CRACOW UNIVERSITY OF ECONOMICS

FOUNDATION OF THE CRACOW UNIVERSITY OF ECONOMICS

DEVELOPMENT, INNOVATION AND BUSINESS POTENTIAL IN VIEW OF ECONOMIC CHANGES

EDITED BY
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Department of Economics and Organization of Enterprises
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Edited by
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Reviewer

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INTRODUCTION

The economy of the early 21st century is the arena of extremely dynamic, turbulent and often unpredictable changes. It creates a climate of new challenges for the functioning, transformation and development of firms. Its distinguishing feature are also crisis phenomena progressing rapidly and with great intensity.

No one has foreseen such enormous scope, depth and extent in time. These properties have resulted in significant perturbations in economies and the economics of business entities. They have questioned the effectiveness of numerous theories and practices. It seems that they have irreversibly destroyed the existing conditions and factors of development. Their considerable strength has made companies lose their internal and external balance, frequently deviating from the set paths of development. What is more, the deep economic crisis has destroyed everything that was built on weak foundations, resources improperly constructed and used. This substantial change, which is a sign of our times, brings about a need to adapt economies and their entities to the new conditions and factors of development, and is a categorical imperative of effective and efficient activities.

In the process of the search for the ways of overcoming the crisis and adapting to new conditions and factors, certain strategies are developed and applied. They set the directions of changes for the functioning and development of the firm - their essence lies in internationalization (globalization and regionalization), innovativeness, entrepreneurship, as well as the creation and the efficient use of knowledge-based resources.

The progressing transformation of the economic reality also results in defining the enterprise itself as a completely new research object. Therefore, a need has been triggered for the dynamic development of knowledge about the concepts, strategies, processes and conditions of enterprise transformations and development, as well as management tools and methods in the era of globalization, new economy and crisis.

In the days of turbulent changes in the environment of businesses and economies and inside them, the demolition of old economic concepts and the emergence of new ones, representatives of numerous economic trends and schools come to the fore. The direction of the proclaimed views and the purpose of the resulting activities focus around necessary calm and providing unstable economies with impulses for changes by restoring the path of permanent development.

In these conditions, the aim of undertaken microeconomic activities is the conscious introduction of changes in the rules and structures of firms in order to restore and maintain the state of internal and external equilibrium in them, which contributes to the implementation of the path of their growth and development. The changes cannot be accidental but they have to be conscious and permanent activities arising from broadly conducted analytical, diagnostic and project works based on the definition of the new situation.

The idea which became the basis for the creation of the book entitled *"Development, Innovation and Business Potential in View of Economic Changes"*, is the consequence of the thoughts formulated above and describing the changes progressing in enterprises and their environment - economy and sectoral policies. The changes constitute the centre of interest and the structural axis of this book. It has developed a framework being its structure and filled with the contents which logically and accurately reveal the quality of cohesion of the issues discussed in it. We can only expect and express our hope that this book will fulfill the characteristics of an important publication included in the offer broadening the knowledge about transformations in contemporary economies and enterprises, creating a competitive advantage with the use of innovation, the internationalization of activities and knowledge resources, as well as the analysis of the nature of their functioning and methods and tools for their efficient management.

The entirety of the Authors' deliberations is divided into four thematic parts creating one coherent whole:

I. Creation of development, competitiveness and business potential.
II. Macroeconomic and sectoral policy problems in terms of economic analysis.
III. Decision-making factors of optimization, reliability and innovation processes in enterprises.
IV. Financial aspects of the functioning and control of firms and public institutions.

The first part of the book presents the problems of international competitiveness, the development of enterprises in terms of their economic and financial potential, the dynamic approach to productivity and entrepreneurship. It opens with the discussion by Janusz Fudaliński and Halina Smutek, devoted to transaction costs as the factor of the growth of international competitiveness of enterprise functioning in industrial clusters. Further chapters draw attention to the concept of financial and economic potential and dynamic productivity, focusing ultimately on the issues of factorial approach to entrepreneurship in terms of competitiveness of local (local governmental) institutions.

The next part opens with a chapter on the nature and determinants of the path of economic development from financial stability to sustainable growth by Grigore Belostecinic. In relation to this, further chapters are devoted to benefits and concerns associated with investment and foreign capital in the banking sector, as well as multi-faceted problems of the implementation of energy security policy, the forms of activation of the unemployed and the foundations of decisions in the conditions of uncertainty and risks undertaken at the level of households, which create consumer demand.

The attention of the third part of the book is focused on the problems gathered under the joint title "Decision-Making Factors of Optimization, Reliability and Innovation Processes in Enterprises". What can be found here is primarily an interesting approach to the issues of innovativeness as a factor of economic growth in the light of the economic crisis, proposed by Marek Dziura. The inquiries related to innovativeness are completed by the problems of cost of operation and reliability of the use of resources of enterprise business assets according to the concept by Stanisław Młynarski and Jarosław Kaczmarek as the co-author. The closing chapter of this part of the book is the discussion on cooperation and open innovation.

The last, fourth part of the book logically strives for undertaking the financial problems of functioning, as well as the supervision and control of enterprises and institutions. This part is opened by Dariusz Zarzecki's chapter devoted to the concept of Private Cost of Capital in the model approach and in terms of empirical verification. Further deliberations of the next authors discuss the discriminatory risk analysis of enterprise bankruptcy, the standards of their valuation process, finally closing in the area of standard internal and external auditing.

This publication is the outcome of long-term scientific and research cooperation among the employees of the Department of Economics and Organization of Enterprises of the Cracow University of Economics and representatives of various scientific and research centres in Poland and abroad, as well as of economic practice. The book we are now handing over to the Readers, by collecting and organizing the developed knowledge, findings and new search, inscribes into the presentation of interesting investigations, detailed analysis and resulting evaluations conducted by the Authors, describing complex and multidimensional issues of development and economic policies, innovation in the behavior of enterprises, their competitiveness and optimization of operations, as well as the financial aspects of their functioning and control. Thus, the Authors hope that the issues presented in the book will provide the point of reference for new deliberations, inquiries, and analyses in this area of scientific discussion.

Jarosław Kaczmarek, Paweł Krzemiński

PART I

CREATION OF DEVELOPMENT, COMPETITIVENESS AND BUSINESS POTENTIAL

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TRANSACTION COSTS AS A FACTOR OF INTERNATIONAL COMPETITIVENESS OF ENTITIES OPERATING WITHIN INDUSTRIAL CLUSTERS

Summary

It seems that in the conditions of intensifying competition, the idea to draw attention to the problem of transaction costs is one of effective competition models, utilizing a number of positive external benefits that can be achieved by functioning within network systems such as industrial clusters. This form of cooperation emphasizes the complexity of relations between business partners and at the same time between competitors. It lets us look at the nature and sources of competitiveness from another perspective. The limited character of internal resources, the impossibility to take actions on a scale that may ensure the company's competitiveness, may be compensated by noticing that competitiveness depends upon the ability to use opportunities created by the environment. This type of clusters gives such opportunities. They enable effective competition not only on the local market, but also on international markets, what in the present times is already a necessity and at the same time a standard of shaping relations, the final result of which may generate an impulse to achieve competitive advantage.

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Introduction

Understanding the essence and mechanisms of processes taking place in the contemporary world, such as globalization, virtualization, growing uncertainty[1] and the degree of complication of macro and

[1] P. Buła, J. Fudaliński, *The Chaos Theory In Managing An International Company; Example Of PKN Orlen*, "Review Of General Management", Vol. 12, Issue 2, Spiru Haret University, Faculty Of Management Brasov, Brasov 2010, pp. 33–50.

microeconomic conditions in the business environment is reflected in a limited possibility to use simple extrapolation in determination of possible future trends determining development possibilities of business entities. In order to find ourselves in this uneasy reality we need to pay attention to such problems as: commercial agreements, policy towards developing countries, the functioning of global institutions, which make that nothing's abroad – but is going on here and now. It is required to appropriately use the positive sides of the processes taking place, which are, among others, integration of countries and people in the world[2], reduction in transaction costs, restriction of barriers in flows of products, services, people and capital between countries. As a consequence, the market starts to operate not only within the domestic economy but also the global economy. Restricting operations to the domestic market may constitute a factor limiting development possibilities focused on improving the competitive position by, among others, use of the means of production from different countries[3]. Global competition forced companies to search for new sources of competitive advantage. Traditional strategic concepts such as strategic adjustment of resources and opportunities[4] or traditionally understood competitive strategies[5], lose relevance in global conditions. There are new proposals of a competitive global strategy, which include, among others, models based on the idea of resources constituting levers and modifications of the idea of strategic adjustment and strategic hierarchy, which can be seen in new business models, constituting an outline of a strategy embedded in the company's structures, processes and systems[6].

The key role is also played by appropriate allocation of the company's resources, which enables optimization of the structure of all production factors – tangible and financial as well as intellectual capital components[7], aimed at increasing the organization's value. Optimization of activity costs is another problem that contemporary economic entities face, which requires the dilemma to be settled – buy and order, namely enjoy market offerings and bear transaction costs, or aim at reducing costs by organizing the company's own production or services? In the days of growing complexity, degree of variability, as well as intensity in the business environment, an important skill is use of different forms of cooperation among business entities, enabling more effective use of internal and external sources of competitiveness, including reduction in operating costs where an important role is played by transaction costs.

Thus the article aims at indicating the role of transaction costs as a factor affecting the level of competitiveness of companies operating on international markets, in particular within industrial clusters.

Determinants of companies' international competitiveness

International expansion of the US economy and then the Japanese and German economies after World War II resulted in a number of theories trying to explain the reasons for differences in development of particular countries. Theory of the technological gap by M.V. Posner[8], trying to explain why economies

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[2] K. Wach, *Skutki akcesji do Unii Europejskiej dla polskich przedsiębiorstw*, Cracow University of Economics, Cracow 2008.

[3] N. Giannellis, G.P. Kouretas, *Does China's International Competitiveness Fluctuate in Consistency with PPP Equilibrium?*, [In:] *Macroeconomic Analysis and International Finance (International Symposia in Economic Theory and Econometrics – Vol. 23,* (ed.) *G.P. Kouretas*, A.P. Papadopoulos, Emerald Group Publishing Limited, 2012, p. 154.

[4] See also: K.R. Andrews, *The Concept of Corporate Strategy*, H. Dow Jones– Irwin, Homewood Illinois 1971; I. Ansoff, *Corporate Strategy. An Analytical Approach to Business Policy and Expansion*, McGraw–Hill, New York 1965; Z. Pierścionek, *Zarządzanie strategiczne w przedsiębiorstwie*, PWN, Warszawa 2011.

[5] M. Porter, *Strategia Konkurencji. Metody analizy sektorów i konkurentów*, Wydawnictwo MT Biznes, Warszawa 2006.

[6] See also: M. Lindgren, *21st Century Management. Leadership and Innovation in the Thought Economy*, Palgrave Mac Millan, London 2012; A. Osterwalder, Y. Pigneur, *Tworzenie modeli biznesowych*, Helion, Gliwice 2012.

[7] J. Fudaliński, *Perspektywy rozwoju zarządzania społecznego w sektorze organizacji non profit w Polsce*, Wydawnictwo Difin, Warszawa 2013.

[8] *Przedsiębiorstwo na rynku międzynarodowym – analiza strategiczna*, (ed.) T. Gołębiowski, PWN, Warszawa 1994, p. 47.

of some countries are more innovative than others and the concept of S.B. Linder[9], assuming that the impulse for international exchange is a similar level of income and models of demand, inspired the conclusion that the biggest exchange takes place between countries of similar equipment in production factors. The points of view of M.V. Posner and S.B. Linder are connected by the theory of the product's life cycle, suggested by R. Vernon's effect[10], in which the author stated that high income and demand in countries leading in development stimulate innovations, first of all, regarding consumer goods of permanent use, thanks to which these countries obtain international competitive advantage which is used by them first by exporting and then by, replacing import in other countries, investments. As the product matures, factors related to comparative advantage regarding costs begin to play an increasingly important role. Production shifts to developing countries and the directions of export reverse. Product life cycle models introduce the level of the branch (economy sectors) to analysis indicating, at the same time, factors directly influencing the company[11].

The process of formulating objectives, methods and ways of implementing activities aimed at development in global conditions leads to the internationalization of business. Many researchers is of the opinion that globalization is a prerequisite for corporate businesses to survive. The functioning of companies on the domestic market, especially if this market is not large, would be a factor limiting their development capacities focused on improving the competitive position by, among others, use of the means of production from different countries[12]. Currently it is believed that the globalization of companies follows the first stage of their development, which is specialization as well as operations on the domestic market, and then diversification and internationalization of the company's activities take place. The contemporary paradigm of management needs to take into account the international aspect of operations that is directly related to transforming the domestic environment into a global one. These changes generate the need for a different look at the process of formulating the company's strategic vision since both the scope of the company's activities as well as its strategies undergo transformation. Competitiveness of companies should be examined in the context of competitiveness of sectors and economies.

In order to ensure competitive advantage of sectors operating on international and global markets, an innovative perception of resources is necessary, on the basis of which advantage in the organization's environment is built, taking account of elements unnoticeable by others: unshaped market, new applications of already existing technologies, potential investors, networks of organizational relations forming convergent interests, etc.

Competitiveness of a given national economy[13] depends on its level, its innovation and a positive attitude towards changes and promotion of enterpreneurial behaviors. In the opinion of M. Porter competitiveness is determined by both macro and microeconomic factors. Proper policy at the macroeconomic level, political stability, legible and stable legal system affect the efficiency and effectiveness of the economy, thereby shaping conditions for initiating and developing business. Apart from macroeconomic conditions he indicates the microeconomic context determined on the one hand by quality of the company's competition strategy (strategic adjustment), while on the other by business micro–environment[14].

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[9] *Przedsiębiorstwo na rynku międzynarodowym ...,* op. cit., p. 47.

[10] R. Vernon, *Intenational Investment and International Trade in the Product Cycle*, „Quarterly Journal of Economics" 1996, vol. 80, No 2.

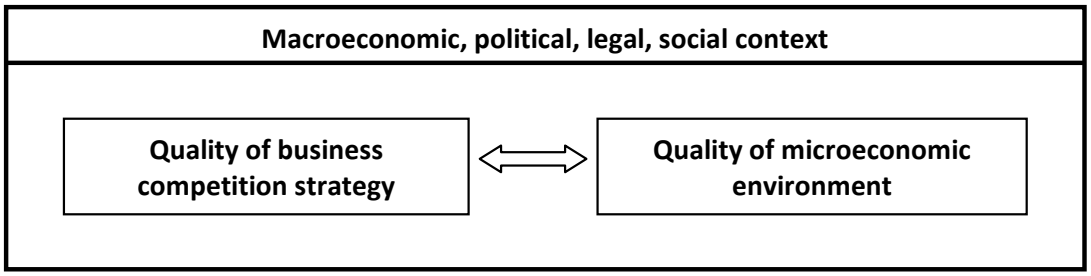
[11] *Przedsiębiorstwo na rynku międzynarodowym ...,* op. cit., p. 48.

[12] J.C. Peña-Vinces, G. Cepeda-Carrión, W.W. Chin, *Effect of ITC on the international competitiveness of firms*, "Management Decision" 2012, Vol. 50, No. 6, p. 1051.

[13] S. Globerman, *Regulation and the international competitiveness of US–based companies*, "Competitiveness Review" 2014, Vol. 24, No. 5, p. 380.

[14] M. Porter, *Clusters and New Economics of Competition*, "Harvard Business Review" 1998, XI–XII.

Figure 1. Determinants of competitiveness



Source: M. Porter, *Clusters and New Economics of Competition*, "Harvard Business Review" 1998, XI–XII.

When looking for an answer to questions concerning sources of competitiveness of sectors and companies, Porter placed competitiveness analysis in the context of national characteristics – national advantage diamond (Porter's diamond). National advantage refers to specific industries of the economy whose competitiveness is determined by: 1) equipment in means of production; 2) character of domestic demand – degree of traditionalism of buyers, their demand for modern products, but conditions of demand also relate to the purchasing power of the society (GDP per capita of a given country); 3) presence of related and supporting sectors (industries) – among others local suppliers and cooperators as well as the quality of cooperation between them; 4) strategy of companies, method of management and competing – manner of creation and management of companies determining the applied investment strategies, employment, nature of competition and such elements as: government and random events.

Concept of industrial clusters

In the theory of national and local competitiveness under the conditions of global economy presented by M. Porter, an important role is played by the concept of industrial cluster, originating from the concept of industrial districts by Marshall who, conducting research of UK's industrial regions, observed presence in them of substantial clusters of companies from individual industries, which he called industrial districts or local production systems. His book *Economic principles* published in 1890 constituted development and interpretation of the 19th century's mainstream economic thought, drawing inspiration first of all from achievements and observations of classic economists. Interest may be observed in Marshall's deliberations in issues pertaining to the to micro – economic level, which was associated with the increasing interest in the problems of resource allocation, place of the company in the economic system based on improvement of demand and supply analysis on markets of particular products. The research conducted by Marshall related to clusters of companies from the same or related industries, such as e.g.: textile, or metal industry. In the Marshall's opinion, these companies benefited from the fact of functioning in the geographic proximity and entering into cooperation or confrontational relations with other industry participants[15]. They were an unintended effect of the phenomenon of agglomeration of enterprises, and, as a consequence, resulted in:

- overlapping social and production factors, decisions made by local communities take account of the presence of industry and, vice versa, economic factors are formed by social factors,

[15] M. Gorynia, B. Jankowska, *Klastry a międzynarodowa konkurencyjność i internacjonalizacja przedsiębiorstw*, Difin, Warszawa 2008, p. 30.

