate the energy saving potential in households using measures influencing behavior.
- To disclose the essential barriers that disturb to change behavior.
- To identify the key factors that determine the changes of behavior.

A half of for the research selected households consist of a family with two people, more than a half of the members in surveyed households have a university education, monthly income does not exceed 260 euro in the majority of the surveyed households, average household size was 2,4. Working-age people (20-59 years.) accounted for about 67 per cent, up to 19 years aged people accounted for 12 percent. Since more than 80 percent of Lithuania's urban population lives in apartment buildings, they were chosen as the target group.

Research process:

- Formation of the scenario,
- Selection of the measures for behavior change regarding energy consumption,
- Preparation of two types of docketts,
- The selection of experiment participants for the control group,
- Presentation of information and training for experiment participants how to fill in the docketts,
- Setting of a goal and anticipation of measures,
- Feedback - determination of the results achieved,
- Presentation of conclusions.

Assuming that household energy consumption in summer and winter time is different, the experiment was carried out both in the summer and winter seasons. Survey was designed for four months: two months during the summer season and two months during the winter season.

Two main scenarios were formed for the experiment:

- Basic scenario: every day during one summer and during one winter month until the goal setting in the docket the data about households activities related to energy consumption were recorded, in order to be able to evaluate later the energy consumption in households without any energy saving measures.

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- Energy-saving scenario: after the evaluation of primary situation, goal setting and introduction of certain energy saving measures, in the docket the data of activities related to energy consumption were recorded every day during one summer month and every day during one winter month, in order be able to evaluate later the energy savings in households using energy-saving measures aimed at behavioral change.
- Seeking to determine the amount of consumed energy data, recorded on the characteristics of electric appliances, readings of electricity, gas and water meters were taken into account.

Data, got for the experiment from each household was summarized in a consolidated docket. Based on the summarized in the dockets recorded information of all in the experiment participating households, the average amount of saved energy in Lithuanian households, implementing measures aimed at the behavioral change was determined. Based on the survey results the main factors (age, education, size of the family, income, attitude to environmental protection and energy consumption, etc.) determining the energy savings potential in households were identified. The survey identified key barriers hindering the change of household behavior: lack of knowledge, distrust of information sources, inertia, values, etc.

It should be noted that consumption of heat in households was not assessed in the survey as the chosen households - apartment dwellers were unable to control the heat consumption. Total energy saving potential of households was assessed separately in groups of households, summarizing data, registered in the dockets. The resulting energy savings were converted into conditional fuel using the fuel calorie table.

For energy-saving scenario following energy-saving measures in households were offered for residents:

- For reduction of electricity consumption: turning electric lights off when leaving the room, less time for the TV and the computer, washing by lower temperature, washing in "eco" mode, turning off of the devices in standby mode, frequent defrosting of refrigerator.
- In the field of transport: the use of public transport, cooperation with others to travel to work, overcoming short-distances by cycling, "gentle" driving, speed reduction;
- In the field of lifestyle changes: consumption of local products, reducing the amount of meat in diet.

The feedback was ensured: one month after the goal setting the household energy consumption was checked. After the evaluation of average energy savings in examined households we determined that one household

during the summer month can save on average: 28.5 kWh of electricity, 0.9 m³ of natural gas, 20.9 l of gasoline or diesel fuel; respectively in winter households can save on average: 21.5 kWh of electricity, 1 m³ of natural gas, 16.2 l of gasoline or diesel fuel. After application of the conversion coefficients the energy saving potential was calculated in GJ or toe. After the conversion it was determined that one household during the year through the change of behavior and with no additional cost, can save 0.73 GJ (0,036 toe) of energy per month or 8.8 GJ (0.21 toe) of energy per year. On the basis of data about the number of households in Lithuania (1,425 million) obtained from the Statistics Lithuania, energy-saving potential of changing population's behavior in households during the cold season is about 5.7 PJ, and during the warm season - 6.84 PJ. Total energy saving potential in households exceeds 12.5 PJ or 0.294 Mtoe / year.

Comparing the energy-saving potential of changing the behavior of households and applying innovations it can be noticed that the energy saving potential applying innovations is higher, but it requires large investments. Meanwhile, the energy saving potential in the sector of energy supply is less than in households. Comparing the cost of energy saving in households applying innovations with energy-saving costs in energy supply sector, the cost of energy-saving in energy supply sector is lower than the cost of energy-saving in energy consumption sector, but energy saving in households, changing people's behavior does not require any investment, but on the contrary enables to save.

Conclusions

A conducted research has showed that, comparing the energy saving potential by changing the behavior of households and applying innovations it can be seen that the energy saving potential in innovations is higher, but it needs large investments. It is necessary to change the climate change mitigation policies and to redirect it to energy consumption sector in Lithuania. It is also proposed to pay more attention to climate change policy at local and regional level: to set goals, to provide adequate support, knowledge and experience on how to combat climate change in daily life, as well as implementing long-term projects. It is recommended to direct climate change mitigation policies from the expensive project financing in the energy supply side and to pay more attention to soft, society educating and behavior changing projects.

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1. It is proposed to incorporate energy-saving measures aimed to change the behavior of households to the National Energy Efficiency Program. It is important that these measures would include an integrated set of measures: targeted information, goal setting and feedback, because, for example, the mere awareness and educational campaigns are not sufficient to significant savings.
2. Transfer of the energy efficiency policy development and responsibility of its implementation and appropriate resources to relevant authorities (local government, community groups) would ensure the appropriateness of the measures in the region and enhance their acceptability.
3. Recommendations for implementation of energy efficiency policy in Lithuania:
 - To raise the savings targets at the local level, to encourage the establishment of multi-saving programs in communities, to use the groups impact to saving goals;
 - To install an online carbon feet calculator;
 - To introduce the eco-labeling for all appliances used in household;
 - To promote and finance housing audits and integrate feedback mechanisms;
 - To apply informative bills for heating, hot water;
 - To promote the use of bicycles, to improve infrastructure;
 - To encourage the use of public transport, to prohibit entry by private car to the city center and the old town;
 - To organize a car-free days;
 - To promote the sharing of family cars and gentle driving;
 - To pay more attention in the education sector to improve the knowledge of teachers and to raise pupils' awareness;
 - To pay more attention to social advertising in the mass media; to disseminate the information on GHG emissions, and the effects of household consumption on GHG emissions;
 - To support “behavioral change” leaders - include public figures in the process of behavior change. They should serve as an example

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Social Media Evaluation Metrics

JEL Classification: *M31*

Keywords: *social media marketing; social media metrics; social media evaluation; consumer purchase decision process*

Abstract: Background. There are many methods how specialists can evaluate return of online marketing activities. Most of the methods out there are designed for versatile use. But each online marketing tool has its own unique specific metrics that should be taken into account when measuring the return of marketing activities. Authors believe that the methods that are designed to evaluate online marketing activities should also be more specific. Hence authors believe that more specific online marketing revenue determination methods should be proposed.

Objectives. The aim of this paper is to propose a formula that can be used to evaluate the return of social media activities depending on consumer purchase decision process stage the online marketing activity was meant to influence.

Methodology. To achieve the aim of this paper, following research methods were used: theoretical literature analysis, expert surveys, grouping and statistical analysis methods.

Data. The proposed formula was based on the data that was collected from theoretical literature analysis and expert surveys.

Results. The main result of this paper was to propose a formula, which can determine the return of social media activities based on purchase decision process stage the social media activity was meant to influence.

Main contribution of the paper. This paper offers a new approach how to evaluate return of social media activities depending on which purchase decision process stage online marketing activity was meant to influence. This paper can be used as a

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basis for further researches where social media activity revenue evaluation methods are discussed. Marketing specialists can use this paper as an example how to evaluate return of social media activities.

Introduction

Social media network popularity is increasing worldwide. In the first quarter of 2008 Facebook was used by approximately 100 million users, but in 2014 fourth quarter Facebook was already used by 1393 million people (Statista, 2014). There are now reported to be 1.5 billion social media users globally. Also at least 70 percent of companies based in United States of America are using some form of social media (Michael Chul et al., 2012, pp. 1-5). Social media networks are becoming more important for every companies marketing strategy. Therefore, it is necessary to pay more attention to social media return analysis.

Consumer purchase decision process has been analysed from many different marketing aspects. From cultural aspect (Chaudhry, et al., 2015, pp. 197-202) from psychological aspect (Samson & Voyer, 2014, pp. 21-33) and others. However there have not been any research papers written on how to measure social media marketing return based on which consumer purchase decision process stage social media activity was meant to influence. Also no researches have been conducted on importance of social media metrics when it comes to evaluating social media activities in Latvia.

The importance of social media marketing metrics can vary from country to country, so it is necessary to conduct researches about social media marketing metrics importance in different countries. No such studies have been made in Latvia so far.

In this article authors will propose, a formula and approach how to evaluate social media return depending on which consumer purchase decision process stage social media was meant to influence. To create the formula authors will use following information: 1. The purchase decision process stage model; 2. Expert opinions about social media metrics importance and usage frequency; 3. Theoretical literature analysis. With the help of this formula and approach more precise data about social media return can be collected.

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Background and motivation of the Study.

The main reasons why authors chose to write about this topic are: 1. Social media in Latvia has been used as a marketing tool to attract customers for many years. 69.5% of Latvia's population use social media networking sites on a regular basis according to central statistical bureau of Latvia. Nevertheless, there are very little researches conducted on social media marketing metrics in Latvia; 2. Companies always have limited resources and the main goal of a business is to use these resources as effective as possible (Abubakar H., 2011, pp. 45-59) That is why authors wanted to create a formula that could help companies evaluate their social media activities more effectively; 3. Social media helps businesses to connect with their customers more effectively while spending fewer resources than by using more traditional communication tools. Because of this reason it is important that the evaluation of social media return is more precise (Kaplan & Haenlein, 2010, pp. 59-68); 4. The proposed return evaluation formula will give a new perspective on how to create social media marketing campaigns.

Social media enables business organisations to connect with their customers at the right time, directly with lower cost and higher efficiency than other traditional communication tools. This allows social media not only to be used by large business organisations, but also small and medium enterprises can use social media to achieve their marketing goals (Kaplan & Haenlein, 2010, pp. 59-68). Hence it is important to help companies better understand how to calculate the return of social media activities in order to better understand the tool in general.

Research gap

Social media researches based on the AIDA model have been conducted for small and medium businesses (Hassan et al., 2015, pp. 262–269). But never social media strategy has been developed based on the consumer purchase decision process. Also there has not been developed a way how to evaluate the return of social media activities depending on which consumer purchase decision process stage social media activity was meant to influence. Authors believe that by development of such a formula and approach that can evaluate the return of social media activities based on the consumer purchase decision process they can help companies create social media

campaigns which can achieve better results. As a result companies can get better return from their investments.

Literature review

The marketing communications medium has evolved from print media, electronic media, to social media in cyberspace. Consumers are more shopping online and rely more on the information published on social media sites than ever before. This trend shows that consumers tend to trust their friends and contacts in social media over the ads displayed by business organisations (Woodcock & Green, 2010).

Social media evaluation methods

Social media measurement methods are rather new, nevertheless they have evolved quickly. There are many approaches how social media activities can be evaluated.

While conducting the theoretical analysis authors came across the following social media evaluation methods. One of the methods proposes to use the following framework to evaluate the return: 1. User Analysis. In this stage we must determine who are the users that will be listening to us; 2. User-Generated Content Analysis. We must listen to the audience to understand the topics that attract the attention of the customers; 3. Engagement Analysis. We must analyse the actions taken in the social media; 4. Benchmarking. We must compare us with our main competitors (Cvijikj et al, 2013, pp. 10-12).

One of the approaches how to evaluate social media marketing is tracking customer's investments, not the companies. When using this kind of approach we evaluate social media metrics, such as number of unique visitors, number of return visits, search rankings etc. This kind of approach gives us the opportunity to evaluate return of social media before any purchases have been made (Donna et al., 2010, pp. 41 – 44).

Return of social media can also be determined by calculating traffic (unique visitors and page views), the stickiness (subscriptions via email, returning visitors), the visibility (link, search rankings and long-trail traffic), viralness (brand awareness), the engagement (comments) and income (Saleem, 2008).

Social media return can be evaluated also through social media insight tools. These tools are divided into 4 groups: 1. Enterprise listening plat-

forms. They collect all the public accessible information about your topics of interest; 2. Text mining partners. This particular kind of platforms helps deciphering the meaning of social comments from different social platforms; 3. Platform API (*application programming interface*) tools. These are niche social measurement tools that provides you access to certain social media network insights; 4. Site analytics solutions. These tools provide you website visitor behaviour information (Murdough, 2009, pp. 96-98).

Social media effect on consumer purchase decision process has been researched in different ways. Dividing specific elements or in general. (Shahizan Hassan et al., 2015, pp. 262–269).

Methodology of the research

Methodology approach

To achieve the aim of the paper several research methods were used: 1. Theoretical literature analysis; 2. Expert survey; 3. Grouping; 4. Statistical analysis methods. As the first research method theoretical literature analysis was chosen. With help of theoretical literature analysis, data about most often used social media metrics was summarised and the research gap was identified. The collected information about social media metrics was used as the basis for the expert survey. The expert survey was used to collect data from experts about most often used and most important social media metrics. The expert survey as a research method was chosen because qualitative research methods can obtain more extensive results than quantitative research methods (Taylor & Bogdan, 1998, pp. 102-130). This kind of approach gave authors additional information that helped to develop social media evaluation formula.

Research framework

To ensure that the objective of the study will be achieved by using previously mentioned research methodology the research question, research objective, the research methods and results were formulated and presented in table 1.

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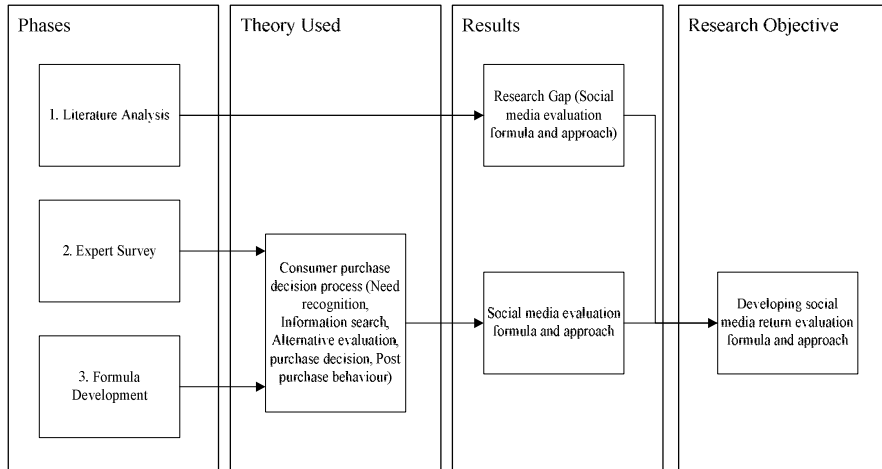
Table 1. Research framework

Research Question	Objective of the Study	Method	Result
How can we evaluate social media return depending on which consumer purchase decision process social media was determine to influence?	Develop a formula and an approach that can evaluate the return of social media depending on which consumer purchase decision process social media was determine to influence.	Theoretical literature analysis and expert surveying.	Formula and approach that can evaluate the return of social media depending on which consumer purchase decision process social media was determine to influence.

Source: authors developed research framework based on the research questions, objectives, methods and results

Based on the research mapping a research framework was developed. The research framework consists of three phases as shown in figure 1. The phases are linked together by the theory that is used, the research results and by the research objective. The first phase includes theoretical literature analysis. This phase resulted in the identification of most often mentioned social media metrics in theoretical literature and in the identification of the research gap. In the second phase an expert survey was conducted. In the result, data about social media metric importance and usage frequency in Latvia were collected. In the third phase based on collected information in phase one and two, a formula that can evaluate the return of social media activities depending on which consumer purchase decision process stage the social media activity was meant to influence was developed.

Figure 1. Research Framework



Source: authors developed research framework based on the research

Expert survey

Data was collected from 21 marketing experts from Latvia. Demographic information about the experts is summarised in table 2. The marketing expert survey was sent to the marketing directors, online marketing specialists, marketing managers and marketing specialists, a completion incentive was offered in the form of providing a summary of the study's results. Expert survey was chosen as one of the research methods because expert survey allows gather precise data while investing less time and funds in comparison to other quantitative research methods (Kelley et al., 2003, pp. 262).

Table 2. Demographic information of the Experts

Age Range	Type of Business	Position	Experience
Between 28 - 43 years	Manufacturing, IT outsourcing, Advertising, Telecom unications, Retail, Heat engineering, Consultation	Marketing specialists Online marketing speciliasts, Marketing mangers, Marketing directors.	5-10 years

Source: own developed table based on the demographics of experts

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The experts were targeted derived from various industrial sectors (e.g. manufacturing, IT, etc.). The companies that experts worked varied in terms of employee numbers from 1 to 250, with a turnover below 50 million Euros, in line the EU definition of small and medium enterprises (European Commission, 2003). Twenty one questionnaires were returned with 20 being fully completed. One expert was excluded from the sample because he did not fully answer all the questions.

The questionnaire consisted of two parts, and included social media evaluation metrics based on the previous theoretical literature analysis.

The experts had to appraise the importance and usage frequency of the metrics in scale from 0.5 to 1.5 as 0.5 being not important/hardly used and 1.5 very important/used very often.

The collected data was grouped so it can be used to test out the proposed formula. The expert survey results are shown in table 1.

Table 3. Expert survey results

		Consumer purchase decision process									
		Need recognition		Information search		Alternative evaluation		Purchase decision		Post purchase behaviour	
		Importance	Usage frequency	Importance	Usage frequency	Importance	Usage frequency	Importance	Usage frequency	Importance	Usage frequency
Social media metrics	Bounce rate	1.1	1.07	1.2	1.12	1.2	1.07	1.3	1.07	1.4	1.07
	Time spent on site	1.35	1.15	1.3	1.15	1.4	1.15	1.3	1.15	1.1	1.15
	Unsubscribe rate	1.15	1.1	1.35	1.23	1.2	1.18	1.2	1.12	1.4	1.25
	Comments	1.37	1.25	1.4	1.33	1.4	1.34	1.4	1.34	1	0.87
	Followers	1.3	1.2	1.35	1.3	1.4	1.36	1.4	1.36	1.4	1.36
	Shares	1.3	1.28	1.4	1.36	1.4	1.36	1.4	1.34	1	0.87
	Likes	1.33	1.30	1.4	1.36	1.4	1.32	1.4	1.36	1.1	1
	Visitors	1.3	1.25	1.37	1.32	1	0.89	1	0.9	1	0.92

Source: results collected from expert surveys

Findings

Social media evaluation formula

Based on the literature analysis and the expert survey, a formula which can be used to determine social media return depending on which consumer purchase decision process stage the social media activity was meant to influence was proposed. The following information was taken into consideration while developing the formula: 1. Theoretical literature summary about most often used social media metrics; 2. Expert opinions about most frequently used and most important social media metrics; 3. The consumer purchase decision process specifics; 4. Similar research papers were analysed about social media and different consumer decision models (Shahizan Hassan et al., 2015, pp. 262–269); 5. Authors' personal experience. Based on this information following formula was proposed:

$$\mathbf{Social\ media\ return} = (\mathbf{a}_1 * \mathbf{b}_1) * \frac{\mathbf{v}_1}{\mathbf{L}_i + \mathbf{L}_d} + \dots + (\mathbf{a}_n * \mathbf{c}_n) * \frac{\mathbf{v}_n}{\mathbf{L}_i + \mathbf{L}_d} \quad (1.)$$

Where, **a**- The importance of indicator, **b** - The indicators usage frequency, **v** - Total value of actions, **L_i** - Campaign development time, **L_d** - Campaign duration.

The current formula is developed so that using marketing expert opinion companies can determine return of social media activities depending on which consumer purchase decision process stage the social media activity was meant to influence.

In this formula **a** is the expert evaluation about social media metric importance depending on which consumer purchase decision process stage the social media activity was meant to influence.

With **b** expert evaluation about social media metrics usage frequency is indicated. Experts determine how often they use certain social media metric to evaluate social media activities depending on which consumer purchase decision process stage the social media activity was meant to influence.

Both of these indicators are multiplied (**a*b**) by multiplying these two indicators we get the value of the indicators or (**c**). This method is borrowed from risk analysis modelling. Where risk impact level is multiplied by risk probability. Authors suggest that previously provided table 3. is used when

evaluating the social media return depending on which consumer purchase decision process stage the social media activity was meant to influence.

With v , the total value of actions is indicated. To calculate the total value of actions, we assume that every action is worth something. We define a worth for every action that has been taken and multiply the total amount of actions with the assumed worth of an action. We indicate Q as the amount of social media metrics actions and with M the assumed worth of an action.

$$v = Q * M \quad (2)$$

With L_i authors indicated the necessary time to prepare the social media activity. The activity preparation time is the time that is necessary for social media activity development from the planning till the launch of the activity.

With L_d the social media activity duration is indicated. This is the time from social media activity launch till the end of the activity. The activity development time and activity duration is summarised and the total activity time is calculated. Each social media activity has its own development time and duration time. The social media activity that brings more return in shorter time of period is the most effective one.

The formula can be used in different countries. The only thing that has to be taken under consideration when using this formula outside of Latvia, the expert opinions may vary in different countries.

Conclusions

This research is both practical and theoretical.

In practice, this paper can be used as example when analysing the return of social media activities depending on consumer purchase decision process stage the online marketing activity was meant to influence. This kind of an approach will give marketing specialists more accurate results about the actual return of social media activities. Due to this approach more precise marketing campaigns can be developed, that can only target one of the five consumer purchase decision process stages. By achieving marketing goals more precisely, companies can increase their revenues.

The theoretical contribution of this research is: 1. This research paper increases the application possibilities of consumer purchase decision process model. Due to this research we can see that the consumer purchase

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decision process model can be used as the base when evaluating digital marketing campaigns; 2. A new social media return evaluation approach is presented.

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Specifics of Cluster Policy in Russia

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Abstract: The article presents the results of management quality survey in Russian clusters that reveals specifics of cluster support policy in Russia. We compare 22 Russian clusters, supported by the Government, using series of indicators measuring cooperation intensity of cluster participants and activity of cluster management teams. We introduce a description of the typical Russian innovative territorial cluster, based on the average values of the indicators.

Our analysis revealed that international communications, information about funding and training courses are highly useful tools to improve collaborations among cluster participants. This paper proposes a methodology for measuring cluster performance by the cluster scale index, cluster development index and cluster management efficiency index.

In conclusion, we formulate recommendations for cluster policy improvement in Russia, based on our analysis of indicators' correlations and comparison between the results of our research and the similar researches in other countries.

This analysis will be useful for researchers and policymakers from countries, where cluster policy recently became a popular topic.

Introduction

According to M. Porter, cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field that are linked by commonalities and complementarities (Porter, 2000, p. 16). Cluster policy is a useful tool for improving economic performance of former transition countries (Ketels, 2003, p. 1). The most successful clusters have mechanisms and entities for collecting and disseminating knowledge and accumulating social capital (Rosenfeld, 2002, p.6).

Cluster policy in Russia recently became a popular topic. The Russian Government in its attempt to foster development of innovations and commercialization of technologies decided to support «territorial innovative clusters». The foreign best practices had been thoroughly studied, and experience of cluster development in Germany and France had been significantly explored. In the beginning of 2012, the Ministry of Economic Development of Russia initiated a competition of regional cluster projects. Russian regional administrations submitted about 100 applications, and among them 25 applications were selected for support from the federal budget. At the beginning of the program, selected clusters could spend federal subsidies mainly on improving an infrastructure in territories of their location (Abashkin et al., 2012, pp. 16-26).

Selection process was aimed at choosing high-tech clusters with high innovative potential. Most of the selected clusters were based on former large Soviet enterprises, which survived during the transition period in 90th. These enterprises operate in such spheres as biotechnology, aerospace industry, nuclear power medicine and informational technologies. The main problem of these clusters is that they lack a tie with small companies and have an insufficient level of cooperation (Borisenko, 2012, pp. 143-148). That is why, this initiative looks like revitalization of soviet system of territorial production complexes, when the several large companies from connected industries (like charcoal production, metallurgy and heavy machinery) were energetically and technologically integrated in regional boundaries. The Ministry of economic development is now addressing this shortcoming by organisation of special centres for cluster management that will provide soft infrastructure services - facilitation of interactions between cluster participants, provision of educational services, assistance in marketing and branding cluster participants, etc.

According to (European Cluster Excellence Initiative, 2012) the quality of management is an important prerequisite not only in business, public and

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government organisations, but as well it is an important component for a cluster organisation that is aimed at facilitating common projects among cluster participants.

The aim of this paper is to evaluate the efficiency of cluster management organisations in Russia and outcomes of their work during the 2012-2013 years.

For this purposes, authors used the results of the survey of 25 Russian innovative territorial clusters. A survey was designed according to the questionnaire of the European Cluster Excellence Initiative. The survey was conducted by the Association of Innovative regions of Russia in February 2015. The survey was designed by means of Survey Monkey software¹. Such survey was conducted in Russia for the first time.

Among 25 surveyed clusters, management in 22 clusters gave responses (the response rate is 88%). Invitation to participate in survey was sent on behalf of Russian development institution – Association of Innovative Regions of Russia (AIRR). About 60 questions in the survey address different aspects of cluster management functioning. In particular, the questions address such topics as structure of the cluster, cooperation of cluster participants, initiation and management of cluster activities, strategy of cluster development and its implementation plan, recognition of the cluster in the internet, press and media.

The map on the figure 1 shows regions, where 22 surveyed Russian innovative territorial clusters are located.

¹ URL: <https://www.surveymonkey.com>

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Figure 1. Regions of location of 22 Russian territorial innovative clusters



Source: own work.

The names of the surveyed clusters, their abbreviations and region of their location are presented in the table 1.

Table 1. Russian innovative territorial clusters

Abbreviation	Name of the cluster and its specialization	Region of location
SIC	Shipbuilding innovative regional cluster	Arkhangelsk region
FBK	Pharmaceuticals, biotechnology and biomedicine cluster	Kaluga region
CIW	Complex processing of coal and industrial waste	Kemerovo region
MFR	Medical, pharmaceutical and radiation technology cluster	Leningrad region
ICZ	Innovative regional cluster of Zelenograd	Moscow
PHH	Phystech XXI	Moscow region
BIC	Biotechnological Innovation Cluster of Pushchino	Moscow region
NFN	Innovative regional cluster of nuclear physics and nanotechnology in Dubna	Moscow region

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API	Industrial innovation cluster of the automotive and petrochemical industries	Nizhny Novgorod region
NBI	IT&BIO cluster	Novosibirsk region
FOT	A cluster of fiber-optic technologies "Photonics"	Perm region
RIC	Innovative regional cluster of rocket engine	Perm Region
PIC	Petrochemical innovative regional cluster	The Republic of Bashkortostan
ILM	Energy-efficient lighting and intelligent lighting control systems	The Republic of Mordovia
KIC	Kamsky innovative regional production cluster "Innokam"	The Republic of Tatarstan
ACS	Innovative regional aerospace cluster	Samara region
IES	Development of information technology, electronics, instrumentation, communications, and information & telecommunications	Saint Petersburg
MPR	A cluster of medical, pharmaceutical and radiation technologies	Saint Petersburg
TCS	Titanium Cluster	Sverdlovsk region
PMI	Pharmaceutics, medical equipment and information technology	Tomsk reioign
NCD	Nuclear Innovation Cluster of Dimitrovgrad	Ulyanovsk region
ASH	Innovative regional cluster of aerospace and shipbuilding	Khabarovsk region

Source: Ministry of Economic Development of Russia

The results of the survey were analysed using statistical and econometrical methods. We provide a characteristic of a typical Russian innovative territorial cluster, based on survey indicators.

The rest of the paper is structured as follows. Section 2 provides a brief description of the methodology of the research. Section 3 is devoted to the characteristic of functioning of Russian innovative territorial clusters and their management teams. Section 4 presents the correlation analysis results of cluster performance indicators. Section 5 contains the conclusion of the

research. Finally, the appendix contains a matrix of correlation coefficients and description of variables.

Methodology of the research

The article is based on the results of the cluster management survey in 22 Russian innovation territorial clusters. We used correlation analysis in order to identify relationships between the 52 survey indicators (description of the indicators presented in the Appendix A.1). We also created a portrait of a typical (standard) Russian innovative territorial cluster based on the average values of selected indicators. For the description of the whole sample of the Russian clusters, we presented minimum and maximum values for selected indicators, their averages and a standard deviation.

For the purpose of comparison of clusters development performance and efficiency of cluster management organizations we build several rankings based on indicators both gathered during the survey and calculated on the base of the collected data.

Following the methodology for constructing index of knowledge economy (Chen, D. H., & Dahlman, C. J., 2005, p.17), we build the ranking of clusters by their scale, level of development and efficiency of cluster management.

Using expert method we select k most relevant indicators (from full dataset, consisting of $n=52$ indicators ($x_1 \dots x_{52}$)) for the purpose of cluster description at each of the mentioned spheres².

For every selected indicator x_k we calculate the rank index R_i for cluster $i=1..21$ according to the following expression:

$$R_i = \frac{R_{low}}{R} \times 10,$$

where R_{low} is a number of clusters with a lower rank, R is the total number of clusters.

By construction $0 \leq R_i < 10$.

² For example in the case of cluster scale ranking, we use indicators: $x_1, x_4, x_{14}, x_{15}, x_{16}, x_{22}, x_{24}, x_{28}, x_{36}$. These indicators are highly correlated with the number of registered cluster participants (x_1) and almost not correlated with each other.

After that we define average rank index (AR_i) for cluster $i=1..21$ by the following expression:

$$AR_i = \frac{\sum_{i=1}^k R_i}{k},$$

where k – is the number of selected indicators³.

We use the same procedure to obtain AR_i indices for scale of cluster (AR_i^{scale}), its level of development (AR_i^{dev}) and efficiency of cluster management organizations (AR_i^{man}).

In the case of **scale** ranking construction we use raw data from our survey ($x1..x52$ indicators).

To obtain input data for cluster rankings on level of development and efficiency of cluster management we standardize raw data by dividing corresponding indicators by the number of registered cluster participants (N_{part}) and number of cluster management staff (N_{team}).

In doing so for $n=1..52$ we obtain:

$$x'_n = \frac{x_n}{N_{part}} \text{ and } x''_n = \frac{x_n}{N_{team}}.$$

Then we calculate AR_i indices using x'_n and x''_n input data.

After that, we obtain integral rank of the cluster i by the following expression:

$$IAR_i = \frac{AR_i^{scale} + AR_i^{dev} + AR_i^{man}}{3}.$$

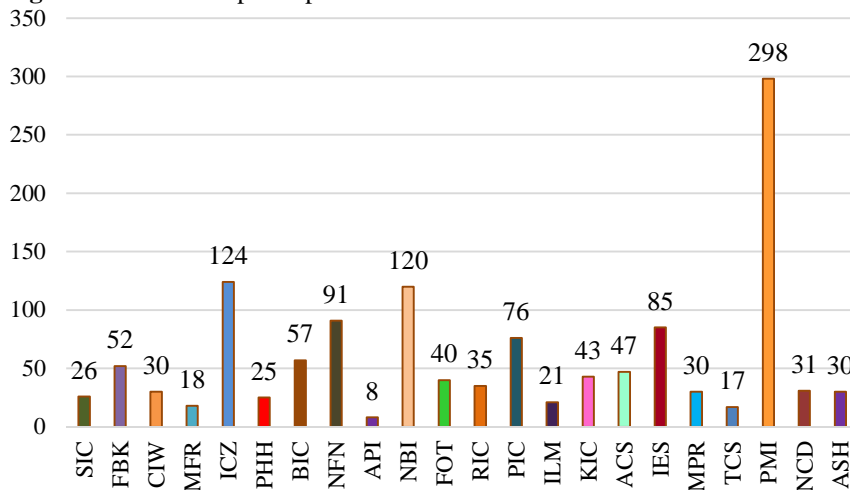
All used variables and correlation matrixes are in the Appendixes A1 – A8.

³ In the case of cluster scale ranking number of selected indicators ($x1, x4, x14, x15, x16, x22, x24, x28, x36$) counts nine.

Description of Russian innovative territorial clusters

According to the survey, there is a high differentiation in the size of the clusters. The highest number of participants registered in the PMI cluster (Pharmaceutics, medical equipment and information technology of Tomsk region) – about 300. The lowest number of participants belongs to the API cluster (Nizhny Novgorod industrial innovation cluster of the automotive and petrochemical industries). The average number of cluster participants is 68 and standard deviation equals to 72 (figure 2). Comparing to other European clusters (Lundquist, Power, 2002), the Russian innovative clusters can be characterized as highly concentrated and less diversified. The number of cluster participants is related to the industrial specialization. The medical industry in Russia is highly dispersed, there are much more small innovative companies than in traditional machinery or chemical clusters, where large soviet factories prevail. Unfortunately, the survey could not help to reveal the size (number of workers, sales, etc.) of the cluster members. Also the regional location does matter, because in the university centre (for example, Tomsk region), there are much more small businesses than in traditional industrial regions (such as Yekaterinburg or Bashkortostan).