- wide division of labor and advanced specialization typical of companies involved in the production of complementary goods.

According to the assumptions of Marshall's theory, the main cause encouraging new entities to locate their operations in the given place is a possibility to benefit from spatial existence of many companies side by side. Companies were aware of the positive external effects occurring in the so–called. industrial districts constituting a group of business entities specializing in different production process phases, which enabled companies to obtain and develop skills associated with the given stage of production of a given good , ensured the possibility of using the economies of scale. Other positive consequences of industrial districts were access to specialized workforce, facilitated flow of information resulting from geographic proximity of companies, which, in consequence, have led to innovation diffusion[16].

Referring to the Marshall's concept, Porter indicates clusters as a mechanism which may have a stimulating effect on the scope of cooperation between different entities of economic life, increasing the level of innovation by transfer of knowledge and information, and hence contributing to improvement in competitiveness of cluster participants. Cluster is defined as a geographic concentration of inter–related companies, specialized suppliers, service–providing units, companies operating in related sectors and institutions related to them (for example universities, standardization units and trade associations) in particular areas, competing, but also cooperating among themselves[17].

Identification of an industrial cluster consists in horizontal or vertical analysis of value creation chain. In the vertical perspective analysis encompasses a line of activities implemented in the system supplier – manufacturer – buyer. On the other hand, the horizontal dimension of the analysis comes down to identification of trades and sectors that use common distribution channels or produce complementary products or services[18]. According to Porter, clusters may have various scope in geographic space and usually the scope of a cluster does not correspond to the scope of one industry or sector.

Apart from the classic definition of M. Porter, literature on the subject contains many other cluster definitions[19], which proves large popularity of the clustering concept, which results in actions and programs supporting cluster initiatives.

Rabelotti defines cluster as a geographic concentration of specialized (mainly small and medium) companies, operating in related sectors, connected with the network of public and private institutions supporting their activities. There are market and non–market linkages between companies, resulting from exchange of goods and information. Behaviors of different companies are determined by a sense of bond and community with other companies from related sectors, operating in a particular location[20].

Cook defines cluster similarly[21] as a geographic concentration of companies, between which there are horizontal and vertical dependencies. These companies cooperate and compete with each other within a specific market segment. They use a shared local infrastructure and identify themselves with the same vision of industry and region development.

Despite definition–related diversity of the cluster term, for its most important characteristics are existence of internal relationships and links having the nature of a system and simultaneous presence of both competition and cooperation between particular entities – which is defined more and more often in

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[16] M. Gorynia, B. Jankowska, *Klastry a międzynarodowa konkurencyjność…,* op. cit., p. 34.

[17] M. Porter, *Porter o konkurencji*, PWE, Warszawa 2001.

[18] M. Gorynia, B. Jankowska, *Klastry a międzynarodowa konkurencyjność…,* op. cit., p. 34.

[19] See: H. Maw–Shin, L. Yung–Lung, L. Feng–Jhy, *The impact of industrial clusters on human resource and firms performance*, "Journal of Modelling in Management" 2014, Vol. 9, No. 2, p. 142; A. Martínez, J.A. Belso-Martínez, F. Más-Verdú, *Industrial clusters in Mexico and Spain: Comparing inter-organizational structures within context of change*, "Journal of Organizational Change Management" 2012, Vol. 25, No. 5, p. 657.

[20] M. Gorynia, B. Jankowska, *Klastry a międzynarodowa konkurencyjność …,* op. cit., p. 35.

[21] P. Cooke, R. Huggings, *High technology Clustering im Cambridge*, [In:] *The Institution of Local Development,* (ed.) A. Aming, S. Goglio, S. Forzi, London 2002.

economic literature as coopetition – coopetition[22]. Coopetition can be understood as a strategy of common value creation and competition at distribution of this value in conditions of partial convergence of goals and variable structure of the positive–sum game[23]. This phenomenon appears when intentionally a network of strategic cooperating parties is created, made up of past competitors and when the phenomenon of competition and cooperation is present simultaneously, which additionally results in the following effects:

- the parties cooperate with each other to achieve common advantages, they do not cease to be competitors,
- common interests and the desire to confront cause the need to conclude formal agreements,
- the competitive part of the coopetition relation remains not formalized.

Coopetition is usually aimed at by business units which have a strong position in the sector, with simultaneous lack of access to strategic resources, being at the disposal of the competitor. Coopetition model indicates a change in configuration of the value creation model by companies, from the previously dominating method of value chain to the model of value network, in which competitive advantage is determined by the abilities of common use of resources by units operating in specified.

To sum up, elements creating a cluster are[24]:

1. Industry being the core of the cluster (core business) whose companies are key participants of the cluster, earn high revenues, support international market,
2. Supporting industries – serving industries being the core of the cluster, such as: suppliers of machines, materials, components, suppliers of financial services marketing. They are characterized by high level of specialization and proximity of companies from the center of the cluster,
3. Soft support infrastructure, covering local schools, universities, local government institutions, economic development agencies, having crucial importance for companies operating within the cluster,
4. Hard infrastructure which traditionally encompasses road, ports, waste management, telecommunications.

What is common for the business model of the cluster is the attribute of geographic proximity. Typical characteristics of the industrial cluster model that differentiate it from the network model are that:

- it attracts providers of specialized services to the region,
- it is characterized by open membership,
- it is based on social values, related to trust and reciprocity,
- it results in the need for presence of a greater number of companies with similar skills and capabilities,
- it is based on competition and cooperation,
- the cluster participants have a common vision of functioning.

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[22] J. Cygler, *Kooperencja przedsiębiorstw. Czynniki sektorowe i korporacyjne*, Oficyna Wydawnicza SGH w Warszawie, Warszawa 2009.

[23] G.B. Dagnino, F. Le Roy, S. Yami, W. Czakon, *Strategie koopetycji – nowa forma dynamiki międzyorganizacyjnej?*, „Przegląd Organizacji" 2008, No. 6.

[24] See: M. Gorynia, B. Jankowska, *Klastry a międzynarodowa konkurencyjność ...,* op. cit., p. 35. In the subject literature, apart from the notion of clusters, we can find the term cluster initiative. The cluster initiative is more or less institutionalized (formalized) group of local actors focused on initiation of operation of a given cluster or finding solutions to significant problems of an already functioning cluster. Start–up of the cluster initiative may be a result of bottom–up actions of business entities interested in cooperation (bottom–up) or a result of top–down actions undertaken by public authorities (top–down). The popularity of the discussed form of cooperation between companies has resulted in such definitions being used as: industrial district, metropolitan area, industrial complex, business environment.

Positive effects of industrial clusters

Creation and development of clusters in a region involve a number of phenomena, which foster competitiveness and innovation of the local economy, such as:

- shaping the market of specialized production factors, of which the greatest importance is attached to knowledge and high quality of the human capital,
- development of scientific infrastructure in the region and its greater use by business units,
- stimulation of flow of knowledge, learning processes and absorption and generation of innovations, thanks to spatial proximity and interactions among various units operating within the cluster structures,
- creation of innovation culture and entrepreneurship in the region,
- development of complex production networks consisting of specialized subsuppliers and cooperating parties, which is an interesting example of a production organization system based on the SME sector – however it is often concentrated around one or several large companies,
- formation of new business units in the region,
- incorporation of SME in cluster structures, which leads to their higher specialization and effectiveness of functioning, thanks to intermediate implementation of scale benefits,
- creation of attractive labour market, attracting qualified employees,
- increasing location attractiveness for foreign direct investments,
- positive impact on the natural environment, thanks to investments and initiatives for environmental protection on the part of cooperating entities and creation and implementation of environmental innovations (eco–innovation).

The regional aspect in cluster operation is related to a cultural community and a higher level of trust and social capital[25]. Currently, the increasing role is emphasized of factors related to social capital that are necessary for undertaking common activities, especially in the environment of competition and conflict of interest. The value generated by social networks, however, depends on three factors: the level of trust in social relations, the degree of synergy of various kinds of networks as well as the force of shared sense of identity. Trust and a higher level of social capital has a positive economic effect in the form of lower transaction costs and costs of control, as well as accepting the so–called external effects. Clusters can also contribute to reduction in information asymmetry between business units.

The beginnings of cluster initiatives were associated mainly with trades having a sufficient scale of research and development. A prime example is the Silicon Valley. Currently, many initiatives and projects are implemented referring to the concept of a cluster and using this word in the name. Genesis, objectives and the entitative structure of these projects are, however, largely diverse[26]. The possibilities of creating industrial clusters in Poland are decided largely by spatial concentration of business operations. High degree of concentration in relation to the remaining sectors of the economy is typical in particular of sectors of high technologies both in processing industry (pharmaceutical industry, production of computers and office machines, precise, electronic and aviation sectors) and in market services (computer science, research and development). These sectors are characterized by a high ratio of outlays for research–development works to sold production, they are concentrated mainly in strong academic centers, having appropriate human capital resources and research facilities. Innovative clusters have special importance for economic development, and are distinguished by the fact that key partner relations are shaped not only between production and service companies, but a cooperation network incorporates units directly

[25] J. Fudaliński, *The Issues of Shaping the Procurement Function in the Sector of Non–profit Organizations– Fition or Challenge and a Real Problem? (Chapter 2) Processes ans Structures* [In:] *Management Science in Transition Period in Moldava and Poland Processes and Structure in the Time of Destabilization*, (ed.) J. Teczke, P. Buła, V. Grosu, International Management Fundation, Cracow University of Economics, pp. 42–47.

[26] L. Han–Sheng, H. Chin–Hua, *Geographic clustering, network relationships and competitive advantage: Two industrial clusters in Taiwan*, "Management Decision" 2014, Vol. 52, No. 5, p. 854.

associated with the R&D sphere. The main reason for concentration of innovative companies within a particular geographic area is the possibility of faster knowledge diffusion constituting the result of the research – development works or constituting the result of activity of companies operating within a cluster. The use of clustering as the plane of cooperation of various units results in the fact that companies participating in innovative clusters systems are characterized most often by specialization and complementarity of products/services. It generates a dynamic process of knowledge creation and its transfer[27]. Thus collective learning processes take place in clusters, which initiate innovations. Such clusters are often said to constitute local innovative systems[28]. Innovative systems are perceived as a network of related business entities and institutions, and the number of relations determines the synergy effect. For this reason, OECD has distinguished four forms of relations in the innovative system (OECD 1999, 2004):

- company–company connections,
- company–science and research sphere connections and public technology transfer institutions,
- market technology transfer i.e. diffusion of knowledge and innovation by way of e.g. purchase of machines, devices, licences (R&D indirect expenses),
- mobility of employees and transfer of tacit knowledge.

The experiences of recent years have showed that companies operating in the sectors of traditional or medium technologies can be characterized by high innovativeness, and thus competitiveness. A symptom of this new approach is, among others, interest in interactions and efficient information flow between different units of regional or local economy (companies, research centers, institutions around business and local authorities) and their importance for introducing innovations.

It may be stated that both on the national and the regional level more and more often we can notice the importance of clusters in shaping the economic policy promoting competitiveness and innovation. The Polish legislation defines clusters as a spatial and sectoral concentration of entities cooperating for the economic development or innovation and at least ten entrepreneurs performing business operations within the area of one or more neighbouring provinces, competing and cooperating in the same or related industries and interconnected with an extensive network of relations of formal and informal nature[29]. Experience in building vertical relations indicates increasing importance of clusters, which enable:

- better organization of a given sector,
- concentration of supply,
- reconstruction of distribution channels,
- removal of the technological and organizational gap,
- faster flow of knowledge and technology,
- development of a better and more competitive offer.

Cooperation under clusters affects their participants' different areas of value creation such as value chain optimization, increase in value through improvement in the management system, improvement in financial performance by a possibility to utilize effects of the economies of scale, reduction of operating costs, including transaction costs, ensuring access to external sources of funding or minimization of risk related with the implementation of new research and development projects.

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[27] N. Kuei-Hsien, G. Miles, S. Bach, K. Chinen, *Trust, learning and a firm's involvement in industrial clusters: a conceptual framework*, "Competitiveness Review: An International Business Journal" 2012, Vol. 22, No. 2, p. 135.

[28] M.S. Dahl, C. Pedersen, *Knowledge Flows through Informal Contacts in Industrial Clusters: Myths and Realities?,* Danish Research Unit for Industrial Dynamics, "DRUID Working Paper" 2003, No. 03–01.

[29] Regulation of the Minister of Economy of 2 December 2006 on granting financial aid not related to operational programs by the Polish Agency for Enterprise Development, "Journal of Laws" 2006, No. 141, item 1006, as amended.

Transaction costs concept

R. Coase had a significant contribution to the development of the theory of external benefits – positive and negative. In his opinion, companies are managed in a manner similar to economies with one difference – their size is determined by voluntary decisions resulting from the amount of market transaction costs. If costs related to concluding transactions are zero, then, according to Coase, it would not be necessary to create companies and any business operations would take place in the form of direct market transactions. The theory of transaction costs indicates that boundaries of a company are not determined only by a given stage of technological process[30] that it is in (production function), but they are affected by differences in costs of transactions taking place on the market, or in the company[31]. Coase's most important contribution to the theory of economics and the theory of a company was identification and definition of transaction costs, which made it possible to cast a new light upon the problem of costs in a company. Clearly, one may limit transaction costs by moving all production processes to the company[32]. Transaction costs are a category of costs which encompasses both production factors as well as costs of changes in property rights[33]. These costs are affected also by the way of concluding and complying with contracts and the quality of the institutional environment.

Transaction costs economics focused on management costs assumes the ability to generate savings as the fundamental element in the analysis of business organizations[34]. In this perspective a business is rather a characteristic management structure than a system of production functions. Based on the concept of O. E. Williamson, one may distinguish ex ante and ex post transaction costs. Ex ante costs are costs created in the course of preparation and negotiation of contracts and the amount of them is often dependent upon the type of goods and services being the subject matter of the contract. They usually include costs of design, negotiation and protection of the contract. On the other hand, ex post costs are associated with the need to establish and ensure proper operation of the management structure and consider possible misalignment and renegotiation, monitor the course of the process, as well as keep security stock[35].

Competition benefits from limiting transaction costs

Transaction costs economics is based on behavioral assumptions concerning limited rationality, opportunism and neutrality of risk[36]. The assumption of limited rationality claims that people are intentionally rational, but only to a limited extent. Although human behavior in the sphere of management can be explained in the categories of ideal, strictly rational choices, actually the man does not behave in a reasonable manner, using economic calculation in making decisions, but commits errors, which are a

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[30] D. Luzzini, F. Caniato, S. Ronchi, G. Spina, *A transaction costs approach to purchasing portfolio management*, "International Journal of Operations & Production Management" 2012, Vol. 32, No. 9, p.1020.

[31] Writing the article The Nature of the Firm in 1937, Coase emphasized that coordination of production factors could not proceed using the price mechanism of "the invisible hand ", but in a "visible" manner, by decisions in companies. According to Coase, market and entrepreneurs (companies) are two alternative forms of allocation of limited resources.

[32] R.H. Coase, *The Lighthouse in Economics,* "Journal of Law and Economics" 1974, No. 17 (2), pp. 357–376.

[33] J. Małysz, *Instytucje a koszty transakcyjne w świetle neoinstytucjonalnej ekonomii*, „Ekonomista" 2003, No. 3, p. 324.

[34] L. Huimin, D. Arditi, Z. Wang, *Transaction costs incurred by construction owners*, "Engineering, Construction and Architectural Management" 2014, Vol. 21, No. 4, p. 444.

[35] O.E. Williamson, *Ekonomiczne instytucje kapitalizmu. Firmy, rynki, relacje kontraktowe*, PWN, Warszawa 1998, pp. 33–35.

[36] A.H. Wisgickl, J. Puck, *Considering the Local Partner. A Two–Sided Perspective on Transaction Costs During Market Entry*, [In:] *Multinational Enterprises, Markets and Institutional Diversity (Progress in International Business Research. Volume 9),* (ed.) A. Verbeke, R. van Tulder, S. Lundan, Emerald Group Publishing Limited, 2014, p. 50.

result of information asymmetry[37]. On the other hand, the second assumption referring to opportunism in human attitudes applies to those who withdraw from fulfilling promises made in the contract or agreement, if only it is beneficial for them[38]. Opportunism, in the opinion of O.E. Williamson, may be eliminated or limited by means of organizational structures (hierarchy). This author attaches great importance to opportunism as the category explaining or justifying existence of a firm. Human behaviors characterized by opportunism and limited rationality determine the presence of transaction costs, which should be limited or minimized.

The third behavioral assumption in the economics of transaction costs is the assumption of risk neutrality[39]. This assumption is particularly useful in the case of multi–period contracting typical of network companies. Multi–period contracting is present in the event when management structures are neutral in relation to risk and focus on attributes of the transactions being concluded and their effectiveness.

According to O. E. Williamson both limited rationality and opportunism do not rule out the possibility of creating business alliances, if only partners are characterized by long–sightedness and awareness of potential benefits in the long run[40]. Under transaction costs Williamson distinguished:

- costs of searching,
- costs of contracting,
- costs of coordination.

Costs of searching are a result of activities undertaken by the company in order to find prospective business partners, including costs of credibility assessment. The level of searching costs may be different for particular industries, as it is affected by the specific character and the level of concentration of a given industry. For companies operating in network systems these are costs mainly borne in the initial period of operation, when potential partners are sought, which involves necessary development of databases and information about the firm's potential business partners. At this stage of the company's development, transaction costs are all expenses related to entering into the final version of the contract. It is natural that in the case of many years of cooperation based on repeated contracts, these costs diminish with time. High costs of contracting, related to all the activities being repeated at subsequent contracts, were a discouraging factor to transfer production tasks or services beyond the borders of the firm. In a network company the boundaries of the firm extend, incorporating cooperating business partners, being separate economic entities cooperating in the implementation of a particular business based on concluded agreements (contracts). The last group of transaction costs are costs of coordination, including any costs arising in connection with the company's cooperation with external entities. They include, among other things, costs of supply chain management[41] and costs related to enforcement of concluded contracts, as well as meeting any obligations contained therein. Costs of enforcement result from opportunism of managers who can make implementation of the contract dependent on their own benefits – if they do not see them, they may lose interest in meeting the obligations set forth in the contract.

The level of transaction costs depends on uncertainty, frequency of transactions and the specific nature of assets. Uncertainty comes down to opportunistic behaviors of the parties participating in transactions. The frequency of transactions leads to accumulation of entities' experience, therefore, a rule emerges – the higher the frequency of transactions, the lower the transaction costs. The specific character of assets is generally defined as the basis for choice between alternative management structures based

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[37] M. Blaug, *Metodologia ekonomii*, PWN, Warszawa 1995, p. 127.

[38] O.E. Williamson, *Ekonomiczne instytucje kapitalizmu ...,* op. cit., p. 39.

[39] J. Fudaliński, *Problematic aspect of risk in SME sector operations on international markets*, [In:] *Zarządzanie – nowe perspektywy w dobie zmian demograficznych w świetle badań*, (ed.) E. Gołębiowska, Przedsiębiorczość i Zarządzanie, tom XV, z. 11,cz. II, pp. 89–101.

[40] O.E. Williamson, *Ekonomiczne instytucje kapitalizmu ...,* op. cit., p. 35.

[41] J. Fudaliński, *The Issues of Shaping the Procurement Function ...,* op. cit., pp. 227–247.

on the analysis and understanding of their internal relations. Opportunities for minimizing transaction costs should also be sought in organizational diversity. Business transactions can be single or repeated, and this should be the determinant of the scope of integration and cooperation between companies[42].

Therefore, if we assume that the measure of the company's effectiveness is minimization of total costs, which include production costs and transaction costs, then we arrive at the following conclusions:

- growth in the level of production specialization is favorable for reduced production costs, at the same time with an observable increase in transaction costs, associated with the risk of sunk costs,
- optimal levels of specialization are thus determined by the situation where total transaction costs and production costs are as small as possible,
- every company should aim at minimizing transaction costs,
- in pursuit of economic optimization, one should consider the possibilities for social cooperation as well as determinants of economic growth,
- transaction costs economics emphasizes the importance of broadly understood management costs and benefits resulting from their limitation.

Conclusion

To sum up, internalization of external effects consists in incorporating external costs or benefits into a business's economic account, which can be achieved by creating adequately large business units. Referring to Coase's concept, such entities can effectively operate, generating positive external effects, which are the basis for their competitiveness, assuming that property rights are precisely defined, cooperating entities are not excessively fragmented and that there is the awareness of the need to limit transaction costs. It should also be noted that research conducted by KPMG in 2009, the purpose of which was to explore the approach to the costs policy among Polish companies, has demonstrated that 18% of subjects paid attention to the possibility of using various forms business partnership for the purpose of limiting risk and distributing costs, apart from such actions as optimization of business processes, optimization of purchases or restructuring of the organization[43].

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[42] A. Łupicka, *Teorie wyjaśniające powstawanie i funkcjonowanie sieci logistycznych*, Log forum 1.2.1, URL, http://www.logforum.net

[43] J. Karasek, P. Cegielski, P. Pacewicz, P. Hałka, A. Musiał, *Redukcja kosztów – doraźna potrzeba czy długofalowe działanie*? Raport KPMG, Warszawa 2009, p. 21.

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THE CONCEPT OF ENTERPRISE DEVELOPMENT IN TERMS OF ITS FINANCIAL AND ECONOMIC POTENTIAL

Summary

Different definitions of the term „potential" are analyzed. The typology of economic potential was suggested on the basis of these studies. The definitions the terms „enterprise development" and „the potential of enterprise development" are given. The properties of the constituent elements of the potential of enterprise development and its relationship with the economic and financial potentials are considered. The influence of external and internal factors on the economic development of is studied and the key role of financial and economic potential of enterprises in ensuring the effective implementation of the enterprise development is determined.

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Introduction

There is no doubt that the problem of ensuring the efficiency of manufacturing enterprises that are the engine of progressive economic development of Ukraine belong to the problems that need innovative methodological approaches to their research and solution. Under today's economic conditions the emphasis has shifted from current organizational and production problems to the formation and achievement of long–term goals of enterprise development. Accordingly, the purpose of our study is to outline unresolved or controversial aspects of the problem, namely to propose a typology of economic potential, to consider the properties of the constituent elements of the potential of enterprise development and its relationship with the economic and financial potentials on the bases of the analysis of theoretical studies and publications on the interpretation of economic, financial and economic potentials and the potential of enterprise development

The concept of economic potential

The problems of strategic management and planning of business entities are actively researched and described in the works of many national and foreign scholars such as I. Ansoff, P. Drucker, M. Porter.

They studied the conditions and patterns of socio–economic development, highlighted peculiarities of these processes in different types of economies, accumulated considerable experience and developed the methods for evaluating the effectiveness and risks of social and economic development of enterprises in the global economic system. At the same time, the theoretical basis for identifying and evaluating the potential of business development with all its components has not been worked out properly. Particularly the notion of the potential of enterprise development is still controversial.

Strategic re–orientation of enterprise towards development of competitive advantages could not affect the management system of a company, and the development of strategic management. in particular. The strategic goals of the company may include: strengthening its leading position in a certain market segment, increasing profitability from main activity, increasing market value of a company, etc. Stages of development of strategic goals and plans, and organizing their achievements follow the stages of determining and evaluating the potential of enterprise development.

Let us consider the definition of the term „potential" in details because the variety of its definitions generates a diversity of views and methods of its evaluation. The potential in the truest sense of the word describes the capabilities of the enterprise, which under particular conditions of external and internal environment can occur in certain direction with certain efficiency in certain time. In general we can say that the potential of the company is an integral assessment of current and future opportunities of economic system to transform inputs into economic benefits using entrepreneurial skills of its personnel, thus satisfying corporate and public interests.

If the direction of potential realization is economy is, then „... economic potential is economic capacity of the state, which can be used for satisfying all material needs"[1]. The magnitude of the economic potential is characterized by the volume and structure of production of material goods. Professor Lapin EV evaluates the economic potential of the company as the sum of the potentials of all economic resources that it owns[2]. Economic potential reflects the level of development of industry, agriculture, transport, availability of natural resources and the degree of their development, inventory and reserves, the level of development of science and technology, the number of working–age population, availability of skilled personnel, the level education and culture, etc.

The proposed typology of economic potential is shown in Table 1.

The main classification criteria of potential include: the level of economic system, functional areas of potential formation, the type of economic activity, period of time, time orientation, level and stage of potential realisation.

It is clear that each typology is rather arbitrary, as classified objects are described by means of the sysrem of features and it is not always possible to achieve unambiguity.

Summarizing abovementioned approaches to interpretation of the potential of the company and the related concept of the potential of enterprise development, the following common features of the potential, which are considered by the majority of researchers, can be distinguished: potential may reflect both current and long–term time possibilities for future development of enterprise in a particular area; potential describes the possibility of transforming the internal resources of the enterprise (available or possible, involved or not involved in the production process) into the final product, taking into account synergistic effect; potential associated with a particular purpose of the enterprise; external factors can significantly affect the level of potential[3].

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[1] O.I. Skopnenko, T.V. Tsymbaliuk, *Modern dictionary of foreign words: 20 thousand words and phrases*, Dovira, 2006, p. 789.

[2] E.V. Lapyn, *Evaluation of enterprise economic potential*, YTD Universitetskaya Kniga, Sumy 2004, p. 360.

[3] *Scientific bases of formation and use of the economic potential*, (ed.) V. Shvets, V. Soloviev, Cherkasy National University named after Bogdan Khmelnitsky, Cherkasy 2013, p. 360.

Table 1. Typology of economic potential

Classification criteria	Types of economic potential	
1. Economic system	World Economy National economy Regional economy	Association of enterprises Enterprises of organizational units
2. Functional areas of potential formation	Science and Technology Production Finance and Economics Management Organizing	Functional Resource Innovation Investment Other
3. Types of economic activity	Agriculture Transport and communications Industry Construction	Wholesale and retail trade Financial activities State Department Other
4. The time period	Moment	Interval
5. Time orientation	Past (present) – achieved	Future – projected
6. The level of potential	High Average	Low
7. The stage of potential realisation	Fully realized Partially realized	unrealized

Source: own study.

The role of financial and economic potential in the process of enterprise development

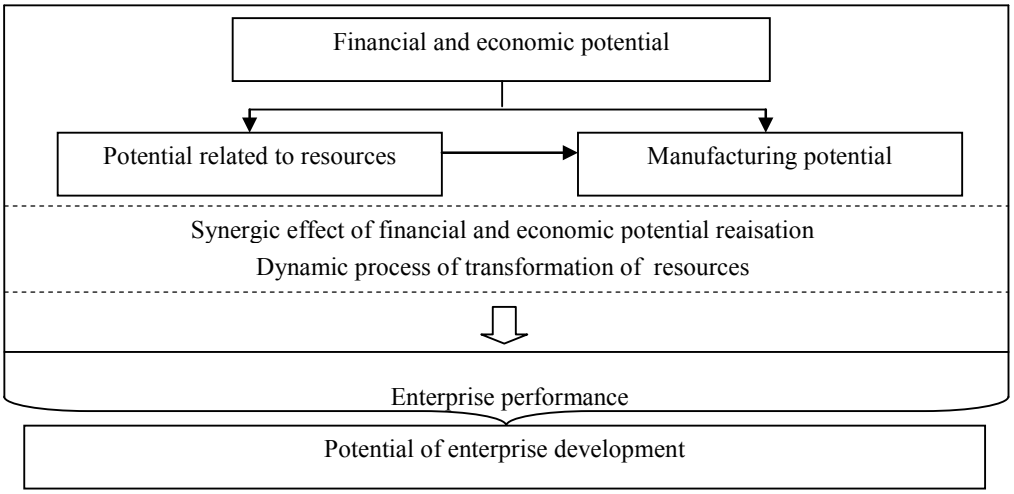
Let us consider the enterprise activities in the terms of financial and economic processes and describe financial and economic potenial.

Financial and economic potential forms the basis for the production of a certain volume and range of products, building models of profit maximization, determining the optimal ratio of the components of productive, financial and organizational structure of management and other economic mechanisms. The ability of the enterprise to use its own financial and economic potential efficiently determines its viability and competitiveness.

Financial and economic potential consists not only in integral reflection of current and future opportunities of the economic system, but also in transforming inputs into economic benefits using entrepreneurial skills of its personnel, that will help to satisfy the interests of the company and society. Not being constant, the financial and economic potential of the company as well as other elements of production, is disposed to constant change and thus requires special approaches to management. Prolonged interruption of the process of reproduction of financial and economic potential hinders or even stops the development of the enterprise. Actually, three components (finance, labour and material resources and means of labour) is the basis for determination of three components of the complete financial and economic potential of the company – related to resources, productive and financial. The first component is of a static character, the other two – dynamic. And the dynamism of manufacturing component is predetermined by the impact of financial component of the potential. The meaning and role

of the financial and economic potential can be viewed from the standpoint of the relationships between its components and performance of the enterprise as a whole (Figure 1).

Figure 1. The relationship of components of financial and economic potential and enterprise development potential



Source: Compiled according to: O.V. Lepyohina, *Financial and economic interdependence of the company potential*, "Actual Problems of Economy" 2010, No. 7 (109), pp. 127–136.

Financial potential is a combination of financial resources involved in production and business activities, and is characterized by the ability to attract funding for future activities and specific strategic directions of the company development.

Financial potential provides the possibility of transformation of resource and production potential in the result of the company activities. To some extent, the financial potential is a lever which forms the mechanism of dynamic transformation of resources in the process of operating activities of the enterprise. Its role in the reproduction process in the company is equally important. The financial potential includes financial resources, consisting, in its turn, of statutory, supplementary and reserve capitals, targeted funding, accumulation funds, the amount of permanent capital, cost of fixed and current assets and so on. In assessing financial potential it is necessary to take into account such factors as the amount of own funds, the ability of getting additional funding in the form of targeted financing; accounts receivable, efficiency of financial management and so on.

The components of the financial and economic potential of enterprises are interdependent, and this interdependence is hierarchical in nature. This is due to the fact that the resource potential of the enterprise is the primary and essential condition of industrial and economic activity. However, in order to use resources in the production process more actively it is necessary to involve technological and economic instruments as well as administrative measures and actions aimed at efficiency of production.

Thus, the resource potential is transformed into production potential upon availability of specific components which ensure the production process. In is turn, financial potential ensures production process and serves as the basis for effective use of financial and economic potential of the company. Cumulative combination of all these components ensures the appropriate level of potentia of enterprise development.

Concept of enterprise development

Regarding the concept of enterprise development, it should be distinguished from growth. Economic growth will be interpreted as the process of scaling up production without noticeable change (improvement) of indicators of its efficiency. At the same time, the development of the company is directly related to the improvement of the efficiency of its production and economic activity, as well as the achievement of the indicators which reflect the economic and social goals of the company. It should be noted that the basis of the company deveopment is its potential, however, enterprise development aso leads to its potential increase.

Speaking about the development of the company it should be said about the dialectical relationship between „functioning" and „development". Professor V. Prokhorov notes that functioning impedes development and at the same time is the basis for its realization. Development destroys many functioning processes, but it creates the conditions for its more sustainable realization[4]. Hense for the company to develop, it has to work, and vice versa, it can not function without developing. In other words, the development process consists of phased functioning processes by which the company achieves its goal. And it is moving to its new state[5].

Environmental factors that affect the development of the company should include the following:

- social and political – social structure of society in terms of income, political objectives, financial policy, tax policy, investment climate,
- legislative – the legislation in the field of entrepreneurship, regulation in banking, labor, foreign trade, taxation, etc.,
- economic – inflation, income levels, cost structure, the unemployment rate, the discount interest rate, exchange rate, energy prices, etc.,
- market – competition, supply and demand, market infrastructure, the system of relations in the supply chain, etc.,
- R & D – priority areas for Research and Technology,
- environmental – environmental condition and trends of its change,
- demographics –size and structure (age, gender) of population, trends in demographics, marriage, birthrat, etc.,
- cultural and educational – education level, traditions, religion, habits, outlook, etc.,
- regional – a system of relations with governmental authorities, research organizations, educational institutions and others".

The most significant groups of internal factors influencing the development of enterprise by BSC methodology include „production", „resources", „processes", „intangible assets". „Production" is characterized by various characteristics, namely the range of products, quality, life cycle phase, the level of competitiveness in the domestic and foreign markets. The values of these characteristics affect both the volumes output (sales), and the formation of consumer demand for the products of the company.

„Resources" will be interpreted in the broadest sense of the term. They are labour, energy, information and financial resources, and fixed assets. All kinds of resources are limited in scope at particular time and have the ability to replenish (to increase). Labour resources and capital (fixed assets) are treated as mutually interchangeable in economic theory. The dynamic characteristics of internal resources should be mentioned. For example, fixed assets wear out mentally and physically and need to be updated; workforce – quantitative and qualitative characteristics change according to the requirements of

[4] V. Prokhorova, *Economic development of enterprise: theoretical and methodological aspects: monograph*, UkrDAZT, 2010, p. 523.