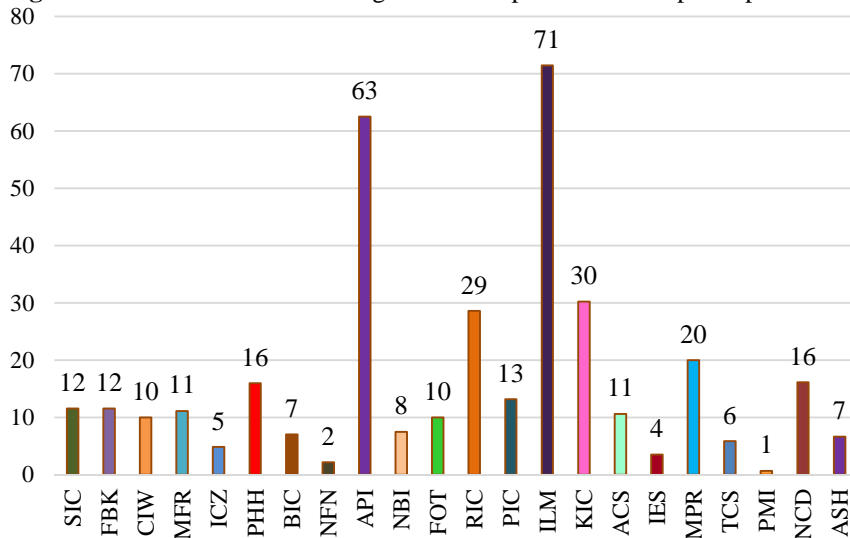
Figure 2. Number of participants in the Russian territorial innovative clusters



Source: own calculations based on the AIRR cluster survey

Number of cluster management staff per cluster participant is an important characteristic of potential services, which can be provided in the cluster. The highest number of cluster management staff per 100 cluster participants is in the ILM cluster (Energy-efficient lighting and intelligent lighting control systems in Mordovia region) – about 71 managers per 100 cluster participants. The lowest number is in the PMI cluster (Pharmaceutics, medical equipment and information technology of Tomsk region) – 1 manager per 100 cluster participants. The average number of management staff per 100 cluster participants is 15 and the standard deviation is 17 (figure 3).

Figure 3. Number of cluster management staff per 100 cluster participants



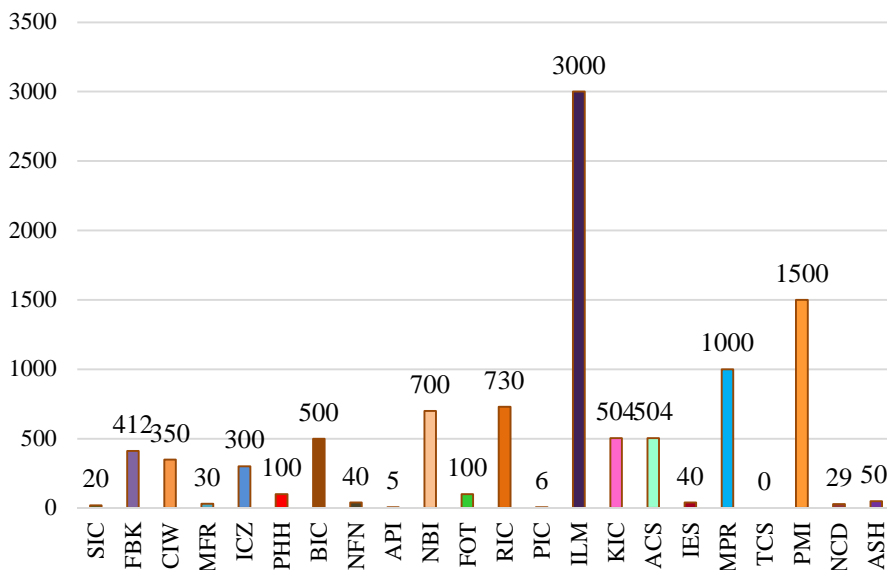
Source: own calculations based on the AIRR cluster survey

It seems that high number of cluster management staff per cluster participants influence positively the intensity of communications between cluster management organisation and cluster participants. The correlation coefficient between two variables is 0.51. The leader in terms of the number of communications between the cluster management team and cluster participants is the ILM cluster (Energy-efficient lighting and intelligent lighting control systems of Mordovia region) – about 3000 interactions during the last two years. So the high number of management staff gives payoffs in terms of intensity of interactions with cluster members. The lowest number

of interactions was reported by the API cluster (Nizhny Novgorod industrial innovation cluster of the automotive and petrochemical industries) – only 5 during the last two years. At the same time the API has the second highest number of cluster management staff (63 managers per 100 cluster members). It means that the efficiency of the API staff work is low in terms of interactions with cluster participants.

The average number of interactions between cluster management team and cluster participants is 441 for the two years period and the standard deviation is 648 (figure 4).

Figure 4. Number of personal interactions between cluster management staff and cluster participants during 2013-2014 years



Source: own calculations based on the AIRR cluster survey

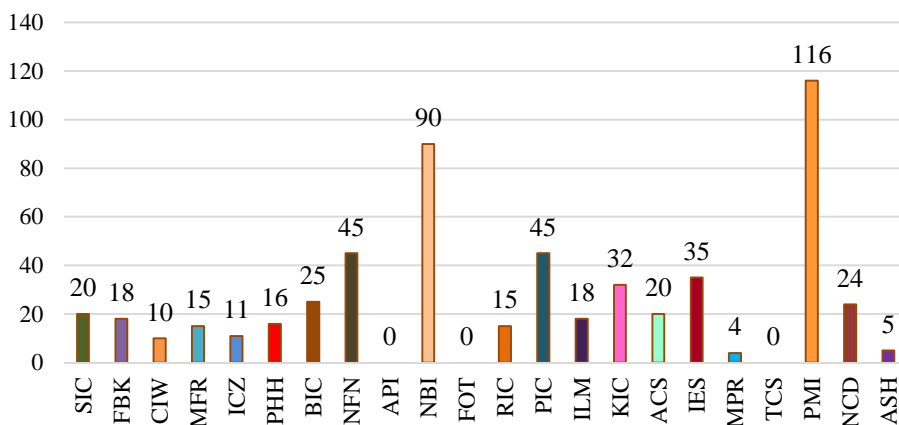
Collaborations among cluster participants is an important indicator of trust level in the cluster. Collaborated projects create synergy effect in terms of higher revenues and profits to its participants. Moreover, it is empirically proved that collaboration is one of the main factors of cluster efficiency and regional performance (Delgado, et al., 2014).

The highest number of cluster participants that were involved in joint projects (collaborated) during the 2013-2014 years is 116 in the PMI

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(Pharmaceuticals, medical equipment and information technology of Tomsk region). The lowest number of cluster members that were involved in common activities is four in the MPR cluster (Cluster of medical, pharmaceutical and radiation technologies of St. Petersburg). The average number of cluster members that collaborated is 37 for the sample of 22 Russian innovative territorial clusters during the two year period and the standard deviation is 50 (figure 5). Comparing to the results of cluster policy in other European countries it is rather modest result, but Russian cluster policy is just on the stage of introduction.

Figure 5. Number of cluster participants involved in joint projects during 2013-2014 years



Source: own calculations based on the AIRR cluster survey.

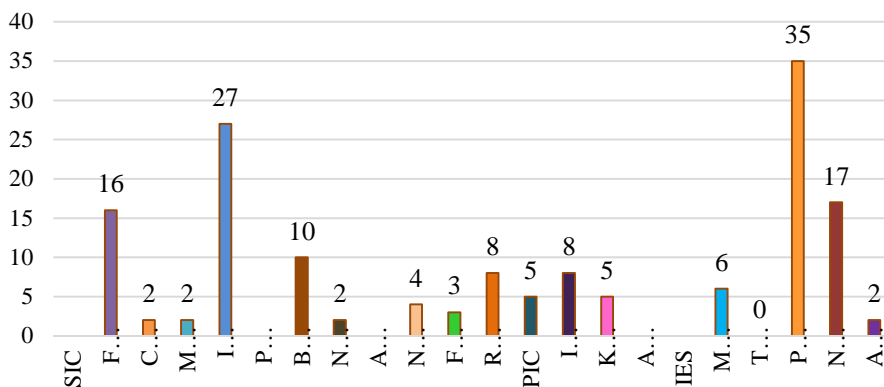
Further, we investigate the specific aspects of collaborations inside the Russian innovative territorial clusters such as joint R&D projects, training and coaching, funding support services, cluster presentations, external networking, communication events.

The prospects of cluster future development depend significantly on collaborations among its participants. Especially important collaborations are in the sphere of R&D and development of new products. The highest number of joint R&D or innovation projects between cluster participants per year is 35 in the PMI cluster (Pharmaceuticals, medical equipment and information technology of Tomsk region). The lowest number is only two in the Innovative regional cluster of aerospace and shipbuilding of Khaba-

rovsk Krai (zero numbers were not analysed, because they could be missing answers). The average number of cluster collaborative R&D or innovation projects is 12 and the standard deviation is 13 (figure 6). In other words, an average rate of R&D collaboration is 1,1 per 10 cluster participants. This value depends on the cluster specialization, it is much higher in the most innovative spheres (such as pharmaceuticals, microelectronics or nuclear technologies), where small firms or even one big firm cannot make a new product without collaboration.

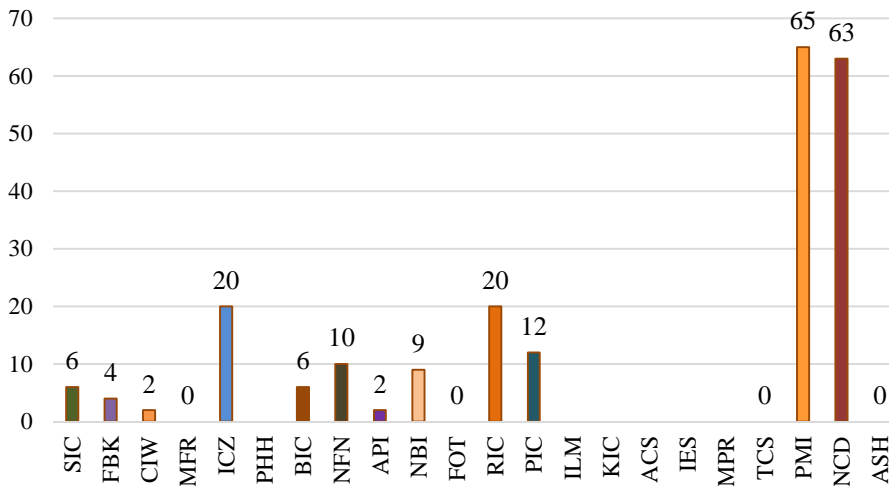
For the successful development of the cluster, it is very important to stimulate the growth of the number of small companies. Consulting and coaching services helps to increase start-ups' survival rate. The highest number of consulting and coaching events for entrepreneurs was held in the PMI cluster (Pharmaceutics, medical equipment and information technology of Tomsk region) – 65 events during 2014. And the lowest number was zero – in the FOT (Cluster of fibre-optic technologies "Photonics" of Perm region) and the ASH clusters (Innovative regional cluster of aerospace and shipbuilding of Khabarovsk Krai). For some other clusters, it is not clear whether absent values mean zero or missed data. The average number of consulting and coaching events for entrepreneurs is 16 and the standard deviation is 21 (figure 7), the average rate of consulting assistance was 1.7 per 10 cluster participant.

Figure 6. Collaborative R&D or innovation projects between cluster participants (2014 year)



Source: own calculations based on the AIRR cluster survey.

Figure 7. Consulting and coaching events for entrepreneurs (2014 year)

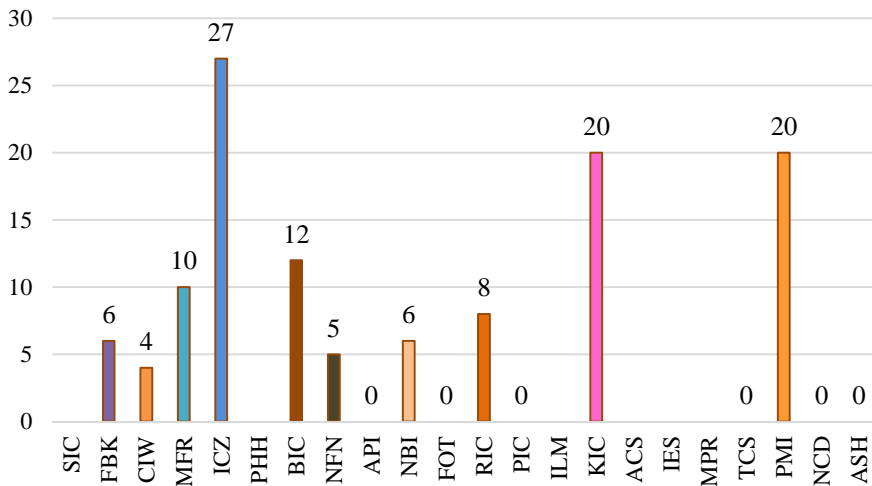


Source: own calculations based on the AIRR cluster survey.

Access to funding is an essential factor for growth of small business enterprises represented in clusters. One of the core activities of a cluster management organisation is to provide a support for start-ups and entrepreneurs in attraction of financial resources. The highest number of cluster companies, which were assisted in fundraising was 27 in the ICZ cluster (Innovative regional cluster of Zelenograd in Moscow region). The lowest non-zero number of supported companies was in the CIW cluster (Complex processing of coal and industrial waste of Kemerovo region), where only 4 companies were assisted in acquisition of financial resources. The average number of assisted companies was 10 in 2014 and the standard deviation is 11 (figure 8). The average rate of financial assistance was 0.9 per 10 cluster participants.

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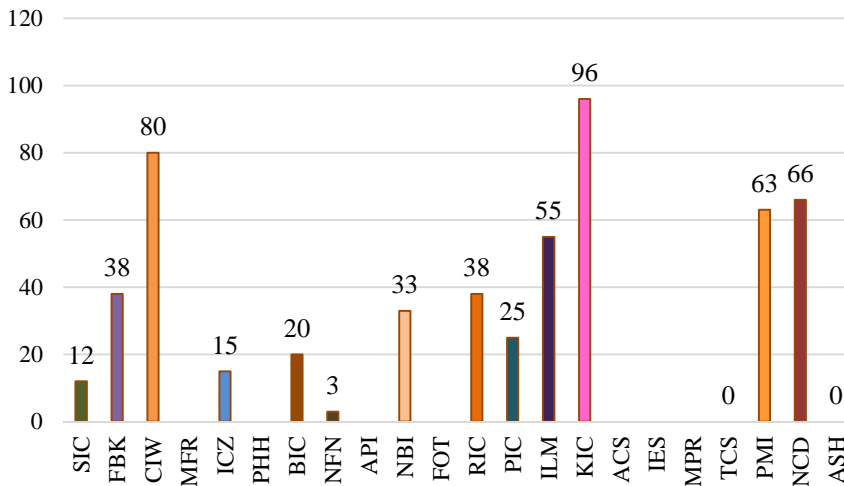
Figure 8. Number of companies supported in acquisition of financial sources (venture capital, banks, public funds etc.), 2014



Source: own calculations based on the AIRR cluster survey.

Training of cluster participants is helpful in terms of increasing the level of cooperation and trust in the cluster. The highest percentage of trained cluster members was in the KIC (Kamsky innovative regional production cluster "Innokam" of Tatarstan region), where 96% cluster members' representatives completed common educational courses. The smallest non-zero share is in the NFN cluster (Innovative regional cluster of nuclear physics and nanotechnology in Dubna of Moscow region), where only 3% cluster members had joint educational training. The average portion of trained cluster participants was 39% and standard deviation is 29% (figure 9).

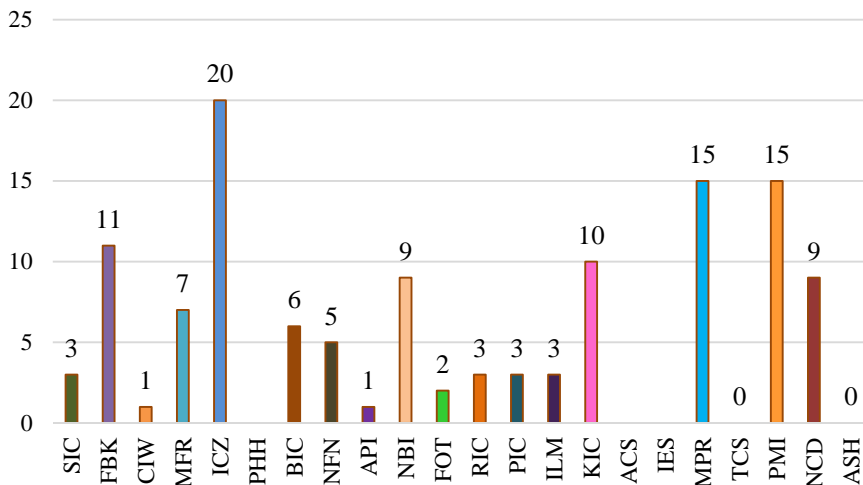
Figure 9. Percentage of trained cluster participants (2014 year)



Source: own calculations based on the AIRR cluster survey.

Promotion of cluster and its participants in trade fairs and exhibitions is helpful for increasing recognition of cluster members and creation of external links. The highest number of presentations of cluster and its participants was made by the ICZ cluster (Innovative regional cluster of Zelenograd in Moscow region), that conducted 20 such events in 2014. The lowest non-zero number was 1 presentation in the CIW cluster (Complex processing of coal and industrial waste of Kemerovo region) and the API cluster (Nizhny Novgorod industrial innovation cluster of the automotive and petrochemical industries). The average number of cluster presentations is 7 and the standard deviation is 6. (figure 10).

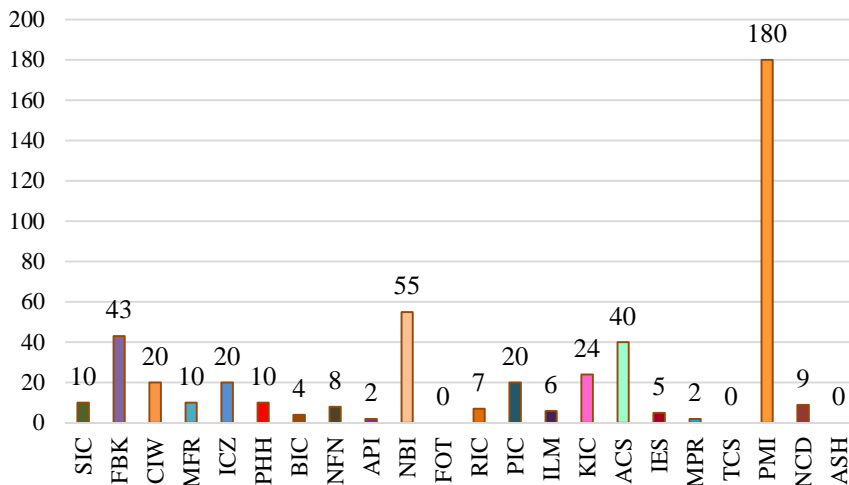
Figure 10. Presentation of cluster and its participants on trade fairs / conferences / etc. (2014 year)



Source: own calculations based on the AIRR cluster survey.

The key duty of cluster management organisation is to organize and facilitate cooperation and interactions among cluster participants and internal and external partners through communication activities. The highest number of communication activities was organized in the PMI cluster (Pharmaceuticals, medical equipment and information technology of Tomsk region) – 180 activities. The lowest non-zero number of such activities was in the MPR cluster (Cluster of medical, pharmaceutical and radiation technologies of St. Petersburg) – only 2. The average number of communication activities was 24 and the standard deviation is 39 (figure 11).

Figure 11. Number of communication activities (2014 year)



Source: own calculations based on the AIRR cluster survey.

Based on aggregate data of the AIRR survey of cluster management organisations, we designed a portrait of typical Russian innovative territorial cluster. For this purpose, we calculated average values for the survey indicators. In this article, we call it as the Russian standard cluster.

The Russian standard cluster has about 70 participants (SMEs, large companies, universities, research institutions, government bodies, business incubators and technoparks). Among them 50 cluster participants were registered during the last two years (71%).

About 80% of cluster participants are located at the distance lower than 150 km or 1 hour and a half time of travelling. In average a cluster management organisation started to work in 2011 and its staff consists of 6 people responsible for cluster management activities. That staff was trained for two weeks in 2014 and one week in 2013 in order to accomplish their goals, 37% of cluster management staff involved in continuous training programs. About 70% of the budget of cluster management organisation is financed by government bodies (regional or federal) and 30% comes from private sources (membership fees, service payments, etc.).

During the last year about 220 interactions were initiated between cluster management staff and cluster members (on average, 3 interaction per cluster member per year) and 18 cluster participants were involved in joint projects (26% of all cluster members). About 40% of cluster members par-

ticipated in various training programs during 2014 year.

A representative cluster management organisation distributed among cluster members information about 12 funding programs and possibilities in 2014. It also organized seven task forces and working groups and two of them were devoted to innovations. Average cluster management organisation supported 10 entrepreneurs in acquisition of financial resources. It made seven presentations of cluster and its participants on trade fairs and conferences, issued 18 press releases, send 126 informational letters to cluster participants, and organized 24 communication events. As a result, the cluster was 26 times mentioned in media and internet during 2014 year.

Correlation analysis of cluster performance indicators

At the next step of our analysis, we examined pairwise correlation coefficients (r) between different indicators of the AIRR survey. The list of examined variables presented in the Appendix A.1. For this set of variables, we calculated pairwise correlation coefficients using the Stata 11.0 software⁴. We picked only those correlation coefficients that were significant at level 5% and whose value exceeded 0.7. The matrix of selected correlation coefficients is presented in the Appendix A.2. Correlation analysis helps us to identify relationships and propose policy measures that can improve performance of the Russian innovative territorial clusters.

According to (Biggiero, L., & Sammarra, A., 2010, pp. 283-305) constant personal interactions and exchange of knowledge are essential to stimulate spread of innovations and spur competitiveness of companies in clusters. The number of cluster participants, which were involved in joint projects during 2013-2014 years ($x14$) is significantly correlated with the number of thematic and business or commercial-based events and workshops ($x25$) for cluster participants ($r(x14;x25)=0.73$), and in general with the number of communication activities ($x52$) inside the cluster ($r(x14;x52)=0.83$). Correlation coefficients also show that the number of collaborating cluster participants is proportionate to the size of the cluster ($r(x14;x1)=0.85$, $r(x14;x1)=0.80$).

Our analysis provides evidence that cluster management organisation could stimulate collaborations among cluster participants via organisation of communication activities, in particular, commercial-based events and workshops.

⁴ URL: <http://www.stata.com/>

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Firms at clusters should be at the forefront of science in order to be successful and that stimulates them to collaborate with universities and research institutions (Häussler, C., & Zademach, H. M., 2006, pp. 2-19).

Correlation analysis reveals that the number of collaborative R&D and innovation projects of cluster participants (x_{24}) is highly correlated with the following indicators:

1. the number of specific training courses related to cluster development for cluster participants (x_{30}), $r(x_{24};x_{30})=0.82$;
2. the number of distributions of information about funding programs and possibilities for cluster participants (x_{21}), $r(x_{24};x_{21})=0.80$;
3. the number of internal newsletters or web-based information and information exchange (x_{44}), $r(x_{24};x_{44})=0.78$;
4. the number of training days of cluster management staff (x_5), $r(x_{24};x_5)=0.75$.

According to our analysis, for increasing the number of collaborative R&D and innovation projects it is important to distribute information about funding programs among cluster participants, stimulate information exchange between them and initiate training courses for cluster participants and cluster management staff.

Clusters have great potential for profitable interactions between their participants but miss many opportunities, because their members often lack relevant information. The set of knowledge failures, network failures, collaboration failures and coordination failures of cluster participants lead to the innovation failure of the cluster (Ketels C., et al., 2012, p. 33-34). That is why the role of cluster management organisation is so important – it helps to improve the competitiveness and growth of cluster by establishing a communication field within it.

International cooperation of cluster management organisation is now becoming its crucial function as in Russia and worldwide. Transnational cooperation of cluster management organisation helps to bring new ideas to SMEs that lack foreign contacts. Because of this, international cooperation of cluster management organisation is considered as a suitable approach for decreasing the risk of cluster degradation due to a “lock-in” effect (Europe INNOVA, 2008, p. 48).

Correlation analysis reveals that different aspects of international activity of cluster management organisation are strongly related to each other. For instance, issuing information about cluster in foreign languages (x_{45}), participation of cluster organisation in foreign trade fairs and conferences (x_{46}), and the number of its offices abroad (x_{47}) are highly correlated with

each other.

What is more important, all three indicators (*x45*, *x46*, and *x47*) are strongly correlated with the participation of cluster management organisation in regional policy development (*x39*). International contacts help to increase the skills and experience of cluster managers and excellent management is considered as a main prerequisite for a cluster organisation to make a high impact on the regional legislative framework (Müller L., et al., 2012, p. 31).

Summing up, correlation analysis revealed several important facts that could be helpful for cluster policy.

Primarily, international collaborations should be a high priority for cluster participants and cluster management team. International collaborations stimulates active participation of cluster in transforming institutional environment of its functioning, spur dissemination of new ideas and technologies via organisation of innovation workshops and initiation of innovative projects.

Second, spread of information about funding among cluster participants stimulates initiation of collaborative R&D projects between them. This is because the main source of additional funding in Russia is government grants to small companies and the necessary condition for receiving most types of such grants are collaborations and R&D focus.

Finally, training courses are highly useful both for cluster participants and for cluster management team. Training courses spur communications between cluster members, stimulate development of trust and increase collaborations. Information about funding possibilities also can be disseminated via training courses. The more trained cluster management staff is, the better it provides specialized services for cluster participants.

Based on the findings we recommend to regional and federal authorities responsible for cluster policy to co-finance international exposure of clusters, assist in spreading information about funding possibilities and subsidize training courses for cluster participants and cluster management team.

Ranking of Russian clusters due to their scale, stage of development and efficiency of cluster management

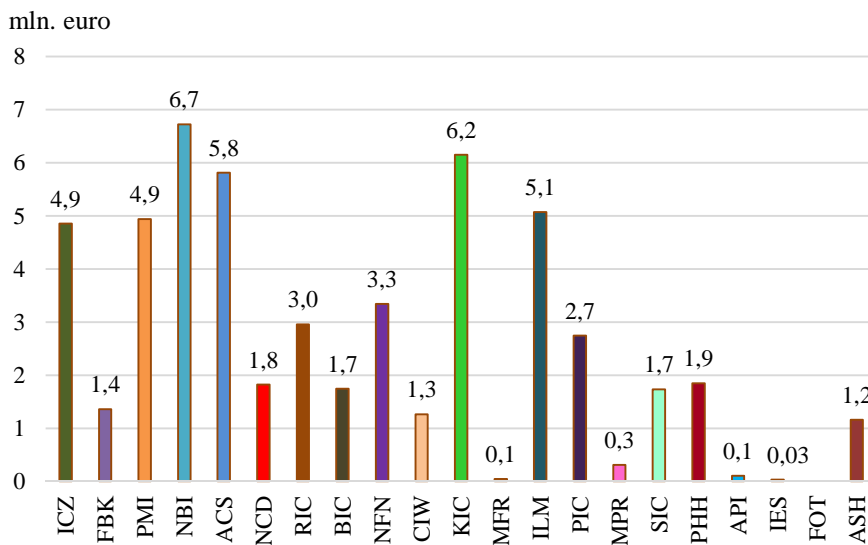
Russian territorial innovative clusters received in total 62.5 mln euro of subsidies from the federal budget with a condition of their cofinancing from regional budgets (5-30% of federal subsidy). Federal government allocated funding unequally among clusters (figure 12). The amount of federal budg-

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et subsidy was calculated on the basis of the projects that each cluster proposed. Federal subsidies can be spend on training of cluster participants, investment consulting, participation in trade fairs and conferences, development of engineering centres and purchasing equipment.

The highest amount of financing from federal budget received the NBI cluster (IT&BIO cluster of Novosibirsk region) – 6.7 mln euro. The lowest amount of federal budget funding got the IES (Cluster for development of information technology, electronics, instrumentation, communications, and information & telecommunications of Saint Petersburg) – 0.03 mln euro. The average amount of federal subsidy equals to 2.7 mln euro and the standard deviation is 2.1 mln euro. Because the funding was allocated mainly to the projects proposed by clusters it is not clear how the amount of funding relates to a scale of cluster, its stage of development and efficiency of management.

Figure 12. Federal budget subsidies to clusters, mln euro (2014 year)



Note: the data is presented only for 22 clusters that took part in the survey, while federal subsidies were allocated among the 26 clusters

Source: own calculations based on the AIRR cluster survey.

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In order to investigate this issue we combine the data of the AIRR survey with the data about federal funding and analyse how an amount of budget subsidy relates to such characteristics of a cluster as its scale, stage of development and efficiency of cluster management. In order to perform the comparison we rank clusters by the mentioned above characteristics and compare the results with their funding ranking. The detailed description of composition of the rankings is presented in the chapter “Methodology”.

Cluster scale ranking

The scale of the cluster reflects how large the cluster is and how many interactions it has. So the scale ranking compares clusters on their ability to influence regional economy. For this purpose, we constructed a cluster scale index.

Among the 52 indicators of the AIRR survey, we chose the number of registered cluster participants ($x1$) and the number of cluster management staff ($x4$) as the main indicators for the cluster scale index. Then we selected indicators that are significantly correlated with the two main variables (at the α -level less than 10% and correlation coefficient more than 0.6) and not correlated with each other (in the cases of multicorrelation we selected the most informative one). As a result, for constructing the cluster scale index we used the following set of nine indicators (the correlation matrix is presented in the Appendix A.3):

1. Number of registered cluster participants ($x1$)
2. Number of cluster management staff ($x4$)
3. Number of cluster participants that were involved in joined projects during 2013-2014 years ($x14$)
4. Number of innovation & business infrastructure organisations and financial institutions among cluster participants ($x15$)
5. Number of strategic alliances with innovation & business infrastructure organisations and financial institutions ($x16$)
6. Number of task forces and working groups organized by cluster participants ($x22$)
7. Number of collaborative R&D and/or innovation projects initiated without participation of the cluster management: between participants / by participants ($x24$)
8. Number of consulting and coaching activities for entrepreneurs ($x28$)
9. Number of presentations of the cluster and its participants on trade fairs and conferences / etc. ($x36$)

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For each of these indicators we constructed the rank index and calculated the resulting cluster scale index as a simple average of ranks of the nine mentioned above indicators (the detailed data are presented in the Appendix A.4). The leader of the cluster scale ranking is the PMI cluster (cluster of pharmaceuticals, medical equipment and information technology of Tomsk region), it has rank index equal to 7.4. This cluster has the highest number of participants, many of them are intensively collaborate, especially in the sphere of R&D, and in the cluster are well presented innovation & business infrastructure organisations and financial institutions.

Cluster development ranking

This ranking reflects the level of integration of cluster participants - how intensive and efficient are interactions between them, and how many cluster policy measures affect every participant. In this case we divided 52 indicators from the AIRR survey by the number of cluster participants where it is possible and mark them with a single apostrophe ('). Then we chose the main indicators among them. They are: the number of cluster participants that were involved in joined projects during 2013-2014 years per 100 cluster participants ($x14'$), the number of distributions of information about funding programs and possibilities for cluster participants per 100 cluster participants ($x21'$), and the number of activities like innovation workshops, technology scouting and/or road mapping campaigns/projects, etc. per 100 cluster participants ($x23'$).

The next step, we select those indicators that correlate with the three main ones (at the α -level less than 10% and correlation coefficient more than 0.6) and not correlated with each other (in the cases of multicorrelation we selected the most informative one). As a result, for constructing the cluster scale index we used the following set of ten indicators (the correlation matrix is presented in the Appendix A.5):

1. Number of cluster participants that were involved in joined projects during 2013-2014 years per 100 cluster participants ($x14'$)
2. Number of collaborative R&D and/or innovation projects initiated without participation of the cluster management: between participants / by participants per 100 cluster participants ($x24'$)
3. Number of collaborative B2B projects (no R&D, innovation as a minor issue) initiated between participants / by participants per 100 cluster participants ($x27'$)

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4. Number of consulting and coaching activities of entrepreneurs per 100 cluster participants (x_{28} ')
5. Number of recruitments of specialists, executive managers, and other human resources by the cluster participants where cluster management gave assistance per 100 cluster participants (x_{32} ')
6. Number of presentations of the cluster and its participants on trade fairs and conferences / etc. per 100 cluster participants (x_{36} ')
7. Number of specific events and workshops organized by the cluster organisation to present the cluster and its participants to external parties per 100 cluster participants (x_{37} ')
8. Number of internal (for committed cluster participants only) newsletters/web-based information and information exchange per 100 cluster participants (x_{44} ')
9. Number of offices or permanent representations of the cluster abroad per 100 cluster participants (x_{49} ')
10. Number of communication activities (internal and external communication) were carried out during 2014 year per 100 cluster participants (x_{52} ').

For each of these indicators, we constructed the rank index and calculated the resulting cluster development index as a simple average of ranks of the ten mentioned above indicators (the detailed data are presented in the Appendix A.6). The leader of the cluster development ranking is the FBK cluster (cluster of pharmaceuticals, biotechnology and biomedicine of Kaluga region), it has rank index equal to 7.4. This cluster has the highest number per participant of collaborative R&D and innovation projects, issued newsletters and web-based information releases, offices or permanent representations of the cluster abroad, and communication activities.

Cluster management efficiency ranking

The efficiency of cluster management mainly reflects intensity of work of cluster management staff – basically, how many activities one member of the management team leads. We divided 52 indicators from the AIRR survey by the number of cluster management staff where it was possible and marked them with a double apostrophe (“”).

Among the available indicators we chose the number of registered cluster participants per management team member (x_{1} ”) and number of cluster participants trained per management team member (x_{31} ”) as the main indicators for the cluster management efficiency index. As in previous rank-

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ings, we than selected indicators that are significantly correlated with the two main variables (at the α -level less than 10% and correlation coefficient more than 0.6) and not correlated with each other (in the cases of multicorrelation we selected the most informative one). As a result, for constructing the cluster management efficiency index we used the following set of ten indicators (the correlation matrix is presented in the Appendix A.7):

1. Number of registered cluster participants per management team member ($x1$)
2. Number of cluster participants trained per management team member ($x31$)
3. Number of training days of cluster management staff during 2014 year ($x5$)
4. Number of personal interactions between cluster management team and cluster participants during 2013-2014 years per management team member ($x13$)
5. Number of innovation & business infrastructure organisations and financial institutions among cluster participants per management team member ($x15$)
6. Number of activities like innovation workshops, technology scouting and/or road mapping campaigns/projects, etc. per management team member ($x23$)
7. Number of support activities for acquisition of financial sources (venture capital, banks, public funds etc.) for and/or on behalf of entrepreneurs per management team member ($x29$)
8. Number of curricula initiated and/or courses carried out by cluster management organisation for cluster participants per management team member ($x33$)
9. Number of issued press releases about cluster and its participants per management team member ($x35$)
10. Percentage of increase of private and public financial support for the cluster management during 2014 year ($x41$).