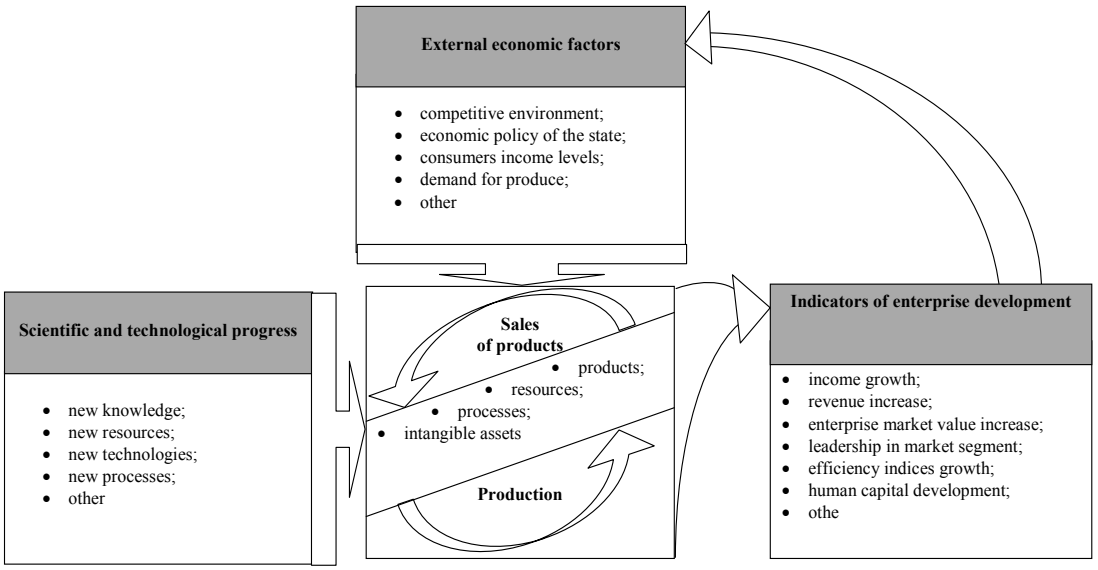
[5] T.V. Shwed, *To questions about the nature of enterprise development*, http://dspace.nuft.edu.ua/jspui/bitstream/123456789/12606/1/Shved.pdf.

operations; information resources require constant updating; financial resources are in constant motion, can be replenished from external sources.

„Processes" include both the technology of production and company management. „Intangible assets" are new knowledge acquired through own scientific, design and technological, organizationally processed research or borrowed from external sources.

The influence of external and internal factors on the economic development of the company are shown in Figure 2.

Figure 2. Factors influencing the economic development of the enterprise



Source: own study.

The development of the company can be claimed when in the result of improved manufacturing or business processes or their management, the efficiency of the company increases in the current time period compared to baseline. The relative indicators of effect size (rate of change, growth rate) have a significant advantage over the absolute, since the leve of achieving the targets of the company can be shown with their help.

In our opinion, such targets should include not only economic indicators (profitability, return, etc.), but also indicators of meeting customers needs and expectations, improving business processes, improving corporate governance, personnel motivation, meeting shareholders needs and interests[6].

Economic growth of the enterprise is primarily characterized by absolute or relative increase in revenues from sales of goods (services). Coordinated growth of the company affects the balance of cash flow – without shortages and surpluses.

Thus, the potential of the company can be seen as possibiity to achieve the goal of the enterprise over a certain period of time $\Delta t = t_1 - t_0$ under conditions of relative constancy of certain parameters (the state

[6] O.V. Rayevnyeva, *Management of enterprise development: methodology, mechanism, models*, VD INZHEK, Kharkiv 2006, p. 496.

of the environment, type of economic activity) and taking into account the dynamism of factors which describe the internal conditions of business operation (products, resources, technology, intangible assets).

Studies have shown that in a number of companies in countries with developed economies (USA, Germany, UK, Japan) annual growth rates of revenue from product sales as an indicator of the company development exceeds 12%, inflation rate in these countries does not exceed 4%. It can be claimed that a real sustainable economic growth of these companies is 8%, despite the fact that even an increase of 4% is considered to be sufficient.

The development of the enterprise results in the need to choose one of three possible directions of its transformation: sustainable (organic) growth; acquisition of companies, specializing in the same field; business diversification.

Conclusion

World experience shows that in a changing business environment efficiency of production and business activities of enterprises significantly depends on their potential, which assessment and planning is a complex and vital issues of modern management.

On the basis of these studies, a typology of economic potential is proposed, the key role of financial and economic potential of the company in ensuring the effective realisation of enterprise development is identified, common features of enterprise development potential are determined, its components are considered and the impact of external and internal factors on the economic development of the enterprise is analyzed.

Further investigations should address the evaluation system of enterprises development potential, ascertainment of regularity of changes in the parameters of the internal and external environments, definition of criteria indicators by which the purpose is described; and determination of reference values of parameters by which the level of enterprise development potential could be quantitatively assessed.

Such research will help to create preconditions for improving the quality and validity of entities development programmes.

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6. Shwed T.V., *To questions about the nature of enterprise development*, http://dspace.nuft.edu.ua/jspui/bitstream/123456789/12606/1/Shved.pdf.
7. Skopnenko O.I., Tsymbaliuk T.V., *Modern dictionary of foreign words: 20 thousand words and phrases*, Dovira, 2006.

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DYNAMIC CAPABILITIES: ON A DEVELOPMENTAL PATH FROM AN APPROACH TOWARDS A THEORY

Summary

An emerging concept of dynamic capabilities represents a relatively new and promising approach to explore strategic renewal, since it is characterized by an inherent focus on change. The field has been generating a significant and systematic growth of scholarly attention. Outcomes of that research effort confirm a substantial move forward on a developmental path of dynamic capabilities from a vague and obscure concept toward a cohesive paradigm. Nevertheless the concept is still under development and does not meet the criteria set for evaluating the objectives of a scientific theory. The study therefore aims to contribute to theory by presenting and discussing areas of convergence and divergence between existing approaches to conceptualization of dynamic capabilities.

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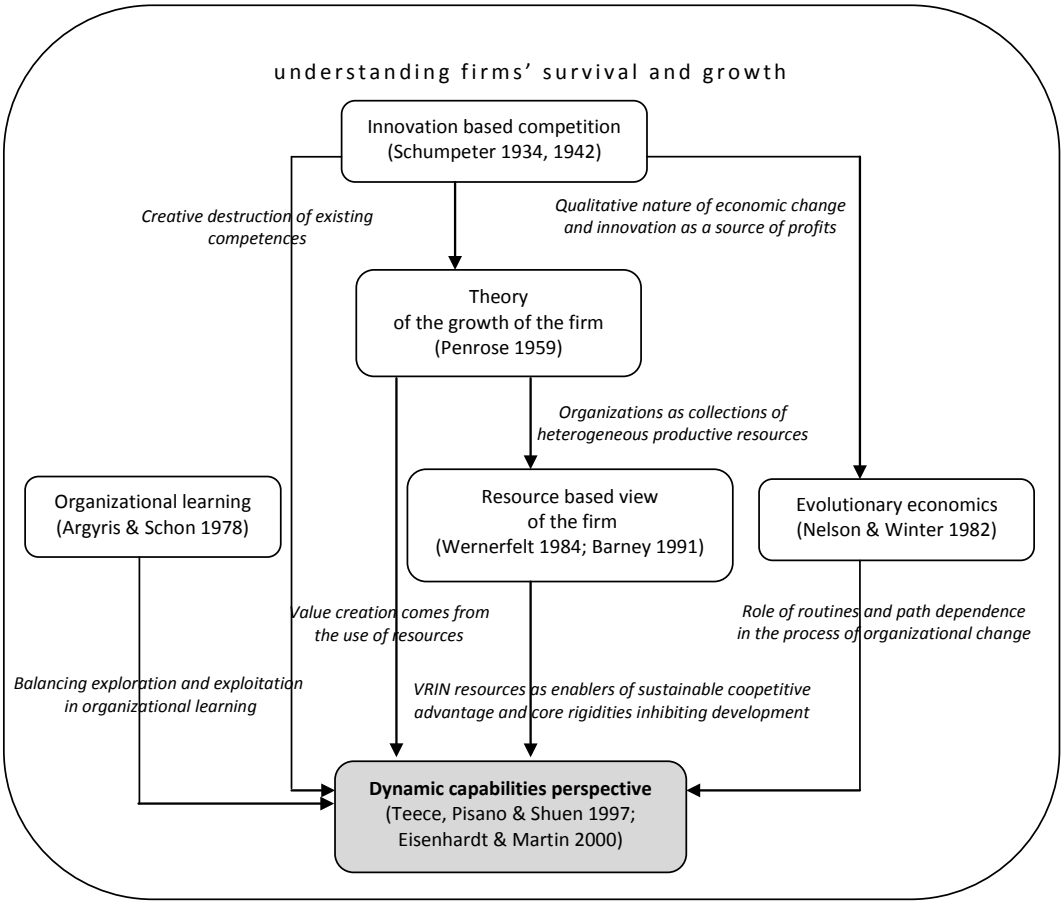
Introduction

The dynamics of the environment observed and experienced through a more and more intensive globalization, integration and interdependence of markets forces firms toward incorporation of that dynamics in their strategic management in order to grow, and most importantly to survive. A strategic attempt to effectively exploit changes in the environment need to be supported by inevitable modifications in deployed patterns of action. Thus, a thorough understanding of development of competitive advantages in such unstable conditions requires an approach that directly address the problem of change. An emerging concept of dynamic capabilities represents a relatively new and promising approach to explore strategic renewal, since it is characterized by an inherent focus on change. The field has been generating a significant and systematic growth of scholarly attention– according to ABI/INFORM database an impressive number of 6885 articles published between 1997 and 2014 referred to "dynamic capabilities" (2323 articles referred to "dynamic capability"). However, despite that remarkable flow of research the framework still retains unsolved issues and inconsistencies regarding its core elements. The study therefore aims to contribute to theory by presenting and discussing areas of convergence and divergence between existing approaches to conceptualization of dynamic capabilities.

Conceptualizing dynamic capabilities – state of art

In most scholarly works dynamic capabilities perspective is recognized as an extension of the resource base view of the firm (RBV)[1], since it emerged on the theoretical grounding of RBV. Both approaches share fundamental assumptions regarding heterogeneity of resource bundles in the context of competitive advantage of a firm, yet dynamic capabilities concept has been developed to overcome substantial shortcomings of the static perspective exhibited in RBV. While RBV stresses that the basis for competitive advantage is located in unique bundles of VRIN (valuable, rare, inimitable, non–substitutable) resources, the dynamic capabilities framework concentrate on change, on creating, extending and reconfiguring resources over time. Nevertheless it has to be emphasized that the concept of dynamic capabilities is embedded within a more broad context of scientific discussion concerning firm's survival and growth (Figure 1).

Figure 1. Theoretical background of dynamic capabilities perspective



Source: author's own.

[1] K.M. Eisenhardt, J.A. Martin, *Dynamic Capabilities: What Are They?*, "Strategic Management Journal" 2000, No. 21, pp. 1105–1121; C.L. Wang, P.K. Ahmed, *Dynamic Capabilities: A Review and Research Agenda*, "The International Journal of Management Reviews" 2007, Vol. 9, No. 1, pp. 31–51.

The intellectual roots of dynamic capabilities perspective reach down to Schumpeterian innovation–based competition and "creative destruction" process[2], Penrose's theory of the growth of the firm[3], evolutionary economics exploring the role of routines as enablers and constraints of organizational change[4], and ideas formulated in the theory of organizational learning[5]. This broad base of theoretical foundations "reflects the breadth and complexity of the issues under consideration"[6], yet this vast array of contributions lies at the root of the problem of inconsistencies and ambiguity in the theoretical content of dynamic capabilities perspective[7].

Since the seminal article written by Teece, Pisano and Shuen[8] the field of dynamic capabilities has been generating a significant and systematic growth of scholarly attention. According to ABI/INFORM database by the mid–2014 the number of scientific works referred directly to "dynamic capabilities" reached a remarkable level of 6885 (as of 20 June 2014). Hence, existing literature provides a wide spectrum of definitions as well as distinct views on the concept resulting from different research backgrounds of scholars contributing to the field of dynamic capabilities.

Successively introduced definitions, built on the initial one[9] and incrementally improved on the basis of generated cumulative knowledge, reflect the evolvement of the research on dynamic capabilities. Consequently, the existing literature provides a considerable amount of definitions exhibiting different degree of conciseness and comprehensiveness with regard to the logic of dynamic capabilities. Nevertheless, dynamic capabilities perspective is an emerging field of inquiry, still at an early stage of development from "an approach" toward "a theory"[10]. Hence, bearing in mind other examples of emerging theories, i.e. transaction cost theory, proliferation of definitions is a common occurrence at early stages of theory development and reaching a consensus takes rather a long time[11]. As exhibited on Table 1 main definitions presented in most cited articles referring to "dynamic capabilities" confirm a general agreement on the role of dynamic capabilities, yet definitional proposals vary in several aspects indicating existence of important contradictory perspectives on the nature of dynamic capabilities. The following paragraphs present most often discussed although still not comprehensively solved issues concerning dynamic capabilities.

Presence of external conditions. As dynamic capabilities concept was originally formulated within the context of rapid technological change[12], in the introduced initial definition dynamic capabilities "address rapidly changing environment"[13]. Such reference raised "criticism of being tautological because

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[2] J.A. Schumpeter, *Capitalism, Socialism, and Democracy*. Harper: New York 1942. Reprint: Routledge, 2013; J.A. Schumpeter, *Theory of Economic Development*. Harvard University Press: Cambridge, MA 1934, Reprint: Transaction Publishers, 2012.

[3] E.T. Penrose, *The Theory of the Growth of the Firm*, Wiley: New York 1959, Reprint: Oxford University Press, 2009.

[4] R. Nelson, S.G. Winter, *An Evolutionary Theory of Economic Change*, Belknap Press: Cambridge, MA 1982.

[5] C. Argyris, D. Schon, *Organizational learning,* Addison–Wesley: Reading, MA 1978.

[6] C.E. Helfat, M. Peteraf, *Understanding dynamic capabilities: progress along a developmental path,* "Strategic Organization" 2003, No. 7 (1), p. 93.

[7] C.L. Wang, P.K. Ahmed, *Dynamic Capabilities: A Review …,* op. cit.; C.E. Helfat, M. Peteraf, *Understanding dynamic capabilities* …, op. cit.; V. Ambrosini, C. Bowman, *What are dynamic capabilities and are they a useful construct in strategic management?, "*International Journal of Management Reviews" 2009, No. 11 (1), pp. 29–49; S.A. Zahra, H.J. Sapienza, P. Davidsson, *Entrepreneurship and Dynamic Capabilities: A Review, Model and Research Agenda,* "Journal of Management Studies" 2006, No. 43 (4), pp. 917–955.

[8] D.J. Teece, G. Pisano, A. Shuen, *Dynamic Capabilities and Strategic Management*, "Strategic Management Journal" 1997, No. 18 (7), pp. 509–533.

[9] D.J. Teece, G. Pisano, A. Shuen, *Dynamic Capabilities and Strategic …,* op. cit.

[10] C.E. Helfat, M. Peteraf, *Understanding dynamic capabilities …,* op. cit.

[11] C.E. Helfat, M. Peteraf, *Understanding dynamic capabilities …,* op. cit.

[12] D.J. Teece, G. Pisano, A. Shuen, *Dynamic Capabilities and Strategic …,* op. cit.

[13] D.J. Teece, G. Pisano, A. Shuen, *Dynamic Capabilities and Strategic …,* op. cit., p. 16.

Table 1. Key definitions of dynamic capabilities presented in most cited articles

Source	Citations of the article[1]	Definition
Teece, Pisano & Shuen (1997)	4 419	Firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments.
Eisenhardt & Martin (2000)	2 107	The firm's processes that use resources – specifically the processes to integrate, reconfigure, gain and release resources – to match and even create market change. Dynamic capabilities thus are the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die.
Zahra & George (2002)	1 343	Dynamic capabilities are embedded in organizational processes and (…) enable the firm to reconfigure its resource base and adapt to changing market conditions in order to achieve a competitive advantage.
Zollo & Winter (2002)	1 080	A dynamic capability is a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness
Teece (2007)	670	These (dynamic) capabilities can be harnessed to continuously create, extend, upgrade, protect, and keep relevant the enterprise's unique asset base. Dynamic capabilities can be disaggregated into the capacity (1) to sense and shape opportunities and threats, (2) to seize opportunities, and (3) to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise's intangible and tangible assets
Winter (2003)	574	Those (capabilities) that operate to extend, modify or create ordinary capabilities

Note: ([1]) Web of Science Core Collection (as of 30 June 2014).
Source: author's own.

of the confusion between the concept and the main proposition (that firms with dynamic capabilities are better equipped to deal with changing environments and, in consequence, to perform better)"[14]. Further exploration of the field resulted in conclusion that dynamic capabilities apply also to environments with lower rates of change[15]. Nevertheless, it has been stressed that structural patterns of dynamic capabilities depend on the market dynamisms in such a way that in high–velocity markets dynamic capabilities consist of mostly simple and unstable routines, while in moderately dynamic markets those structural patterns

[14] I. Barreto, *Dynamic Capabilities: A Review of Past Research and an Agenda for the Future,* "Journal of Management" 2010, 36 (1), p. 271.

[15] K.M. Eisenhardt, J.A. Martin, *Dynamic Capabilities: What Are They?* …, op. cit.; M. Zollo, S.G. Winter, *Deliberate Learning and the Evolution of Dynamic Capabilities*, "Organization Science" 2002, No. 13 (3), pp. 339–351.

become more complicated and detailed[16]. Acknowledging those contributions subsequently formulated definitions received more general form without referring to external conditions[17].

The nature of dynamic capabilities and terminology used. An overview of main definitions provides a broad array of terms used explain the nature of dynamic capabilities: abilities, processes, routines, capacities. Defining dynamic capabilities as ability raised arguments of tautology, whereas referring to a process and routine without further explanation of the distinction between used terms escalated criticism against the concept as being vague and elusive[18]. Thus, it can be observed a continuous attempt to propose improved definitions that address criticized weak points. Bearing in mind that dynamic capabilities may exhibit varying degrees across different organizations and are not synonymous with superior performance, new proposals referred dynamic capabilities to "a capacity" that reflects "a potential for adequate performance" and repeatability of action patterns[19]. According to that line of reasoning "change in the resource base of an organization implies only that the organization is doing something different, but not necessarily better, than before"[20]. Moreover, in order to solve the controversy concerning phrases such as "capability to change capabilities" authors turned to discuss firm capabilities and routines in a hierarchical order (Table 2), thus defining dynamic capabilities as those that alter the resource base / operational capabilities[21]. However, Helfat & Winter in their article published in 2011[22] argue that although dynamic and operating capabilities can be distinguished on the basis of their purpose and intended outcomes, the line between them is blurry due to the fact that change is always occurring at least to some extent, it is impossible to unambiguously link dynamic capabilities with radical changes, and finally organizations deploy singe–, dual– or multi–purpose capabilities. Moreover, Schreyögg and Kliesch–Eberl present a very interesting argumentation contesting integrating a dynamic dimension into the capability construct[23]. In their view conceptualizing dynamic capabilities by merging two contradictory dimensions of exploitation and exploration leads to a serious theoretical dilemma since "the same process cannot comprise concurrently stabilizing and destabilizing forces"[24]. Adding dynamic feature to the static problem solving architecture (concept of organizational capabilities) dissolves the replicable essence of routinized action patterns, given that focusing on a continuous change inevitably means lessening the stress on the reliable replication[25]. Therefore, they propose a dual–process model that recognizes "capability evolvement and system dynamization (…) as two separate countervailing processes, which are performed simultaneously"[26]. Although the workability of the model is to be explored, it undoubtedly challenges the dominating logic for defining the nature of dynamic capabilities.

Further, in order to highlight the distinctive character of dynamic capabilities from other organizational processes some researchers included in formulated definitions explicitly "purposeful" character of changes

[16] K.M. Eisenhardt, J.A. Martin, *Dynamic Capabilities: What Are They?* …, op. cit.

[17] C.E. Helfat, S. Finkelstein, W. Mitchell, M. Peteraf, H. Singh, S.G. Winter, *Dynamic Capabilities: Understanding Strategic Change in Organizations,* Blackwell Publishing: Malden, MA 2007; I. Barreto, *Dynamic Capabilities: A Review of ...,* op. cit.

[18] O.E. Williamson, *Strategy Research: Governance and Competence Perspectives,* "Strategic Management Journal" 1999, No. 20 (12), pp. 1087–1108; C.L. Wang, P.K. Ahmed, *Dynamic Capabilities: A Review ...,* op. cit.

[19] C.E. Helfat, S. Finkelstein, W. Mitchell, M. Peteraf, H. Singh, S.G. Winter, *Dynamic* …, op. cit., p. 5.

[20] C.E. Helfat, S. Finkelstein, W. Mitchell, M. Peteraf, H. Singh, S.G. Winter, *Dynamic* …, op. cit., p. 5.

[21] M. Zollo, S.G. Winter, *Deliberate Learning ...,* op. cit.; C.L. Wang, P.K. Ahmed, *Dynamic Capabilities: A Review ...,* op. cit.; V. Ambrosini, C. Bowman, *What are dynamic capabilities ...,* op. cit.

[22] C.E. Helfat, S.G. Winter, *Untangling dynamic and operational capabilities: Strategy for the (n)ever–changing world*, "Strategic Management Journal" 2011, No. 32, pp. 1243–1250.

[23] G. Schreyögg, M. Kliesch–Eberl, *How dynamic can organizational capabilities be? Towards a dual–process model of capability mobilization,* "Strategic Management Journal" 2007, No. 28, pp. 913–933.

[24] G. Schreyögg, M. Kliesch–Eberl, *How dynamic can organizational* …, op. cit., p. 925.

[25] G. Schreyögg, M. Kliesch–Eberl, *How dynamic can organizational* …, op. cit.

[26] G. Schreyögg, M. Kliesch–Eberl, *How dynamic can organizational* …, op. cit., p. 925.

induced by dynamic capabilities, without specifying resulting/expected outcome of those changes[27]. Thus, they underlined a minimal degree of intentionality that distinguishes dynamic capability from pure luck[28]. However, such attempt has not gained a wide and common recognition since it "open(s) the door to a new controversy, namely, about the difficulties to empirically test it either ex ante or ex post"[29].

Development mechanisms. Although most authors agree that dynamic capabilities are built rather than bought in the market introduced definition rarely explicitly explain how dynamic capabilities are created and developed. On the basis of evolutionary economics contribution it is generally assumed that dynamic capabilities are developed through learning mechanisms[30] thus are path–dependent[31] and embedded in the organization[32]. Nevertheless, authors acknowledging the underpinning function of organizational learning present a variety of different perspectives on drivers of successful organizational learning that contribute to development of dynamic capabilities[33]. Therefore, Zollo and Winter[34] proposed a conceptual framework of recursive cycle of three core learning mechanisms that enhance development of dynamic capabilities, namely: experience accumulation, knowledge articulation, and knowledge codification. The analysis of cost investment in those distinct learning mechanisms lead to conclusion that dynamic capabilities are not automatically involved in every reaction to environmental change, since it depends on the balance of costs and benefits derived from their deployment in comparison to a non–routinized response labeled as ad–hoc problem solving[35]. Nevertheless, it is worth noting that with regard to path–dependency of dynamic capabilities scholars point at quite important paradox. On the one hand it is assumed that dynamic capabilities represent the main approach to overcome lock–in situations resulting from path dependencies in organizations[36]. On the other hand, dynamic capabilities are commonly defined as path–dependent processes, hence are subject to the evolutionary mechanisms of variation–selection–retention and are characterized by three main principles of path–dependent processes: history matters, increasing returns and the risk of lock–in[37]. Thus, it has been argued that in order to response to unfamiliar triggers an organization needs a frame breaking approach instead of a patterned course of actions[38].

Core components. Recent research tends to conceive dynamic capabilities as an aggregate construct formed by a limited number of distinct but correlated components[39]. It is an important step forward toward a reliable operationalization of the concept, hence an attempt to resolve the commonalities dilemma[40].

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[27] C.E. Helfat, S. Finkelstein, W. Mitchell, M. Peteraf, H. Singh, S.G. Winter, *Dynamic* …, op. cit.

[28] C.E. Helfat, S. Finkelstein, W. Mitchell, M. Peteraf, H. Singh, S.G. Winter, *Dynamic* …, op. cit.

[29] I. Barreto, *Dynamic Capabilities: A Review of ...,* op. cit.

[30] K.M. Eisenhardt, J.A. Martin, *Dynamic Capabilities: What Are They?* …, op. cit.

[31] M. Zollo, S.G. Winter, *Deliberate Learning ...,* op. cit.; D.J. Teece, G. Pisano, A. Shuen, *Dynamic Capabilities and Strategic ...,* op. cit.

[32] K.M. Eisenhardt, J.A. Martin, *Dynamic Capabilities: What Are They?* …, op. cit.

[33] P. Cordes–Berszin, *Dynamic capabilities. How Organizational Structures Affect Knowledge Processes,* Palgrave Macmillan, New York 2013.

[34] M. Zollo, S.G. Winter, *Deliberate Learning ...,* op. cit.

[35] S.G. Winter, *Understanding Dynamic Capabilities,* "Strategic Management Journal" 2003, No. 24 (10), pp. 991–995.

[36] D.J. Teece, G. Pisano, A. Shuen, *Dynamic Capabilities and Strategic ...,* op. cit.

[37] Schreyögg G., Kliesch–Eberl M., *How dynamic can organizational* …, op. cit.; Cordes–Berszin P., *Dynamic capabilities...,* op. cit.

[38] Schreyögg G., Kliesch–Eberl M., *How dynamic can organizational* …, op. cit.

[39] D.J. Teece, *Explicating Dynamic Capabilities: The Nature and Microfoundations of (sustainable) Enterprise Performance*, "Strategic Management Journal" 2007, No. 28 (13), pp. 1319–1350; I. Barreto, *Dynamic Capabilities: A Review of ...,* op. cit.; C.L. Wang, P.K. Ahmed, *Dynamic Capabilities: A Review ...,* op. cit.; A.P. Pavlou, O.A. El Sawy, *Understanding the Elusive Black Box of Dynamic Capabilities,* "Decision Sciences" 2011, No. 42 (1), pp. 239–270.

[40] I. Barreto, *Dynamic Capabilities: A Review of ...,* op. cit.; M. Peteraf, G. Di Stefano, G. Verona, *The elephant in the room of dynamic capabilities: bringing two diverging conversation together*, "Strategic Management Journal" 2013, No. 34, pp. 1389–1410.

Table 2. Typologies of capabilities

Collis (1994)	**Winter (2002)**	**Zahra, Sapienza & Davidsson (2006)**	**Wang & Ahmed (2007)**	**Ambrosini & Bowman (2009)**
First category Resources enabling performance of the basic functional activities of the firm	*Zero–level* Operational capabilities enabling firms to earn their current living	*Substantive capabilities* Set of abilities and resources that go into solving a problem or achieving an outcome	*Zero–order* Resources *First– order* Capabilities of deploying resources *Second–order* Core capabilities strategically important to competitive advantage at a certain point of time	*Resource base*
Second category Dynamic improvements to the activities of the firm *Third category* Capability to recognize the intrinsic value of other resources or to develop novel strategies before competitors	*First–order* Dynamic capabilities that alter zero–level capabilities	*Dynamic capabilities* Dynamic ability to change or reconfigure existing substantive capabilities	*Third–order* Dynamic capabilities enabling renewal, reconfiguration and re–creation of resources, capabilities and core capabilities to address the environmental change	*Incremental dynamic capabilities* Dynamic capabilities enabling incremental adjustments of the resource base in relatively stable context *Renewing dynamic capabilities* Dynamic capabilities enabling renewing the nature of the resource stock due to rapid changes in the environment
Meta–capabilities Learning–to–learn capabilities	*Higher–order* Dynamic capabilities that alter routinized responses to familiar types of change			*Regenerative dynamic capabilities* Dynamic capabilities allowing the firm to move away from previous change practices towards new dynamic capabilities
Ad infinitum meta–capabilities				

Source: author's own.

The initial view of dynamic capabilities that embraced a vast array of firm–specific organizational and managerial processes and routines proved to be overly complex, hard to operationalize and too narrow and idiosyncratic in application to develop a generalizable theory[41]. Disaggregating the construct into parsimonious set of distinct components reflecting common and measurable features of

[41] O.E. Williamson, *Strategy Research: Governance and Competence* …, op. cit.; D. Galunic, K. Eisenhardt, *Architectural innovation and modular corporate forms*, "Academy of Management Journal" 2001, No. 44 (6), pp. 1229–1249.

dynamic capabilities at high level of abstraction directly addresses formulated concerns[42]. This logical decomposition introduces the right balance between the required general character of the concept (relevant across diverse sectoral contexts) and necessary level of specificity (salient idiosyncratic properties at the micro–foundational level). Thus, a conceptual separation of the organizational and managerial processes, from underpinning distinct skills, procedures, structures allows for a disclosure of an "elusive black box" of dynamic capabilities[43] while preserves a somewhat opaque view on their microfoundations[44] as exclusiveness and "idiosyncrasy in details" determine the potential for achieving a competitive advantage[45].

Several alternative approaches to this conceptual disaggregation were subsequently introduced (Table 3). The nature of identified components indicate that the initial approach formulated by Teece[46] on the basis of entrepreneurial perspective is reflected in all subsequently developed propositions. Although proposals vary in the number and content range of defined components, they all decompose the aggregated multidimensional construct of dynamic capabilities into a coherent set of also aggregate constructs, yet quite broadly explored in the literature in their own right[47].

Outcomes. Since the line of reasoning for development dynamic capabilities framework addresses the fundamental question of how firms build and sustain competitive advantage in diverse environmental conditions, "the most important relationship in the field is perhaps the one between dynamic capabilities and performance"[48]. Initially scholars assumed direct link to performance by concerning dynamic capabilities as the main source of competitive advantage[49]. Many of early definitions of the concept include direct impact of dynamic capabilities on firm's performance[50]. Such an approach was criticized for being tautological, because it is based on the assumption that firm with dynamic capability must perform well and firm with excellent performance must have dynamic capability. Thus, subsequent contributions departed from the initial view by introducing definitions without any explicit or implicit association with overall performance and focusing research also on the indirect impact of dynamic capabilities through intermediate outcomes[51]. Therefore, dynamic capabilities are not conceived as synonymous to a success anymore, as the notion of dynamic capabilities and performance has been decoupled[52]. According to current research dynamic capabilities are acting upon operational level routines in the pursue of greater effectiveness, yet resulting change in the resource base may not necessarily be valuable[53]. Hence, as pointed by Peteraf et al. "regardless of the level of market dynamisms or the nature of dynamic capabilities,

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[42] I. Barreto, *Dynamic Capabilities: A Review of ...,* op. cit.; C.E. Helfat, S. Finkelstein, W. Mitchell, M. Peteraf, H. Singh, S.G. Winter, *Dynamic* …, op. cit.

[43] A.P. Pavlou, O.A. El Sawy, *Understanding the Elusive ...,* op. cit.

[44] D.J. Teece, *Explicating Dynamic Capabilities ...,* op. cit.

[45] K.M. Eisenhardt, J.A. Martin, *Dynamic Capabilities: What Are They?* …, op. cit.; D.J. Teece, *Explicating Dynamic Capabilities ...,* op. cit.;M. Peteraf, G. Di Stefano, G. Verona, *The elephant in the room* …, op. cit.

[46] D.J. Teece, *Explicating Dynamic Capabilities ...,* op. cit.

[47] I. Barreto, *Dynamic Capabilities: A Review of ...,* op. cit.; C.L. Wang, P.K. Ahmed, *Dynamic Capabilities: A Review ...,* op. cit.; A.P. Pavlou, O.A. El Sawy, *Understanding the Elusive ...,* op. cit.

[48] I. Barreto, *Dynamic Capabilities: A Review of ...,* op. cit., p. 274.

[49] D.J. Teece, G. Pisano, A. Shuen, *Dynamic Capabilities and Strategic ...,* op. cit.

[50] D.J. Teece, G. Pisano, A. Shuen, *Dynamic Capabilities and Strategic ...,* op. cit.; S. Zahra, G. George, *Absorptive Capacity: A Review, Reconceptualization and Extension*, "Academy of Management Review" 2002, No. 27 (2), pp. 213–240; M. Zollo, S.G. Winter, *Deliberate Learning ...,* op. cit.

[51] C. Zott, *Dynamic capabilities and the emergence of intra industry differential performance: insights from a simulation study*, "Strategic Management Journal" 2003, No. 24 (2), pp. 97–125; C.E. Helfat, M. Peteraf, *Understanding dynamic capabilities* …, op. cit.; C.E. Helfat, S. Finkelstein, W. Mitchell, M. Peteraf, H. Singh, S.G. Winter, *Dynamic* …, op. cit.; V. Ambrosini, C. Bowman, *What are dynamic capabilities ...,* op. cit.

[52] C.E. Helfat, S. Finkelstein, W. Mitchell, M. Peteraf, H. Singh, S.G. Winter, *Dynamic* …, op. cit.

[53] C.E. Helfat, S. Finkelstein, W. Mitchell, M. Peteraf, H. Singh, S.G. Winter, *Dynamic* …, op. cit.; S.G. Winter, *Understanding Dynamic Capabilities ...,* op. cit.

Table 3. Typologies of core components of dynamic capabilities

Teece (2007)	**Wang & Ahmed (2007)**	**Barreto (2010)**	**Pavlou & El Sawy (2011)**
Sensing and shaping opportunities and threats Scanning, creation, learning, interpreting and investing in research	*Adaptive capability* Ability to identify and capitalize on emerging opportunities	*Propensity to sense opportunities and threats* managerial framing of opportunities and threats	*Sensing capability* Spotting, interpreting, and pursuing opportunities
Seizing opportunities Addressing opportunities through new products, processes, or services	*Absorptive capability* Ability to recognize, assimilate and apply new external information to commercial ends	*Propensity to change the resource base* Creating, extending and reconfiguring the resource base	*Learning Capability* Revamping existing operational capabilities with new knowledge
Reconfiguring assets Continuous alignment and realignment of specific tangible and intangible assets	*Innovative capability* Ability to develop new products and/or markets through aligning strategic innovative orientation with innovative behaviors and processes	*Propensity to make timely decisions* Quickly accomplishing reconfiguration and transformation ahead of competitors	*Integrating capability* Embedding new knowledge into operational capabilities with collective sense–making
		Propensity to make market–oriented decisions Focusing on ways to provide superior value to customers	*Coordinating capability* Deploying tasks, resources and activities in reconfigured operational capabilities

Source: author's own.

dynamic capabilities may enable firms to attain a sustainable competitive advantage *in certain conditional cases*"[54]. In other words, evolving understanding of the relationship between dynamic capabilities, firm performance and competitive advantage allowed to address the concerns of tautology and provided a sound conceptual ground for validating the relevance of dynamic capabilities. The literature presents two paths for such evaluation still at an early stage of a thorough empirical validation:

- measuring performance of dynamic capabilities through their impact on intermediate outcomes, and subsequently the effect of intermediate outcomes on the firm performance[55],
- measuring performance of dynamic capabilities through technical fitness ("how effectively a capability performs its intended function when normalized by its costs"[56]) and evolutionary fitness (how well a dynamic capability enables an organization to make a living by creating, extending, or modifying its resource base[57]) affected by the context in which the capabilities are employed.