For each of these indicators we constructed the rank index and calculated the resulting cluster management efficiency index as a simple average of ranks of the nine mentioned above indicators (the detailed data are presented in the Appendix A.8). The leader of the cluster management efficiency ranking is again PMI cluster (cluster of pharmaceuticals, medical equipment and information technology of Tomsk region), it has rank index equal to 7.7. This cluster has the high number of participants per management team member (many of them participated in training programs) and it also char-

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acterised by significant percentage increase of private and public financial support for the cluster management team.

The cluster scale index, cluster development index and cluster management efficiency index are highly correlated with each other (correlation coefficients are equal are above 0.6).

At the final step of our analysis we construct the integral index of cluster performance as a simple average of its three components (scale index, cluster development index and cluster management efficiency index). According to the integral ranking the first place win ICZ (Innovative regional cluster of Zelenograd) that showed relatively strong performance on the all three dimensions of cluster behaviour (table 2).

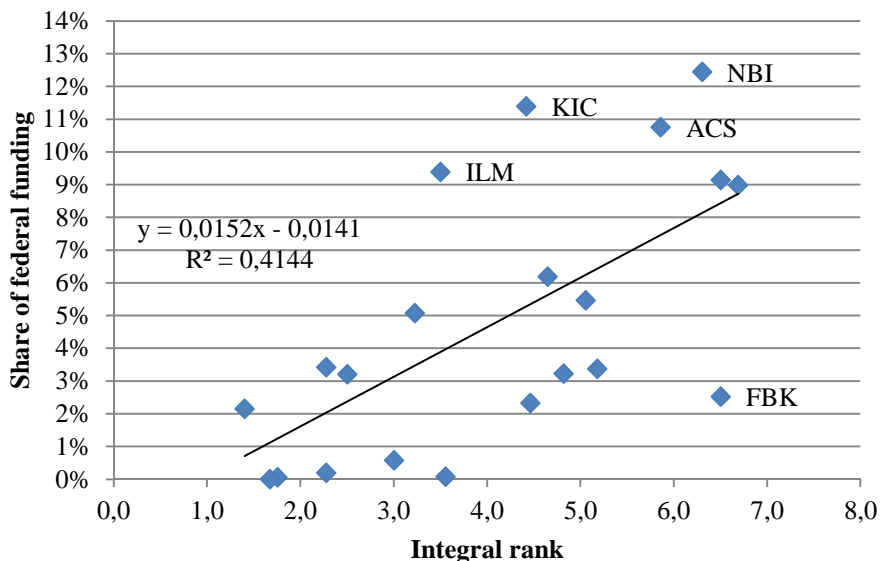
Correlation coefficient between the integral index of cluster performance and the budget funding equals to 0.6. This means that in general the most prosperous clusters received federal budget support.

Table 2. Ranks of clusters

Cluster	Ranks				
	Scale	Development	Efficiency	Integral	Funding
ICZ	6.8	6.5	6.8	6.7	7.0
FBK	5.6	7.4	6.6	6.5	3.0
PMI	7.4	4.4	7.7	6.5	7.5
NBI	6.2	5.9	6.8	6.3	9.5
ACS	4.8	6.0	6.8	5.9	8.5
NCD	4.4	6.7	4.5	5.2	4.5
RIC	5.4	5.0	4.7	5.1	6.0
BIC	4.6	3.7	6.1	4.8	4.0
NFN	3.7	4.2	6.0	4.6	6.5
CIW	2.9	4.2	6.3	4.5	2.5
KIC	5.4	4.2	3.6	4.4	9.0
MFR	1.4	4.0	5.3	3.6	0.5
ILM	2.6	5.4	2.4	3.5	8.0
PIC	4.9	3.2	1.6	3.2	5.5
MPR	3.0	3.6	2.4	3.0	1.5
SIC	1.7	3.4	2.3	2.5	3.5
PHH	2.6	1.3	2.9	2.3	5.0
API	1.2	3.4	2.2	2.3	1.0
IES	2.6	0.5	2.1	1.8	0.0
ASH	0.6	1.3	2.3	1.4	2.0

Source: own calculations based on AIRR survey.

Figure 13. The relationship between the integral rank and the share in financing



Source: own calculations based on AIRR survey.

Figure 13 depicts the relationship between the integral rank and share of federal budget funding for each cluster. It is clear that some clusters were excessively financed relative to their performance (ILM, KIC, ACS, NBI) while others were underfinanced (for instance, FBK).

Amount of federal funding has the closest correlation with the cluster scale rank (0.7), while its correlation with development rank is 0.5 and with efficiency rank is 0.4. That means that the recent cluster support policy in Russia is oriented mainly on the large group of companies while the level of collaborations between them and the quality of management of cluster organisation are relatively less important topics. According to this, we recommend to the federal officials responsible for the cluster support policy to pay more attention to the quality of cluster performance as it directly relates to the future success of clusters.

Conclusions

In this article, we described a typical Russian innovative territorial cluster based on aggregate characteristics of 22 surveyed Russian clusters. For evaluation reasons, it is important to compare performance of a Russian innovative territorial cluster with foreign benchmarks. For this purpose, we chose the minimum European Cluster Excellence Baseline (Hagenauer, 2011, pp. 1-5), which provides a set of critical values for cluster performance.

According to the European Cluster Excellence Baseline, mature cluster should have no less than 90% of participants, which are committed (registered in the cluster), half of them should represent business in the relevant industry of cluster functioning. Universities and research institutions are the obligatory part of the mature cluster. A cluster management organisation should function for more than 2 years and it should yearly contact with minimum 20% of cluster participants. At least 15% of cluster participants are engaged in collaborations with each other.

Our analysis provides evidence that the standard Russian innovation territorial cluster meets criteria for mature cluster. At the same time the range of analysed Russian clusters is very diverse and some of them show relatively strong performance while others are lagging behind.

Correlation analysis revealed the importance for the development of lagging clusters introduction of such measures as increasing their international exposure, spreading information about funding opportunities and subsidizing courses for cluster members and cluster management team.

There is a considerable room for improvement a cluster support policy in Russia. Funding criteria should include such cluster characteristics as efficiency of cluster management and development of cluster tiers among its participants. In the paper, we proposed an approach for evaluation and comparison of clusters according to quality of their management and strength of cooperation among their members.

The direction of further research could be correlation analysis of performance indicators for clusters that operate in familiar industries.

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Appendix A.1. The list of examined variables of the AIRR cluster survey

- x1 – Number of registered cluster participants;
- x2 – Share of cluster participants that are located within 150 km distance or 1 hour and a half travel time;
- x3 – Number of cluster management staff per 100 cluster member organisations;
- x4 – Number of cluster management staff (absolute value);
- x5 – Number of training days of cluster management staff during 2014 year;
- x6 – Number of training days of cluster management staff during 2013 year;
- x7 – Participation of cluster management staff in a continuous training (binary variable: yes – 1, no – 0);
- x8 – Availability of the budget for further cluster management staff trainings (binary variable: yes – 1, no – 0);
- x9 – Number of cluster management staff that left their positions during 2013-2014 years;
- x10 – Number of newly registered cluster participants during 2013-2014 years;
- x11 – Did the head of cluster management organisation leave his or her position 2013-2014 years (binary variable: yes – 1, no – 0);
- x12 – Number of registered cluster participants that left their positions during 2013-2014 years;
- x13 – Number of personal interactions between cluster management team and cluster participants during 2013-2014 years;
- x14 – Number of cluster participants that were involved in joint projects during 2013-2014 years;
- x15 – Number of innovation & business infrastructure organisations and financial institutions among cluster participants;
- x16 – Number of strategic alliances with innovation & business infrastructure organisations and financial institutions;
- x17 – The availability of financial resources for the future years (binary variable: yes – 1, no – 0);
- x18 – Share of private sources in the budget of cluster management organisation;
- x19 – Availability of a document of how cluster management organisation plans to support cluster development in short term, medium term and long term (binary variable: yes – 1, no – 0);
- x20 – Availability of measurement system of quality of work of cluster management organisation (binary variable: yes – 1, no – 0);
- x21 – Number of distributions of information about funding programs and possibilities for cluster participants;
- x22 – Number of task forces and working groups organized by cluster participants;
- x23 – Number of activities like innovation workshops, technology scouting and/or road mapping campaigns/projects, etc.;
- x24 – Number of collaborative R&D and innovation projects initiated without participation of the cluster management: between participants / by participants;
- x25 – Number of thematic and business or commercial-based events and workshops for cluster participants only;
- x26 – Number of internal cluster participants matching;
- x27 – Number of collaborative B2B projects (no R&D, innovation as a minor issue) initiated between participants / by participants;
- x28 – Number of consulting and coaching activities of entrepreneurs;
- x29 – Number of support activities for acquisition of financial sources (venture capital, banks, public funds etc.) for and/or on behalf of entrepreneurs;
- x30 – Number of specific training courses related to cluster development for cluster participants;
- x31 – Percentage of cluster participants trained;
- x32 – Number of recruitments of specialists, executive managers, and other human resources by the cluster participants where cluster management gave assistance;
- x33 – Number of curricula initiated and/or courses carried out by cluster management organisation for cluster participants;
- x34 – Number of electronic or paper sources of up-to-date print or web materials about cluster and its participants;
- x35 – Number of issued press releases about cluster and its participants;
- x36 – Number of presentations of the cluster and its participants on trade fairs and conferences / etc.;

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- x37– Number of specific events and workshops organized by the cluster organisation to present the cluster and its participants to external parties;
- x38– Number of specific matchmaking / networking events with external parties and other clusters where participated only a cluster organisation (without cluster members), organized by third parties;
- x39– Number of contributions to relevant policies (regulations, funding schemes, etc.);
- x40– Number of contributions of cluster management organisation to regional development;
- x41– Percentage of increase of private and public financial support for the cluster management during 2014 year;
- x42– Percentage of increase of personal in the cluster management during 2014 year;
- x43– Percentage of increase of committed cluster participants during 2014 year;
- x44– Number of internal (for committed cluster participants only) newsletters or web-based information and information exchange;
- x45– Number of print and web information documents in foreign languages about cluster and its participants;
- x46– Number of participations of the cluster organisation in trade fairs or conferences abroad with own booth or speech etc. to present the cluster and its participants;
- x47– Number of other activities managed/operated by the cluster organisation for intensifying international contacts and cooperation with foreign partners or clusters;
- x48– Number of participations of cluster management staff in the organisation of trade missions, international meet-the-buyer events, inward investment visits etc. and the facilitation of the participation of cluster participants in such activities;
- x49– Number of offices or permanent representations of the cluster abroad;
- x50– Number of acquisition initiations and deliveries of international innovation projects that were mainly initiated by the cluster management;
- x51– Proportion of the performance targets of the cluster organisation that were achieved;
- x52– Number of communication activities (internal and external communication) were carried out during 2014 year.

Appendix A.2. Correlation matrix of cluster performance indicators

Variable	x24	x26	x29	x30	x33	x37	x39	x45	x47	x48
x14										
x24										
x25										
x30	0.82									
x33										
x36			0.80							
x38						0.72				
x39		0.71								
x40			0.74							
x41			0.82							
x43				0.73						
x44	0.78									
x45							0.73			
x46							0.79			
x47							0.92	0.79		
x48					0.72		0.70		0.86	

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x49						0.87	0.75	0.83	
x50				0.95					0.87
x52									

Note: all correlation coefficients are significant at α -level of 5%.

Source: own calculations based on AIRR cluster survey

Appendix A.3. Correlation matrix of components of the cluster scale index

Indicator	x 1	x 4	x 4	x 5	x 6	x 2	x 2	x 4	x 8	x 3	x 6
x1 – Number of registered cluster participants	1, 0 0										
x4 - Number of cluster management staff		1 , 0 0									
x14 – Number of cluster participants that were involved in joined projects during 2013-2014 years	0, 8 5 *		1, 0 0								
x15 – Number of innovation & business infrastructure organisations and financial institutions among cluster participants	0, 6 4 *		0, 4 6 *	1, 0 0							
x16 – Number of strategic alliances with innovation & business infrastructure organisations and financial institutions		0 , 4 3		0, 5 1 *	1 , 0 0						
x22 – Number of task forces and working groups organized by cluster participants	0, 5 1 *	0 3 9	0, 4 6 *	0, 4 6		1 , 0 0					
x24 – Number of collaborative R&D and/or innovation projects initiated without participation of the cluster management: between participants / by participants	0, 4 5					0 , 4 7	1, 0 0				
x28 – Number of consulting and coaching activities for entrepreneurs	0, 6 1 *		0, 5 5 *					1 , 0 0			
x36– Number of presentations of the cluster and its participants on trade fairs and conferences / etc.	0, 5 3 *			0, 4 5			0, 5 7 *	0 , 4 9	1 , 0 0		

Note: correlation coefficients that are marked with * are significant at α -level of 5%, all others are significant at α -level of 10%.

Source: own calculations based on the AIRR cluster survey

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Appendix A.4. Cluster scale index and its components

Cluster	Region	Ab- bre- viation	x1	x4	x1 4	x1 5	x1 6	x2 2	x2 4	x2 8	x3 6	Rank index
Pharmaceutics, medical equipment and information technology	Tomsk reioign	PMI	9,5	5,7	9,5	8,6	1,9	7,6	9,0	7,1	7,6	7,4
Innovative regional cluster of Zelenograd	Moscow	ICZ	9,0	5,7	2,4	8,1	7,1	6,2	8,6	5,7	8,6	6,8
IT&BIO cluster	Novosibirsk region	NBI	8,6	7,6	9,4	6,8	6,2	6,2	4,3	4,3	5,2	6,2
Pharmaceuticals, biotechnology and biomedicine cluster	Kaluga region	FBK	6,2	5,7	4,8	2,4	5,2	8,1	7,6	2,9	7,1	5,6
Innovative regional cluster of rocket engine	Perm Region	RIC	4,3	8,1	2,9	7,1	7,7	5,2	6,2	5,2	1,9	5,4
Kamsky innovative regional production cluster "Innokam"	The Republic of Tatarstan	KIC	5,2	9,0	7,1	6,7	8,1	1,4	4,8	0,0	6,2	5,4
Petrochemical innovative regional cluster	The Republic of Bashkortostan	PIC	7,1	8,1	8,0	0,0	0,0	8,6	4,4	5,2	1,9	4,9
Innovative regional aerospace cluster	Samara region	ACS	5,7	2,9	2,9	4,8	2,9	7,9	9,1	1,5	6,2	4,8
Biotechnological Innovation Cluster of Pushchino	Moscow region	BIC	6,2	7,9	6,4	7,3	9,3	2,3	7,1	3,4	1,3	4,6
Nuclear Innovation Cluster of Dimitrovgrad	Ulyanovsk region	NCD	3,8	4,8	6,2	0,5	2,9	1,4	8,1	6,7	5,2	4,4
Innovative regional cluster of nuclear physics and nanotechnology in Dubna	Moscow region	NFN	8,0	0,0	8,0	1,5	2,3	2,3	1,9	4,8	3,8	3,7
A cluster of medical, pharmaceutical and radiation technologies	Saint Petersburg	MPR	2,4	5,7	1,0	0,5	2,9	1,0	5,0	0,7	7,6	3,0
Complex processing of coal and industrial waste	Kemerovo region	CIW	2,4	1,4	1,9	7,1	6,2	3,3	1,9	1,4	0,5	2,9
Energy-efficient lighting and intelligent lighting control systems	The Republic of Mordovia	ILM	1,0	9,4	4,8	5,0	0,0	0,6	6,0	0,2	1,9	2,6
Development of information technology, electronics, instrumentation, communications, and information telecommunications	Saint Petersburg	IES	7,6	1,4	7,6	4,8	1,9	0,0	0,0	0,0	0,0	2,6
Phystech XXI	Moscow region	PHH	1,4	2,9	4,3	6,2	5,2	3,3	0,0	0,0	0,0	2,6
A cluster of fiber-optic technologies "Photonics"	Perm region	FOT	4,8	2,0	0,4	2,0	0,3	3,3	3,0	0,0	1,4	2,1
Shipbuilding innovative regional cluster	Arkhangelsk region	SIC	1,9	1,4	5,0	0,0	1,0	0,4	0,3	3,1	1,9	1,7
Medical, pharmaceutical and radiation technology cluster	Leningrad region	MFR	0,5	0,0	2,9	2,4	0,0	0,0	1,9	0,9	4,8	1,4
Industrial innovation cluster of the automotive and petrochemical industries	Nizhny Novgorod region	API	0,0	4,8	0,0	2,4	0,4	1,0	0,4	1,0	0,5	1,2
Innovative regional cluster of aerospace and shipbuilding	Khabarovsk region	ASH	2,0	4,0	1,0	0,0	0,0	0,0	1,9	0,0	0,0	0,6

Source: own calculations based on the AIRR cluster survey

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**Appendix A.5. Correlation matrix of components of the cluster
development index**

Variable	x 1 4'	x 2 4'	x 2 7'	x 2 8 '	x 3 2 '	x 3 6'	x 3 7 '	x 4 4'	x 4 9 '	x 5 2 '
x14 – Number of cluster participants that were involved in joined projects during 2013-2014 years per 100 cluster participants	1									
x24 – Number of collaborative R&D and/or innovation projects initiated without participation of the cluster management: between participants / by participants per 100 cluster participants		1								
x27 – Number of collaborative B2B projects (no R&D, innovation as a minor issue) initiated between participants / by participants per 100 cluster participants			1							
x28 – Number of consulting and coaching activities of entrepreneurs per 100 cluster participants			0. 5 6 2 2 *	1						
x32 – Number of recruitments of specialists, executive managers, and other human resources by the cluster participants where cluster management gave assistance per 100 cluster participants			0, 4		1					
x36– Number of presentations of the cluster and its participants on trade fairs and conferences / etc. per 100 cluster participants		0, 3 8				1				
x37– Number of specific events and workshops organized by the cluster organisation to present the cluster and its participants to external parties per 100 cluster participants	0. 4 9 4 1 *					0. 5 3 6 9 *	1			
x44– Number of internal (for committed cluster participants only) newsletters/web-based information and information exchange per 100 cluster participants		0. 7 8 5 2 *						1		
x49– Number of offices or permanent representations of the cluster abroad per 100 cluster participants		0. 4 7 7 0 *						0. 4 8 0 3 *	1	
x52– Number of communication activities (internal and external communication) were carried out during 2014 year per 100 cluster participants	0, 4									1

Note: correlation coefficients that are marked with * are significant at α -level of 5%, all others are significant at α -level of 10%.

Source: own calculations based on the AIRR cluster survey.

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Appendix A.6. Cluster development index and its components

Cluster	Region	Ab- bre- via- tion	x1 4'	x2 4'	x2 7'	x2 8'	x3 2'	x3 6'	x3 7'	x4 4'	x4 9'	x5 2'	Rank index
Pharmaceuticals, biotechnology and biomed- icine cluster	Kaluga region	FBK	3,3 3	8,1	6,6 7	5,2 4	7,6 2	7,1 4	8,5 7	8,1	9,5 2	9,5 2	7,38
Nuclear Innovation Cluster of Dimitrovgrad	Ulyanovsk region	NCD	8,5 7	9,0 5	9,0 5	9,5 2	7,1 4	8,5 7	9,0 5	0	0	5,7 1	6,67
Innovative regional cluster of Zelenograd	Moscow	ICZ	0,9 5	7,1 4	8,5 7	7,1 4	9,5 2	6,6 7	4,2 7	9,0 5	8,5 7	2,8 6	6,48
Innovative regional aerospace cluster	Samara region	ACS	2,3 8	9,5 2	5,2 4	3,8 1	4,2 9	2,6 2	7,6 4	5,2 4	9,5 2	9,0 3	3,3 6
IT&BIO cluster	Novosibirsk region	NBI	7,6 2	2,3 8	4,2 9	4,7 6	8,5 7	3,8 1	6,1 9	6,1 9	8,1	7,1 4	5,9
Energy-efficient lighting and intelligent lighting control systems	The Republic of Mordovia	ILM	9,5 2	8,5 7	5,7 1	0	5,7 1	6,1 9	8,1	5,2 4	0	5,2 4	5,43
Innovative regional cluster of rocket engine	Perm Region	RIC	4,7 6	7,6 2	8,1	9,0 5	9,0 5	4,2 3	3,8 9	0	0	3,8 1	5,05
Pharmaceutics, medical equipment and information technology	Tomsk reioign	PMI	3,8 1	5,7 1	4,7 6	7,6 2	0	2,8 6	3,3 3	7,1 4	0	8,5 7	4,38
Innovative regional cluster of nuclear physics and nanotechnology in Dubna	Moscow region	NFN	5,7 1	1,9	9,5 2	6,1 9	5,2 4	3,3 3	2,3 8	5,7 1	0	2,3 8	4,24
Kamsky innovative regional production cluster "Innokam"	The Republic of Tatarstan	KIC	7,1 4	5,2 4	0	0	6,6 7	8,1	7,1 4	0	0	8,1	4,24
Complex processing of coal and industrial waste	Kemerovo region	CIW	2,8 6	3,3 3	6,1 9	4,2 9	6,1 9	1,4 3	0	8,5 7	0	9,0 5	4,19
Medical, pharmaceutical and radiation technology cluster	Leningrad region	MFR	9,0 5	4,7 6	0	0	0	9,0 5	9,5 2	0	0	7,6 2	4
Biotechnological Innovation Cluster of Pushchino	Moscow region	BIC	5,2 4	6,1 9	3,8 1	5,7 1	3,8 1	4,7 6	5,7 1	0	0	1,9	3,71
A cluster of medical, pharmaceutical and radiation technologies	Saint Petersburg	MPR	1,4 3	6,6 7	7,6 2	0	4,7 6	9,5 2	4,7 6	0	0	1,4 3	3,62
Shipbuilding innovative regional cluster	Arkhan- gelsk region	SIC	8,1	0	0	8,1	0	5,2 4	6,6 7	0	0	6,1 9	3,43
Industrial innovation cluster of the automo- tive and petrochemical industries	Nizhny Novgorod region	API	0	0	0	8,5 7	8,1	5,7 1	0	7,6 2	0	4,2 9	3,43
Petrochemical innovative regional cluster	The Republic of Bashkorto- stan	PIC	6,1 9	2,8 6	0	6,6 7	0	1,9	2,8 6	6,6 7	0	4,7 6	3,19
A cluster of fiber-optic technologies "Photon- ics"	Perm region	FOT	0	4,2 9	7,1 4	0	0	2,3 8	0	0	0	0	1,38
Phystech XXI	Moscow region	PHH	6,6 7	0	0	0	0	0	0	0	0	6,6 7	1,33
Innovative regional cluster of aerospace and shipbuilding	Khabarovsk region	ASH	1,9	3,3 3	0	0	0	0	7,6 2	0	0	0	1,29
Development of information technology, electronics, instrumentation, communica- tions, and information& telecommunications	Saint Petersburg	IES	4,2 9	0	0	0	0	0	0	0	0	0,9 5	0,52

Source: own calculations based on the AIRR cluster survey

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**Appendix A.7. Correlation matrix of components of the cluster
management efficiency index**

Indicator	x1 "	x3 1"	x5 "	x1 3"	x1 5"	x 2 2 "	x2 9v	x 3 3 "	x 3 5 "	x 4 1
x1" – Number of registered cluster participants per management team member	1									
x31" – Number of cluster participants trained per management team member	0. 60 43 *	1	0. 50 98 *	0. 54 99 *	0. 48 64 *	0 ;				
x5" – Number of training days of cluster management staff during 2014 year			1							
x13" – Number of personal interactions between cluster management team and cluster participants during 2013-2014 years per management team member			0. 45 94 *	1						
x15" – Number of innovation & business infrastructure organisations and financial institutions among cluster participants per management team member	0. 43 29 *				1					
x23" – Number of activities like innovation workshops, technology scouting and/or road mapping campaigns/projects, etc. per management team member						1				
x29" – Number of support activities for acquisition of financial sources (venture capital, banks, public funds etc.) for and/or on behalf of entrepreneurs per management team member	0. 43 75 *				0. 52 11 *		1			
x33" – Number of curricula initiated and/or courses carried out by cluster management organisation for cluster participants per management team member	0, 4							1		
x35" – Number of issued press releases about cluster and its participants per management team member	0, 4	0. 46 30 *			0. 59 53 *		0. 55 37 *		1	
x41 – Percentage of increase of private and public financial support for the cluster management during 2014 year	0. 46 26 *	0. 73 56 *		0. 45 94 *	0, 4		0. 44 09 *			1

Appendix A.8. Cluster management efficiency index and its components

Cluster	Region	Ab- bre- via- tion	x 1" "	x 5" "	x1 3" "	x1 5v "	x2 3" "	x2 9" "	x3 1" "	x3 3" "	x3 5" "	x 4 1	Ran k in- dex
Pharmaceutics, medical equipment and information technology	Tomsk region	PMI	9, 5 2	8, 5 7	9, 05	9, 05	0	8, 57	9, 52	4, 76	8, 57	9, 5 2	7,71
Innovative regional cluster of Zelenograd	Moscow	ICZ	8, 1	6, 1 9	5, 24	8, 57	5, 71	9, 05	6, 19	0	9, 52	9, 0 5	6,76
Innovative regional aerospace cluster	Samara region	ACS	6, 1 9	9, 0 5	9, 05	6, 67	7, 14	7, 14	7, 62	7, 14	3, 81	3, 8 1	6,76
IT&BIO cluster	Novosi- birsk region	NBI	6, 6 7	7, 1 4	6, 67	3, 33	9, 05	4, 76	8, 57	9, 05	4, 76	7, 6 2	6,76

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Pharmaceuticals, biotechnology and biomedicine cluster	Kaluga region	FBK	3, 8 1	9, 5 2	5, 7 1	2, 8 8	5, 7 1	7, 7 14	8, 1 1	6, 6 7	8, 1 1	6,57	
Complex processing of coal and industrial waste	Kemerovo region	CIW	5, 2 4	3, 8 1	7, 1 14	9, 5 52	5, 6 71	6, 9 19	9, 0 05	9, 0 05	7, 1 4	6,29	
Biotechnological Innovation Cluster of Pushchino	Moscow region	BIC	7, 1 4	6, 1 9	7, 7 62	5, 7 71	7, 8 14	8, 1 1	5, 7 71	6, 6 19	2, 4 86	4, 7 6	6,14
Innovative regional cluster of nuclear physics and nanotechnology in Dubna	Moscow region	NFN	9, 0 5	0	2, 8 86	5, 7 71	8, 1 1	7, 7 62	4, 9 76	9, 5 52	7, 4 62	4, 7 6	6
Medical, pharmaceutical and radiation technology cluster	Leningrad region	MFR	4, 7 6	5, 2 4	2, 3 38	7, 7 14	9, 9 52	9, 0 0	0	0	5, 7 71	8, 5 7	5,29
Innovative regional cluster of rocket engine	Perm Region	RIC	1, 4 3	7, 6 2	6, 1 19	5, 5 24	4, 4 76	5, 4 24	4, 5 29	5, 3 24	3, 3 33	3, 3 3	4,67
Nuclear Innovation Cluster of Dimitrovgrad	Ulyanovsk region	NCD	2, 3 8	8, 1	0, 0 95	2, 2 38	4, 4 76	0	8, 1	6, 6 67	7, 7 14	4, 2 9	4,48
Kamsky innovative regional production cluster "Innokam"	The Republic of Tatarstan	KIC	0, 9 5	4, 7 6	4, 4 76	4, 2 29	3, 3 81	6, 6 67	6, 0 67	0	4, 4 29	0	3,62
Phystech XXI	Moscow region	PHH	2, 8 6	4, 2 9	3, 3 33	8, 1	0	0	0	0	5, 7 71	4, 7 6	2,9
Energy-efficient lighting and intelligent lighting control systems	The Republic of Mordovia	ILM	0	2, 8 6	8, 5 57	1, 4 43	0	0	3, 3 33	5, 5 71	2, 3 38	0	2,43
A cluster of medical, pharmaceutical and radiation technologies	Saint Petersburg	MPR	1, 9	0	8, 1	1, 4 9	4, 2 29	0	0	8, 1	0	0	2,43
Shipbuilding innovative regional cluster	Arkhangelsk region	SIC	3, 8 1	0	1, 4 43	0	6, 6 67	0	3, 3 81	0	7, 7 62	0	2,33
Innovative regional cluster of aerospace and shipbuilding	Khabarovsk region	ASH	7, 6 2	0	3, 3 33	0	0	0	0	7, 7 14	0	4, 7 6	2,29
Industrial innovation cluster of the automotive and petrochemical industries	Nizhny Novgorod region	API	0, 4 8	5, 7 1	0, 0 48	3, 3 81	0	0	0	0	5, 5 24	6, 6 7	2,24
Development of information technology, electronics, instrumentation, communications, and information & telecommunications	Saint Petersburg	IES	8, 5 7	3, 3 3	1, 1 9	7, 7 62	0	0	0	0	0	0	2,14
Petrochemical innovative regional cluster	The Republic of Bashkortostan	PIC	3, 3 3	0	0	0	3, 3 33	0	5, 5 24	4, 4 29	0	0	1,62
A cluster of fiber-optic technologies "Photonics"	Perm region	FOT	5, 2 4	2, 3 8	3, 3 33	4, 4 76	0	0	0	0	0	0	1,57

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Motives and Effects of the Initial Public Offerings on the Warsaw Stock Exchange

JEL Classification: *G32; G23*

Keywords: *Initial public offering; Primary shares; Secondary shares; Motives for going public*

Abstract: This paper empirically investigates the links between the motives for going public and changes in the market value and efficiency of new stock companies. Using a sample of 200 firms from Warsaw Stock Exchange between 2005 and 2012 I find that the principal purpose of initial public offering is raising additional capital by the company but divestment grounds of initial shareholders are also important. I find evidence that the sale of secondary shares in the initial public offering may be seen as a negative signal at aftermarket performance of the firm. The data reveal that the most adverse long-term changes in the market value and business efficiency are observed for those companies, where in the initial public offering both primary and secondary shares were sold.

Introduction

The offering of the company's shares for the first time on a stock exchange is inextricably linked to the implementation of various strategic objectives of stock companies and their shareholders. The decision to undertake an initial public offering (IPO) is an extremely important step on the development path of the company, significantly changing its business

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conditions. On the one hand, the company gains access to new sources of capital, enabling development of the new investment projects, which are aimed at multiplying its value. On the other hand, the stock exchange listing of shares provides favorable conditions for the changes in the company's existing ownership structure, allowing the shareholders to sell their holdings. The multiplicity and complexity of the grounds for the IPO gives the rise to seek answers to the question about the effects of this type of company's growth strategy.

The main aim of this study is to seek the relationships and dependencies between the motives underlying the initial public offering and changes in the market value and efficiency of new listed companies. The necessity to take research on these concerns is associated with the lack of the results of studies in the literature on the heterogeneous forms of the initial public offerings and their long-term effects for the companies and their shareholders. Especially noticeable is paucity of such analyzes for other markets than the U.S. The results of the research in this area may significantly contribute to the formation and development of effective financial strategies of enterprises.

In order to achieve the goal of the research the main hypothesis has been formulated and it states that the sale of shares by the initial owners in an IPO is related to a decrease in the efficiency of the enterprise and reduction its market value. At the core of the research hypothesis there are some reasons for which as the most important the existing among initial shareholders privilege in terms of access, possession and possibility to use the key information about the company's prospects can be regarded. The decision to cut back on the shareholders' involvement in the company can, therefore, be seen as a negative signal about the expected changes in the efficiency of the firm and its market value.

Primary and secondary shares in the initial public offering

The first listing of shares on the stock exchange is the result of the adoption of a specific business strategy of the company's development and the nature of the decision to go public is complex and multifaceted. The sale of shares in the IPO affects the enterprise in a number of ways that increase the liquidity of insiders' portfolios and the firm's access to capital (Kim & Weisbach, 2008, p. 282).

Most often it is pointed out that the main reason for going public is the wish to raise additional capital by the company (see Cumming (ed.), 2012,

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pp. 468–469) (compare Ritter & Welch, 2002, pp. 1796–1799). Although this reason is not questioned in the literature, there can be seen significant differences in the indicated ways of allocation of the raised capital. Extensive research in this area is carried out by Pagano et al. (1998). They conclude that companies do not go public to finance subsequent investment and further growth, but rather to rebalance their accounts after a period of high investment and dynamic development (Pagano et al., 1998, p. 61). The proceeds received from the issuance of new shares are often used to repay the existing debt (compare Mikkelsen et al., 1997, Auret & Britten, 2008). Moreover, by going public, a company becomes stronger in relations with the banks, which allows reducing the cost of credit and diminishing the concentration of bank loans (Pagano et al., 1998, p. 29).

The significance of the demand for capital as the main motive for going public was also studied by Kim & Wiesbach (2008). Using a large, international sample of IPOs they show that firms generally issue equity to fund a series of projects over time rather than particular investments (Kim & Wiesbach, 2008). Their results suggest that - contrary to the rebalancing of the financial structure of Pagano et al. (1998) - the investment financing motivation for equity offers can be a primary premise of the IPO.

There is no doubt that the going public decision should be considered from the perspective of the motives of the company's initial shareholders. It should be noted that IPO is a method of divestment. Investors, who have invested capital in the earlier stages of the life cycle of the firm, may sell their holdings and achieve the expected capital gain. This reason for IPO is particularly important in the activities of private equity funds (Barnes et al., 2003; Jeng & Wells, 2000; Black & Gilson, 1998), as well as other groups of investors seeking to exit from the investment, e.g. in the case of the privatization processes of the State Treasury's assets (Choi et al., 2010). What is more, the IPO is a mechanism to diversify the initial shareholders' portfolio and improve its liquidity.

Motives for going public outlined above¹, namely the demand for capital and divestment, are reflected in the securities offered to the stock market investors. Specifically, if the firm issues new shares in the IPO, the proceeds from selling newly created shares (i.e. primary shares) receives the company and the raised capital may be used to finance the growth or re-

¹ The literature also draws attention to the importance of other reasons going public, i.e. the use of favorable market conditions, participation in the mergers and acquisitions market, to attract product market competition, to obtain additional benefits of being the first in an industry, to reduce of agency costs (see Ritter & Welch, 2002, pp. 1796-1799).

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balance the financial structure. However, in order to allow initial owners to cut back the involvement in the company and exit from their investment, the previously existing shares have to be sold in the IPO, i.e. secondary shares. The proceeds from the sale of secondary shares receive the company's shareholders who sell shares. It should be noted that in IPO practice, there may be sold either only primary shares or only secondary shares, as well as a combination of both. The structure of the shares sold in IPO, based on the primary and secondary portion, actually distinguish subgroups of firms with different objectives for listing and motives for going public (Huyghebaert & Van Hulle, 2006, p. 318).

Bearing in mind the concept of Value Based Management (Rappaport, 1986; Copeland et al., 2000) you can ask a question about the importance of an IPO in the creation of the company's value, if initial shareholders seek to withdraw from the company the earlier invested capital and reduce their involvement. This question seems to be important for many reasons. One of them is the issue of getting certain capital benefits or avoid capital losses. One of them is the matter of getting certain capital benefits or avoid capital losses. Existing shareholders (especially insiders) have an information advantage about the condition of the issuing firm and its prospects (Megginson & Weiss, 1991). Taking into account the information asymmetry and agency theory, the dispose of secondary shares may suggest that initial owners sell overpriced shares opportunistically. This issue is particularly important in the context of a great deal of research which has been carried out in many markets and indicates the existence of some kind of anomaly. In fact, these studies show that in the long term the rates of return on shares of the new stock companies are lower than the average market return (Schuster, 2003; Siwek, 2005; Brav et al., 2000; Zheng, 2007), as well as companies similar to them in terms of capitalization and industry, but already publicly traded (Ritter, 1991; Loughran & Ritter, 1995). The literature points out the various reasons for the long term IPO overpricing, especially the divergence of opinion hypothesis, the impresario hypothesis, the windows of opportunity hypothesis and the IPO issuer costs (see Cumming & Johan, 2009, pp. 587-588). Furthermore, it is emphasized that after IPO the deterioration in the issuer's financial position can be expected. Relatively permanent, adverse changes in the financial condition of the new listed companies have been observed in many markets, such as USA (Jain & Kini, 1994; Mikkelsen et al., 1997; Teoh et al., 1998), Italy (Pagano et al., 1998), the United Kingdom (Coakley et al., 2007) and many Asian countries (Ahmad, 2011; Ahmad-Zaluki, 2008; Wang, 2005). Extensive scien-

tific debate on this issue points out three potential explanations for the decline in the post-issue operating performance of IPO firms, namely potential for increased agency costs when a firm makes the transition from the private to public ownership (Kutsuna et al., 2002), managers' attempt to window-dress their accounting numbers before going public (Teoh et al., 1998; Rangan, 1998), as well as the entrepreneurs time their issues to coincide with periods of unusually good performance levels (Benninga et al., 2005). Klein and Li (2009) confirmed that the window-dressing practice as measured by discretionary current accruals is positively correlated with secondary share offerings. Moreover, their studies suggest that initial shareholders are more likely to cash out their shares when the overall stock market condition is favorable (Klein & Li, 2009).

Although the IPO overpricing and the deterioration of the financial condition of new listed companies met with the interest of the researchers in the whole world, there is surprisingly little knowledge about the impact of the sale of primary and secondary shares on the market value and efficiency of firms in the long term. Jain and Kini (1994) point to the existence of a significant, positive relation between the long term post-IPO operating performance and the proportion of shares retained by the original entrepreneurs. In contrast, the study of Brau et al. (2007) shows that the aftermarket performance is not affected by the offering type (i.e. primary versus secondary offerings), implying that secondary share sales in general are due to the existing shareholders' portfolio diversification rather than opportunistic selling of over-priced stocks. Nevertheless, insider selling is related to poorer long-run performance, consistent with agency and asymmetric information theories (Brau et al., 2007, p. 2630). It is also worth mentioning the research on the secondary share sale of seasoned equity offerings that have been carried out by Lee (1997) as well as Clarke et al. (2004), where the results show that the long-run abnormal returns are significantly negative and that the operating performance of the firms in the study declines subsequently to the secondary offering for offers when insiders are secondary share sellers.

Methodology of the research

The empirical studies have been carried out on a sample of companies whose shares were listed on the main market of the Warsaw Stock Exchange for the first time between 2005 and 2012. There are 291 IPOs during this period in total. Then, from the research sample I exclude 44 foreign

companies, take out 11 firms because their IPO does not include the sale of primary or secondary shares, delete 29 companies previously listed on NewConnect or MST-CeTo. In addition, due to the nature of business I also eliminate 3 banks and 1 insurance company, as well as 3 firms for which to obtain the necessary figures required for the research is not possible. After applying these filters, there are 200 IPOs left in the sample.

To investigate the changes in the market value of companies after the first listing on stock exchange I calculate the rates of returns resulting from the so called buy and hold investment strategy. It has been assumed, the investment strategy where an investor purchases shares at the end of the first day of trading at the closing price and holds them for a long time. This made it possible to eliminate the influence of unusually high rates of return in the first day of trading, that is the observed in many markets and in different periods phenomenon of IPO underpricing (see Ljungqvist, 2006, pp. 8-10; Loughran et al., 1994; Boulton et al, 2010). This way calculated rates of return ($BHR_T^{IPO,i}$), in addition to factors specific to a particular company or group of companies also include general changes in the stock market sentiment. To eliminate the influence of this factor, the obtained results were adjusted by the normal rate of return, determined on the basis of the index model. According to this approach, the normal rate of return on the company's shares is equal to a rate of return on the market portfolio ($BHR_T^{WIG,i}$). Thus, I use the Warsaw Stock Exchange Index (WIG) on the particular day of stock trading as a benchmark. The rates of return resulting from the buy and hold investment strategy are given by the following formulas:

$$BHR_T^{IPO,i} = \prod_{t=2}^T (1 + R_{i,t}) - 1$$

$$BHR_T^{WIG,i} = \prod_{t=2}^T (1 + R_{WIG,t}) - 1$$

$$BAHR_T^i = BHR_T^{IPO,i} - BHR_T^{WIG,i} = \prod_{t=2}^T (1 + R_{i,t}) - \prod_{t=2}^T (1 + R_{WIG,t})$$

where $R_{i,t}$ is the rate of return on the shares of i -company in the t -day of trading, $R_{WIG,t}$ is the rate of return of the WIG index on the t -day of trading and $BAHR_T^i$ is the buy-and-hold abnormal rate of return on the shares of i -company in the t -day of trading.

The assessment of changes in the company's efficiency after the IPO is conducted on the basis of the return on total assets (ROA = net profit / total

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assets), which gives an idea as to how efficient management is at using firm's assets to generate profit. Unfortunately, the necessary financial data are listed as for a specific date, such as the end of the firm's financial year, creating difficulties for observation of changes in the company's efficiency (ΔROA). The reference point for further analysis is the return on assets reached at the end of the year prior to the first listing of the company's shares on stock exchange (ROA_{T-1}).

In order to investigate whether the issue of new shares and the sale of secondary shares by initial shareholders influence the post-IPO changes in the market value ($BHAR_T$) and efficiency of companies (ΔROA), I estimate the two following OLS models:

$$BAHR_T = \alpha_0 + \alpha_1 PRIMARY + \alpha_2 SECONDARY + \alpha_3 \ln MV + \mu$$
$$\Delta ROA = \beta_0 + \beta_1 PRIMARY + \beta_2 SECONDARY + \beta_3 \ln TC + \mu$$

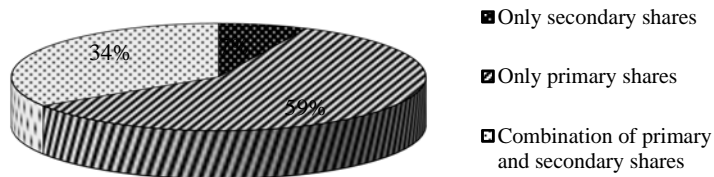
The explanatory variable *PRIMARY* is a dummy variable that equals one when in the IPO primary shares are sold and zero otherwise. *SECONDARY* is also a dummy that takes a value one when the initial shareholders dispose their shares in IPO and if not its value is equal to zero. Regarding the conclusions from the research on the company's market value of Fama & French (1996), the model for *BHAR* contains the control variable *MV* that determines the market value of the company at the end of the first day of stock trading. Similarly, in the second model the control variable *TC* is used, which is the total book assets of the company prior to the IPO and it reflects the size of the enterprise. The size of a firm is seen as a primary factor in determining the profitability of a firm due to the concept known as economies of scale which can be found in the traditional neoclassical view of the company (Niresch & Velnampy, 2014, p. 57; Pervan & Višić, 2012, pp. 213-223).

The information on the type of shares sold in IPO, that is primary and secondary shares are hand-collected from the Register of financial instruments maintained by the Polish Financial Supervision Authority. The post-IPO number of shares, the return on assets ratios and information on the total book assets for each company come from the unconsolidated financial statements available in the Notoria Service database. The source of information about the daily rates of return of companies' shares on the Warsaw Stock Exchange is <http://gpwinforesta.pl>.

Empirical results

Empirical studies of the IPO practice in the Polish capital market indicate that the decision to go public is associated with the wish to achieve a variety of purposes. Figure 1 presents the structure of IPOs, when firms are sorted according to the floatation structure (i.e. if company sells only primary shares, just secondary shares or a combination of both). The information presented in Figure 1 indicates that the dominant reason for IPO is the need to raise new capital to the company.

Figure 1. Public offerings of shares according to floatation structure

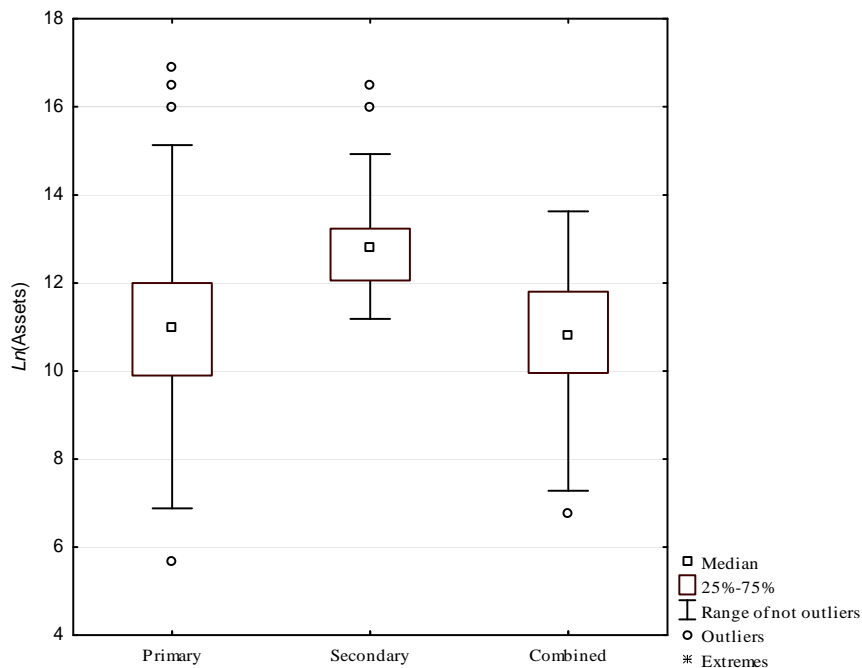


Source: the author's own study based on Register of financial instruments, Polish Financial Supervision Authority.

The analyzed IPOs are generally associated with the sale of only newly issued shares and thus the firm is entitled to all proceeds. This type offerings include 59% of the cases. However, based on the analyzed data it can be also said that the Polish stock market plays an important role in the divestment processes. Among the all IPOs 34% are those in which the issue of new shares was combined with the sale of shares owned by existing shareholders, namely secondary shares. Whereas, pure secondary offerings are relatively uncommon on the Warsaw Stock Exchange and represent only 7% of all observations. From the point of view of the type of shares sold to the public in IPO, Polish stock market is not very different from the stock exchanges in other European countries (see Kim & Weisbach, 2008, pp. 302-303). It is noteworthy that firms which IPO concerns only the sale of secondary shares are relatively bigger in comparison to other new stock companies (see Figure 2).

The analysis of the effects of the IPOs on the Warsaw Stock Exchange shows that the adoption of this strategy of business development can bring diverse results. On the basis of the rates of return resulting from the buy and hold strategy it can be concluded that the phenomenon of the long run underperformance of IPOs is present on the Polish stock market. Although for the total sample the mean of the buy-and-hold abnormal rates of return is positive in most intervals, special attention should be paid to the high standard deviation. This shows a significant variation in the changes of the stock prices across all companies.

Figure 2. The size of firm (the natural logarithm of total assets) at the end of of the fiscal year prior to the going public according to the floatation structure.



Source: the author's own study based on *Notoria Service Sp. z o.o.* and Register of financial instruments, Polish Financial Supervision Authority.

It should be emphasized that in the all analyzed intervals, the median is negative. Moreover, the existence of a clear downtrend can be noted. In the

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whole group of IPOs a deterioration in business efficiency measured by the change of return on assets is also seen (see Table 1).

The assessment of the long-term market effects of IPOs in each group of companies using buy-and-hold abnormal rates of return indicates that one can observe the existence of certain differences across all categories. Even though the highest rates of return are reported for these offerings, where only primary shares were sold, the small size of this group does not allow drawing generalizing conclusions. Whereas, the comparison of primary and combined offerings allows concluding that in the long run for stock investors investments in public offerings are more profitable, if the initial shareholders did not sell their stakes. One year after the first listing of the company's shares, both the mean and median of BAHR is lower for combined offers.

Table 1. Summary statistics of BAHR and ΔROA according to floatation structure

Specification	Mean	Median	Std. dev.	Min	Ma	N
	Whole sample					
$BHAR_{125}$	0,0302	-0,0387	0,4327	-0,7983	2,7781	200
$BHAR_{250}$	0,0381	-0,0543	0,6573	-1,2112	5,6055	200
$BHAR_{500}$	0,2235	-0,1555	3,0066	-1,5405	40,2755	197
$BHAR_{750}$	-0,0291	-0,2434	0,8545	-1,5278	5,5299	184
$\Delta ROA_{T0/T-1}$	-0,0506	-0,0208	0,1486	-1,2277	0,2139	200
$\Delta ROA_{T+1/T-1}$	-0,0817	-0,0462	0,2071	-2,1956	0,3124	200
$\Delta ROA_{T+2/T-1}$	-0,1270	-0,0735	0,3674	-4,3542	0,4057	187
$\Delta ROA_{T+3/T-1}$	-0,1659	-0,0773	0,5493	-6,5347	0,1527	165
Secondary						
$BHAR_{125}$	0,0590	-0,0091	0,5224	-0,5973	1,5010	14
$BHAR_{250}$	0,0861	0,0724	0,5757	-0,7667	1,2093	14
$BHAR_{500}$	0,5939	0,1348	1,6246	-1,3180	4,0256	14
$BHAR_{750}$	1,3454	1,0303	1,8756	-0,7162	5,5299	10
$\Delta ROA_{T0/T-1}$	-0,0240	-0,0037	0,1138	-0,2641	0,1545	14
$\Delta ROA_{T+1/T-1}$	-0,0414	-0,0372	0,1523	-0,3361	0,3124	14
$\Delta ROA_{T+2/T-1}$	-0,0049	0,0035	0,1650	-0,2904	0,3497	11
$\Delta ROA_{T+3/T-1}$	-0,0174	0,0014	0,0963	-0,1780	0,0644	5
Primary						
$BHAR_{125}$	0,0398	-0,0417	0,5000	-0,7983	2,7781	118
$BHAR_{250}$	0,0859	-0,0364	0,7889	-1,2112	5,6055	118
$BHAR_{500}$	0,3753	-0,1604	3,8415	-1,5405	40,2755	117
$BHAR_{750}$	-0,0828	-0,2394	0,7629	-1,5278	4,2050	110

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ΔROA_{T_0T-1}	-0,0361	-0,0176	0,1223	-1,0383	0,2139	118
ΔROA_{T+1T-1}	-0,0751	-0,0369	0,2333	-2,1956	0,1876	118
ΔROA_{T+2T-1}	-0,0954	-0,0546	0,1771	-1,0611	0,4057	111
ΔROA_{T+3T-1}	-0,1315	-0,0693	0,2453	-1,3524	0,1527	100
Combined						
$BHAR_{125}$	0,0076	-0,0296	0,2565	-0,5053	0,7092	68
$BHAR_{250}$	-0,0547	-0,0659	0,3450	-0,7531	1,1886	68
$BHAR_{500}$	-0,1240	-0,1696	0,4477	-1,2126	1,2534	66
$BHAR_{750}$	-0,1516	-0,2750	0,5396	-1,3679	1,8587	64
ΔROA_{T_0T-1}	-0,0813	-0,0412	0,1884	-1,2277	0,1947	68
ΔROA_{T+1T-1}	-0,1014	-0,0810	0,1643	-1,0240	0,1427	68
ΔROA_{T+2T-1}	-0,2015	-0,0903	0,5693	-4,3542	0,0803	65
ΔROA_{T+3T-1}	-0,2354	-0,1001	0,8534	-6,5347	0,1321	60

Source: the author's own study

The analysis of the data presented in Table. 1 indicates that the smallest decline in return on assets is observed in companies where in the IPO only secondary shares were sold. Two years after the first stock listing in more than a half of the enterprises in this subsample one can observe the increase in return on assets compared to the period before the IPO. In the other group of companies there is a clear downward tendency of the average return on assets. In the all analyzed interval the ROA biggest drop is observed for those companies where IPOs were related to both the issue of new shares and the sale of the secondary shares. The results indicate that the reduction of the original owners' capital involvement in the IPO may be associated with a significant decrease in the company's efficiency at a later date.

Differences in the examined variables illustrating the effects of the going public observed across all categories are statistically significant only in the part of the comparisons (see Table 2).

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Table 2. The p -value of non-parametric Wilcoxon rank-sum test

Specification	Primary versus Secondary	Secondary versus Combined	Primary versus Combined
$BHAR_{125}$	0,9676	0,8293	0,3876
$BHAR_{250}$	0,5921	0,3152	0,4309
$BHAR_{500}$	0,2467	0,1900	0,7925
$BHAR_{750}$	0,0049	0,0035	0,9068
$\Delta ROA_{T0/T-1}$	0,5870	0,1978	0,0512
$\Delta ROA_{T+1/T-1}$	0,9088	0,2492	0,0239
$\Delta ROA_{T+2/T-1}$	0,1286	0,0335	0,2099
$\Delta ROA_{T+3/T-1}$	0,0905	0,0666	0,2412

Source: the author's own study.

In order to determine whether and how the secondary shares disposal by the initial owners in the IPO influences the changes in the company's market value and profitability of assets in the long-term I use the multiple linear regression models indicated above. The results presented in Table 3 - parameter estimates and p -values (in brackets) - shows that received equations slightly explain the dependent variables.

The analysis of the results indicates that the negative impact on the buy-and-hold abnormal return after IPO can have both the issue of new shares and the sale of secondary shares held by the initial owners. In all intervals the coefficients on PRIMARY and SECONDARY are negative, which is in line with the prediction of the research hypothesis. However, in most of the estimated equations, these two variables are not statistically significant.

Table 3. Determinants of $BAHR_T$ and ΔROA - the results from OLS regressions

Dependent variable	Explanatory variables					
	Intercept	Primary	Secondary	LnMV for BHAR LnTC for ROA	Adj. R ²	F-statistics
$BHAR_{125}$	0,7876 (0,0175)	-0,1031 (0,4220)	-0,0103 (0,8760)	-0,0540 (0,0217)	0,0132	1,89 (0,1327)
$BHAR_{250}$	1,2505 (0,0127)	-0,2169 (0,2648)	-0,1084 (0,2799)	-0,0794 (0,0257)	0,0204	2,38 (0,0706)
$BHAR_{500}$	6,5488 (0,0045)	-1,1277 (0,2051)	-0,3272 (0,4791)	-0,4231 (0,0095)	0,0263	2,76 (0,0433)
$BHAR_{750}$	2,6926 (0,0000)	-1,5802 (0,0000)	-0,0260 (0,8347)	-0,1003 (0,0208)	0,1621	12,80 (0,0000)
$\Delta ROA_{T0/T-1}$	-0,3804 (0,0000)	0,0124 (0,7728)	-0,0409 (0,0550)	0,0302 (0,0000)	0,1267	10,62 (0,0000)

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$\Delta ROA_{T+1/T-1}$	-0,3254 (0,0133)	-0,0062 (0,9218)	-0,0229 (0,4617)	0,0234 (0,0071)	0,0278	2,90 (0,0362)
$\Delta ROA_{T+2/T-1}$	-0,4169 (0,0807)	-0,1095 (0,3706)	-0,1036 (0,0665)	0,0394 (0,0118)	0,0432	3,80 (0,0113)
$\Delta ROA_{T+3/T-1}$	-0,3938 (0,3472)	-0,1273 (0,6283)	-0,1015 (0,2582)	0,0358 (0,1430)	0,0054	1,30 (0,2770)

Source: the author's own study.

Likewise, the data describing the change in efficiency of new listed companies (ΔROA) support the notion, also consistent with the research hypothesis, that the sale of secondary shares by existing shareholders may be associated with a decrease in return on assets in the future. In all models, where ΔROA is the explained variable, the coefficients for SECONDARY take the value below zero. Moreover, in models for $\Delta ROA_{T0 / T-1}$ and $\Delta ROA_{T+2 / T-1}$ these parameters are statistically significant at 0.1.

Conclusions

Initial public offering is a milestone on the growth path of a company. The adoption of this strategy of firm development radically affects the external and internal conditions of the business. Although this topic is the subject of many research studies, the knowledge about relationships and dependencies between the motives for going public and consequences of this decision in the form of changes in the company's market value and efficiency is still limited.

Results of empirical studies support the presumption that the sale of shares by the initial owners in an IPO favors the deterioration of the company's business efficiency and negatively affect its market value. The biggest decline in the market value and return on total assets is observed in companies where the IPO was associated with a combination of the issuance of new, primary shares and the sale of secondary shares by the initial owners. These findings are at least suggestive of the idea of the information asymmetry and agency theory that owners of private companies may use information advantage in IPO to achieve their personal goals and effectively accomplish the divestment process.

Results presented in this paper indicate a need for further studies on the structure of the shares offered in IPO and its impact on the short- and long-term effects of this type of company's development strategy. Furthermore, for the future research it becomes extremely important to find answers to the question about directions and effectiveness of the use of capital raised,

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when capital growth resulting from the issuance of new shares is accompanied by a decrease in the efficiency of the company.

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**Management of Projects Risk with Business
Intelligence**

JEL Classification: *O22; G32; D81*

Key Words: *Risk management; Business Intelligence; Data Cube; Prediction Algorithms*

Abstract: Project management is characterized like the broader concept of a comprehensive set of management processes and activities that are limited in time and whose aim is to implement something specific, whether the introduction, change, etc. Project management involves the application of knowledge, experience, skills, activities, tools and techniques so that the final project met its requirements and achieves its goals in a limited time interval. Between the initial and final state the project goes through several phases, including project risk. To eliminate these risks is determined by the risk management as an area focusing on analysis and risk reduction using various tools and techniques.

If we seek to answer the question what is the risk, then in terms of project management it can be understood as the likelihood that an event occurs that is contrary to the assumption. The first stage is to identify risks. This is based on the areas covered by the project and cannot be generalized for different types of projects. For example, a project for the implementation of data warehouse will have different areas of risk than new product development. The next stage is risk analysis. At this stage, we try to find the level of risk and its impact on the completion of the project. We are looking for those risks which are important and have a significant influence on the project (priority risks). Following the planning and risk management, which proposes procedures to minimize risk, responsibility for the procedures and time frames in which the procedures are being implemented. The last phase is monitoring, which leads to elimination of risks, which are no longer relevant and to re-identify new risks. This entire process is appropriate to support software tool that allows us to their effective management.

We can use Business Intelligence tools as one of the software tools, especially in the phase of risk identification and analysis. Identifying risks putting together a basic set of potential risks when the input use various available sources of information such as the pre-

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viously identified risks files or lists the usual risks in managing similar projects. In the analysis phase, then we can make risk assessment of the potential risks, including the determination of their probabilities to create a catalogue of potential risks of the project, which must be addressed at the planning stage and management, Business Intelligence tools are with justification used for the suggestions to minimize risks.

The article discusses the Business Intelligence tools and their application in the field of project's risk management. This is an opportunity to create panels, tables, graphs and matrices, including analyses of data cubes and to a certain extent and use of prediction algorithms for determining the probability of the risk and its impact on the implementation of the project.

Introduction

Risk management in every part of interest, not only in project management is a systematic process that aims to identify and manage risk, in order to act on its appearance (minimizing or eliminating, (if it is possible) and controlling them), by implementing systems and procedures to identify, analyse, evaluate and address the risks inherent to any project. (Conroy & Soltan, 1998) (Raz & Michael, Use and benefits of tools for project risk management, 2001) Project risk management consists of three phases (Buchan, 1994) - risk identification, risk assessment and risk response.

Project management is becoming more and more integrated into organization of all kind all over the world. About one third of the economic activity takes place in projects and the percentage is growing. (Bredillet, et al., 2007)

Risk management is a structured approach for the identification, assessment, and prioritization of risks followed by planning of resources to minimize, monitor, and control the probability and impact of undesirable events. (Smith & Merritt, 2002)

Risk management is an essential part of every kind of project because no project is free from risks. At any stage of a life cycle, a project is plagued with various risks due to the complex and dynamic nature. (Zhao & Chen, 2010)

Risk management is often left aside in project management practice, or is not given due attention. But the risk management can help project managers to anticipate delays that cause projects not to be delivered on time. (Grant, Cashman, & Christensen, 2006) The risk response plays a proactive role in mitigating the negative impact of project risks. (Miller & Lessard, 2001)

The project team with the risk manager should encounter risks throughout the whole life cycle of the project and in all of its phases especially in the post project phase too.

Smith described basic principles and guidelines for effective risk management and emphasized the importance of active risk management for accelerating projects and improving their success rates. (Smith P. , 1999) Raz et al. then performed an empirical study that reported - risk management practice is more applicable for higher-risk projects and appears to be related to project success. (Raz, Shenhar, & Dvir, Risk management, project success, and technological uncertainty, 2002)

Theoretical basis for the methods and algorithms of Business Intelligence tools were obtained from long-term study of selected professional publications, in particular by the following authors: (Kimbal & et al., 1998) (Kimball & Ross, 2002) (Inmon, 2005) (Lacko, 2003) (Smejkal & Rais, 2006) (Smalltree, 2006) (Howson, 2008) (Pour, et al., 2012) (Veerman, et al., 2009).

Methodology of the research

There are the basic methods used with SQL Server Data Tools Analysis Services Multidimensional and Data Mining Project for prediction (algorithms for prediction the risk):

- The Microsoft Decision Trees algorithm is a classification algorithm that works well for predictive modelling. The algorithm supports the prediction of both discrete and continuous attributes.
- The Microsoft Neural Network algorithm uses a gradient method to optimize parameters of multilayer networks to predict multiple attributes. It can be used for classification of discrete attributes as well as regression of continuous attributes.
- The Microsoft Clustering algorithm uses iterative techniques to group records from a dataset into clusters containing similar characteristics. This is useful when you want to find general groupings in your data.
- The Microsoft Association Rules algorithm builds rules describing which items are most likely to be appear together in a transaction. The rules can be used to predict the presence of an item based on the presence of other items in a transaction.
- The Microsoft Naive Bayes algorithm is a classification algorithm that is quick to build, and works well for predictive modelling. The algorithm supports only discrete or discretized attributes, and it considers all

the input attributes to be independent, given the predictable attribute. (Rankins, Bertucci, Gallelli, & Silverstein, 2013)

Other important task is the methods used in project risk management. The Business intelligence tools should help project manager to solve the problems effective and faster. The methods are divided according the project phase.

Pre-Project Phase

Risks accompany the project team all the time and in all project life cycles. In the pre-project phase the project team along with the project manager analyse risks. First, the project team makes a list of all potential risks; here the most frequent method is brainstorming or another creative method Crawford Slip. Looking for risks the project team may not forget the risks arising from human failures, either. These risks are dealt with by the HRA analysis. The method is usually used in conjunction with other methods that allow quantification of results. If we apply the method using event trees or fault trees, it is possible to graphically illustrate the sequence of human failure and its impact on the result of project. (Obrová & Smolíková, The Role of Risk Management in Successful Project Management, 2013) The method should be employed by two analysts as a minimum that must be familiar with the interviewing technique; it is a very demanding method requiring experience on the part of the analyst in order to interpret the interviews in a proper manner. (Tichý, 2006)

There are also the tree techniques. The risk tree technique can be divided into two areas, event tree analysis (ETA) and fault tree analysis (FTA).

ETA (Event Tree Analysis) is a causal analytical technique used for an assessment of the progress of a process and its events leading to a potential incident. ETA method does not deal with causes of the undesirable event but considers further development of the event, thus providing a survey of probability of potential resulting events. The method is based on the principle of event monitoring and assessment of their sequence and mutual relations leading not only to the system failure but also to the system defects. The results of the ETA analyses include various incident scenarios. The method is used to identify and analyse system, project and process weak points. The output is a series of recommendations for reducing the incident probability and consequences. (Obrová & Smolíková, The comparison of selected risk management methods for project management , 2013)

FTA (Fault Tree Analysis) is a deductive technique focusing on one particular incident or major failure of a system and defining a method of specification of causes of such an incident. The fault tree is a graphical model

showing various combinations of device failures and human errors which may result in a serious system failure. FTA is a qualitative instrument and its strength is in its ability to identify combinations of basic device failures and human errors that may result in an incident. (Obrová & Smolíková, The comparison of selected risk management methods for project management, 2013) FTA is an ideal analytical tool for very complex systems. (Fuchs et al, 2004) This method may also be used in the framework of quantitative analysis where the individual events are defined with regard to probability of occurrence with the result of probability of the peak incident (Korecký & Trkovský, 2011).

Project Phase

In the implementation phase the project team must observe the risks. If a risk occurs that was previously analysed the project team introduces the envisioned measure. It may happen that a risk occurs that was not taken into account by the project team and then a measure for eliminating damage, if any, must be introduced as soon as possible. It may also happen that a risk previously analysed ceased to exist and there is no need to observe it any more. (Obrová & Smolíková, 2013)

Post-Project Phase

In the last life cycle phase – the post-project it is necessary to evaluate and analyse everything. The team should prepare a document indicating how risks were handled during the project implementation. In most cases, the project team compares the risks analysed in the pre-project phase with those occurred in the implementation phase. An outcome of the implementation phase should have the form of a list (or risk catalogue or risk register) that could be used in the new projects to come. (Obrová & Smolíková, 2013)

Risk

Generally, the term risk is called a threat, a potential problem, the possibility of failure or failure, damage, loss, risk of damage, etc. Risk expresses a degree of uncertainty. They can be characterized as the probability of achieving a result that is different from what you expected.

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The concept of risk is related to the concept of uncertainty. It is the possibility of different outcomes, the probability is quantified. The comparison of risk and uncertainties are in Table 1.

Table 6. Comparison of risks and uncertainties

Dimension	Risk	Uncertainty
Measurability	Measurable	Unmeasurable
Methods	statistics and probability	subjective estimate
Data	quantitative data	qualitative data

Source: (Merna & Faisal, 2007)

Risks in projects related primarily to internal and external environment, innovation, change, and resources and we can prevent them effective management of project risks. Each risk can be expressed its characteristics, the most important are:

- The level of probability of risk - the possibility that the risk will
- The level of risk
- Risk Impacts - consequences which occur when there is risk situation
- Predictability of risk - the chance that the risk can be identified in advance and anticipate
- The level of risk suggestibility
 - suggestible
 - partially influenced
 - not suggestible
- relation to the organization
 - internal risks - those types of risks can influence and control
 - external risks - those types of risks cannot directly influence, it is the environmental factors
- The order of action - formation and removability
 - primary
 - secondary - those types of risks arising from the elimination of the primary risks
 - residual - it is a risk that is acceptable
- The amount of risk
 - small
 - medium
 - great

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- The degree of acceptability (acceptability, acceptability)
 - necessary (required)
 - tolerable (acceptable)
 - intolerable (unacceptable)
- The probability of occurrence and effect
 - unprovable
 - low probable
 - probable
 - very probable
 - almost sure
- Scope of action
 - systematic - this type of risk applies to all types of projects
 - unsystematic - this type of risk is only valid for a certain type of project

In addition to these characteristics the risks can be classified by type, for example, operational risks, technological risks, production risks, information risks, economic and financial risks, marketing risks, social risks, and natural hazards and some others.

When comparing decision making under risk and decision making under uncertainty it is essential, that in the decision-making under risk we are able to determine the probability of risk events and in conditions of uncertainty, this probability is there unknown.

If we are able to determine the probability of the risk, we have more information and we are able to make decisions based on knowledge. This is the assumption for using of Business Intelligence tools beyond the known and standard procedures for project risk management.

Project risks

Project risks include all kinds of risks that could in any way threaten the project. Key project risks are those that threaten the goal, time and project costs. Frequently may occur due to changes in the project, poor communication, or due to changes in internal and external circumstances and conditions.