[54] M. Peteraf, G. Di Stefano, G. Verona, *The elephant in the room* …, op. cit., p. 1407.
[55] I. Barreto,, *Dynamic Capabilities: A Review of ...,* op. cit.
[56] C.E. Helfat, S. Finkelstein, W. Mitchell, M. Peteraf, H. Singh, S.G. Winter, *Dynamic* …, op. cit., p. 7.
[57] C.E. Helfat, S. Finkelstein, W. Mitchell, M. Peteraf, H. Singh, S.G. Winter, *Dynamic* …, op. cit., p. 7.

Conclusion

Scientific exploration of the field of dynamic capabilities has been intensifying greatly over the last decade. The initial idea has evolved through manifold contributions aiming at addressing main concerns of tautology inoperability or internal inconsistencies of the concept. Outcomes of that research effort presented in numerous articles confirm a substantial move forward on a developmental path of dynamic capabilities from a vague and obscure concept toward a cohesive theory. Nevertheless the concept is still under development and does not meet the criteria set for evaluating the objectives of a scientific theory[58]. The analysis of a current state of art referring to dynamic capabilities allows for a conclusion in line with Barreto[59] that the variation stage (evolutionary economics) on that developmental path has been reached. As a growing number of research works focus on consolidating the plethora of proposed explanations into a cohesive, generalizable construct and organizing a developed knowledge base in a more structured manner, it clearly indicates entering the selection stage (evolutionary economics) of theory development.

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[58] M. Peteraf, *Understanding dynamic capabilities: progress* …, op. cit.
[59] I. Barreto, *Dynamic Capabilities: A Review of …,* op. cit.

15. Peteraf M., Di Stefano G., Verona, G., *The elephant in the room of dynamic capabilities: bringing two diverging conversation together*, "Strategic Management Journal" 2013, No. 34, pp. 1389–1410.
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ENTREPRENEURSHIP AND INNOVATION AS A FACTOR IN THE COMPETITIVENESS OF LOCAL AUTHORITY UNITS

Summary

Dynamic development of new business organisations, corporations, manufacturing concerns, and non–profit organisations has strengthened the need for innovation, entrepreneurship and new strategies in the rapidly changing world. Expanding the area of interest in regard to innovation and entrepreneurship is a result of a new interpretation of the complexity of tasks within managerial functions and the complexity of management in the contemporary market economy. Similar importance of innovation and entrepreneurship can be observed in the development of regions and local authority units. That contributes to a faster growth of regional entities and the varied advancement of economic processes.

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Definitions of entrepreneurship and innovation

In the literature, "entrepreneurship" is regarded as an interdisciplinary issue, which plays a part in many areas of social and economic life and, therefore, it should not be considered only in one dimension. This approach is reflected in the number of scientific views on entrepreneurship and innovation, presented in many contexts of interpretation. The abundance of definitions of entrepreneurship and their constant development indicate both the interdisciplinary nature of the notion and the ambiguous classification criteria. This unique issue remains a challenge for the researchers who still need to organise and systematise it. Contemporary research on entrepreneurship refers to the historical trends initiated by F. Knight, J. Schumpeter and the Austrian school[1], who claimed that taking risks is the main manifestation of entrepreneurship. This belief made enterprising individuals to be perceived in a negative manner

[1] W.J. Baumol, *Entrepreneurschip: Productive, Unproductive, and Destructive,* "Journal of Political Economy" 1990, vol. 98, pp. 893–921, [In:] A. Gaweł, *Ekonomiczne determinanty przedsiębiorczości,* Wydawnictwo AE w Poznaniu, Poznań 2007, p. 14.

and their behaviour regarded as uncertain. It was F. Knight who believed that entrepreneurship mainly manifests by taking risks by entrepreneurs. This view was reflected in a direction of economic study where attention was paid to uncertainty in the context of entrepreneurial behaviour. F. Knight pointed out the differences between risk and uncertainty of entrepreneurs, which in a sense mitigated the pejorative assessment of the concept of entrepreneurship and an enterprising person. In his opinion, "risk means a certain (possible) deviation from the expected states, which can be predicted and from which one can protect. Uncertainty is a deviation, which cannot be predicted, quantified or from which one can protect"[2].

A follower of F. Knight's views was R. Griffin, who believed that entrepreneurship is a process of organising and running a business, as well as taking the encountered risks. F. Knight's developed thought is a universal definition of entrepreneurship and it has created new opportunities for entrepreneurship. In the light of this definition, it must be recognised that this is not necessarily the owner of the company, but a professional manager hired for that purpose who is an enterprising person, though not an entrepreneur. R. Giffin defined the semantic scope of an enterprising person for the first time[3].

The second theoretical direction can be found in the works by J. Schumpeter (the 1930s), presenting new ideas and economic solutions, which occurred during the industrial revolution at the beginning of the twentieth century. In his writing, Schumpeter stresses the ability of entrepreneurs to create new products, ideas, markets, technologies, etc. He emphasises that factors stimulating entrepreneurial activity include a competitive fight for scarce production factors and a rapidly growing desire to maximise profits. J. Schumpeter came to the conclusion that a company is an economic entity which analyses and then implements "new combinations" of production factors, as well as it is an active participant in these processes. When analysing the causes of economic growth, he published the thesis of new combinations in the organisation of a company (new products, new service, new sources of raw materials, new production methods, new markets, new organisational structures) and the model of generating innovation and, that way, he first introduced the concept of new combinations. By introducing a model that describes the creation of new scientific achievements on the basis of the supply theory, he initiated studies on innovation. In this model, Schumpeter highlighted the "internal science", i.e. own research units and laboratories of companies that implement innovation. "External science" (research units outside the industry), being a part of the environment, has a little impact on implementing innovation, but it exchanges information with innovative centres within the model. A driving force of innovation are management processes. This theory has gained many followers, especially among economists who are sceptical of consumers' independence in decision–making. This independence is highly constrained by the promotional campaigns of large companies, which impose certain patterns of consumption on the purchasers. This is supply that determines what products are on the market.

Thanks to entrepreneurship and innovation, ideas are transformed into a viable business[4]. This process is followed by launching new activities that let entrepreneurs overcome the risks and achieve higher benefits. Such an approach refers to the classical concept of entrepreneurship and innovation by J. Schumpeter[5], which considers an entrepreneur to be a creator of entrepreneurship, attributing to him the following functions[6]:

- introducing new products,
- introducing new production methods,
- developing new markets,

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[2] H. Barreto, *The entrepreneur in microeconomic theory. Disappearance and explanation*, London – New York 1989, p. 39.

[3] R. Griffin, Podstawy zarządzania organizacjami, PWN, Warszawa 2001, p. 730.

[4] M. Bratnicki, *Przedsiębiorczość i dynamika organizacji*, „Organizacja i Kierowanie" 2001, No. 2.

[5] M. Bratnicki, *W poszukiwaniu teoretycznych podstaw pomiaru przedsiębiorczości organizacyjnej*, „Organizacja i Kierowanie" 2005, No. 4.

[6] *Podstawy nauki o przedsiębiorstwie*, (ed.) J. Lichtarski, Wydawnictwo AE we Wrocławiu, Wrocław 2007, pp. 59–60.

- creating new sources of resources supply,
- reorganizing the industrial structures.

T. Velblen noticed a significant role of managers in the process of gaining competitive advantage for the company, with a simultaneous reduction in the role of business owners. T. Velblen believes that technical intelligence is truly progressive, and hopes for economic and social development should be based on it[7]. This is a clear indication of the role of science and technological progress in the growth and positioning of companies.

Dynamic development of new business organisations, corporations, manufacturing concerns, and non–profit organisations has strengthened the need for innovation, entrepreneurship and new strategies in a rapidly changing world. Broadening and deepening the area of interest in regard to innovation and entrepreneurship[8] is a result of a new interpretation of the complexity of tasks within managerial functions and the complexity of management in contemporary market economy. P. Drucker[9] argued that a company has significant potential and proper managing gives it the opportunity to develop. He was described as "a visionary of management" for highlighting the importance of personal commitment of employees to the success of any company. Drucker promoted the idea that marketing and innovation are more important than the financial situation of a company. The methods developed by Drucker have been used to stimulate motivation by the management of America's largest corporations.

Interest in the issues of entrepreneurship and innovation has grown in Polish literature after 1990. Broadening the area of interest in these issues was a result of the sustained connections between entities, organisations[10] and the rules of the market economy in order to gain a competitive advantage, which even if it does not translate directly into a spectacular commercial success, it allows the company to keep a certain position on the market. Along with the intensification of competition, demand for a long–term success and a relatively permanent competitive advantage are generated. At the same time, paradoxically, a success and its base, i.e. a competitive advantage, are becoming more and more short–lived, ephemeral. Increasing the competitiveness on the market comes along with turbulence, while entities and organisations try to make entrepreneurship a means of gaining permanent features and competence. Competence is a means of acquisition, sustained bonds of entities and organisations to ensure that they achieve the objectives of natural development and survival. By initiating, discovering, identifying, and taking opportunities, entrepreneurship and innovation give new space for strategic management, whose focus is the long–term development, formulating the vision, mission and strategic goals of the organisation, strategy deployment, and providing key resources such as: organisation funding, providing staff, developing harmonious relationships with key social contractors, formulating competitive fight strategies and managing the implementation of this strategy, creating values for customers, and thus multiplying the wealth of business owners.

The broad spectrum of views on entrepreneurship can be found in Polish economic and regional literature. R. Borowiecki's approach to problems of entrepreneurship and innovation outstands from among many other opinions. He refers to these issues in the context of the challenges and dilemmas of economic competitiveness and business competitiveness. He believes that a source of competitive advantages lies in innovation that it lets companies adopt to changing conditions. R. Borowiecki argues that, "Competitiveness of companies is conditioned by factors of internal and external nature, and the latter include the way of managing, working capital, modern techniques and technologies, as well as the quality of manufactured products. Innovation plays a special role among the determinants of competitiveness at the company level, region and country, determines the pace and direction of economic development

[7] J. Górski, W. Sierpiński, Historia powszechnej myśli ekonomicznej, PWN, Warszawa 1987, p. 16.
[8] P.F. Drucker, *Innowacja i przedsiębiorczość, Praktyka i zasady*, PWE, Warszawa 1992, p. 35.
[9] P.F. Drucker, *Profession of Management*, Wydawnictwo MT Biznes 2004, p. 39.
[10] J. Machaczka, *Przedsiębiorczość, zarządzanie i zmiana – tryptyk organizacji*, „Przegląd Organizacji" 1996, No. 5, p.11.

(it has been pointed out that two–thirds of economic growth in developed countries is related to the introduction of innovation[11], setting the form and structure of international business cooperation to a large extent and, thus, determining the international competitiveness"[12].

On the other hand, M. Bratnicki[13] emphasises that entrepreneurship is undoubtedly one of the most important carriers of gaining and maintaining a competitive advantage and is a crucial factor in the management structure. He believes that entrepreneurship is manifested in the entrepreneurs' activities, which let them gain wealth and, simultaneously, the entrepreneurs also increase the pace of change in the economy by using their talent and sometimes good luck.

The problem of innovative city is the subject of research by R. Domański, who proposed a new approach to it[14]. Using the concepts of the operation of mechanical systems in physics, he described the complex combination of production factors variability and their influence on the development of more innovative and efficient urban systems. He stresses the importance of real non–linear processes, sustained non–linear development and non–linearity of the relationship economy–society–environment.

T. Marszał believes that entrepreneurship is strongly associated with innovation. This approach, identified as "entrepreneurial", is a factor determining success at all stages of development (of the city), however, it is of a particular importance in the case when the purpose is to obtain a competitive advantage in order to catch up with development. Innovation and willingness to take reasonable risks are invaluable then. Willingness to take adaptive actions to the environment and flexibility are also essential. This is related to the choice of market strategy aimed at being innovative[15].

According to the authors of this study, entrepreneurship is a concept adapted to the research methodology of many scientific disciplines, which means that it is an ambiguous and multi–faceted notion. From an economic point of view, entrepreneurship is one of the generative factors, beside land, capital and labour. Entrepreneurial activities consist of organising capital resources for the implementation of (often risky) projects in order to obtain benefits. The essence of entrepreneurship is seizing the opportunity to make a profit. It can be defined as the active behaviour of managers, business owners who strive to achieve a sustained competitive advantage of their companies, and take non–standard actions for profits. An enterprising manager (entrepreneur) is expected to be take responsibility for the company's employees and their families, as well as for the success of companies in turbulent market conditions.

From a social point of view, entrepreneurship means socially accepted actions taken by individuals or social groups, aimed at development–oriented activities, which benefit the participants of the process and their environment. An enterprising person is expected to be able to have a good rapport with other people, control one's emotions and respect ethical values. Such a person easily adapts to the changing environment and finds one's own place. Openness, optimism, willingness to realise new, unknown tasks, the ability to manage oneself and others, make decisions and estimate the expenditure needed to implement a particular entrepreneurial project allow an enterprising person to embrace their duties, also in economic reality. All the people have the natural ability and the need to be enterprising, so they should discover such qualities in themselves and develop them. Certain entrepreneurial attitudes and abilities are connected with the traits of an enterprising person:

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[11] S. Ciok, *Polityka rządu wobec wspierania działalności innowacyjnej i badawczo–rozwojowej*, [In:] *Endo i egzogeniczne determinanty obszarów wzrostu i stagnacji w województwie dolnośląskim w kontekście Dolnośląskiej Strategii Innowacji*, Urząd Marszałkowski Województwa Dolnośląskiego, Wrocław 2009, p. 119.

[12] R. Borowiecki, B. Siuta–Tokarska, *Wyzwania i dylematy społeczno–gospodarcze Polski w procesie transformacji*, Toruń 2012, p. 224.

[13] M. Bratnicki, *W poszukiwaniu teoretycznych podstaw pomiaru przedsiębiorczości organizacyjnej*, „Organizacja i Kierowanie" 2005, No. 4, p. 39.

[14] R. Domański, *Miasto innowacyjne*, Studia KPZK PAN, vol. CIX, Warszawa 2000, p. 57.

[15] T. Marszał, *Some Remarks on Entrepreneurship in Poland Experiences of Small and Medium Enterprisees in the Last Decade*, [In:] *Spatial Aspects of Entrepreneurship* (ed.) T. Marszał, Studia Regionalia, vol. 13, Warszawa 2003, p. 65.

- the ability to deal with failures and find inspiration for further action in them,
- the ability to enjoy the success,
- the ability to be a leader, influence and encourage others to cooperate,
- responsibility for oneself and others,
- fairness in relation to oneself and others,
- taking care of the family,
- solidarity between people,
- good communication with other people,
- ingenuity, resourcefulness, taking the initiative,
- searching for knowledge and getting to its sources,
- the practical application of knowledge,
- developing skills, self–improvement,
- controlling one's emotions,
- taking care of the environment.

Enterprising people are required to take actions that will guide the development of the company and their activities will allow the associated people to function in a market economy, so enterprising people need to be innovative. This means that entrepreneurship is correlated with innovation and innovative behaviour.