Risk management is a continuous activity, which can be characterized by these interrelated phases:

- Identify project risks
- Evaluation of project risks

- Elimination or manage project risk
- Monitoring of potential project risks

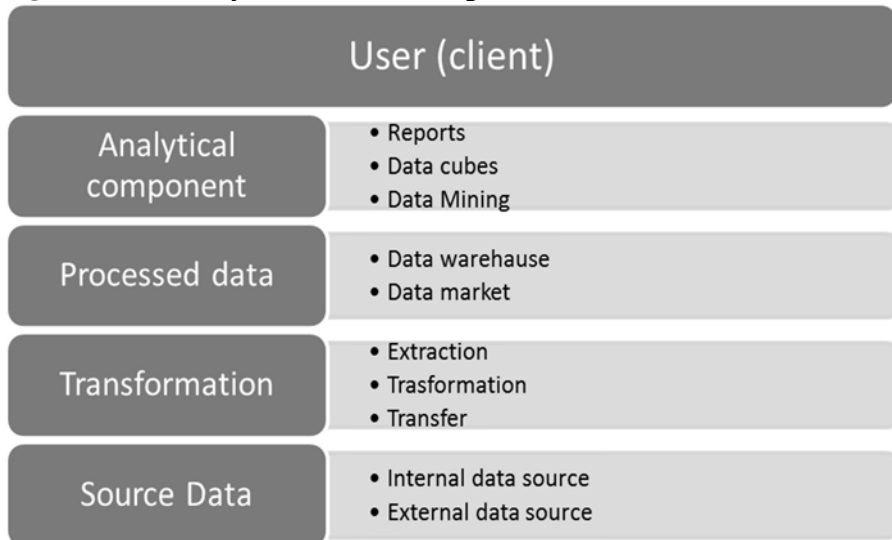
The target solution is to reduce the probability or reduce the impact of risks during project implementation. The project is key risk prevention, especially in the planning phase of the project, the ability to timely identify risks, eliminate and prevent problems that might occur in the project. Significant is also the ability to manage changes in project implementation, which in most cases are the most common source of project risks.

Business Intelligence in project risks

Generally, we can term Business Intelligence characterized as converting large volumes of data to knowledge, which are required for end users. These can then be used effectively in the decision-making process in various activities. The essence of all the data is that there are hidden some information, that we are able to detect if we add to the data the context. Consequently, we are able to acquire the knowledge, or rather the ability to evaluate knowledge and its application in practice.

Simplified Business Intelligence hierarchy is shown in Figure 1.

Figure 1 – Hierarchy of Business intelligence



Source: Own compilation

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Due to the fact that today's modern database platform include extensive support for building data warehouses (data warehouse), (OLAP cubes) and data mining (mining, uncovering data), these platforms can be used advantageously as a comprehensive solution and project management, including project risk management.

As noted in chapter risk, secondly, can be characterized, but also to classify. In the case of decision under risk is essential that we are able to determine the likelihood of the risk occurring.

So we have available data from internal and external systems, which can be put into context and explore their mutual characteristics according to the type of risk, focusing on systematic, unsystematic, internal and external. Based on this division we are using Business Intelligence tools to further investigate possible links and similarities in data aimed at further risk characteristics.

Conclusions

Using OLAP analysis (data cubes), which allow to examine data from a larger number of dimensions than two (two dimensions can be thought of as a classic excel tables or tables in a relational database), and then using different methods of data mining, we are able to analyse or predict, including determining the degree of probability of the risks within projects are most likely, what is the likelihood of their elimination and likely impact on target project.

Data mining is still one of the fastest growing segments of Business Intelligence. It is principally based on heuristic algorithms, neural networks and other advanced software technologies and artificial intelligence methods. It is used in the analysis of trends and predicting events.

It was historically primarily deployed for analysis and prediction of various business applications. Gradually, with the development of this technology was progressively deployed to other areas such as the analysis and prediction of credit risk, the risk in issuing credit cards, etc.

Regarding the implementation of complex business intelligence tools into database platforms, there is no longer need to rely on specialized solutions in this area and we are able to use these tools to streamline the process of project risk management more complex methods than are currently in common use.

The concluding paragraph should provide a neat summary of the main discussion of the paper and possible directions of future research. In con-

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clusions it is not necessary to take new matter which was not discussed in the paper.

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**Economic vs Managerial Perspective
on Inter-organisational Relations' Analysis
– Are Economists on the Dead-end Track?**

JEL Classification: *M00*

Keywords: *Inter-organisational relations*

Abstract: Inter-organisational relations (IOR), being ties between entities of different nature, length and strength (and thus bearing various consequences), can be investigated from different economic points of view of: their components, structure and magnitude (e.g. using lenses of resource based economy), power, strength, dynamics (e.g. taking the network or political perspective), or impact they have on companies (when looking at them as sources of competitive advantage). Yet interesting, are these perspectives still applicable and useful for growing number of agile corporations with blurred boundaries? Can economic thought add any novelty to IOR analysis in the era of relational view. Do academics from managerial sciences wear more practical, down to earth glasses or they just moved forward with their theories by employing advances from social sciences, like psychology sociology, legal sciences, economic history, economic geography. Are these two perspectives contradictory or complementary to each other.

The aim of this article is to show different perspectives of the inter-organisational relations (IORs) in economic theory and managerial sciences. They share some ideas and develop them in similar way, but also differ in many ways. The authors would like to present critical review aimed at ideas especially useful for practitioners but also those which seem to lead to dead ends.

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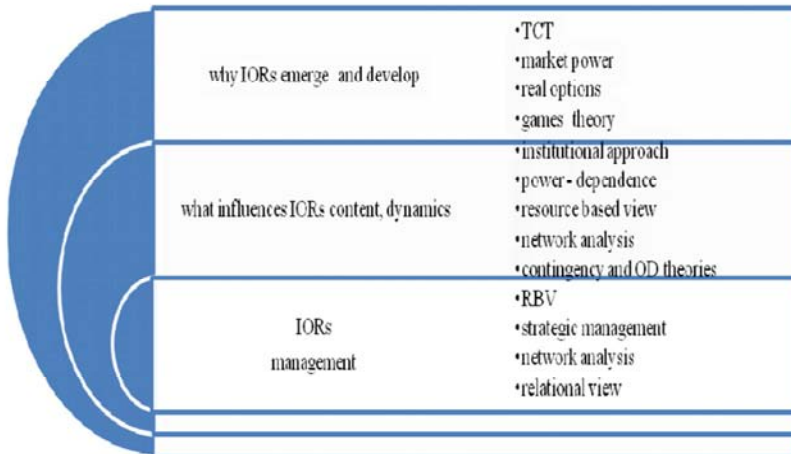
In order to do so, the authors review main economic disciplines dealing with IOR (e.g. transaction cost theory, institutional analysis of the firm, the theory of power and resource dependency and network analysis) and juxtapose them with managerial IOR analysis (e.g. resource based view, relational view, IMP Group approach, social network theory).

Introduction

Inter-organizational relations (IOR), being ties of different nature, length and strength, can be investigated from different points of view on: their components, structure, power, strength, dynamics or impact they have on companies. In order to effectively study, and manage these complex constructs we need to look on relations between enterprises from many - economic, sociological, psychological or even anthropological - theoretical perspectives. In this article we focus on economic and organizational view in IORs analysis and show in what aspects certain economic or organizational theories seem viable. We review some economic disciplines dealing with IORs and juxtapose them with organizational view on inter-organizational relations, in order to show their insights and consequences of using particular theoretical concepts as analytical framework.

We take different perspectives and use accordingly various theoretical concepts being a consequence of questions we ask. We can examine the grounds of IOR creation, study their shape or structure over time or take a closer look at impact they have on entities and environment. The answers built here reflect not only theoretical lenses we use but also result from different background (social, economic, cultural) or knowledge and experience we have acquired. The question is – taking which perspective brings the desired outcomes?

Scheme 1. Theoretical framework to study IOR



Source: own work.

The theoretical framework we propose in this article (see scheme 1) divides theories dealing with IORs into three main groups: theories that focus on IORs as results of rational choices; theories concentrated on the exploration of reasons, why IORs are built in a specific way and concepts looking for conditions, methods and key drivers of IORs successful management. Using this division criteria we want to show, the main focus of a certain theory in IORs analysis, but we are fully aware that insights of certain theories can overlap between sections (as they can e.g. explain both why and how IORs are shaped together with building some normative propositions how to construct them effectively).

Methodology of the research

The article presents results of critical theoretical analysis based on thorough literature review. The authors reviewed the body of literature on economic and organizational theories (respectively: new institutional economics, resource based view, power – dependence theory and institutional analysis of organizations, market power theory, real options theory, contingency view of the firm, strategic management, network analysis).

Inter - organizational relations as consequences of economic choice

Economic entities emerge and develop over time with the main primary goal to maximize their value over time. Pursuit to optimize activities in the long run requires choosing the right activities' composition in a particular environmental set. Transaction cost theory (TCT) examines premises and consequences of different governance structures: the firm with its hierarchy system; the market with its price mechanism, and hybrid relations, where the features of both price mechanism and hierarchy system are mixed (Hennart, 1993, pp. 529-548.). Pooling (with its intrafirm relations), contracts (governed by market mechanisms) and cooperation (with inter-organizational relations based on long term loose framework contracts) are chosen after transaction cost and value analysis, grounded in the given external conditions (Hennart, 2010, pp. 339 – 365; Jacobides & Billinger, 2005, pp. 249 - 261; McCarthy & Anagnostou, 2004, pp. 61-71).

TCT perceives IORs as results of economic calculation and rational choice of certain governance models. In a hierarchy, one has to cope with the internal coordination problems and provide the set of managing rules minimizing shirking. In market, when the external transactions prevail, relations between the partners are highly formalised by contract rules and reflect market conditions. When calculations opt for hybrid solutions then relations between the partners are determined by relatively loose set of mutual obligations accompanied by a mixture of managing and coordinating tools. As TCT assumes bounded rationality and opportunism of humans, IORs may be subject of cheating, unethical behaviour and misleading judgement accompanied by information scarcity or its misinterpretation. Resulting from certain governance model choice, IOR will be shaped accordingly. They will differ in their:

- length (market type – the shortest, even if repetitive; pooling the longest; hybrid solutions – lengthy);
- strength: from the weakest (external, governed by market and contracts) to very strong internal hierarchical ties; the strength of hybrid relations is highly dependent on the value created due to these ties, resources engaged, mutual commitment of partners and the length of these relations;
- shape determined by market, hierarchical order or loose framework contracts.

In market relations, transaction costs will stem from finding partners and information about them and a formation and execution of a contract with stress on securing parties interests. In hybrid (co-operation) relations,

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transaction costs will raise due to difficulties in acquiring information about co-operation partner, costs related to performance and management of the cooperation subject and cooperative relations (e.g. monitoring, organisation, controlling) and possible difficulties of contract execution (due to its loose framework but complex character). In hierarchy/ pooling transactions the main burden of costs will be associated with internal management.

While TCT gives explanation why particular relations evolve within and between economic entities and what kind of costs and risks they carry, it does not bring clear answers how they should be shaped/ managed in order to use them as a source of long-term competitive advantage. IORs are perceived here as the outcomes of certain economic decisions aiming at long-term value maximization, but not as the causes and sources that can raise this value over time. Another big drawback of TCT body of literature, yet being diminished recently, is too shallow reflection over an institutional impact on economic performance of enterprises (and thus on IOR's shape, strength and influences). Paradoxically, TCT is a part of the new institutional economics, that analyses institutions and their impact on economic behaviour, and when supported by institutional theorists' reflections, it gains a lot in explanatory value.

Similarly to TCT, IORs are perceived as outcomes of external factors in the market power theory. Co-operation is treated here as the alternative form of co-ordination and composition of company's value chain, chosen as the best result of costs and environmental factors' analysis. What differentiates these two perspectives, is the stress on possible gains and costs of co-operation or coalitions. Co-operation allows for risk reduction, economies of scale or pooling and sale of knowledge, competencies that are created and internalized in IORs. The costs of co-operation include coordination and mutual adjustment of the partners, risk of cheating, information, knowledge outflow, or even conversion of competitive power between the partners. The shape, nature and management of IOR in this stream is also (like in TCT) somewhat neglected; they are necessary to build effective co-ordination structures, they can be either offensive or defensive, aiming at mutual learning or piggy-backing, but the way they are built and developed in order to support, enhance or ruin certain co-ordination structures remains a black box here.

Game theory describes economic actors' behaviour patterns in social situations (called games here) involving two or more entities, having different goals but interdependent or interconnected interests. Cooperative relations are treated as an outcome of players' behavioural optimal choices between

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either competition or cooperation. Companies compare the consequences of cooperative and competitive behaviour to create successful strategies based on a chosen dominant approach or flexible coupling of cooperation in one sphere with competition in another (Nalebuff & Brandenburger, 1996).

Real options theory (used in strategic management), concentrates on explaining why a company should (or should not) make certain investments in developing assets due to planned growth. Companies should create their future potential accordingly to changes in their market situations and bundle of information they have. Both organizational structure and assets structure of a company should be flexible to meet challenges occurring in turbulent and hardly predictable environment.. Real option is an investment in existing assets, that give firm's managers discretion to decide about their exploitation in order to achieve firms goals and profits. Internal (hierarchical) and external (market and hybrid) growth methods are treated as alternative investments of different risk to profit ratio. Rational choices between options, (e.g. to invest in building new own factory or to co-produce new product with a partner and invest in mutual process integration) decide about preferred ways to grow in certain market conditions. Involvement in inter-organizational relations is seen as a kind of investment giving company a chance to increase its profits and market value. Some authors point out that real options theorizing is somewhat cynical treating partnerships more like cheaper and less risky way to gain firms goals, while e.g. traditional cooperation theory concentrates on positive thinking and states that cooperation is a mutual commitment regarding strategy bringing profits for all involved partners (Faulkner & de Rond, 2005, p. 17).

**Inter-organisational relations as a result and reflection
of environmental conditions**

When we divert our interest from the question why certain types of intra- and inter-organizational relations arise and develop, into examining what influences their content, durability or effectiveness, TCT, real options' or market power theory do not offer a comprehensive answer, (even though we can learn some of their traits like length, type of costs involved, market conditions which give impulse to their rise and development). We can learn a lot more of their shape and nature from power – dependence theory or contingency approach to study organizations, as they take into account the social component of IOR, lying either in the composition of

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environment or depending on certain resources of entities entering into a certain relation.

To start with, we will examine institutional approach to studying IORs and define institutions (after D. North) as formal rules, informal compulsions and ways to impose and enforce them (North, 1986, p. 231), but they are also called “hardened preferences” (Riker, 1980, pp. 432-446), “rules, procedures and arrangements” (Shepsle, 1989, pp. 131-147), or “principles which define how one should act and what is forbidden” (Ostrom 1986, pp. 3-25). According to the new institutionalists of the organizational theory, institutions are macroabstracts of rationalized and depersonalised recommendations (Powell & DiMaggio, 1991, p.15) and they originate from certain scripts of behaviour, categorizations or rules, not necessarily rational but becoming ingrained, and then institutionalised when repeated without any reflection.

Despite the differences, all definitions emphasize a significant impact of institutions on economic performance. Institutions (both external and internal, within the organization) create a tunnel which restricts full rationality of economic actors (Simon, 1987; Stępień & Szarzec, 2007), influence their performance together with shaping IORs and any outcomes of economic actions.

Despite the agreement about the impact of institutions on economic performance, there are big differences among institutional theoretical fractions, concerning the question how strong this impact is. For example, according to TCT and the theory of public choice, institutions originate from logical reasoning aiming at optimization, so economic performance influenced by institutions can diversify the strategy the goals are achieved, but will not disrupt its economic logic. Quite different is the approach of economic historians to this interplay between institutions and economic performance. Institutions, being socially embedded and therefore persistently lengthy, deteriorate in time; the quicker and more drastically, the more turbulent environment is. Due to social embeddedness, legacy and change persistence, economic effectiveness of institutions remains questionable, thus they can blur or mislead economic performance and outcomes.

This difference in the (either rational or social, cultural, historic) nature of institutions and its impact on economic performance is also reflected in the way IOR are perceived and analysed.

In the public choice theory inter-organizational relations result either from obedience or legal (or illegal) avoidance of existing constraints, but economic actors are self –determined and can efficiently cope with these

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restrictions. To juxtapose, the institutional organisational perspective shows an economic actor as a passive individual entangled and bound by environmental regulations, striving for legitimization in its desire to adapt to external rules (Lotia & Hardy, 2008, p. 370). Adhering to routines, duplicating patterns or favouring institutionalization often leads to structural inertia (Hannan & Freeman, 1984, pp. 149-164; Podolny & Stuart, 1995, pp. 1224-1260), as changes in performance (and in IOR) occur rarely and rather creep than step. Revolutionary, fundamental changes in economic performance (and IOR) are possible, but only as a response to major revolution or institutional breakdown (Stępień, 2001, pp. 53-71).

The perception of IORs depends also on the type of institutions we analyze. New institutional economists concentrate mostly on formal institutions (e.g. regulations concerning the freedom to conduct economic activity, tax systems); their content, stability, executing power and overall ability to lower transaction costs (North, 1992, pp. 477-478). The more stable the institutional framework, the stronger social confidence in the state and in business partners, the more efficient and lasting IOR can be: they embody social trust, bear less informational misinterpretation or shirking and allow co-operation partners for innovative business development.

By comparison, researchers developing the new institutionalism in the organisation theory put emphasis on informal institutions and their impact on IORs structure and dynamics. Only these formal institutions that originate from informal set of rules, reinforce social approval and stability (Grannovetter 1985; Uzzi 1997; Kenis & Knoke, 2002; Rooks et. al. 2000). Building effective and long lasting IOR requires convergence of both formal and informal institutions, that stem from social trust and are strengthened by political stability and transparency. Social capital can then be developed in order to minimize transactions costs and temptations to behave in opportunistic manner (Gulati, 1995; Gulati & Sytch, 2008; Gulati & Singh, 1998).

To sum up, institutional analysis offers better understanding how the outside rules of game shape the content, length and effectiveness of IORs, but can be hammered as environmental determinism. In order to balance the criticism of this perspective, the resource dependence theory can be analysed, as internal perception of environmental pressures and its consequences on IORs.

Resource dependence theory views IORs as organisation's reaction to either internal or environmental pressures, caused by power imbalance (Pfeffer & Salancik, 2003). The power itself is generated from three main ana-

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lytic sources: resources, regulations and networks (Knoke & Chen, 2009, p. 443). Environmental forces (like state imposition of certain acts, powerful stakeholders, competitors' networks etc.) may limit organisation's autonomy and profitability and exert their power on organisations internal processes. IORs are responses to power-related problems, built to modify power relationships between organisation and external forces (Huxham & Beech, 2009, pp. 556-557). They are means to gain power and are themselves resources that combine both material and social capital in a certain (most desirably – optimal) way, substantiated in internal and external routines. Forms, mutual interdependencies, dynamics of IORs are analysed in power-dependency theory, but the main focus is put on their ability to neutralize environmental constraints (Casciaro & Piskorski, 2005, pp. 167-199). This ability derives from resources (possessed or controlled by an organization), obtained through investment, self-development or participation in IORs (Pfeffer, 1992; Knoke & Chen, 2009, pp. 446). The value and competitive power of a resource rises with its: ability to reduce costs and differentiate the portfolio of a company; uniqueness (measured by rarity and external demand) and the difficulty to duplicate them by competitors (Godfrey & Hill, 1995, p. 520).. The value of IORs (as co-opetitive forms of organisation), is relative and different for each partner, since it depends on the partner's ability to effectively utilise them (Sulimowska-Formowicz & Stępień, 2014).

To summarise, power – dependency theory perceives economic entities as open systems exchanging resources and building external ties, that shape their competitive power through:

- creating and managing valuable relational competencies that shape outstanding IOR - the source of power comes from the ownership of knowledge and the competence to build and manage such IOR,
- controlling IOR - the source of power comes from the ability to control relations, which were not necessarily created by a given entity,
- having formal authorisation to create the rules of the game within certain environment, and therefore the power to create favourable IOR,
- having informal authorisation to create both the rules of the game and IOR.

From a point of view of contingency theory, IORs may be seen as alternative structures of firm's activities in given context. Structural contingency means that organization has a plan how to organize its internal value chain and its external connections in order to assure the best fit and adaptability to changes necessary for successful operation in a given business environ-

ment. Structural contingency is affected by a set of external and internal determinants - contingency factors. Organizations as open systems interact with environment and adapt to its circumstances by choosing the best structure to both fit to outside conditions and satisfy internal needs . Strategic, structural, technological, managerial and cultural fit (both external and internal) is a key success factor explored in this field and further developed in organizational development theory.

IOR as manageable capital and a source of competitive advantage

Power – resource dependence or contingency theories show IORs as a special kind of resources and ties, which value depends on an environmental fit and a set of relative competencies of the company. The latter diverts our attention into the inside of the organization and provokes the question about the ability and limits of successful management of internal resources.

Business cooperation allows independent organizations to achieve mutual benefits by: resource connection, exchanging and distribution and co-creation of products, services, procedures and organizational processes (Serrat, 2009). Engagement in cooperation is also considered to be a ‘hard times strategy’; the answer for increasing market uncertainty by reliance on trustworthy external partners. (Lorenzoni & Lipparini, 1999). When we take the managerial perspective into studying IORs, using advances of resource based view theory strategic management or relational theories are both promising and useful here, as both fields are developed on the foundation of human ability to actively and successfully manage internal resources in order to achieve the desired goals.

Strategic management theories, perceiving IORs as alternative ways of companies development (compared with usage of internal resources or market transactions) explore motives of IORs creation, problems with choosing cooperation partners, but focus mainly body on creation and development of competitive cooperation structures (Faulkner & de Rond, 2005, pp. 4-16). IORs, perceived as potential source of a competitive advantage, can be then effectively managed by partners through creating common governance modes and conditions for inter-partner learning and by companies themselves in order to gain individual advantages from the partnership.

Efficient long-term inter-organisational relations should positively affect not only the profitability of partners, but also the quality of their competitive power by improvement of their: products, technological chains or

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increasing partners' knowledge, competences related to the subject of cooperation and skills in establishing, maintaining, and developing long-term business relations (Hansen & Schaumburg-Mueller, 2006, p. 12). Cooperation effectiveness and efficiency is influenced by factors coming from the environment - partners' home markets and the arena of partnership, related to transaction attributes (information asymmetry, asset specificity and differences in bargaining power) as well as connected with firms' characteristics (cooperative capabilities and trustworthiness). By managing these factors (some of them remain beyond firm's control) cooperation partners try to reach their business goals, what means they try to maximize the gain from the relationship and minimize its cost. The latter means efforts made in order to balance formal and informal governance methods preventing opportunistic behavior (Hansen, et. al. 2008).

Resource based view concentrates on factors determining the success of cooperation strategies. The assumption is that cooperation can create such competitive advantage for partners, that could not be achieved independently (due to bigger costs or longer time required) (Madhhok 2005, p. 77). IORs are means to get the access to partners' resources, internalize them and build the competitive advantage out of this access. In order to make IORs lasting and effective partners have to build mechanisms that secure their interests, allow to manage relations smoothly and effectively by creating synergy effects. Within the organizations, soft, dynamic, systemic and multi-structured relational competencies (reflected in social capital and organizational knowledge) have to be built in order to create, monitor, develop, sustain, and cease cooperation together with enhancing the possibility to absorb external knowledge, competencies, information etc.

Contrary to RBV, a relational view assumes that the main source of competitive advantage are not the resources acquired through cooperation, but IORs themselves (Dyer & Singh 1998; Gomes-Casseres 1994; Smith, et. al 1995, Lavie 2006). Relations, networks are valuable resources (as potential sources of sustainable competitive advantage), as they embody social capital, relational competencies and condition the absorption of information and knowledge.

Network approach, adopting this view builds on practically all above mentioned theoretical findings, although it is not a cohesive set of theoretical streams (Hakansson & Snehota 1995; Ford & Hakansson 2002;). Depending on the paradigm, studying IORs can be driven by; rational choices reflected in an economic stream of thought (they result from transaction costs or power imbalances); organizational outcomes (and then IORs stem

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from structures and procedures inside companies but transformed by environmental pressures) or individual traits of actors involved in the cooperation (due to their genes, experience etc.). The focus is put on detailed descriptions of network and relations content and types, partner selection topics and endogenous network-based processes: Why do organizations choose each other to be partners?, whom do they choose for what purpose?, what are mechanisms structuring relation - social ties type?, what trust building mechanisms are used?, how do corporate practices diffuse in networks?, how do governance structures change?, what is the route of organizational forms adoption among partners? (Lomi et. al. 2009, pp. 322-323). Even though very popular today, with many plots developed here, no consistent theoretical set of rules has emerged clearly yet.

Conclusions

Both economic and organizational perspectives are vital not only to understanding, but also to effective IORs managing in order to convert them into sources of sustainable competitive advantages and fibre for companies' value maximization. In spite of some areas where economic and organizational approaches are contradictory (in the perception of the level of bounded rationality of economic entities, the strength of institutional impact, the source of competitive power IORs possess and carry) they supplement and enrich the relational analysis by stressing different aspects of their creation, dynamics and performance.

Economic thought, although not answering in detail how IOR should be shaped and managed in the era of global environmental turbulence, has built unquestionably useful grounds for determining optimal structure and governance mode of intra – and inter-organizational relations, and highlights their environmental dependence (arising either from institutional impact or power imbalances) and embeddedness in company's structure, knowledge and social capital.

Academics representing organizational sciences do not always take practical, managerial approach (even though they heavily lie on and employ social sciences advances in their IORs research), as some concepts perceive organizations as entangled with environmental constraints, or disempowered by internal structural inertia.

Each of the theories reviewed here shows certain limitations – especially in the light of efficient IOR management and by doing so, defines its boundaries. In order to push these boundaries forward and increase the

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probability of successful IOR management, it is vital to look on relations between enterprises from many theoretical perspectives, as each theory focuses usually on one or few different aspects while overshadowing remaining areas. IOR are complex artefacts and cannot be sufficiently explained only by one, no matter how well developed theory. By the same token successful IOR management requires tools that are built with careful usage of economic, sociological, psychological and anthropological theoretic achievements. We also have to remember, that persistence and development of inter-organisational relations blurs the boundaries of organisations involved in such interplay, but it does not necessarily makes the IOR management more difficult. Acquiring experience and building trust together with learning various types of relational boundaries (like economic, political, functional, time, cultural constraints etc.) (Williams, 2006) makes IOR management easier despite the fact that the action takes place on the verge of control.

In the table below, we summarize the above review of selected economic and organizational perspectives on IORs analysis, together with shedding some light on their usefulness and areas, that remain further investigation.

Table 1. Theories studying inter-organizational relations – their insights and limitations

	Theories	Focus on	IOR as:	Limitations/ Questions remaining
The reason why IOR are created and are shaped accordingly	1) TCT 2) real options theory 3) market power theory 4) game theory	1,2,3) outside conditions/ rational economic choices 4) actors' behavior optimization in certain game context, due to maximum profit gaining	1) Outcomes of companies goals and both internal and external conditions; 2) set of IORs as a portfolio of real options for assets that may or may not be invested in 3) IORs structure, length and strength reflects the governance structure determined by transaction costs minimization 4) Result of calculation when cooperative behaviour should prevail self-interest	The level of control (and managerial feasibility of IOR is belittled due to the framework contracts and high risk of such relations, IORs treated as investments, not social interactions IORs are created as outcomes of both economic and political (power imbalances) choices, but the grounds of IORs can be of social or psychological nature. The question - how to ensure maximum profit of cooperative relation – still remains open

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Impact of environment on IOR shape, length and effectiveness	<p>1) institutional economics (TCT, historic school, public choice)</p> <p>2) new organizational intuitionism</p> <p>3) power dependence</p> <p>4) contingency approach</p>	<p>1, 2, 3) institutions, power relations; IORs as reflections of environmental conditions and companies' experience, structure and internal power .</p> <p>4) being fit to external conditions</p>	<p>1,2) institutions determine probability of successful cooperation, to be effective companies should consider smart adjustment to market rules and partner's routines</p> <p>3) IORs as results of power imbalances and tools to gain the power over external actors</p> <p>4). alliances and coalitions as a means for best situational and structural fit to environment conditions</p>	<p>IOR depend heavily on the proper understanding and adjustment to the given set of rules in a certain environment, IOR embedded in social structure, difficult to control and shape, not necessarily result of rational choices</p> <p>No clear answer how to create and manage IORs in order to make them cohesive, environmentally fit and efficient at the same time.</p>
IORs as source of competitive advantage	<p>1) RBV incl. knowledge based view, relational view and dynamic competences approach</p> <p>2) Strategic management</p> <p>3) Network analysis</p>	<p>1) Resources' composition and value added thanks to cooperation (relational rent - advantage gained thanks to relational embeddedness) and dynamic relational competences</p> <p>2) methods to achieve goals with IORs usage, critical success factors of relations' effectiveness</p> <p>3) structure, composition of ties, insights how to compose them effectively.</p>	<p>1) unique resources (dynamic, relational competencies) as a source of sustainable competitive advantage, access to inimitable, path dependent resources as a main motive to cooperate, being a part of broader network of relations and profit from partners' interdependencies.</p> <p>2,3) IORs as sources to gain external knowledge, power, strengthen position in network of IORs</p> <p>3) Embeddedness in network via IORs as a source of relational advantage - relational rent</p> <p>Explains why actors form ties and also with whom they do that, and how IORs lead to informational and control benefits</p>	<p>1) Relative competencies are "hidden" in social capital in the whole structure of the company, depend on specific, selected sources and determinants of IORs success – so the main problem is to find them and manage accordingly</p> <p>2) No general rule, no systemic set of general guidelines for successful inter-firm relation, lots of propositions but all of them shall be adapted to relation - specific context</p> <p>3) Many plots raised, discussed, highlighted, lack of synthetic approaches and recommendations</p>

Source: own work.

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**Assessment of the Performance
and Competitiveness of the Selected Clusters in
the Moravian-Silesian Region**

JEL Classification: *M1; M14; M21; L62; F6; R10*

Keywords: *cluster; competitiveness; performance; BEE model; Moravian-Silesian Region*

Abstract: In recent years have been recording the number of sectorial clusters of firms and their links with a research and academic sphere unprecedented prosperity in the Czech Republic. The trend and popularity of clusters in regions are considered as an important source of competitive advantage of given locality. In particular SMEs can in this way overcome a certain weaknesses of this type of business and strategically use of so-called synergistic effect. Many times, it was stressed to be SMEs as the foundation of any economy, but they do not have the necessary economic force. These problems help to remove specific form alliances – the cluster. The competitiveness of regions goes hand in hand with support for cluster organizations. Clusters are perceived as modern and well-defined type groupings of entities from certain industry or field. The aim of this paper is to evaluate and assess the efficiency and competitiveness of selected cluster groups in the Moravian and Silesian region. The partial aim is a generalization of international methodologies for assessing the performance of clusters and linking this methodology with the basic principles of competitiveness evaluation. On practical example will be applied Porter's diamond combined with the EFQM model and Cluster Management Excellence methodology. The outcome of the paper will be the evaluation of cluster initiatives. There will also be proposed basic precautions that should lead

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to the desired performance level of international excellence cluster. For the selection of appropriate proposals will be used the multi-criteria decision analysis, to identify those measures that are currently most advantageous for the cluster.

Introduction

In recent years have been recording the number of sectorial clusters of firms and their links with research and academic unprecedented prosperity in the Czech Republic. The trend and popularity of clusters in regions and micro-regions are considered as an important source of competitive advantage of given locality. As Stejskal (2011, p. 13) interpreted, the regional policy objectives is "balanced regional development with regard to their economic and social potential."

In particular SMEs can in this way overcome certain weaknesses of this type of business and strategically use of so-called synergistic effect. There comes to multiplying the power of individual participating companies from the SME segment and mitigation, respectively elimination of some major negatives of their development. Many times it was stressed that SMEs are the foundation of any economy, but do not have the necessary economic force, high administrative burden acts on them and still persists difficult access to capital in many cases. Inalienable fact is the weak positions of SMEs in public tenders. These problems help remove specific form alliances - the cluster.

The competitiveness of regions, hence the entire national economy, goes hand in hand with support of cluster organizations that are supported, among others, by public funds. Clusters are perceived as modern and well-defined type of groupings of entities from certain industry or field. The existence of clusters opened the possibility of support for these sectors and increase their efficiency and competitiveness.

The aim of this paper is to evaluate and assess the efficiency and competitiveness of selected cluster groups in the Moravian-Silesian Region. The partial aim is a generalization of international methodologies for assessing the performance of clusters and linking this methodology with the basic principles of competitiveness evaluation. On the practical example will be applied Business Environment Evaluation model, the BEE model which combines the principles of Porter's diamond with the EFQM model and Cluster Management Excellence methodology. The outcome of the paper is the evaluation of cluster initiatives in the Moravian-Silesian Region on the basis of this evaluation and assessment of its competitiveness

according to the chosen methodology. There will also be proposed basic precautions that should lead to the desired performance on the level of international excellence cluster. For the selection of appropriate proposals will be use the multi-criteria decision analysis to identify those measures that are currently most advantageous in term of use of market opportunities and its economic benefits.

Clusters and cluster initiatives

Clusters are the types of network business, which has experienced in the past ten years with a significant expansion. Business network is considered the interconnection of complementary businesses, within which businesses together to create the final product, and they can, for example, cooperate on research and development to create common logical solution build by the distribution network, also after-sales service in a situation where they remain independent businesses (Pavelkova, 2009). Networking for business growth must be strategic and focused. Not everyone can help to move business forward, but everything can be driven by the intention to grow the business.

Networks, respectively the clusters are primarily intended for clustering and networking of small and medium-sized companies in order to support the growth of their competitiveness, we must remember this one very important fact. In connection with the generally perceived opinion, that these small and medium-sized enterprises are the backbones of Czech, respectively European economies. We should also mention the reasons why these companies are looking for business networks. These reasons described Kolečák (2004), the primary reasons for the creation of business networks are a desire of companies to achieve an increase in the value of products, cost-sharing, or competitive forces reduction.

Therefore, in connection with the network business is a meeting and talking about the formation of the so-called Hollow and virtual businesses. These businesses focus their processes on activities that add a high value added. This type of enterprise respectively the Hollow enterprise Mikolas (2005) interprets as the company, which is broken down into sub-bundles, with its own potential, which leads to a condition as we are talking about the so-called enterprise management, or intra business. An earmarking and outsourcing of individual identified activities and focusing on activities that add high added value leads to higher business efficiency, so it describes the Hollow enterprise.

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Conversely, a virtual company itself already represents a huddle of mutually reinforcing businesses that join together to collaborate frequently on clearly defined period of time, to ensure existing orders or to achieve certain goals. Synek et al. (2011, p. 246) define the virtual enterprise as "phenomenal specific forms of corporate networks, namely dynamic networks, because they are set up temporarily and changes its structure in relation to the problems, it is the sort of structure formed ad-hoc and temporary." The business network in the form of clusters is often also referred as the so-called sectorial group of companies and it is important for us to see all their specifics, including their understanding of the current economic environment.

"Principles of economic states that industries often are locally concentrated and gain significant benefits from externalities, such as economies of scale and" knowledge spill-overs "arising from these concentrations." (Studenikova, 2011, 62 p.) The very interconnectedness especially industrial enterprises by Marshall brings with them "localization economies" and as their primary reason for establishing are the natural conditions in the form of climate, mineral resources, soil, etc.

There are many definitions of clusters, among the most concise definition include Porter's definition when he says that Clusters are geographic concentrations of related industries and associated institutions. The agglomeration of related economic activity is a central feature of economic geography. Cluster definitions are groups of industries related by skill, technology, supply, demand, and/or other linkages. This paper focuses on regionally comparable cluster definitions (i.e. the industries that constitute a cluster (e.g. Biopharmaceuticals) are the same for all regions). Inter industry linkages are identified through the co-location patterns of industries across regions or with a range of national data available across industries. The identified linkages are used to group industries into a set of defined clusters, allowing clusters to be compared across regions.

Another definition, which is important in terms of the concept of clusters for the purpose of this paper, is to define the clusters according to CzechInvest agency, where the cluster conceived as "a set of regional affiliated companies (entrepreneurs and associated institutions and organizations - especially tertiary education institutions (universities, colleges) - whose links have the potential to strengthen and enhance their competitiveness."

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For the purposes of this paper are therefore seen as clusters group of interconnected entities in a particular sector and in geographic clusters, which means close ties strengthen and enhance their competitiveness, hence the performance.

If we would like to deal with the cluster's performance, it is necessary to perceive the concept of cluster initiatives, where "Cluster initiatives are organized efforts to increase the growth and competitiveness of clusters within a region, involving cluster firms, government or research community. These initiatives over the past ten years become a central feature of microeconomic policy linked to industrial policy, regional policy, for SMEs, FDI attraction, and research and innovation policies." Sölvell, Lindqvist and Ketels (2006, p. 16)

Clusters and their benefits in regional policy

Clusters in recent years become one of the instruments and means of promoting regional development and competitiveness. For this reason, the clusters become part of not only regional policies, but also policies at the state level respectively Czech Republic, respectively the European Union.

Clusters are groups of interconnected companies, which together cooperate to strengthen and increase their competitiveness, including e.g. the development and support of research, development and innovation in the sector. Sölvell, Lindqvist and Ketels (2006, p. 20) confirm the hypothesis that functional clusters are carriers of economic growth state that "clusters offer a fertile ground for innovation and improving the competitive advantage of companies." In this context Sölvell, Lindqvist and Ketels (2006) give the idea that there are at least three very strong arguments proving the claim that innovation and modernization are directly related to the existence of clusters. Among these arguments then are: the need to reduce technical and economic uncertainty, the need for constant and continuous collaboration and cooperation between companies and specialized institutions, which belong to research and educational institutions, including universities, and the need for contact and interaction of the exchange of information on new findings and knowledge in their respective fields.

In general we can say that clusters are primarily the concentration of small and medium enterprises (SMEs) that make up these clusters in small and large economies. Mynarzova (2014) on this subject states that clusters represent a different way of organizing of economic activities and the perception of the economy, where is often very difficult to draw the bounda-

ries of the cluster. These boundaries of the cluster should thus include all firms, industries, and institutions with strong ties horizontal, vertical or institutional, as part of clusters are often classified in different categories of industry and services.

CzechInvest (2007) defines the basic principle of economic development based on a sequence of innovation - productivity - prosperity, which is the basis of the process in the relations between private parties, particularly the business sector and the State, as the government and universities. In this environment it is being called a cluster, "Connecting link" between relevant stakeholders.

From the above-mentioned it is clear that clusters are currently gateway for clusters, respectively organizations, which significantly help the development of regions and are one of the remarkable features of regional policies. This confirms the reason Kloudova et al. (2010, p. 39), which identifies clusters of creative clusters, whose address says, quote: "A cluster is very important for the development of the creative economy and unites both private and public activities and assists in the development of a creative city or region and is able to pass a creative idea."

Clusters and their importance for competitiveness

The influence on increasing competitiveness clusters is generally indisputable. The basic economic effect of clusters is their influence just on business competitiveness, regional extension states. This fact also indicates Pavelkova (2009, p. 27), and further asserts that: "Clusters allow to stimulate the economic growth of national economies through increased competitiveness and performance of businesses, encouraging innovation, including more efficient use of research and development, support for new businesses attracting foreign investment, increasing exports and influencing employment in the region."

The competitiveness of firms, which supports cluster is derived from competitive advantages. These benefits are shaped by the activities of the companies in their presence in the market and are often closely related to the level of innovation respectively level of activity of these companies in the field of research and development. Here again, the clusters will play a significant role as primary actors initiate the process of research, development and innovative activities and projects. The important role of innovation is also confirmed by Stejskal (2011, p. 28) argues that innovation is just "way to increase the competitiveness of companies, respectively the

whole region and that this process is closely related to research and development and new technologies, which are an important factor in the development of the region."

The need to evaluate the performance of clusters, respectively cluster organizations is essentially based on their support of the institutions, public or private. According to the fact that clusters are regional clusters of firms, on the one hand, financed from the resources of these businesses and on the other by the institutions of the public sphere such as government agencies, etc. This idea is also confirmed by Sölvell, Lindquist and Ketels (2006, p. 83), who report that information on the performance of cluster organizations are very important for institutions that fund this initiative, whether they be e.g. the government agencies or private companies, mainly because, and quoting: "to be convinced that their money is used and spent effectively."

Methodology of the research

For practical application has been created new model Business Environment Evaluation model, so-called BEE model. The emergence of this model has been used widely applied methodology for the evaluation of the competitiveness and assessment of the clusters.

Porter's diamond is a model used as a part for the strategic analysis stage of the strategic planning process. Porter's diamond describes and analyses the environment or branch of the organization, in this case the cluster and its members. This model identifies the competitive advantage and as stated Stejskal (2011, p. 47) out of it, "identifies factors interrelated influences by which firms achieve competitive." In this model, we follow four basic factors, which are: the business strategy, the structure and rivalry, the terms of input factors, the demand conditions, and the supporting and related industries.

The second model from which the model BEE has been created is based on the EFQM. Applied methodology for evaluating the performance of the cluster, respectively the quality of its management is based precisely on the basic elements and principles of the EFQM model. This fact close ties between the EFQM model and method of benchmarking confirms Lang (2007, p. 235), which states: "The quality of this model can be used versatile, self-assessment, evaluation of third parties and as an indicator of the benchmarking. The EFQM Model promotes benchmarking through the creation of expert discussions and working groups. "The Czech Society for

Quality adds that: " The EFQM Excellence Model is a practical, voluntary framework that enables organizations to: assess where they are on the road to excellence, develop a common vocabulary and way of thinking about the organization to facilitate effective communication of ideas both within the organization and outside, to unify existing and planned initiatives while removing duplication and identify gaps and prepare a basic structure for the organization's management system."

The Cluster Management Excellence methodology is based on the EFQM model. The Cluster management Excellence primary objective is to evaluate the quality of the management of the cluster and helps to achieve its international cluster of excellence, respectively competitiveness and the competitiveness of its members, that also confirmed Svobodová (2013) which states that this model currently places great emphasis on targeted change management within the organization, including the strengthening of its flexibility, sustainability, risk management and the ability of the organization to prove rationally, systematically and quickly identify opportunities to achieve its development and growth.

For the selection of appropriate proposals using multi-criteria decision analysis to identify those measures that are selected cluster initiative currently most advantageous use of market opportunities and economic benefits. For these purposes, is most often used the Saaty method of paired comparisons. In the design of the method is created the so-called Saaty matrix through which is subsequently pairwise comparison performed.

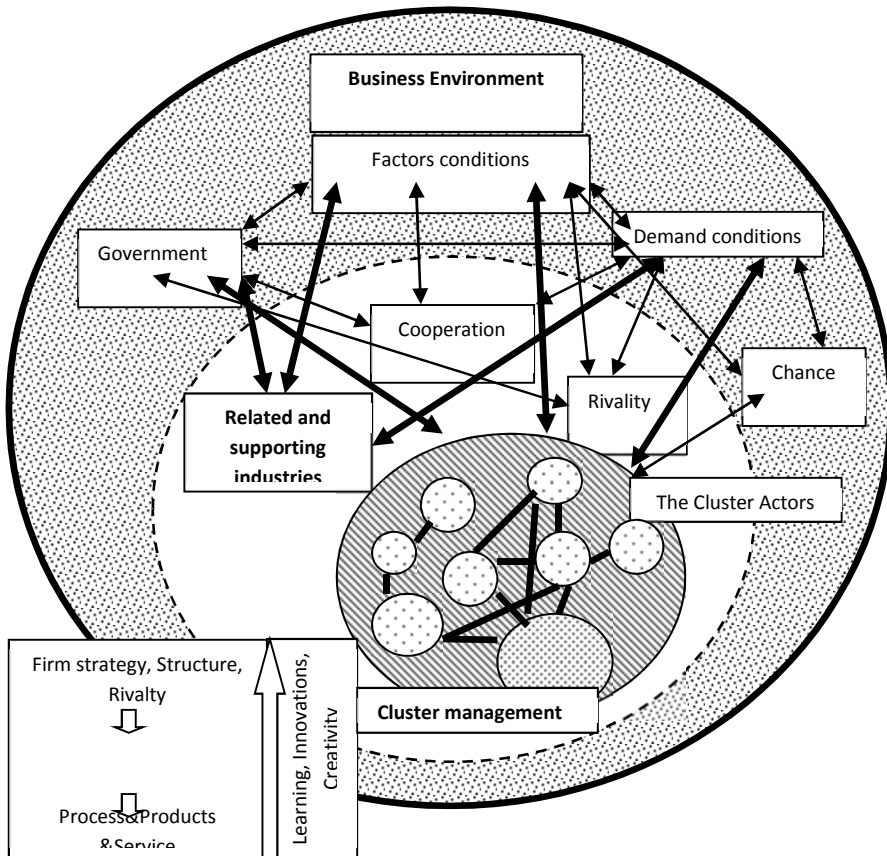
Methodology Cluster Management Excellence is based on the evaluation of the quality management from management, which is considered as the most important aspect of the activities and processes within the cluster, which affects the efficient achievement of stated objectives. This methodology is based on the principles of benchmarking. Furthermore, common standards for excellent cluster management enable better mutual understanding necessary for transnational cooperation between cluster and network organizations and by this are important to promote successful international cluster co-operation, in particular for the benefit of the participating SMEs. The Quality Indicators focus on the cluster organization hosting and operating the cluster management, not on the framework conditions or a cluster as such, as demonstrated in figure 1. The item to be managed (the cluster as such) have to fulfil certain minimum requirements when considering the excellence of its management (certain minimum size, age, etc.). Quality Indicators cover the following dimensions:

- Structure of the cluster (level 2)

- Typology, governance, co-operation (levels 1 and 2)
- Financing cluster organization management (level 1)
- Strategy, objectives, services (level 1)
- Achievements, recognition (level 1)

The simplified model called Business Environment Evaluation Model, BEE model based on the EFQM methodology, the Porter's diamond and the methodologies Cluster Management Excellence was created by the author and is captured in the following figure.

Figure 5. Business Environment Evaluation model, BEE model



Source: own model BEE based on the Porter's diamond, the EFQM model and the Cluster Management Excellence

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The clusters are complex and dynamic structures that are subject to continuous change. The strong clusters can promote economic growth through leveraging the innovation and business potential of a region. New employment opportunities, new products and services, new companies, new R&D activities and new patents can be the result of activities within a cluster. A professional cluster management can contribute to such a development through projects and services that tap into the cluster's potential. The European Cluster Excellence Initiative, initiated by the European Commission DG Enterprise and Industry, developed methodologies and tools to support cluster organizations to improve their capacities and capabilities in the management of clusters and networks. Being members of the European Cluster Excellence Initiative 13 project partners from nine European countries - all well experienced in the field of cluster management and support - created a uniform set of cluster management quality indicators and developed a quality labelling system for professional cluster management with the aim to get this methodology and proof of quality accepted all over the Europe.

The basic characteristics of the region - the Moravian-Silesian Region

Moravian-Silesian Region was established simultaneously with the other 13 Czech regions on 1. 1. 2001, under legislation adopted in 2000. It is located in the easternmost part of the Czech Republic (towards the center of Prague is located about 300 km as the crow flies). If the region is perceived supra-regional, then its location on the border of three countries (Czech Republic, Poland, Slovakia), almost in the middle of a European space which is very convenient. In terms of the Europe, the region located between Vienna, Austria, Polish Silesian conurbation and Slovak, Bratislava. The power of position throughout the region are trying to further emphasize regional actors, who has long striven to link some activities Moravian-Silesian Region, Zilina Self-governing Region and Silesian province in certain activities with a view to creating significant territorial center in a European perspective. (CSO, 2013)

Region currently has an area of 5,427 square kilometers and consists of six former districts and the 22 municipalities with extended powers. In the region there are a total of 300 municipalities, of which 5 are statutory towns, 35 cities and 3 of the township. On 31. 3. 2010 was the state of the region's inhabitants 1,247,373 inhabitants, which was the highest among

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the regions of the Czech Republic. On 1. 1. 2011, the largest city of Ostrava had 3 10,464 inhabitants.

Basic data on the GDP in the Moravian-Silesian Region (Source: Yearbook of the Moravian-Silesian Region 2012)

- GDP at market prices 392,166 mill. CZK
- Moravian-Silesian Region share of GDP in the Czech Republic 9.8%
- GDP per capita 319 249 CZK

In the past, the Moravian-Silesian Region was significant especially in heavy industry, particularly engineering, metallurgy and mining. These industries largely affect the character of the region so far, and to quantify the research and development capabilities, then most of them are associated with large companies in these sectors. In recent years, the region stands out even more promising industry. Heavy industry is being replaced by fields of manufacturing; there is a considerable development of services. Business development in a free market environment has significantly changed the structure of the business. Many restructured companies were bought by foreign investors, local companies, particularly small ones, respectively medium, is evident in the field of information and innovative technologies, electronics and automotive industries. In addition, in the country there is a number of smaller and larger companies that deal with both traditional craft disciplines, so-called high-tech and hi-tech products.

In the Moravian-Silesian Region, there is wide application of new investment projects. There are several differently oriented business incubators (private, university and public) that support start-ups and young entrepreneurs. Domestic and foreign investors are also used industrial areas and industrial zones, which are located in the region of a few whose full the average is about 75%.

**Clusters in Moravian-Silesian Region and application of selected
methods of assessing performance and competitiveness
in terms of a specific cluster**

Moravian-Silesian Region has throughout the Czech Republic a long tradition and experience in strengthening the competitiveness of local industries through cluster cooperation. The cooperation is based on the industry association of businesses, universities and research and development institutions, which are being institutionalized in the form of cluster organizations. There are currently in the Moravian-Silesian region a total of 12 cluster organizations (CzechInvest, 2015), of which the oldest is the Na-

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tional Engineering Cluster, based in Ostrava (founded in 2003 originally Silesian Engineering Cluster) and the youngest among Cluster Green Horizon Association, founded in 2011, also based in Ostrava and dealing with treatment waste for reuse.

For previously outlined analysis was elected Silesian Automotive Cluster. Moravian-Silesian Automotive Cluster c.a. (Hereinafter referred to as MAK) was founded in 2006 to promote innovation and increased competitiveness and export capabilities of interconnected companies, businesses and institutions in the Region. The founding of the company in the beginning especially sought to build a common identity firms in the cluster and the goal was to engender confidence and positive attitudes towards the automotive industry and the entire region. The main objective is the development of the automotive industry through industrial businesses, secondary schools and universities and scientific research institutions. (MAK, 2015)

Sustainability benefits for their members cluster currently actively developing and providing innovative approaches through coordination teams that are focused on the following:

- Developing human potential - working team Human Resources Development (education and development competencies).
- Developing and supporting development activities, testing and metrology - working team for Laboratories and Testing (product testing and supporting for innovation)
- The development of trade and cooperation - working team for Trade Relations (savings funds and opening paths to new markets).

Among the first steps included a study that mapped the automotive industry in Moravian-Silesian Region. Declared benefits for members of the cluster are following:

- Cluster develops and supports innovative projects, processes and products with added value.
- Cluster increases the voice and power of small and medium businesses.
- Companies have a better chance of obtaining assistance co-financed by the Structural Funds and other.
- Promoting civic association members and MAK at home and abroad.
- A member of the cluster gets easier, faster and usually free information from management cluster, supporting institutions and members that as a separate company gained or acquired very seriously.
- Cluster works closely with state organizations:
 - a) The Czech Invest, www.czechinvest.org
 - b) The Ministry of Industry and Trade, www.mpo.cz,

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- c) Regional Office of the Moravian-Silesian Region, www.kr-moravskoslezsky.cz,
- d) The Regional Development Agency www.arr.cz,
- e) The Association for the Development of the Moravian-Silesian Region, www.msunion.cz.

The mission of the cluster is creating conditions and promoting competitiveness members for sustainable development of the region. The vision of the cluster is to become an integrator companies, educational and research institutions and other stakeholders whose activities support the development of the automotive industry in the region.

Values of the cluster:

- People, their knowledge and skills,
- Collaboration based on trust,
- Innovation and Flexibility,
- Mutual benefits (MAK, 2015).

Brief description and analysis of data (selected areas)

The results presented are selected from a larger set of data and results and aims to document and support the newly created model. The Moravian-Silesian Cluster was founded in September 2006, and at the time had 22 members. Based on the age of the cluster can be identified today maturity cluster. It has been shown that the majority of cluster organizations that have achieved excellence were founded in 2002 - 2006. It was in this period, the establishment of the Moravian-Silesian automotive cluster falls.

Legal status (civil association, today the Association) is the most common form of legal form clusters in the country.

It currently has 66 cluster members, in the category of educational and other 8 members are classified into categories of R & D is included 11 members, other categories are as follows:

- TIER 1 10 members,
- TIER 2 12 members,
- TIER 3 12 members,
- TIER 4 13 members.

If we focus on the aspect of financial resources Silesian automotive cluster is pumped 53% of public funds, 27% from private sources, and 20% from their own resources.

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When analyzing the use of regional growth potential were determined to be approximately 20% of the number of changes in cluster membership in 24 months, and 35% of the value of the ratio of the number of cluster members to the total number of potential regional cluster members. Based on the results it can be concluded that the cluster despite the relatively long period of existence must constantly seek potential for its development. The analysis was studied further corporate governance cluster. Based on the results, it can be concluded that the administration and management of the cluster are at a level that can be as strong.

In the area focusing on technology development and transfer information cluster perform many activities that are implemented by each working group. The purpose of these working groups is to implement projects - in 2014, for example. Automotive without borders - and through individual projects implement the strategy of the cluster - see above. From this perspective, the cluster achieves results at a very high level. Among individual cluster members for regular exchanges of information and there is a strong support for the exchange of experiences. Also in this area are achieved very good results. To a large extent leads to the use of modern communication technologies. Human resources development is not declared in the strategy of the cluster, but is also continuously implemented. The results are noticeable in particular in the field of cooperation with academic sphere.

Within the application of multi-criteria of a decision-making, as the first step in the decision-making process, there was the evaluation establishment of the criteria and the weight of their importance. The method was used for the pairwise comparisons using a nine-point scale (according Subrt, 2011, p. 174). Calculations weighting of the criteria were subsequently used within the structure of the final table with the results of decision analysis with respect to the proposed recommendations. To formulate the concrete recommendations of AHP method was used, which allowed to decompose the problem into individual sub problems and then to work individually with each evaluation criteria. The criteria (recommendations) were chosen as follows (an excerpt):

- Determining the strategy for the period 2015-2020.
- Creation and development of products and services.
- Targeted support cooperation between cluster members.
- Strength and stabilization of the membership structure of the cluster.
- Creating a concept plan for financing cluster.
- The concept of monitoring the satisfaction of cluster members.
- Stabilization of cluster membership structure.

- Increased cross-border cooperation of neighboring regions.

The results of the evaluation of the biggest benefits of highest priority was assigned to implement the recommendations out a strategy for the period 2015-2020, followed then the targeted promotion of cooperation between members of the cluster concept and monitoring the satisfaction of cluster members.

Based on the analyses clearly showed recommendation regularly monitor individual elements affect the performance of the cluster not only one or a few selected methods, but on the basis of a comprehensive approach. Such may be e.g. the proposed BEE model, the Business Environment Evaluation model, which includes both the parameters and objectives Porter's diamond and characteristics and objectives of the EFQM model and the nature of the Model Cluster Management Excellence.

Conclusions

In the context of increasing global competition and the pursuit of each company to achieve the highest performance, it is important to find a competitive advantage, to this end can also occur through cluster initiatives and streamlining the functioning of the sector. Businesses are exposed to global pressures of globalization and the need to evolve a great effort to maintain competitive advantage, which is absorbed by the market. One option for gaining competitive advantage is therefore their involvement in the cluster. Successful cluster initiative enhances the performance of participating enterprises and drives economic development across sectors and regions.

Performance evaluation of clusters and individual companies involved in cluster initiatives is possible using a simplified model Business Environment Evaluation model. The advantage of this model is to link three main methodologies for assessing the performance of clusters and the cluster model Management Excellence, the EFQM model and the Porter's diamond. Another positive aspect of this BEE model, Business Environment Evaluation model, can effectively use the cluster initiative itself, or individual players cluster initiative. It is one of the ways to assess the performance of cluster initiatives and their members without hard financial indicators. The weakness of this model is the same as the other models, subjectivity analysis and asymmetric information. These two weaknesses can prevent plugging of objective evaluators to process applications of the Business Environment Evaluation model.

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Corporate Reputation and Customer Loyalty as the Measures of Competitive Enterprise Position – Empirical Analyses on the Example of Banking Sector

JEL Classification: *G21; L14; L25; M31*

Keywords: *reputation; customer loyalty; competitive position; banking sector*

Abstract: In order to determine the competitive position of a company not only the traditional measures of market position (market share) and financial position (financial ratios) are used but also the qualitative measures concerning intangible resources. Customer satisfaction and customer loyalty are the two most commonly applied qualitative measures. Due to the growing importance of intangible resources, and of reputation in particular, the need arises to use the reputation indicator as a measure of competitive position in achieving a long-term competitive advantage and building the enterprise value. The purpose of this article is to identify the competitive position indicated by the level of corporate reputation in comparison with the customer loyalty indicator and the most popular traditional measures based on the example of banking sector. For calculation of qualitative measures the method of survey was used, conducted among the retail banking customers. The study showed a weak relationship between reputation and loyalty: the banks that received the highest ratings of reputation, obtained the poorest results in terms of loyalty. Due to the limited subjective and methodological scope of research, the results cannot constitute a sufficient basis to prove this thesis, however, they may constitute a good starting point for conducting broader research in this area.

Introduction

The essence and natural objective of enterprises' competition on the market is to lead continuously to outrunning the rivals and obtaining the best possible position in this race. Competition may take place on many dimensions and may concern various aspects of the functioning of the competitive subjects. Each of them may gain better results in one field and worse in others. The enterprise's competitive position is understood as a place that it takes comparing to its rivals in a multi-dimensional space of competition in the particular time (Szwajca, 2012b, pp. 26-27). The competitive position informs about the enterprise's strength and distance in relation with the rivals in the particular aspect of activity, therefore, its retention or improvement may constitute an important strategic goal. A change in the competitive position in the particular time allows estimating whether the appropriate competition strategy was used (Romanowska, 2004, p. 262).

Because of a multi-dimensional character of the field of competition, the competitive position may be determined using various measures, depending on the purpose of the analysis. The classical, commonly used measures of competitive position include the measures of enterprise's market and financial position (Barney, 1997, pp. 36-43; Stankiewicz, 2005, p. 299). The most popular measure of market position is market share (due to markets globalization, partial measures are used the most often: domestic, regional, local market share or relative market share calculated in relation to the main competitors), however, financial position is determined using financial indicators: rate of return, liquidity ratio, debt ratio, activity rate. In connection with a dynamic technical and technological advance of the current information era, a significant measure of enterprise's competitive position in this area is the innovativeness level estimated using quantitative and qualitative criteria (see: Szwajca, 2011; Nawrocki, 2012; Michalak, Jonek-Kowalska, 2013).

In the 90s of the previous century the main building material of a long-term competitive advantage were intangible resources (Gorczyńska, 2009, pp. 55-67), including marketing resources connected with the customer. A resulting change in the behavior of enterprises' strategy into the assessment of enterprise's competitive position caused that two other measures of competitive position started being used as well: customer satisfaction and loyalty (Day, 1997, pp. 62-63; Szwajca, 2007, pp. 519-528). In the recent years one of the most valuable intangible resources of a company has been

considered to be reputation. Strong, positive reputation strengthens loyalty and confidence not only from the side of customers but also investors, business partners, employees, what translates into better financial results (Roberts and Dowling, 2002; Dowling, 2002; Fuente-Sabatè and Quevedo-Puente, 2003; Helm, 2007). For many years reputation indexes have been the basis for the lists and rankings of the most appreciated and admired enterprises (Fombrun, 2007). The enterprises themselves also feel the need for assessment and measurement of their reputations more and more and for comparing it with the competitors' reputation (Kitchen and Laurence, 2003, pp. 103-117). In connection with this, the reputation index becomes the next essential measure of competitive position of a contemporary company. The purpose of the article is to identify the competitive position of the largest banks functioning on the Polish market using two measures: customer loyalty and reputation and their confrontation with the traditional measures: market share and return on equity (ROE). In order to accomplish the purpose adopted, the following research hypotheses are formulated:

H₁ There is a positive dependence between the reputation and loyalty level – enterprises with the highest reputation indexes achieve the highest loyalty rates as well and the enterprises of the lowest reputation indexes – the lowest loyalty rates.

H₂ Market share indicates a positive dependence with the level of enterprise's loyalty, and ROE – with the level of enterprise's reputation.

H₃ Market share still constitutes the most popular measure of general competitive position for the enterprise.

The first hypothesis comes from a mutual dependence suggested in literature and from a mutual assistance of two intangible resources such as reputation and loyalty. Positive reputation consolidates confidence and respect for the company in the customer's mind, and the very confidence creates true loyalty. In turn, strong customer loyalty and faithfulness has a positive effect on the customer's opinions about the enterprise and also on passing them to the other groups of stakeholders, what creates positive reputation.

The basis for formulating the second hypothesis is the fact that strong customer loyalty leads to sales increase and to preferring the enterprise's products, what in a long term translates into the market share increase. Furthermore, the positive dependence among the financial results (profitability) and investors' decisions as well as reputation is suggested by many types of research conducted (see: Dąbrowski, 2010, pp. 239-246).

The third hypothesis is connected with a common stereotype that the position of market leader belongs to the enterprise with the highest market share.

Customer loyalty and corporate reputation as the subject of measurement

Customer loyalty and reputation are listed as the key enterprise's marketing resources of a strategic character. Due to their specific features, that is, valuableness, rarity and difficulty in imitating, they may constitute a source of long-term competitive advantage (Szwajca, 2012b). Moreover, as intangible assets they are not prone to depreciation during their utilization and they also enrich and multiply each other: good reputation builds and consolidates customer loyalty, then loyal customers, thanks to their attitudes and recommendations, create positive opinions about the company in the environment (Obłój, 2001, p. 222).

Loyalty and reputation are interdisciplinary categories, understood in various ways and defined by the specialists from different fields (among others, management, marketing, psychology). The various ways of describing and expressing their essence generate difficulties in their measurement reliability. Many conceptions and methodologies in that matter have been developed until now.

Loyalty, in the marketing approach, is understood as behavior, attitude or relation of attitude-behavior, however, most of the authors support the third type (Śliwińska (Ed.), 2008, p. 15). Therefore, it may be stated that customer loyalty is a relatively permanent attitude based on strong conviction about the company's and its offer exceptionality, manifested in a particular behavior. In case of the customer it is the regularity of purchase and recommending the enterprise to other subject. However, in practice, loyalty measurement is the most often limited to investigating the buyer behavior as it is much more difficult to identify the real motives of such behavior (see: Falkowska, Tyszka, 2006; Caputa, 2015, pp.111-112). In the process of customer loyalty measurement there are three groups of indicators used (Jones and Sasser, 1995, p. 94):

- 1) concerning the attempt of repeating the purchase,
- 2) concerning the basic buyer behavior (that is purchase frequency, amount paid, customer retention/defection rate, time of contacts with the company etc.)

3) concerning additional (secondary) customer behavior (e.g. disseminating information about the company, recommending the company to others).

The base for their calculation are opinion polls. For example, a standard loyalty rate is a percentage of customers who declare willingness to repeat the purchase or recommend the product or the company to others among all the customers surveyed (Kozielski (Ed.), 2004, p. 66).

Reputation is also a complex, interdisciplinary category, ambiguously defined by the specialists from such fields as: economy, management, marketing, sociology, finance and accounting (see: Figiel, 2013, pp. 17-24; Krawiec, 2009, pp. 36-46). It is most often understood as an accumulated opinion about the enterprise, formulated by such group of stakeholders as: customers, business partners, investors, employees, public administration, local society and total society, on the grounds of perception and evaluation of the various aspects of its activity (Walker, 2010, pp. 367-370). Ambiguity in reputation understanding and defining generates difficulties with its reliable measurement, what translates into the quantity and variety of the methods and conceptions developed (Berens and van Riel, 2004, pp. 161-178). Nevertheless, most of them bases on using survey methods, where the respondents are the various groups of stakeholders (mainly customers and employees) or experts on management or finance. In the survey research they express their opinions on the different aspects of activity of the company evaluated.

The longest traditions of reputation measurement belongs to *Fortune magazine*, which since 1983 has been publishing the rankings of the most admired enterprises from many countries and many sectors of economy. The basis for the rankings are the opinions of the executives of the highest management levels and financial analysts, expressed about the nine following areas of company's activity: innovation, quality of management, long-term investment, social responsibility, people management, products/services quality, financial soundness, use of corporate assets, global competitiveness. Another, popular method of reputation measurement is *Reputation Quotient* developed by the Reputation Institute and Harris Interactive - research enterprise, in the 90s of XX century. The respondents are the residents of a particular country who in the first stage of research indicate the enterprises of the most visible (good or bad) reputation, then on the second stage they evaluate their reputation based on 20 features grouped in 6 dimensions: products and services, financial performance, workplace environment, social responsibility, vision & leadership, emotional appeal

(Gardberg and Fombrun, 2002). Another proposal is *Reputation Index* – the instrument created in order to measure and evaluate reputation as one of the intangible assets in the enterprise (Cravens, Oliver and Ramamoorti, 2003). Within the frames of the index there are nine areas assessed (products and services, employees, external relations, innovation, value creation, financial strength, strategy, ethics policy and culture, intangible liabilities) using nine-scale weights for their significance. *Reputation Index* takes into account internal and external information and has a character of an audit, however, the assessment can be made by the enterprise itself or by the external auditors.

Among other, less popular models of reputation measurement, the following may be mentioned: *Corporate Character Scale*, in which reputation is assessed by the customers and employees or *Stakeholder Performance Indicator and Relationship Improvement Tool*, in which reputation may be assessed by the various, selected groups of stakeholders (Dąbrowski, 2010, p. 199).

Methodology of the research

In order to calculate the indexes of customer loyalty and reputation a methodology of measurements was used, based on survey research. A questionnaire method was used, which was aimed at the customers of retail banking. The group of respondents comprised of part-time undergraduate and graduate students from the Faculty of Organization and Management of the Silesian University of Technology from four facilities: in Zabrze, Katowice, Bytom and Rybnik, adult members of their families and their friends who have at least one bank account opened. The sample was selected using the snowball method. The questionnaire was sent to the students via e-mail to the e-mail of the university, along with a request to forward it to one's friends and family. The research was conducted at the turn of year 2013 and 2014.

1428 people took part in the research¹, including 64.3% of women and 35.7% of men. The age structure was as follows: there were 41.7% of people at the age of 19-25, 37.1% at the age of 26-35 and 21.2% of those at the age of more than 35 years old. These were the customers of the following

¹ Over 1800 completed questionnaires were collected but for the purpose of the analysis 1428 questionnaires were chosen among the customers of the seven banks that were most strongly represented. The limit of representativeness was set at 100 customers of a given bank.

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banks: ING BSK (26.6%), PKO BP (21.5%), Pekao S.A. (14.3%), BZ WBK (11.7%), mBank (10.1%), Alior Bank (8.6%) and Eurobank (7.2%). Due to the size of the sample and its relatively low level of representativeness, the research may be considered as pilot research.

The level of bank reputation was determined on the basis of evaluation of the various aspects of reputation, suggested by the creators of the Fortune methodology and Reputation Quotient. Due to the fact that only one group of stakeholders took part in the research – the customers – the choice of those aspects was based on the customers’ perception ability (e.g. it would be difficult for the customers to evaluate the investment attractiveness of the bank). The following aspects were chosen to be evaluated: the quality of services, social responsibility, level of confidence and attractiveness of the bank as a potential employer. In table 1 the questions related to given aspects are presented.

Table 1. The evaluated aspects of reputation

The evaluated aspect	Contents of the question	The scales of responses
Quality of services (price/quality relation)	<i>I believe that the bank offers the products at a price corresponding to their quality</i>	<i>Definitely yes</i> <i>Probably yes</i> <i>Probably not</i> <i>Definitely not</i>
Social responsibility	<i>In my opinion this bank does not operate for profit only, but is also socially responsible (cares about the natural environment, supports charity action, sponsors culture, sport etc.)</i>	
Level of confidence	<i>This bank is a trustworthy company</i>	
Attractiveness as an employer	<i>I would like to work in this bank</i>	

Source: own work.

While calculating the results the percentage of positive answers (‘*definitely yes*’ and ‘*probably yes*’) was taken into consideration.