Innovation and management process

Management process consists of the following functions: planning and decision–making, organisation, interaction with people and control. All these functions also apply to region or local system management, however, in this case, actions are based on planning, especially strategic planning. One of the elements of management is establishing long–term development directions which allow for exploiting the existing opportunities and growth factors. It should be assumed that the entrepreneurial and innovation potential, which is essential to the process of management of the region, are important factors of regional development. In order to achieve the desired results, it is necessary to diagnose the region and assume that:

- a region is a place of residence of certain structures of the population which, for the fulfilment of its needs, behaves actively; a manifestation of this activity is, among others, growth of private business,
- the fulfilment of the needs of the region's inhabitants depends on social policy of the local authorities, initiation and implementation of innovative ideas, inhabitants' activity in the socio–economic area, identification of the areas of cooperation with local government,
- the fulfilment of the needs of the region as a whole is made possible by development of the social sphere, building the social fabric, enhancing human capital and promotion of social capital,
- a competitive region is able to promote creative individuals, build local elites and, above all, social groups identifying with the "local homeland" who work for the public welfare,
- a competitive region consciously shapes social attitudes of its inhabitants, whose manifestation is, for example, an active participation in local government elections, participation in discussions on the development strategy of the municipality, general participation in public consultations while determining the objectives of spatial development plans,
- a region strategy assumes that local authorities strengthen the position of stakeholders, which means that they create favourable conditions for attracting financial capital, widen access to knowledge, promote market–targeted fields of study (scholarships, so–called ordered specialties) by means of financial instruments, support the creation of regional research and development centres at universities, which will become centres of innovation, provide access to the latest technologies, implement interactive collaboration between science and economy, and, with the support of universities, influence the creation of innovation parks, innovation clusters, business and innovation incubators,

- local authorities, with a view to strengthening the competitive position of the region and its entities, influence the development of business environment institutions (e.g. technology transfer centres, information institutions, trade centres, exhibition and promotion centres, investor service offices in municipalities, loan and guarantee specialized institutions, private equity funds, venture capital),
- local authority acts for the inhabitants, on their behalf and in their interest, by creating conditions for economic development, and to this end, building a modern technical, social and institutional infrastructure (construction of transportation systems (airport, high speed train, motorway, expressways), logistics centres in order to strengthen national and global functions of regional centres) as an image of the region offering investment opportunities for the location of modern economic activities,
- local authority, in order to secure the needs of the inhabitants and efficiently manage the administration of the municipality, shapes the process of building modern local government structures with highly qualified staff, whose aim is to shape the social and economic relationships at all levels. One of the elements of the municipality management process is the use of modern marketing tools, taking advantage of scientific achievements, leaning on the highly qualified capital of inhabitants,
- local authority takes care of the needs of inhabitants and social groups, takes actions to improve the conditions of their material and spiritual life, continuously invests in culture and education of all age groups of the population, builds environment of tolerance and inhabitant's belief that knowledge and high level of technology is a prerequisite for a prosperous life.

Entrepreneurship and innovation as a process of seeking opportunities

Recognising the importance of the entrepreneur, i.e. a creative person, has a long history. R. Cantillon[16] was the first one to coin the term "entrepreneur". He treated entrepreneur's activities as a separate activity that was governed by its own laws (type of arbitration), while a thief or a beggar could be entrepreneurs[17]. The term "entrepreneur" refers to a person who plays a leading role in the economic process, and so is the initiator, animator, innovator, organizer, explorer of ways of adapting resources to people's needs. Entrepreneurship is a formula of freedom, the principle of the human activity. It can be defined as an ability to cope with all circumstances. It is a process that consists in creation or recognition of opportunities for success and using them. It can also be perceived from the point of view of personality, that is it can be analysed in terms of the personal qualities of an individual. Therefore, the question should be asked: who is an enterprising person?

According to R. Sobiecki[18], the key entrepreneurial human qualities are:

- daydreaming, vision, setting ambitious goals for oneself,
- self–confidence, appreciation of one's value,
- no fear of taking risks,
- optimism,
- creative thinking and acting,
- perseverance in action,

[16] B. Karlöf, *Strategia biznesu*, Warszawa 1992, pp. 27–28.

[17] *Entrepreneurship of these social groups can also be observed today*. Journalists of an Italian magazine "II Giornale" have estimated that beggars in Venice can earn approx. 500 euros per day. In Poland's the big cities, this amount is estimated at up to 8–10 thousand zlotys per month. It should be noted, however, that beggar entrepreneurship often transforms into organized crime, mafia, spheres of influence, makes reference to various economic models of restriction of competition. It sometimes takes gruesome forms, e.g. children in India had their legs broken so that they could earn money as disabled beggars.

[18] R. Sobiecki, *Przedsiębiorczość i jej rola w rozwoju obszarów zurbanizowanych*, [In:] *Miasto innowacyjne*, *Wiedza, Przedsiębiorczość, Marketing*, (ed.) Z. Makieła, A. Szromnik, Studia KPZK PAN, Warszawa 2012, v. CXLI, p. 122–125.

- the ability to cope with failures (not breaking down because of them), ability to find inspiration for further action in failures,
- valuing knowledge and experience, education, practical experience, participation in training (the relationship between education and entrepreneurial attitude),
- the ability to use the knowledge and skills of others,
- the ability to enjoy the success,
- organisational and team management skills.

Entrepreneurship is characterized by dynamism, activity, willingness to take risks, ability to exploit ideas, perceiving opportunities and using them, innovation and motility[19].

According to B. Makieła[20], an enterprising person should be equipped with a mix of four qualities that is "Imagination, Knowledge, Faith, Perseverance" in action. Only these qualities combined bring the success in business, personal life and family life.

Factors and sources of regional competitiveness

According to the opinion expressed by M.E. Porter[21], the notion of competitiveness of the whole country is extremely difficult to define, and a synthetic evaluation of this competitiveness is impossible to carry out. The goal of a country is to raise the population's standard of living. This can be achieved through the efficient use of the possessed resources and effectiveness will depend on the performance of companies. Under this approach, the basic measure of competitiveness is efficiency, and the goal of a country is to achieve a high standard of life of its citizens, which is dependent on the productivity of labour and efficiency of capital.

A slightly different approach toward the question of regional competitiveness is represented by the OECD[22], in which it is understood as the ability of businesses, regions, countries to match international competitiveness and to provide a relatively high rate of return on the applied production factors and a relatively high level of employment[23], and, in regional terms, with the real income growth of the population over the long term at the same time[24]. It can be assumed that regional competitiveness is determined by four main factors which are: economic performance, government efficiency, business efficiency and infrastructure. The so–called regional competitiveness profile is affected by a set of four interpenetrating streams of influence. These are: attractiveness and activity, proximity and peripherality, potential and process, integrity and risk. From the point of view of a region, competitiveness is defined as the degree to which it is able to produce, in market conditions, goods and services that can gain recognition in international markets, while maintaining or expanding the real income of inhabitants in the long term. The basic condition for the competitiveness is the economic activity carried out successfully, which is perceived as improvement of income levels and standards of living implemented in an open market of products and services produced by a country. The standard of living appears here as the final result of competitiveness.

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[19] A. Einstein characterized entrepreneurship in a very interesting way. He said: "*Everybody knows that something can't be done and then somebody turns up and he doesn't know it can't be done and he does it.*", and that is entrepreneurship.

[20] B. Makieła – from an entrepreneurship teacher's experience.

[21] M.E. Porter, *Strategia konkurencji. Metody analizy sektorów i konkurentów*, Wydawnictwo MT Biznes, Warszawa 2006, p. 20.

[22] M. Gorynia, *Pojęcie konkurencyjności – istota i poziomy*, [In:] *Luka konkurencyjna na poziomie przedsiębiorstwa a przystąpienie Polski do UE*, (ed.) M. Gorynia, AE w Poznaniu, Poznań 2002, p. 53.

[23] Z. Wysokińska, *Konkurencyjność polskiej gospodarki*, [In:] *Strategie konkurencji przedsiębiorstw – wybrane zagadnienia*, (ed.) J. Szabłowski, Wyższa Szkoła Finansów i Zarządzania w Białymstoku, Białystok 2004, p. 105.

[24] T. Barker, J. Kohler, *Environmental policy and competitiveness*, "Environmental Policy Research Briefs" 1996, No. 2, p. 11.

Regional competitiveness is the ability of a regional economy to stimulate internal resources of the region in order to compete and sustainably operate on domestic and global markets, and the ability to adapt to changes in those markets. It should be noted that competitiveness of the regional economy is not a simple sum of competitiveness of the entities operating within it. Competitiveness of the regional economy is determined by the mechanisms shaping networks of connections. They influence the formation of the internal network of cooperation between regional entities and the creation of an external network of cooperation of regional entities with the environment. Today, these networks determine the quality and intensity of economic cooperation. This phenomenon should be analysed at three levels of competitiveness: macro–level, meso–level and micro–level[25].

Conclusion

The aim of this article is to review the basic concepts, definitions, views related to entrepreneurship and innovation. An analysis of these issues demonstrates that the question of entrepreneurship is interdisciplinary and its conceptual scope is expanded and incorporated by new scientific disciplines. This results in the fact that a general adoption of a single definition is now impossible, and its proposition would evoke many comments, concerns and controversies. The main focus of the study was to address the issues of regional entrepreneurship, including the entities in the region that determine the management of the region. The study demonstrated that entrepreneurship is an inseparable attribute of innovation. Entrepreneurial behaviour of regional entities contributes to the change of thinking of local authorities, entrepreneurs, inhabitants concerning the need to implement innovation, because it is a prerequisite for obtaining competitive advantages, acquiring a stable leadership position, improving the functioning conditions of settlement units, which, in turn, determines the quality of life in the region.

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PART II

MACROECONOMIC AND SECTORAL POLICY PROBLEMS IN TERMS OF ECONOMIC ANALYSIS

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REPUBLIC OF MOLDOVA: THROUGH FINANCIAL STABILITY TO SUSTAINABLE ECONOMIC GROWTH

"*Whoever controls the volume of money in any country is absolute master of all industry and commerce"*

(*James A. Garfield, the 20th USA President*)

Summary

In a globalized and increasingly sophisticated financial environment, with continuous growing competition, new opportunities and uncertainties, financial stability is a new challenge for modern economies and a prerequisite for ensuring sustainable economic growth. In this context, in the present paper, considering the concept of "financial stability", analyzing the statistical data on the evolution of some indicators, such as loans granted by the banking system, interest rates on loans and deposits, money transfer from abroad by individuals, official state reserve assets, foreign debt, etc., the interdependence between them and the positions held by the Republic of Moldova in the Global Competitiveness Report, the author being responsible for primary data collection in the country, we came to the conclusion that Moldovan economy has favorable conditions, able to ensure financial stability and capable of generating sustainable economic growth, that would generate employment, competitiveness and social cohesion.

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Introduction

The new realities of the national, regional or global economic environment, which are becoming more and more globalized, with a constantly growing competition, with new opportunities, but also with new uncertainties, as well as profound transformations borne by financial systems under the influence of innovation technology, globalization and liberalization of capital flows, which are trends specific to the last few decades, have made capital flow in sophisticated ways and on markets increas singly integrated worldwide. And even though in the long run, this development promotes more efficient allocation of capital resources, finance is not exempted from destabilizing voltage generating risks for both players in the financial industry and the economies as a whole. The proof is the Euro zone debt crisis, which continues to be a factor of instability. Along with harsh fiscal policies, there is a decrease in the share

of funds gathered in the capital of European banks, which could lead to reduced lending of the real economy, and why not, of the capital export to countries with developing economies. Another problem is unemployment. During the economic crisis in 2008–2009 was registered a considerable increase in productivity, particularly in the sectors of production, including as a result of massive layoffs, and the services sector was not able to absorb laid off labor force. However, so far, there is no reason to declare that European countries are entering a new crisis, even though some of them are facing problems related to economic growth. The main paradox is the fact that markets need budgetary stability, but, as a consequence, react negatively to economic growth.

Eventually, the measures taken by the European countries, including monetary policy instruments, along with optimism generated by some positive developments in the US economy, could positively affect the global growth. However, we must admit that in a globalized financial environment and increasingly sophisticated, financial stability represents a new challenge for modern economies and a prerequisite for ensuring sustainable growth. Financial stability should also be apriority for the central banks which stand on the top of the national financial systems, thus, requiring a close cooperation and collaboration with various institutions and organizations nationally and internationally.

Financial stability

It should be mentioned that the economic literature and practice have not yet reached a common view on the content of the concept of "financial stability"; on the contrary, it is more about "financial instability". In this context, "financial stability" can be defined as a state of the financial system without systemic disturbances that affect the economic performance in general, i.e. without financial instability, characterized by the formation of financial bubbles, able to explode anytime, excessive volatility of stock prices, abnormal reduction of liquidity in certain market segments, failure of the payment systems, excessive credit limitation, bankruptcy of financial institutions etc. This requires a thorough analysis of all elements that constitute the financial system in terms of their effects on financial stability.

It should be also noted that the historical, economic and social context of the country has influenced over the years the content and the functioning of the banking system and market. Of course we cannot state, or talk about old traditions when referring to Moldova's banking system. The country's independence and transition (unfortunately too long) to market economy required fundamental changes in economic theory and practice, including reorganization, reformation, and why not, the establishment of the financial–banking system, based on the ex–soviet system. There arose the need to train specialist in the banking field and the Academy of Economic Studies of Moldova is the leading institution. During this period of time, the banking activity has suffered profound changes due to some economic phenomena, such as increased competition between banks, diversification of activities and services, emergence of new banking services based on advanced processing technologies and information transfer, adding other categories of operations to the bank activities, even if through daughter companies, such as leasing operations, insurance and reinsurance (here we mention that the national legislation could be adapted to the European practice), also, the banking institutions have proved that they acquired efficient skills in financial risk management.

Moldovan banking system

We believe that, today, the Moldovan banks represent a genuine banking system, have an active role in the economy, with an increased profitability, continuous downward trend (during the last 3 years) in the average interest rate on loans, thus, offering support to businesses, supporting investment activity, demonstrating stability, safety, and thus, contributing to the economic growth, preferably durable, able to generate employment, competitiveness and social cohesion.

Moldova's commercial banks represented the first line of defense against the economic and financial crisis that we faced and have shown resilience and have suffered less than the real economy.

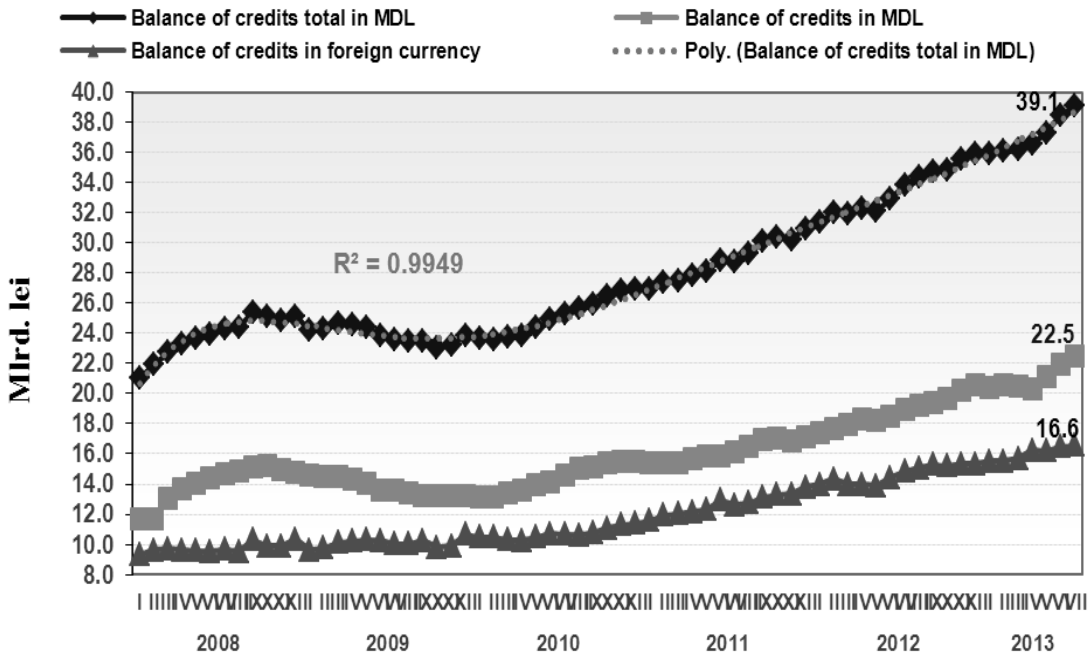
Today, the National Bank's monetary policy is more intelligent and effective in both, macroeconomic stability and improvement of the real lending sector of economy. We believe that the National Bank of Moldova, during the crisis and later on, has used effectively the monetary policy instruments, in order to maintain the exchange rate of the national currency and ensure control over inflation, using for this purpose the required reserves as a tool to control money supply. At the same time, we must admit that these drastic measures may have some negative consequences on economic growth, or, halting inflation means some sacrifices to production activities, investment activities.

Economic growth

The above mentioned allow us to consider that the Moldovan economy has favorable conditions to ensure financial stability capable of generating economic growth.

Thus, for the last years we can state a general continuous upward trend of credits granted by the banking sector, which at the end of April 2013 amounted MDL 36.5 billion (Figure 1), a different trend compared to the one registered during the crisis in 2008–2009.

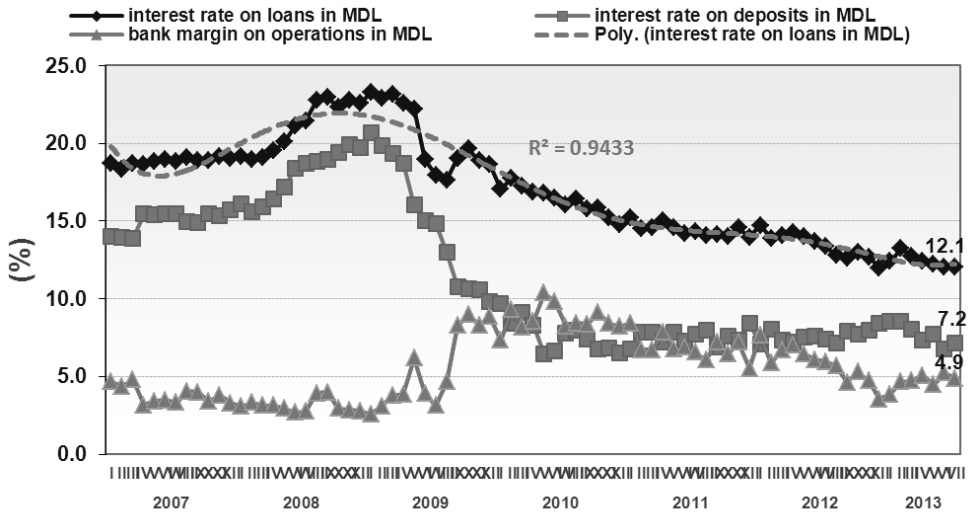
Figure 1. Dynamics of the balance of credits offered by the banking sector at the end of the period 2008–2013 (billion MDL)



Source: elaborated by the author based on the data of National Bureau of Statistics and National Bank of Moldova.