A second nonfinancial measure – customer loyalty – was calculated based on the identification of two most often included symptoms of loyalty, i.e. tendency to choose the same bank again (*If I had to choose, I would choose this bank again*) and the tendency to recommend the bank to other people (*I would recommend this bank to my friends and family*). The scales of responses were the same as the scales used in relation to the evaluation

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of the aspects of reputation. Based on this, standard, partial and general loyalty rates were calculated. The general rate is the average of partial rates.

In order to identify the position of the leader among the seven examined banks one of the projective techniques was used in the questionnaire – a so-called party game. It involves asking the respondents to imagine that the analyzed banks are guests on a party, where they have to be placed at the table, starting from the host and ending with the guest sitting the furthest from him. The bank that is chosen by the majority of those surveyed as the host is named the leader. Other banks, by the number of times they were chosen, occupy the rest of the places in the ranking.

The competitive position of the banks, calculated with the help of reputation index and loyalty rate, was compared to the market position determined by the market share and to the financial position, described using the ROE indicator. The data to these calculations were gathered from the annual reports for the year 2013 and from the data posted on the bankier.pl portal.

Presentation of the results

Out of the seven examined banks the highest reputation index was achieved by Pekao S.A. (71.6%), however, its advantage over the competitors who took other places, that is: PKO BP, ING Bank Śląski and Alior Bank, is not large. The worst result – 62.5% was achieved by Eurobank. The general index comprises of four partial indexes, relating to the evaluation of the four chosen aspects of reputation (table 2).

When it comes to the quality of the services offered the highest index was achieved by ING BSK (92.4%), followed by Alior Bank and mBank, while Eurobank (87.0%) had the worst result. From the point of view of engagement in social activities, Pekao S.A. was rated the highest, then PKO BP and Alior Bank while mBank (35.2%) was rated the lowest. On the other hand, Alior Bank was considered to be the most trustworthy (96.1%) even though the differences are insignificant in the indexes obtained by the banks that were next in the ranking: PKO BP (95.8%), Pekao S.A. (95.6%) and mBank (95.5%). Eurobank (87.6%) was the rated the lowest here. Attractiveness of the banks as potential employers was the lowest rated of all four examined aspects. mBank (51.1%) was relatively the best one, while Eurobank was the worst (22.1%).

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Table 2. General and partial reputation indexes of the examined banks (in %)

Banks	General index	Quality of services	Social responsibility	Level of confidence	Employer attractiveness
Pekao S.A.	71.6	86.6	68.4	95.6	36.0
PKO BP	70.9	80.9	66.7	95.8	40.4
ING BSK	70.6	92.4	57.3	94.1	38.6
Alior Bank	70.0	88.2	66.4	96.1	29.4
BZ WBK	68.8	86.9	63.2	94.2	31.2
mBank	67.2	87.0	35.2	95.5	51.1
Eurobank	62.5	76.3	64.1	87.6	22.1

Source: own work based on the findings.

Generally, among the analyzed reputation indexes the level of confidence was rated the highest (average of 94.1%) and the attractiveness of the bank as an employer was rated the lowest (average of 35.5%). Such a result seems to confirm the generally existing opinion that banks as financial institutions are considered to be institutions of public trust. Furthermore, a low result of banks as potential employers may stem from the fact of a relatively high indicator of employee turnover in this sector. According to the representatives of international recruitment agencies: Cpl Jobs, Antal Banking & Insurance and HAYS Poland, the highest turnover relates to sales posts related to customer service in subsidiaries and call centers (Praca w banku – zobacz kogo szukają headhunterzy, 2013). The second of the analyzed measures of the competitive advantage was the customer loyalty. The standard loyalty rates, calculated based on the questionnaire tendencies to choose a given bank again and to recommend a bank to others, are presented in table 3.

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Table 3. Standard loyalty rates (in %)

Banks	General rate	The rate calculated based on the tendency to choose the same bank again	The rate calculated based on the tendency to recommend the bank to others
Alior Bank	97.2	98.2	96.1
mBank	92.1	89.7	94.6
ING BSK	91.8	91.5	92.1
Pekao S.A.	87.1	84.2	90.1
BZ WBK	86.5	84.3	88.8
PKO BP	80.9	80.9	80.9
Eurobank	69.4	66.6	72.2

Source: own work based on the findings.

As it can be seen in table 3, the values of the partial rate are very similar to one other. The general rate was calculated as the arithmetic average of partial rates. With the result of 97.2% Alior Bank proved to be the leader in relation to the customer loyalty. The other places were taken by mBank and ING BSK. The lowest loyalty rate has been noted in regards to Eurobank (69.4%).

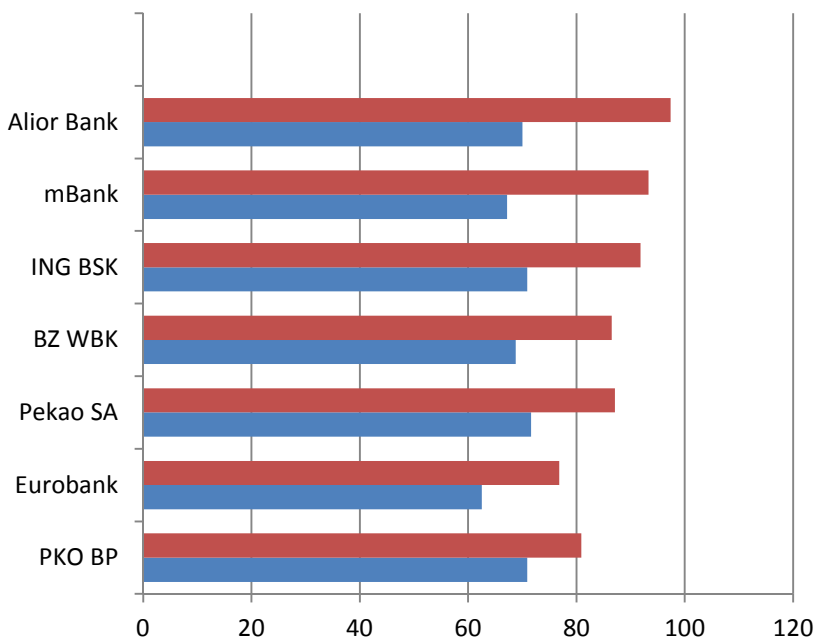
It is worth noting that these results are consistent with the results of research conducted by Bain & Company in the year 2013 regarding customer loyalty in retail banking (*Lojalność klientów ...*, 2013). In this research the NPS methodology was used². The highest loyalty rates among the Polish customers were achieved by: Alior Bank (36%), Eurobank (34%) and ING BSK (23%).

By comparing the competitive positions of the examined banks described by the reputation index and loyalty rate, one may observe significant discrepancies in their level (fig. 1). It turns out that a positive dependence between the level of those resources cannot be determined, i.e. the banks with high reputation indexes obtained relatively low loyalty rates. Alior Bank, which turned out to be a definite leader in terms of loyalty, in terms of reputation took only the fourth place. Similarly the reputation leader – Pekao S.A. – in terms of loyalty achieved the fourth position as well.

² NPS – Net Promoter Score – it is the difference between the loyal customers, ready to recommend the services of the bank to others (friends or family) and those who are not willing to do it. This indicator is calculated on the basis of the answer to the question: In the scale from 0 to 10 how probable do you think is recommending your current bank to friends or family?

These discrepancies may be attempted to be explained based on the analysis of specificity and diversity of the two examined marketing resources such as reputation and loyalty (Szwajca, 2012b, pp. 102-119 and 131-152). Reputation is a strategic resource, created on the span of many years, on the grounds of experience of stakeholders and on close contacts with the enterprise, what cannot be created using advertising or PR. The time and actions are the two main determinants of reputation (Rhee and Haunschild, 2006, pp. 101-117). The company is rated depending on whether its declarations and promises are in line with the actual actions. Reputation is build more by actions than words, based on trust and conviction of the stakeholders regarding the trustworthiness and reliability of the enterprise. Trust depends on shared values such as morality, benevolence, integrity, inferred traits and intentions, fairness and caring – trust is relational. Confidence is based on past performance and experience with an organization, its competence ability, experience and standards (Earle, 2009, pp. 785-92).

Figure 1. Reputation index and loyalty rate for the examined banks



Source: own work based on the findings.

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Loyalty on the other hand, understood and treated by the Polish enterprises, including banks, very superficially as the repeatability of purchases, not as a strong, emotional relationship between the customer and the company. Because of it, it is created mostly by economic stimuli, aimed only at the rational sphere of customers. Such approach does not create true loyalty but, at most, habitual or passive loyalty which is grounded on the habit and routine of repeating a particular behavior (Szwajca, 2012a, p. 147).

By analyzing the reputation indexes of the given banks one may notice a relationship between their level and the age of the bank – the banks with the longest traditions achieved the highest reputation indexes (Pekao exists since 1929, PKO BP - since 1919, ING BSK – since 1988). Other banks began their activities on the Polish market after the year 2000. In turn, the first place of Alior Bank – the bank with shortest history (which exists since year 2008) - in terms of loyalty can be explained by a very expansive and intensive marketing campaign, conducted since entering the Polish market until now.

Comparing the scale of discrepancy between the reputation index and loyalty rate an interesting dependence may be observed. The largest differences concern between the banks with a relatively short history: Alior Bank (-27.4pp.) and mBank (-26.1pp.), while the smallest differences are between banks with the longest traditions: PKO BP (-10pp.) and Pekao S.A. (-15.5pp.).

Examining the competitive positions of analyzed banks it is also worth referring to traditional measures, describing their market and financial position. In relation to the market position, market share was taken into account, calculated as the ratio of the number of current accounts³ of individual customers of the given bank to the number of those accounts in the 20 largest banks operating on the Polish market (data for I quarter of the year 2014). To evaluate the financial position the ROE indicator was chosen. In table 4 all of the analyzed measures of the competitive position of the examined banks are included.

³Only accounts in PLN, excluding savings accounts, were taken into consideration.

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Table 4. Competitive positions of the examined banks according to the analyzed measures

Banks	Market share	ROE	Reputation	Loyalty
PKO BP	22.9	13.2	70.9	80.9
Pekao S. A.	12.8	12.3	71.6	87.1
BZ WBK	10.2	16.6	68.8	86.5
mBank	9.8	13.1	67.2	93.3
ING BSK	7.6	11.6	70.9	91.8
Eurobank	5.1	22.3	62.5	76.8
Alior Bank	4.6	11.0	70.0	97.4

Source: own work based on the findings.

As it can be seen, each of the measures used points out to a different leader. Accordingly, PKO BP is the leader in terms of market share, Eurobank is the leader in the area of profitability. On other hand, in terms of reputation Pekao S.A. took the first place while Alior Bank became the leader in the area of loyalty. Each of the examined bank in some cases achieved even drastically different places depending on the particular measures. For example, Eurobank is on the last place in regards to reputation and loyalty but has the highest profitability indicator. However, Alior Bank is the weakest when it comes to the market share and profitability but the best in terms of loyalty. Each of the measures used highlights a different aspect of the enterprises' activities and functioning. The knowledge and awareness of the position taken on a multidimensional competition space should be considered as a very important piece of information during formulating the strategic goals and designing a target source of competitive advantage.

The results of the party game tests were used to identify a leader understood in a broad sense on the Polish banking market and to determine a ranking of the examined banks. The surveyed customers of all seven chosen banks were supposed to indicate the host of the party, in other words in their opinion the strongest bank on the market. The results achieved are presented in the leader matrix in figure 2.

Figure 2. The leader matrix on the banking market

X \ Y	PKO BP	ING BSK	Pekao S.A.	BZ WBK	Alior Bank	mBank	Eurobank
PKO BP	83.3	6.8	6.6	2.2	1.1	-	-
ING BSK	11.8	75.6	6.0	1.3	2.7	2.0	0.6
Pekao S.A.	16.0	7.4	67.8	-	5.3	-	3.5
BZ WBK	20.6	6.8	3.7	65.5	3.4	-	-
Alior Bank	23.5	17.7	-	-	58.8	-	-
mBank	21.7	21.7	4.5	-	4.3	47.8	-
Eurobank	28.3	25.5	11.7	-	-	16.6	17.9

Source: own work based on the findings.

The data in the matrix should be interpreted in the following way. The first row of the table means that 83.3% of the PKO BP customers chose their bank as the leader, 6.8% of customers of this bank chose ING BSK as the leader, 6.6% - Pekao S.A., 2.2% - BZ WBK and 1.1% Alior Bank, while no customer of PKO BP chose mBank and Eurobank as the host of the party. The rates on the diagonal of the matrix show what percentage of the surveyed customers chose their bank as the leader. As it can be seen, PKO BP is the leader in the ranking, the second place was taken by ING BSK and the third one by Pekao S.A. Eurobank received the weakest place.

Conclusions

Corporate reputation and customer loyalty are two valuable intangible resources for the company and in a theoretical approach, they should support and consolidate each other. For this reason, it should be supposed that the enterprises of strong, positive reputations possess high loyalty rates. However, the results of research conducted did not confirm such direction of the dependence as the banks that took the highest places in terms of reputation, received relatively weaker loyalty rates. It may seem that this may be caused by discrepancies between a theoretical approach to loyalty and its superficial understanding by managers. Furthermore, the actions undertaken in order to build reputation (mainly so-called loyalty programs) are lim-

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ited to purely economic stimuli, what does not favor the creation of strong, emotional ties with the customers and such ties are the foundations of true loyalty. The loyalty really obtained has a habitual, passive character.

Moreover, the research indicated the existence of positive dependence between the loyalty level and market share and between the reputation index and ROE. The banks characterized by a high market share obtained the highest loyalty rates and the banks of low market share – the lowest loyalty rates. A similar dependence was found concerning reputation and profitability. However, the position of market leader in a general sense, identified using the party game test, received the bank of the highest market share and the longest tradition on the Polish market (PKO BP). The other places in this ranking were also determined by the level of market share.

At the end it should be emphasized that the research presented in the article, due to a limited subject and methodological range, was of a pilot character, therefore it does not allow the formation of definite theses. Nevertheless, it may constitute a reason and good grounds for performing further, broader analyses in this area.

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A VBA Model for Calculating Partnership Efficiency

JEL Classification: *M29; C44; C61*

Keywords: *dynamic model; partnership efficiency; stock keeping theory; visual basic for applications*

Abstract: The article presents the development of a software application that focuses on calculating partnership efficiency. Partnership efficiency is part of the theory of stocks. This software is developed by using Microsoft Excel and the programming language Visual Basic for Applications. The main goal is to create a simple, user-friendly interface designed to calculate partnership efficiency among contractual partners. The contribution is based on the assumption that small and medium-sized enterprises do not use complicated IT systems, but to cater for their needs, they mainly use Microsoft Excel. The main contribution of the article is the software application that calculates, in a short term period, partnership efficiency among contractual partners. The created application is also designed for educational purposes (e.g. aimed to assist university students in absorbing the practical implementation of the Cooperation Model).

Introduction

The Cooperation Model, which is part of operations management - namely the theory of stocks - can be a useful decision-making tool for

companies regarding mutual cooperation between the company and the customer. Simultaneously, this topic is also taught at universities. Therefore, it is appropriate to create various teaching aids that enable students to better understand the topic. Whereas the Cooperation Model is quite simple, there is a question on how to calculate a situation where the chain (company – customer) enters the next subject, for instance, the next customer. The aim of the paper is to develop a simple application, using the Visual Basic for Applications (VBA) programming language, which allows to calculate the collaboration between two subjects or among three subjects. In the article we present print screens of the application calculating the collaboration between two subjects.

Methodology of the research

In the article we present an example of using the VBA programming language in order to develop a simple software that practically presents the application of the cooperation model. VBA is the acronym for Visual Basic for Applications. It is an integration of Microsoft's programming language Visual Basic and Microsoft Office applications. By running Visual Basic IDE within the Microsoft Office applications, customized solutions and programs that enhance MS Office capabilities, can be developed. Among Visual Basic for applications, Microsoft Excel VBA is the most popular. Although MS Excel includes various formulas and functions, they are not enough for certain complex calculations and applications. In such cases, it would be relatively easier to write VBA code for such calculations. In the first part, we summarize the literature framework focused on the theoretical explanation of the cooperation model. In this section, we use a basic method, such as analysis, synthesis, comparison, deduction and generalization. In the next section of the article, we introduce the proposal of the interface that is based on the modelling methods and VBA coding. For the interface development we used the software Microsoft Excel 2013 and the specific function developer and the programming language Visual Basic for Applications. The object is the cooperation model and the subject is the interface development using VBA.

Literature framework

In many cases the management of optimal level of stocks is still determined by a subjective approach. But nowadays, there already exist several

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models of operation management. These so called models of stocks, are used to solve the optimization problems with the movement and management of stocks in the company (how much of stocks we need, when should we make an order of some material, what would be the amount of one delivery, etc.). In general “the operation management field encompasses the following decision areas: design of goods and services, managing quality, process and capacity design, location strategy, layout strategy, human resources and job design, supply chain management, inventory and material requirements planning, intermediate and short-term scheduling, and maintenance.” (Avella & Alfaro, 2014, p. 195) Operations management provides solutions for many areas. That is why “the role of operations research and operations management is yet to be studied in depth.” (Gunasekaran et al., 2014, p. 806)

Models of stocks are classified according to several aspects. For example, depending on whether we consider the progress of consumption over time, a random effects on model or the movement of the stocks and so on. Models of stocks determined by the above aspects are then further divided into other “submodels” and strategies. An example could be the dynamic model with the stocks movement absolutely determined. In this model, the cooperation model has an interesting position. It is also called partnership efficiency. The essence of this model is to find out what situation is more effective for the cooperating parts (supplier vs. customer). It takes into account one’s own needs of delivery of some goods at a certain level of costs or makes a trade by mutual agreement for the amount of the delivery and divides the costs. Business partners could theoretically achieve better conditions within this mutual cooperation. Also, it is important to divide the mutual benefits between the participants of the trade. It is the win – win rule.

“Time and spatial separation of production and consumption leads to the need to solve the questions associated with stocks movement management. The inventory we will understand any incomplete use of resource intended to meet future demand, respectively future consumption.” (Sakál & Jerz, 2006, p. 306) Also, the size of this resource is determined in order to effectively meet the demand. By resource we mean finances, human resources, material assets etc. There is still the question: how much should we order? With surplus of stocks there is a risk of their economic or even physical impairment. On the other hand, the lack of supplies poses the risk of not meeting the requirements of customers.

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„The stocks and supplying are important areas of management and production because the amount of capital held in stocks is on average about 16 % of total liabilities at manufacturing enterprises and about 20 % at commercial enterprises.“ (Sixta & Žižka, 2009, p. 61) „The costs of stocks keeping representing then from 20 % to 35 % of their nominal value.“ (Chase & Aquilano, 1995, p. 546)

In managing the stocks we use mathematical modelling. „With the questions of determining the amount of stocks, the method of their recharge and compiling the methods for this purpose deals the theory of stocks.“ (Sakál & Jerz, 2006, p. 306) The essence is to optimize the stocks, in other words, it is an effort to minimize the total costs of inventory management.

One of the possibilities on how to manage the stocks effectively is the cooperation model. This cooperation model is included in dynamic models of stocks, specifically it is the dynamic model with the movement of stocks absolutely determined. The point is that these items should be regularly supplemented.

The cooperation means the agreement between business partners in order to reduce cost per one delivery. In the cooperation supplier and customer can achieve savings in defining a common amount for a delivery, despite the fact that cost optimum may not be achieved for each partner separately. Therefore, there is the win – win rule applied when the total net cost savings are fairly divided between business partners (50 to 50). For instance, in the form of discounts, credit note, etc.

Currently, many mathematical models are transformed into computer programs in order to automate various operations via macros. One of the tools is Visual Basic in Microsoft Excel. “Computer-aided technologies like Visual Basic Software have played a significant role in various science and engineering areas.” (Pal et al., 2014, p. 1835) This technology allows to solve for example “performing efficient and robust parameter estimation on nonlinear models; providing quantitative diagnostics of model fitting (including summary statistics that can be used for model comparison); optimizing the experimental design in the aim of maximizing the statistical power of model-based data analysis; assessing the results reproducibility at the group level (e.g., between-groups and between-conditions model comparisons).” (Daunizeau et al., 2014, p. 1) Also, the authors Dinesh et al. add that “Visual basic is a standalone tool for creating separate software components, such as executable programs, COM components and ActiveX controls which are useful to build a specialized solution of particular task.” (Dinesh et al., 2013, p. 198)

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Microsoft Excel has a significant importance for small and medium enterprises. It is used more often in comparison with sophisticated IT systems such as SAP. The author Antlová indicates the barriers to the adoption of specific information systems in small and medium enterprises. “They are:

- Technological barriers (problems of security, insufficient infrastructure).
- Organisational barriers (management style, shortage of financial sources).
- Barriers arising from the surrounding environment (insufficient knowledge of the market).
- Individual barriers (insufficient knowledge, personal relations in organisation).” (Antlová, 2009, p. 151)

Partnership efficiency in VBA model

Nowadays, there are specific software tools in order to facilitate the task of determining the optimal level of delivery, costs etc. But in many cases these tools include many functions and modules that are not used in the company. Despite this fact, the entrepreneur has to invest in the purchase of such software. Therefore, our goal is to simplify the determination of partnership efficiency, but without using some specific program. We have created a simple application by using Microsoft Excel and the VBA programming language.

The present work includes the development of a user-friendly interface, which is designed for small and medium enterprises and also designed for educational purposes (e.g. aimed to assist university students in absorbing the practical implementation of the *Cooperation Model*). The platform supports the automatic calculation of the following values

- Optimum Size of Delivery of a specific product for Customer and Supplier,
- Optimum Costs of Delivery for Customer and Supplier,
- New Costs for Supplier under the assumption that the customer’s optimum size is accepted,
- Total Costs for Supplier,
- Common Optimized Values of the above stated parameters under the assumption that the supplier respects the customer’s optimum values,
- Summary for customer and supplier including original costs, common optimized costs and their difference,
- Total Net Savings.

The main advantage of the developed application is not only the automatic derivation of the above stated results, but also the possibility to support a more advanced version of the *Cooperation Model*, according to which 3 stakeholders are involved in the procedure. As a result, the model that includes cooperation between Customer (Stakeholder1), and Supplier (Stakeholder 2) can be expanded to the following version:

- Customer (Stakeholder 1) - Supplier (Stakeholder 2),
- Customer (Stakeholder 3) - Supplier (Stakeholder 1).

It is, thus, obvious that in the new version of the initial model, Stakeholder 1 is considered as customer as well as supplier. The developed application supports both situations. The tool which was utilized for the development of the currently presented platform is Visual Basic for Applications in Microsoft Excel 2013. The platform includes three UserForms. The first userform (fig1) is utilized as an input form for entering the essential data required for the above mentioned calculations. The individual input data are the followings: Q – total amount of the delivery; Cp1 – purchase price of customer per delivery; Cs1 – customer’s costs of storage for a period; Cp2 – sales price of supplier per delivery; Cs2 – supplier’s costs of storage for a period; T – time, period. Through the first input form, the user can select if the applied method will involve 2 or 3 stakeholders. If the user decides to proceed with a calculation for 3 stakeholders all the inactive fields (Cp3, Cs3 values) are activated.

Figure 1. Input data form of the Cooperation Model

The screenshot shows a window titled "COOPERATION MODEL" with a standard Windows title bar. Inside the window, there is a list of input fields on the left and two buttons on the right. The input fields are labeled as follows: Q, Cp1, Cs1, Cp2, Cs2, Cp3, Cs3, and T. The Cp3 and Cs3 fields have the value "0" entered. To the right of the input fields, there is a checkbox labeled "PERFORM CALCULATION WITH 3 STAKEHOLDERS" which is currently unchecked. Below the checkbox are two buttons: "CALCULATE" and "CANCEL".

Source: own.

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Through the second userform (fig 2.) all the derived calculations are automatically demonstrated. Again, depending on the number of stakeholders (2 or 3) some of the fields remain inactive with zero values. The second task performed through the userform is to decide, according to the derived results, if the cooperation is approved by none, all or 2 of the stakeholders. The specific task is performed by the optionbuttons which are depicted in fig.2. And the individual input data are the followings: Xopt1 – the optimal amount of a delivery for customer; Nc(Xopt1) – the optimal total costs for customer per delivery; Xopt2 – the optimal amount of a delivery for supplier; NC(Xopt1) – the optimal total costs for supplier per delivery; Nc2(Xopt1) – the actual costs for supplier (because in general the supplier has to accept the customer’s conditions in the contract between the business partners).

Figure 2. Optimum values for each stakeholder

Field	Value
Xopt1	1870,83
Nc(Xopt1)	26191,80
Xopt2	5486,35
Nc(Xopt2)	54863,47
Xopt3	0
Nc(Xopt3)	0
Nc(TOTAL)	119991,33
Nc2(Xopt1)	89799,73
Nc3(Xopt1)	0
Xopt(com)	3818,81
Nc(Xopt(com))	91651,51
Nc1(Xopt(com))	33147,28
Nc2(Xopt(com))	38504,23
Nc3(Xopt(com))	0
Dnc1	-6553,68
Dnc2	31295,3
Dnc3	0
Total Savings	24538,82

Source: own.

Again depending on the decision of the user the inactive frame *ESTIMATION OF COMMON VALUES AND NET TOTAL SAVING* is activated, and accordingly some of the values remain inactive (Nc3(Xopt(com)), Dnc3). These values refer to the positive or negative participation of the third stakeholder. The estimation of common values means the result of cooperation between business partners, in this case between customer and

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supplier of the delivery. $Xopt(com)$ represents the optimal amount of the delivery when customer and supplier cooperate. $Nc(Xopt(com))$ means the total costs for the delivery. $Nc1(Xopt(com))$ and $Nc2(Xopt(com))$ are the values of customer's and supplier's total costs. The costs are divided based on the appropriate equations. $DNc1$ shows the result of the comparison of the original customer's costs and the new one and $DNc2$ shows the result of the comparison of the original supplier's costs and the new one. From $DNc1$ and $DNc2$ we can calculate the total savings. In this case, the customer has loss in this contract, and therefore the supplier has to reimburse the customer's loss. The total savings are divided between contract partners by the win – win rule.

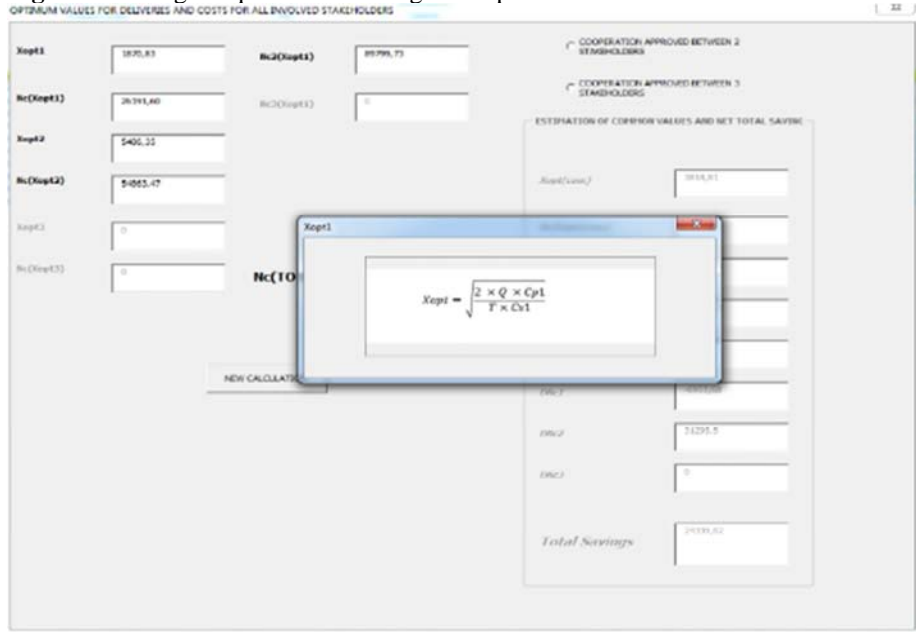
Figure 3. Estimation of common optimized values and Net Total Savings according to the number of involved stakeholders

Input	Value
Xopt1	1870,83
Nc(Xopt1)	26191,60
Xopt2	5486,23
Nc(Xopt2)	54863,47
Xopt3	0
Nc(Xopt3)	0
Nc2(Xopt1)	89799,73
Nc3(Xopt1)	0
Nc(TOTAL)	115991,33
Xopt(com)	3818,81
Nc(Xopt(com))	91651,51
Nc1(Xopt(com))	33147,28
Nc2(Xopt(com))	58504,23
Nc3(Xopt(com))	0
DNc1	-4955,68
DNc2	31295,5
DNc3	0
Total Savings	24329,82

Source: own.

Finally, since the platform is designed for educational purposes, an additional possibility is supported. Through the second userform, and by moving the mouse pointer to the appropriate field, the user is able to view the mathematical equation which provides the corresponding result. The equation is stored in a third userform and according to the position of the mouse cursor, the corresponding image is loaded and the appropriate equation is visible by the user.

Figure 4. Emerged equation according to the position of the mouse cursor



Source: own.

Figure 4 shows the basic equation for calculating the optimum quantity of delivery. It is the same formula for both the customer and the supplier. The difference is in the calculated values, namely purchase price per delivery and costs of storage for a period.

For calculating the total costs for calculated optimum quantity of delivery the following formula is used (from the customer's view):

$$N_c(x_{opt}) = \sqrt{2QTc_{p1}c_{s1}} \quad (1)$$

And the calculation of total costs from the supplier's view is as follows:

$$N_c(x_{opt}) = \sqrt{2QTc_{p2}c_{s2}} \quad (2)$$

Interesting is the fact that the supplier in general is not able to implement their optimum amount of the costs, because it is dependent on the specific customer respecting their terms. Therefore, for the calculation of the total suppliers' costs the following formula is used:

$$N_c(x_{opt}) = \frac{Q}{x} c_{p2} + \frac{x.T}{2} c_{s2} \quad (3)$$

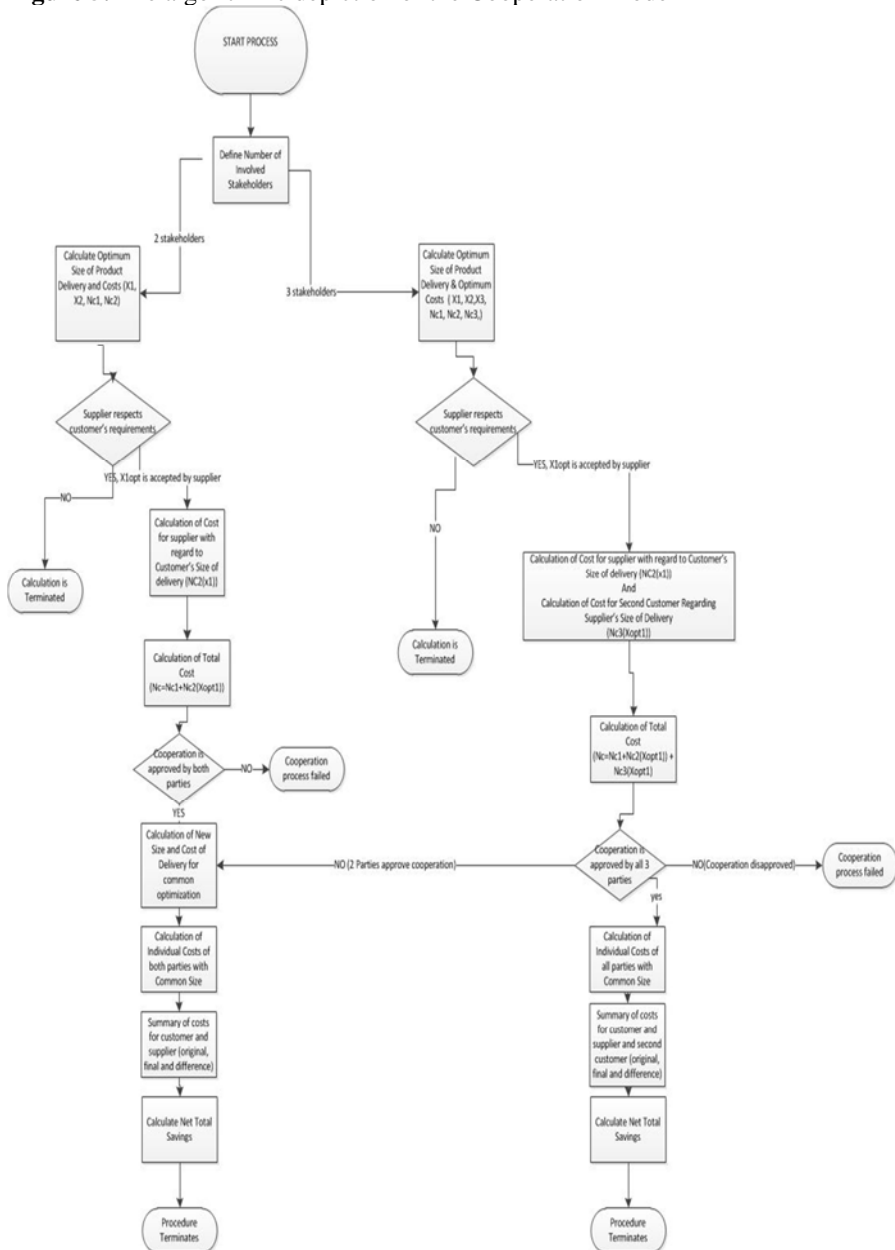
Next, the optimal amount of delivery by common cooperation of business partners, total costs, costs allocation and a comparison of the results obtained are calculated. All formulas are displayed after moving the pointer to the appropriate field.

The algorithmic depiction of the Cooperation Model, which is supported by the currently delineated platform, is performed via the flowchart of fig 5.

The algorithmic steps which support the functionality of the developed application, are a crucial part of the present work. They are as follows:

- The operation of the software is initiated by importing the forms in an excel worksheet and running the application,
- Initially, the application prompts the user to define the number of stakeholders. After selecting the number of the involved stakeholders, the user inserts input values and the Optimum Size of product's delivery and cost are calculated,
- If the supplier respects the customer's requirements, then a calculation of size and cost of delivery and a calculation of cost for the supplier with regard to the customer's size of delivery is made. In the occasion when 3 stakeholders are involved, then, an additional calculation occurs, that is, the estimation of cost for the second customer with regard to the supplier's size of delivery. In a different case, the calculation process is terminated,
- The calculation of Total Cost is then performed,
- The next decision task is the approval of the cooperation by all parties, either 3 or 2. All calculations have been performed, but, the user is now prompted by the system to define the number of stakeholders that approve the cooperation,
- If the cooperation is rejected by all parties then the process is terminated. If all parties approve the cooperation, then the results of the calculation of individual costs are considered,
- Moreover, a summary of costs is controlled by the user,
- Total Net Savings in all the aforementioned cases are also determined and, then,
- The procedure is terminated.

Figure 5. The algorithmic depiction of the Cooperation Model



Source: own.

Conclusions

In the present article a simple application that can be used for the calculation of partnership efficiency is illustrated. Research shows that small and medium enterprises currently do not use complex software tools, but only spreadsheet programs, like Microsoft Excel. The current application developed by using the VBA programming language, can help small and medium enterprises in determining partnership efficiency.

Possible directions of future research could follow two ways. The first one, is to find out whether small and medium enterprises deal with the problem of partnership efficiency or other problems connected to stock management and whether they would be interested in applications like this one. The next possible way to follow (based on the research) would be to create applications for other models of the theory of stocks. For example for dynamic models with the movement of stocks absolutely determined, dynamic models with the movement of stocks determined probability completely, etc.

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Research Trends of Public-Private Partnerships (PPPs) in Poland

JEL Classification: *A10*

Keywords: *public private-partnership (PPP); systematic review; research methods*

Abstract: Over the last two decades the attention given to the research on Public-private partnerships (PPPs) has been steadily increasing. A literature surveys on the research trends of PPP in English language publications suggest some emerging trends in the topics dedicated to the PPP.

A similar compilation of PPP literature is not readily available on the ground on scientific research in Poland. That is why the aim of the article is to present contemporary trends that are being developed in Poland in PPP filed. Indication of possible further research in the area of PPP is also an essential issue tackled in this article.

Introduction

During the last two decades PPP has been adopted more extensively by governments around the globe. One of the most visible form of recent partnership has been the long-term infrastructure contract partnership. This kind of contract is organized around a design, finance, build, own, operate, transfer model and involves private sector financing and private sector project management capabilities.

A parallel phenomenon to the process of PPP implementation is the increasing number of publications devoted to the issues of public and private sector cooperation. In recent years many scholars has given special attention to this phenomenon (Al-Sharif and Kaka, 2004), (Ke at al., 2009), (Tang et al., 2010), (Garvin and Gross, 2012). Conducted so far PPP literature reviews have provided thorough and valuable contributions by cataloging the PPP-related articles and also by sorting these papers into thematic categories. This systematic literature review is especially useful to identify the research trends of PPP topic.

In Poland, the implementation of PPP projects began as late as 2009. Therefore, there is an evident lack of scientific publications based on a thorough analysis of the ongoing process of implementing PPP models to Polish conditions. That is why, to make polish literature more accessible and to facilitate synthesizing PPP on the national ground, similar research was conducted on the basis of publications issued in Poland. The 172 articles were identified, categorized by theme, and analyzed by citations.

This paper will begin by discussing the evidence-based approach in PPP study through the effective use of systematic reviews. The following sections will compare and contrast the nature of publications devoted to the PPP issues. Finally this paper will present the challenges in conducting further research undertaking PPP topics.

Research trends of PPPs

Three of four presented PPP literature reviews, summarized in Table 1, cataloged the PPP-related articles published in civil engineering, construction and project management journals. At the very beginning the authors concentrated on topics concerned to management issues, such as risk, financing, procurement. Garvin and Bosso (2012) expanded this effort by examining PPP in broader context. Instead of rankings articles in a chosen journals, they focused university-published journals, journals with high impact factors and well-known works in the field and articles from university publications. However, in an effort to limit the study scope to a reasonable size, their investigation focused only on highway-related themes (see tab. 1). Similar to prior works, several themes were also established to help characterize the literature found. In contrast to previous studies Garvin and Bosso (2012) have taken into account also themes going beyond the area of management sciences, e.g. general topics, public sector issue, national applications.

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Table 7. Summary of Recent PPP Literature Reviews

	Al-Sharif and Kaka (2004)	Ke et al. (2009)	Tang et al. (2010)	Garvin and Gross (2012)
No. papers	34	170	107	287
Time span	1998-2003	1998-2008	1998-2007	1997-2010
Research area	construction engineering and management	construction engineering and management	construction engineering and management	transportation projects
Categories	Procurement Risk management Financial management	Procurement Risk management Financial package Economic viability Investment environment Governance issues Integration research	Concession periods Risks Financing Relationships Project success factors	General concepts Governance issues Procurement Contract design Risk Finance Public sector issues National applications

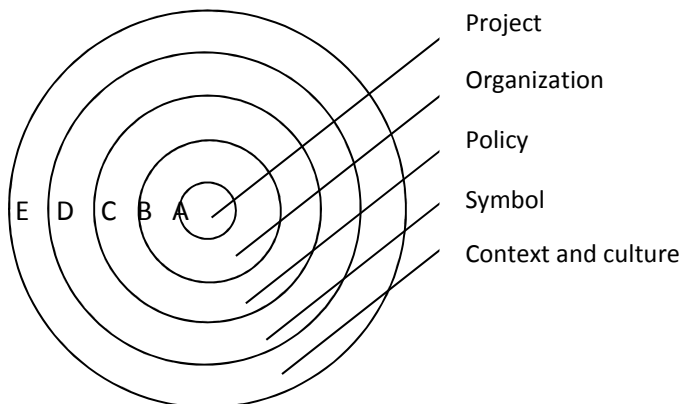
Source: Source: Own study based on Garvin and Gross (2012).

The identified articles were also categorized into research method. Central to the conducted categorization was assessment of data collection techniques. According to this criterion three groups of articles were identified: qualitative, quantitative and reviews. In particular, qualitative methods tended to adopt: individual interviews, focus groups or group interviews, observation, document or textual analysis, and/or visual data analysis. Quantitative methods tended to utilize models or experimental data. Articles where specific data collection methods were not employed tended toward reviews of existing theories, policies or practices.

Described outcomes of presented literature review suggests that there is a number of understandings of what a partnership is. This is one of the reasons that led Hodge (2010) to introduced his conceptual model in which he persuades that PPPs may by analyzed at many different levels. Author formulated it in this way: PPPs can be understood as (1) a specific project or activity, (2) a management tool or organizational form, (3) a policy, or statement as to the role of the government in the economy, (4) a governance tool or symbol or (5) an historical context and a cultural set of assumptions. According to Hodge we might view PPPs to provide infrastruc-

ture through as series of lenses, from a narrow lens at one extreme to the broadest lens at the other, as shown in Figure 1.

Figure 6. Dimensions to the Public-Private Partnership phenomenon



Source: Hodge and Greve (2011).

This research adopts the classification criteria proposed by Hodge (2010). To make the literature analysis more productive we may apply two more dimensions to this conception.

The five circles of understanding PPPs could be examined from three research perspectives: economics, finance and management science. Additionally, according to Garvin and Bosso (2012) the identified articles can be categorized into following research methods: empirical (qualitative or quantitative) and non-empirical (reviews).

Aforementioned criteria of examining PPPs literature seems to constitute the frames that makes it possible to present a complete picture of knowledge on PPP issues in Poland.

The idea of systematic literature review

Generally, the aim of conducting a literature review is to enable the researcher both to map and to assess the existing intellectual territory, and to specify a research question to develop the existing body of knowledge further (see Tranfield et al., 2003). A literature review may take a traditional or systematic form. In its traditional shape literature review is based on a critical analysis of monographs and articles in a chosen research area. This

kind of analysis is often accompanied by the discussion on research subjects that was undertaken by other authors. One of the limitations of the traditional literature review is the fact that it accepts uncompleted representation literature relevant to the analyzed topic exposing the research to the accusation of incompleteness. (see Czakon, 2011). That is why, in a response to the demand for performing the literature studies in a reliable, transparent and reproducible manner as possible, methodology of a systematic literature review was developed. Systematic literature review can be described as a quantitative analysis implemented according to specific stages of purposeful literature selection (Czakon, 2011). In other words systematic reviews differ from traditional narrative reviews by adopting a detailed technology, that aims to minimize bias through exhaustive literature searches of published and unpublished studies and by providing an audit trail of the reviewers decisions, procedures and conclusions (see Tranfield et al., 2003). Additionally systematic review of literature could be characterized by the utilization of digital databases and electronic versions of publications.

Methodology of the research

The process of systematic review was divided on three stages: planning the review, conducting the review and reporting (fig 1).

The first stage starts with the establishing the purpose of the research. The main purpose of the study was to identify scientific research conducted in Poland in the area of PPP and make it more accessible. An important part of the study was both to compare obtained results with the results of similar studies on international PPP research trends as well as to identify the research gaps in a given topic.

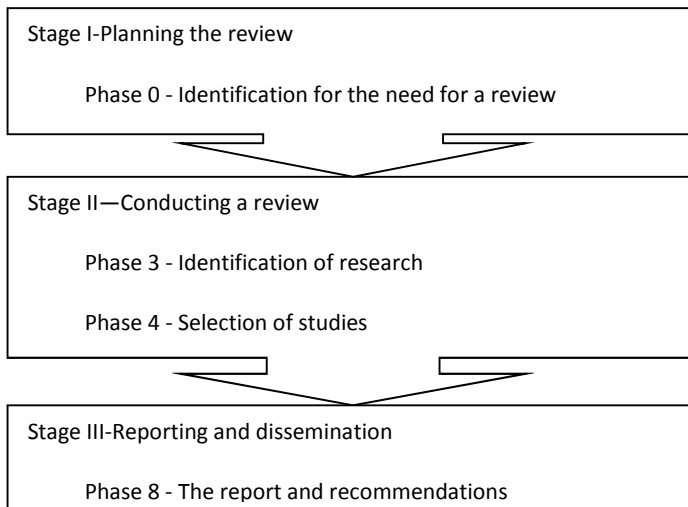
The second stage includes identifying relevant articles and creating database representing a summary of the PPP literature in Poland. To identify PPP literature across a variety of disciplines BAZEKON (a full-text databases with integrated search capabilities) was chosen. The primary set of literature was created by applying key words as a search tool. A unified set of keywords is assigned to the BAZEKON base. Among all the possible terms following keywords were selected:

- public-private partnership (PPP),
- public projects,
- infrastructure financing,
- concessions,

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- project finance,
- investment projects,
- private finance initiative,
- value for money,
- privatization of municipal enterprises,
- public sector.

Figure 2. Dimensions to the Public-Private Partnership phenomenon



Source: Tranfield et al. (2003).

Adopted searching criteria were met by 230 articles that have been published over the years 2002-2013. The aim of the next phase was to limit the initial number of articles by applying exclusion criteria. As a result following articles were omitted:

- published in studies that have only ISBN number (monographs or chapters in monographs),
- published in periodicals that were not included on the list of scientific journals (According to the Minister of Science and Higher Education Statement on the list of scientific journals),
- concerning only legal issues,

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- weakly associated with the PPP subject (The list of 172 also includes articles in which PPP subject was important part of the research although wasn't situated at the core of the research thread).

Applied approach resulted in limiting the number of articles to 172. Full text was available online for 68 publications. However examining only articles that are available online would, in practice, result in narrowing the study to 2010-2013 years. That is why, to widen the time span of the analysis, data relating to the remaining 105 articles were obtained in a traditional way.

Implementing the following criteria allowed to prepare a strict, reliable and reproducible database for the further processing.

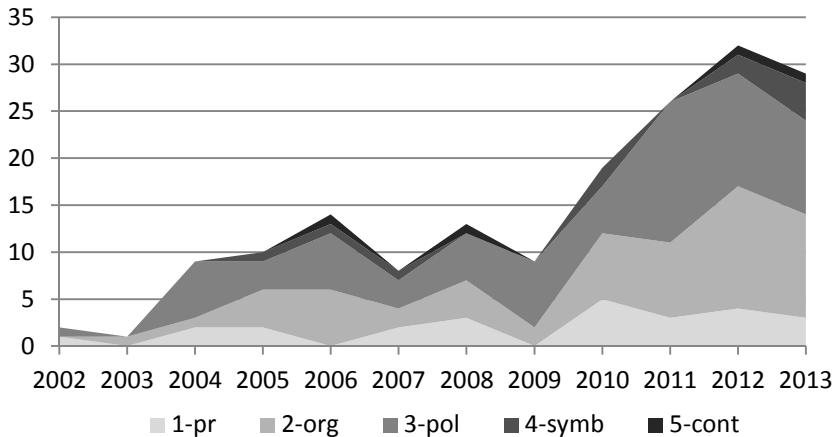
Prior to the bibliometric analysis the articles were categorized by the (1) way of explaining the idea of PPP, (2) research field and (3) methodology. Although some papers could reasonably be assigned to multiple categories among the following sub-groups, in each case a single classification regarded as most descriptive was chosen.

Results

The number of articles on PPP topic grew rapidly starting in 2003. After some fluctuations over the 2004-2009, publications in this topic once again surged significantly in 2010. This increased interest in PPP issues was related to the implementation new regulation acts in PPP in Poland that took place on the beginning of 2009. This phenomenon is explored subsequently.

To explore the trends by the way of explaining the idea of PPP, the chronological distribution of papers within all five groups was considered graphically (Figure 3).

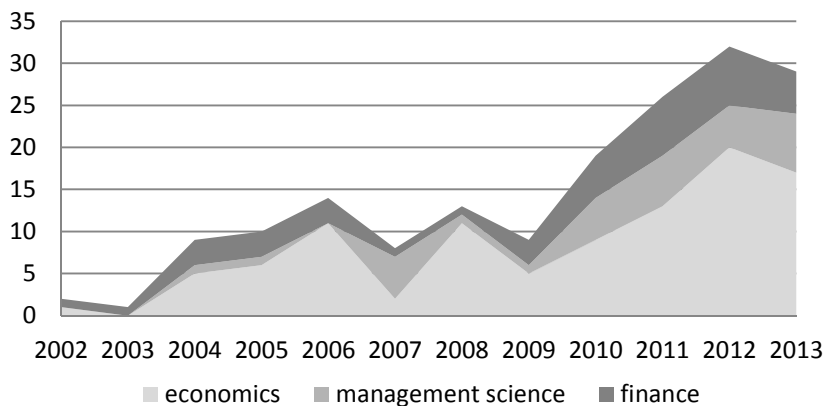
Figure 3. Distribution of Articles considering the way o understanding PPP by Year



Source: Own study

Figure 3 suggests that in Poland PPP is mostly interpreted either as a specific organizational form of providing infrastructure services or as a policy tool. Since 2010, a slight increase of publications examining PPP from a project perspective was noticed. This conclusion could be supported by the findings from analysis the data enclosed on figure 4.

Figure 4. Distribution of Articles considering the research field by Year



Source: Own study

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Presentation of the set of articles in an matrix form arouses some more specific and interesting finding (table 2).

Table 2. Summary of thematic distribution of articles

	Project	Organization	Policy	Symbol	Context and culture	Total
Economics	3	34	53	5	3	98
Management science	13	12	3	6	0	34
Finance	8	15	17	0	0	40
Total	24	61	73	11	3	172

Source: Own study.

Policy (73) and organization (61) are most popular levels of PPPs analysis and this way of PPPs understanding is dominated by economic perspective. At policy level perspective PPP topics was investigated most commonly in the context of economic growth, regional development and the role of the state in the economy. In this context PPP is predominately perceived as a tool to achieve government goals and discussion on workable legal and regulatory framework dominates. At organization level PPP is perceived e.g. as a form of providing public services in municipalities. To this circle of PPP understanding was also assigned studies on PPP market analysis in Poland and other countries.

This two ways of PPPs understanding also dominates if we consider finance perspective. Subject of discussion in finance-relating research was concentrated around such aspects as EU policy in PPP area and its impact on the public debt.

Subsequently PPP can be interpreted as a project. From this point of view PPPs most frequently could be analyzed in management context. However important part of the analysis on this level is finance perspective (e.g. capital structure, rules and techniques of project finance).

Small part of articles in the studied set has taken studies on PPP at the level that represents the symbol of governance (11). From that perspective studies that were focused on efficiency threads were classified into economics while studies related to organizational aspects were attributed to management perspective.

The most extensive background for the analysis of the PPP is an institutional perspective. From this perspective PPP can be the subject of analysis in a historical context and a cultural set of assumptions. However the sample of articles that could be categorized to this research area is limited.

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If we consider applied methodology, 157 of the 172 articles were categorized as non-empirical reviews of existing literature, concepts, or practices. Into this group was also assigned articles that included elements of empirical data analysis, but without clearly indicated methodology of collecting and compiling the data.

Of the remainder, 5 were qualitative while 10 employed quantitative methods (interviews, case studies).

Greatest diversity of applied methods was in the management area. If we take into account the levels of PPP interpretation we could find that diversity reached highest rates on project and organization levels.

Table 3. Top Journal with PPP articles by number of citations and number of articles

No	Journal	Citations*	No of articles
1	Samorząd Terytorialny	27	5
2	Studia Regionalne i Lokalne	13	3
3	Studia i Prace Kolegium Zarządzania i Finansów / Szkoła Główna Handlowa	6	4
4	Bank i Kredyt	4	2
5	Zeszyty Naukowe Uniwersytetu Szczecińskiego. Finanse. Rynki finansowe. Ubezpieczenia.	3	12
6	Acta Universitatis Lodzianis. Folia Oeconomica.	2	13
7	Ekonomika i Organizacja Przedsiębiorstwa	2	3
8	Przegląd Komunikacyjny	2	2
9	Studia Ekonomiczne / Uniwersytet Ekonomiczny w Katowicach	2	13
10	Acta Scientiarum Polonorum. Oeconomia	2	14
11	Prace Naukowe Akademii Ekonomicznej we Wrocławiu / Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu	0	32
12	Zeszyty Naukowe Uniwersytetu Szczecińskiego. Ekonomiczne Problemy Usług	0	11

*Citations on the base of BAZEKON and GoogleScholar, date: 05.12.2014.

Source: Own study

Citations analysis also indicates that there is a low negative correlation (-0,24) between citations number and publication year. Interestingly, there was reported lack of relation between citations and on-line access to electronic version of an article.

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Further analysis of the most frequently cited articles and its source of publication proves that most popular articles were published in “Samorzząd Terytorialny” (see table 3).

To sum up, it seems that in Poland PPP literature has been dominated by economic perspective and PPP is most the subject of analysis on public policy level.

However PPP-related research in management and finance disciplines are also valuable for understanding the complexity of PPP.

Conclusions

This paper has outlined the opportunities and challenges in applying ideas and methods of systematic literature review developed in PPP field into national ground. The aim of systematic review was to provide collective insights through theoretical synthesis into PPP fields and sub-fields in Poland.

Nevertheless, systematic review isn't free of some limitations. This methodology has limited application for the analysis of monographic publications. Systematic literature review considers only publications indexed in the database and has high sensitivity to the wrong choice of keywords.

Despite its limitations, for academics, the systematic reviewing process increases methodological rigour whereas for practitioners systematic review helps develop a reliable knowledge base by accumulating knowledge from a range of studies (see Tranfield et al., 2003, p. 220).

In this sense, systematic review can be regarded as a practical tool which aims to serve both academic and practitioner communities.

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Absorption of EU Funds in the Context of Polish Enterprises Competitiveness Measured by Profitability Rates

JEL Classification: *D21; D92; P17; M41*

Keywords: *financial results; profitability; competitiveness; EU Funds*

Abstract: Competitiveness at the firm level is a subject of interest not only to managers and policy makers but also academics. An effective functioning under the conditions of new economy requires from the enterprises to develop their core capabilities and talents along with the ability to quickly identify and seize the opportunities generated by market environment. The implementation of such an approach allows the creation and sustain of economic surpluses in the long-run.

The paper aims to examine the profitability of enterprises in Poland which is regarded in the context of absorption of EU funds in years 2007-2013. Taking into account that Poland became one of the largest beneficiaries, it is worth analyzing the impact of EU funding on the economic performance of Polish enterprises.

The paper offers a critical reflection on the relationship between the absorption of EU funds and Polish enterprises competitiveness on the basis of the content analysis literature and statistical data derived from the European Commission, the Central Statistical Office and the Ministry of Infrastructure and Development. It is assumed simultaneously that the competitiveness of enterprises is expressed in the term of profitability rates. In spite of limitations which relate to the adopted definition of competitiveness and the short period of the conducted analysis concerning the key relationship, the paper contributes to the debate on the significance of EU Funds in the process of building modern and innovative economy.

Introduction

There is a common consensus that enterprises competitiveness is critical to national prosperity. The stable microeconomic fundamentals are perceived as one of the key prerequisites for sustainable economic growth. Although competitiveness is the most often interpreted as involvement in a business rivalry for markets, it seems to be rather a multidimensional and relative concept (Ambastha, Momaya, 2004, pp. 46-48). In the face of the necessity of improving the competitiveness of the European Union countries, in accordance with the assumptions of the EU Strategy 2020 on smart, sustainable and, inclusive growth, it is particularly worth indicating some of the main factors which determine enterprises competitiveness as well as their financial results.

The aim of the article is to examine the relationship between the profitability of enterprises in Poland and absorption of EU Funds. It appears that better absorption of EU structural funds, especially those directed to companies, leads to the improvement in firm competitiveness and is reflected in their financial performance. Moreover, the effective absorption of EU funds brings many benefits because not only allows for increasing competitiveness of Polish enterprises on global market but also narrowing development gap and contributing to the country competitiveness.

Methodology of the research

The critical reflection on the relationship between the absorption of EU funds and Polish enterprises competitiveness is done on the basis of the content analysis literature and statistical data derived from the European Commission, the Central Statistical Office and the Ministry of Regional Development. For the purpose of the research, it is assumed that competitiveness is expressed by profitability rates such as ROS, ROA and ROE. To assess the correlation between the absorption of EU Funds in years 2007-2013 and profitability of Polish enterprises achieved during the analyzed period, the Pearson correlation coefficient was used. The main limitations of such kind of research refer to the adopted definition of competitiveness and its method of measurement and the short period of the analysis regarding the key relationship.

**The factors influencing enterprise competitiveness
under the condition of new economy**

Competitiveness means a firm's capacity to compete in a specific market, to increase its market share, to enter international market by exporting, and to achieve sustainable growth and profitability (Cetindamar, Kilitcioglu, 2013, p. 9). In the microeconomic perspective, the concept of firm competitiveness is usually related to market performance and productivity. It is in accordance with the neoclassical explanation of the nature of competition which underlines that business main objective is to maximize profit over rivals in the external market place. Firm must provide products and services for which customers are willing to pay a fair return or price. The ultimate goal is to make a profit and in the long run, competitiveness is identified with the ability of the firm to survive in business and to protect its investment (Laureti, Viviani, 2011, p. 2615). Taking it into account, in the process of competition a special attention should be paid to the shareholders who provide the necessary capital as well as help in achieving the business objectives. A firm is competitive only if is able to provide a satisfactory return on investment and find an appropriate balance between short term and long term expectations of its key stakeholders, such as clients, cooperators, natural environment, etc. This is a real challenge because all of them have got different preferences concerning rate of return and the risks attached and what is more, it is worth stressing that the interests of many shareholders are not directly related to financial performance (Feurer, Chaharbaghi, 1994, pp. 49-51). The above discussed view on competitiveness implies that it is a multidimensional concept which can be regarded as a statistic concept (at a particular moment in time) and expressed in financial results as well as in a more dynamic and holistic approach (in terms of the creation of competitive advantages in the future). On the basis of the literature review it seems to be obvious that business competitiveness is a combination of different factors shaping competitiveness and it confirms that the results obtained in this scope should not be only associated with better market performance and higher profitability. Moreover, the pursuit of competitive advantage in order to sustain profit and fulfill the interests of key stakeholders can not be regarded in a narrow sense (cost only) but special efforts must be focus on aspects such as quality, sophistication of inputs and core capabilities development (Aiginger, Bärenthaler-Sieber, Vogel, 2011, p. 11). The increased attention to firm's internal resources and capa-

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bilities, understood as capacity to deploy resources, usually in combination, to produce a desired effect, emerged in the mid 1980s twentieth century along with the resource-based theory of competitive advantage (e.g. Wernerfelt, 1984; Barney, 1991). Its consequences are the dynamic-capabilities view of the firm represented by: theory of key competences (Hamel, Prahalad, 1994), knowledge-based view of the firm (Grant, 1991) and dynamic possibilities view (Teece, Pisano, Shuen, 1997). The resource-based theory suggests that internal resources are the primary determinants of firm performance. In turn, Porter (1980, p. 30) in his competitive forces model emphasizes mainly the significance of external factors (generated by market environment) such as: competition between companies which already exist in the industry, threat of new entrances, substitute products, suppliers' and customers' bargaining position (Zhang, London, 2014, pp. 95-97). The collective strengths of those micro level forces determine firm profitability. One of the external factors affecting competitiveness is also macro environment which embraces: institutions, infrastructure, education, particularly including the access to financing or tax regulations. They are perceived as the crucial drivers of firm competitiveness. In spite of that many researchers highlight that internal as well as external factors are equally important. That it why, firms functioning under the conditions of new economy should seek a strategic fit between the external environment, which generates threats and opportunities, and their internal resources, including intangible assets such as skills and experience workforce, patents, know-how, software, customer relationships, brands, unique organizational culture, etc.

Profitability as a gauge for competitiveness of Polish enterprises

Measuring firm competitiveness is not an easy task, especially if it is a function of different components and embraces aspects such as effectiveness, efficiency, productivity, quality of work life, innovation or customer satisfaction (Rolstadås, 1998, pp. 990-992). In the authors opinion the focus on profitability which represents the ultimate goal for any organization allows to assess the economic performance and competitiveness of Polish enterprises, irrespective of the sectors in which they operate. Profitability rate expresses the efficiency of using the entire patrimony of a firm and can be measured in a different ways on the basis of data derived from financial statements. One of the most frequently used indicators in evaluating profitability are:

– return on sales: $ROS = \text{net profit} / \text{net sales} \times 100\%$

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- return on assets: $ROA = \text{net profit} / \text{total assets} \times 100\%$
- return on equity: $ROE = \text{net profit} / \text{stakeholders' equity} \times 100\%$

Table 1 shows the profitability rates of Polish enterprises. The data presented concerns only those entities which keep accounting ledgers and employ more than nine persons.

Table 1. Profitability rates of non-financial enterprises in Poland

Indicators	2007	2008	2009	2010	2011	2012	2013
ROS	6,0	5,5	5,0	5,1	5,2	4,3	4,3
ROE	13,4	11,6	12,1	12,0	13,0	11,5	11,1
ROA	7,1	5,9	6,3	6,2	6,5	5,8	5,6

Source: Financial results of non-finance enterprises in years 2007-2013, Central Statistical Office.

For the purpose of the analysis, it is also proposed to use such kind of indicators as: profitability rates of gross/net turnover which constitute the relation of gross/net financial result to revenues from total activity. The competitiveness of enterprises in Poland in years 2007-2013 measured by gross profitability rate is presented in Table 2.

Table 2. Gross turnover profitability rate of non-financial enterprises in Poland

Enterprises	2007	2008	2009	2010	2011	2012	2013
Small	8,1	7,3	4,9	5,1	2,1	4,8	4,2
Medium	6,5	6,0	4,2	4,10	3,7	3,5	3,9
Large	6,8	4,7	5,4	5,9	6,2	4,5	4,8

Source: Financial results of non-finance enterprises in years 2007-2013, Central Statistical Office.

The average profitability rate in years 2007-2013 stood at 5,1%. The highest profitability occurred in the large enterprises which turned out to be more resistant to the global economic downturn and its negative impact on Polish economy in comparison to the medium and small entities. It has to be underlined that in the analyzed period macroeconomic factors related to the financial crisis had the greatest influence on the competitiveness of enterprises measured by their profitability.

Absorption of EU funds in years 2007-2013

In the 2007-2013 programming period Poland was one of the largest beneficiaries. The EU funds are considered as an attractive tool for financing investment opportunities and Polish entrepreneurs could obtain support

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under the following Operational Programmes (OP): five national OP, 16 Regional OP and European Cooperation Programmes. The most desirable forms of the EU aid in the process of building modern and innovative economy seem to be subsidies: to invest and support for R&D and innovation activities, for obtainment of patents and copyrights or staff development, support for business activity in the field of electronic commerce or subsidies to enterprises on environmental protection such as: generation of energy from renewable resources, rationalization of resources and waste management (European 2008, pp.15-107).

Table 3. Number and amount of applications submitted, contracts signed/decisions issued and applications for payment under SCF 2007-2013

Operational Programmes	Contracts forco-financing		The applications forpayment	
	Co-financing from the EU (thousands of PLN)	Level of use of allocation for the 2007-2013 period	Co-financing from the EU (thousands of PLN)	Level of use of allocation for the 2007-2013 period
OP Innovative Economy	38 992 028	108%	25 315 687	70%
OP Infrastructure and Environment	118 578 332	99%	88 708 510	74%
OP Human Capital	44 097 151	105%	36 624 344	88%
OP Technical Assistance	2 234 478	104%	1 678 672	78%
OP Development of Eastern Poland	9 970 975	100%	6 994 519	70%
OP of European Territorial Co-operation	1 499 675	104%	1 032 122	71%
16 Regional OP	70 180 720	98%	57 986 812	81%
Total SCF	285 553 359	101%	218 340 665	77%

Source: The use (2014, p. 3).

It turns out that in the analyzed period 33% of Polish enterprises became the beneficiaries under the Strategic Coherence Framework 2007-2013 and the total amount of investment is estimated at 93 103 mln PLN (The utiliza-

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tion, 2014, p. 4). Taking it into account, the assessment of the absorption understood as a country capacity of effectively and efficiently spending the allocated financial resources from the EU funds is also worth considering. According to the Commission Report on the implementation of Cohesion Policy 2007-2013 absorption rate among Member States is diverse (Cohesion, 2013, p. 11). The highest absorption of 90% and more was recorded in countries such as: Ireland, Sweden, Portugal, Belgium, Austria or Germany, whereas the lowest in: Italy, Slovakia, Czech Republic, Bulgaria and Romania (around 30% of their allocated budget). Poland was ranked third among CCE-12 countries with a 67,9% payment rate, however according to the latest data presented in Table 3 the level of use of allocation in Poland is estimated at 77%.

**The Relationship between absorption and profitability
of Polish enterprises in years 2007-2013**

The EU funds contributed to the country development, investment intensification, and the process of building competitive economy (Belka, 2011, p. 34). The total value of inflow of EU funds during the 2007-2013 programming period is presented in Table 4.

Table 4. The total amount of EU funds under the SCF 2007-2013 (in thousands of PLN)

2008	2009	2010	2011	2012	2013
775 028 564	806 092	437 303	188 684	848 545	047 417

Source: Data obtained from the Ministry of Infrastructure and Development.

Polish enterprises belongs to one of the key beneficiaries of EU funds. They impact through investment in micro and SMEs, both in tangible and intangible assets, had a positive influence on their economic performance. It is expected that along with the absorption of EU funds the competitiveness and financial results of Polish enterprises should improve considerably. To assess the relationship between the absorption of EU funds and their profitability, the Pearson correlation was used. On the basis of conducted analysis, the strongest correlation was obtained between the absorption of EU funds and gross turnover profitability rate. However, the strong correlation between the absorption of EU funds and gross turnover profitability (0,842) is only apparent because this relationship turned out to be statistically insignificant.

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Table 5. Correlation between the absorption of EU funds and gross turnover profitability rate

	EU funding	Gross turnover profitability
Pearson Correlation	1	0,842*
Significance		0,35
N	6	6
Pearson Correlation	0,842*	1
Significance	0,35	
N		6

*Correlation is significant at 0,05 (bilateral)

Own calculations based on Financial results of non-finance enterprises in years 2007-2013, Central Statistical Office and data obtained from the Ministry of Infrastructure and Development.

Similar results were achieved in case of correlation between the absorption of EU funds and ROS which seemed to be strong (0,595) but also statistically insignificant. In turn, the weak negative and statistically insignificant correlation (-0,2) was obtained for ROE and ROA with respect to the absorption of EU funds. However, it is worth mentioning one of the surveys conducted by InfoCredit in years 2007-2011. The conducted survey concerned a role of EU funds in the process of Polish enterprises development. It confirmed that the EU funds not only contributed to the increase of sales revenues and assets but also determined long term profitability of enterprises (Igielski, 2014, pp. 31-34). In a selected group of entities using EU funds the worse economic performance was only observed at the beginning of the period. It is not surprising, especially if the realization of projects co-financed by EU funds is usually expensive and investment brings benefits in the future.

Conclusions

On the basis of conducted analysis is difficult to assess the relationship between the absorption of EU funds and profitability of Polish enterprises. It appears that the apparently strong correlation between the key variables can not be statistically proved. In the authors opinion it is a result of the limits of research such as: too short period of the analysis, macroeconomic factors which determined economic performance of enterprises at the time of global crisis, and the sample of entities taken into consideration. The EU funds were directed mainly to micro, small and medium enterprises but

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because the majority of them keeping rather simplified forms of accounting (Tax Revenue and Expense Ledger) they were not embraced in the analysis. Moreover, it is worth highlighting that the apparently high absorption of EU funds did not find its confirmation in the competitiveness growth of Polish enterprises measured by their profitability. As a result, the expected rise in profitability rates, as well as innovativeness of enterprises benefiting from the support, compared to the others Member States did not appear. According to the Innovation Union Scoreboard 2014 Poland is still ranked below most EU countries (in 26th place) and classified as a moderate innovator. In spite of the inflow of EU funds in years 2007-2013, Summary Innovation Index (SII) remained at the level of 0,279, while the EU average increased to 0,554 (Innovation, 2014, p. 94). It allows to conclude that the effective absorption at the administrative level which goes along with the optimal choice of economically desired investment is not possible and Polish entrepreneurs simply adopted to the required criteria.

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