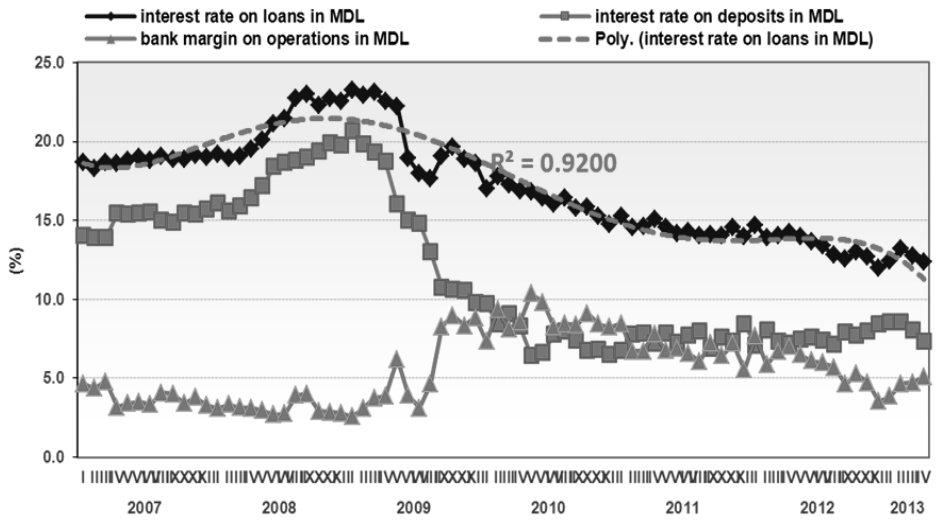
This is due to the general decreasing trend of interest rates set by commercial banks for loans given both in MDL and foreign currency, as well as reducing the bank margin both in national and foreign currency operations (Figures 2, 3).

Figure 2. Dynamics of interest rates on loans and deposits, lending bank margin in MDL during 2008–2013



Source: elaborated by the author based on the data of National Bureau of Statistics and National Bank of Moldova.

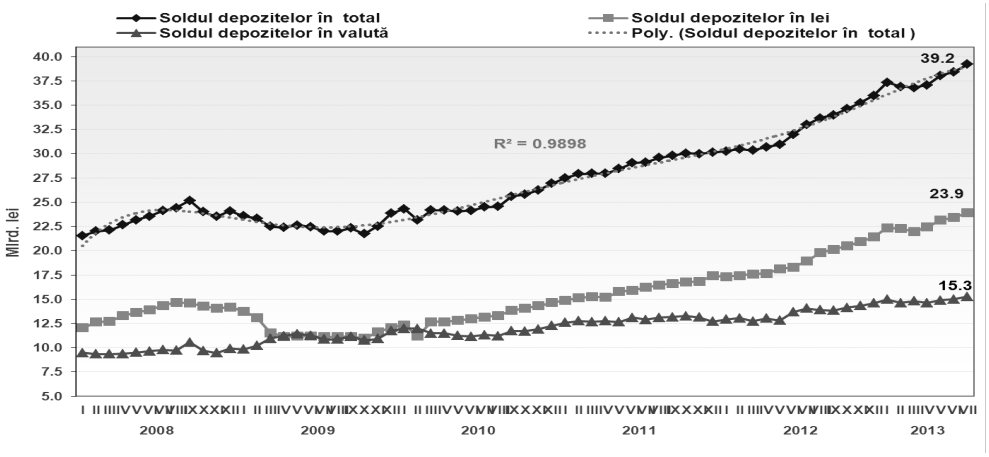
Figure 3. Dynamics of interest rate on loans and deposits, lending bank margin in foreign currency during 2008–2013



Source: elaborated by the author based on the data of National Bureau of Statistics and National Bank of Moldova.

With few exceptions, the increase of banking deposits, as a source of increased liquidity of banks can be regarded as positive, which at the end of April was MDL 37.1 billion, of which 22.5 billion in MDL and 14.6 billion in foreign currency (Figure 4).

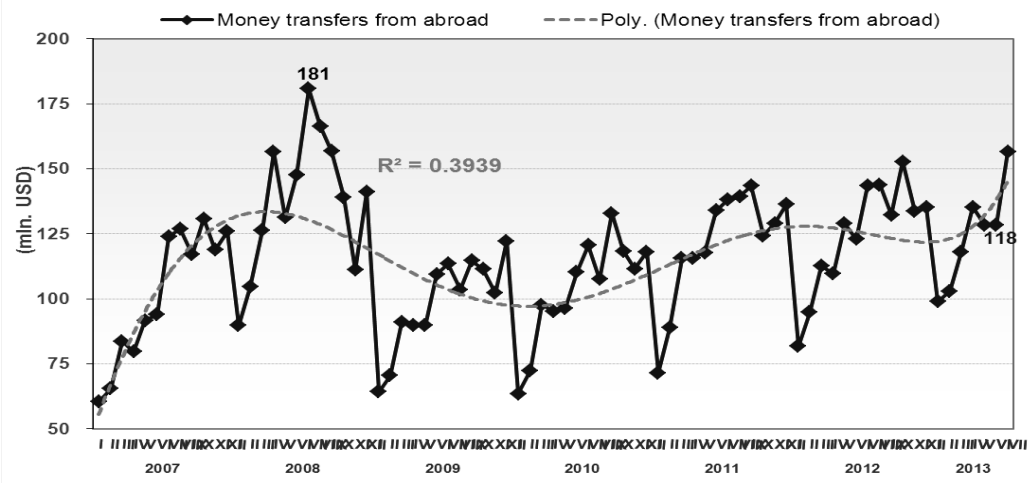
Figure 4. Dynamics of deposits balance in the banking sector during 2008–2013 (billion MDL)



Source: elaborated by the author based on the data of National Bureau of Statistics and National Bank of Moldova.

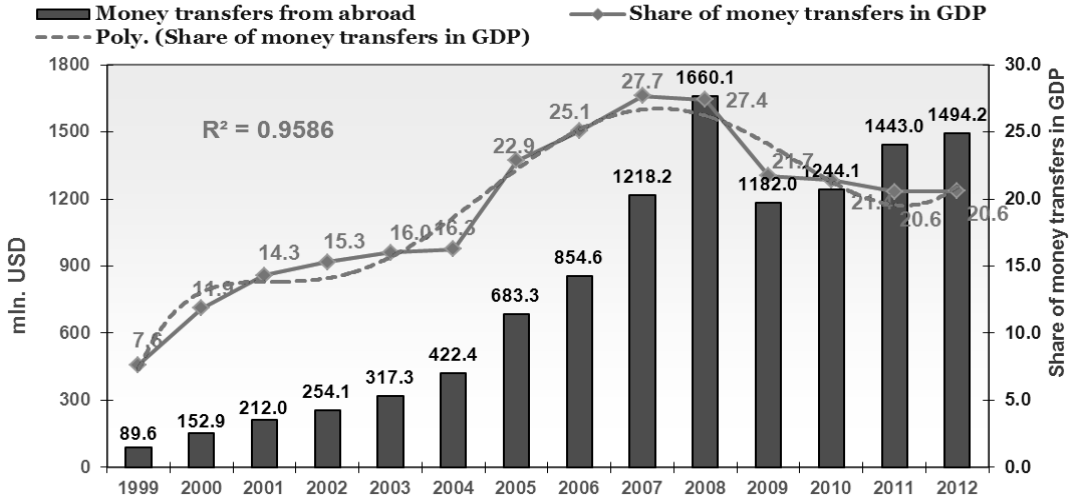
Even though the remittances from the people working abroad have not reached the level of 2008, for the past four years there is an upward trend.In March of the current year they reached USD 118 million (Figure 5) and during USD 2012 – 1494.2 million (Figure 6).Even if the share of foreign remittances in the GDP has a decreasing tendency (20.6% in 2012 compared to 27.4 in 2009), they remain a major source for stimulating domestic demand and supplying the liquidity of the banking system.

Figure 5. Dynamics of money transfers from individuals living abroad (residents and nonresidents) through Moldova's banks during 2008–2013



Source: elaborated by the author based on the data of National Bureau of Statistics and National Bank of Moldova.

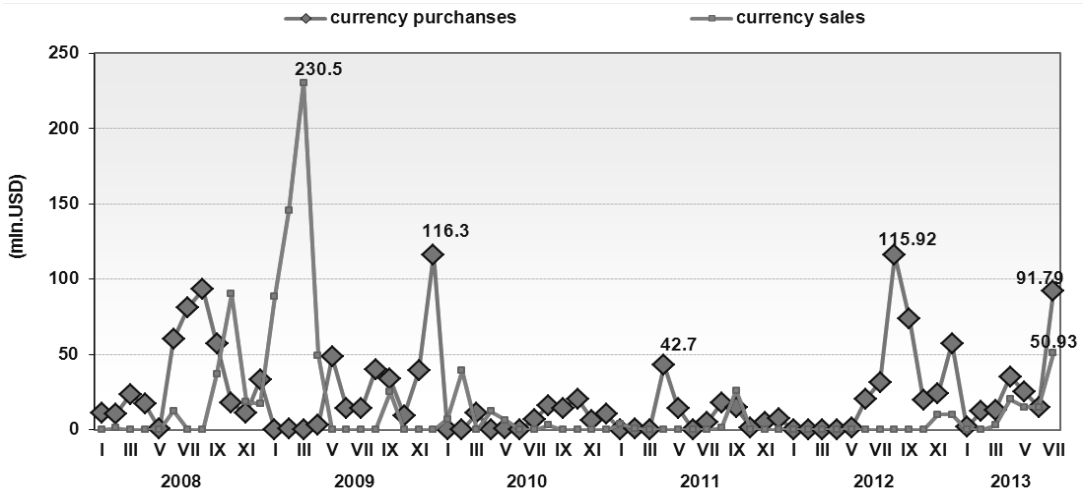
Figure 6. Share of money transfers from individuals living abroad in GDP through Moldovan banks during 1999–2013



Source: elaborated by the author based on the data of National Bureau of Statistics and National Bank of Moldova.

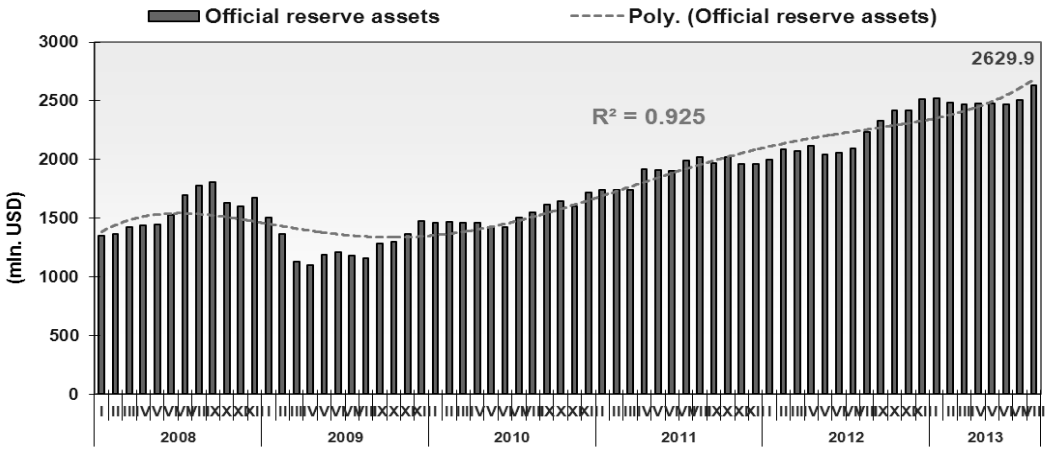
It is also noteworthy that the National Bank of Moldova has not been lately involved in the sale of currency, similar to actions in 2009 (Figure 7), on the contrary, has contributed to the increase of the state foreign exchange reserves, which reached USD 2481.0 million at the end of April of the current year (Figure 8), coverage of imports by reserve assets constituting 5.1 (Figure 9).

Figure 7. Activity of the National Bank of Moldova on the exchange market during 2008–2012



Source: elaborated by the author based on the data of National Bureau of Statistics and National Bank of Moldova.

Figure 8. Dynamics of official reserve assets of the Republic of Moldova during 2008–2013 (4 months)

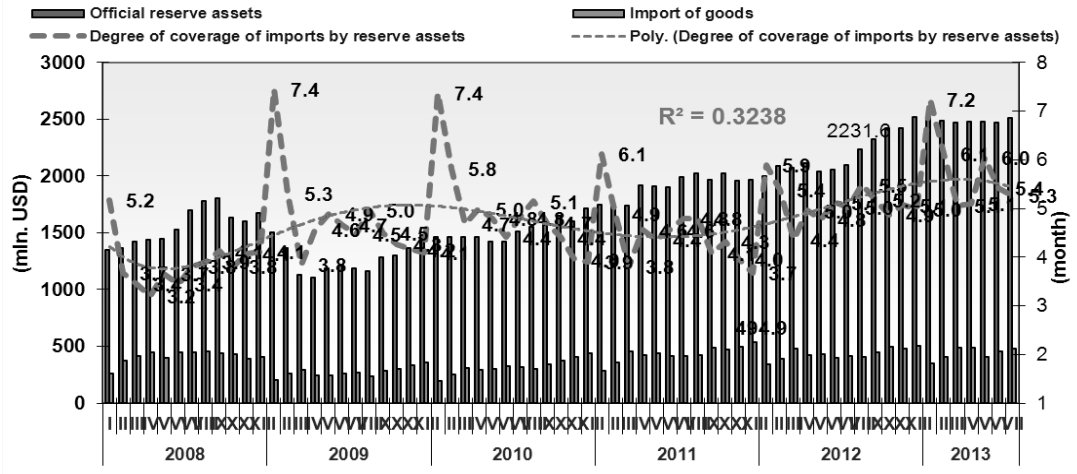


Source: elaborated by the author based on the data of National Bureau of Statistics and National Bank of Moldova.

Foreign debt and public external debt

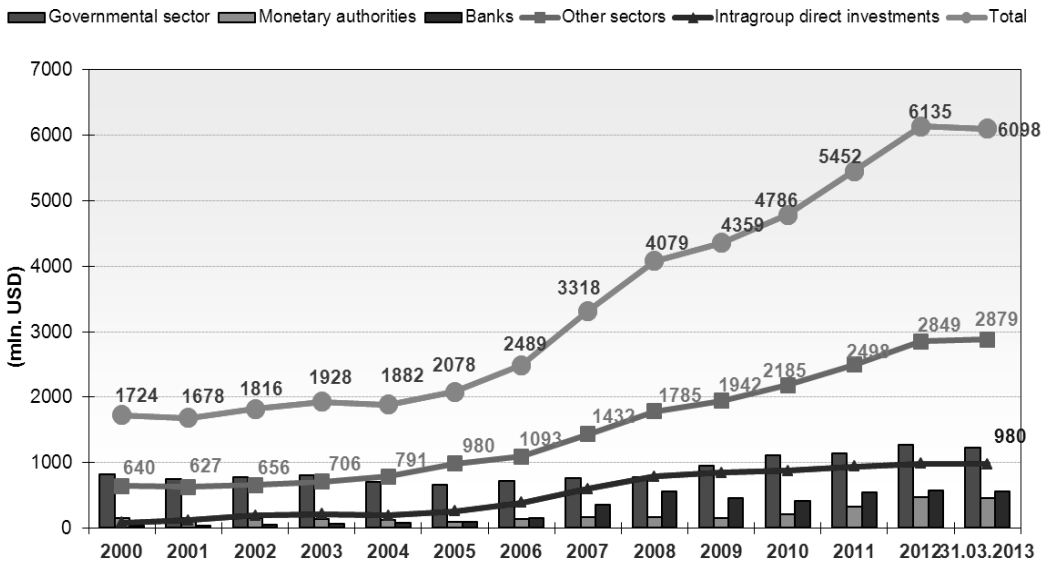
At first sight, a problem for the Moldovan economy is the continuous growth of foreign debt. However, even though the total external debt of the Republic of Moldova, during the last 10 years have an increasing tendency, reaching the amount of USD 6132 million by the end of 2012, we should point out that the greatest share belongs to the private sector, while the public debt increases at much smaller rates (Figure 10).

Figure 9. Dynamics of official reserve assets of the Republic of Moldova and coverage of imports during 2008–2013 (6 months)



Source: elaborated by the author based on the data of National Bureau of Statistics and National Bank of Moldova.

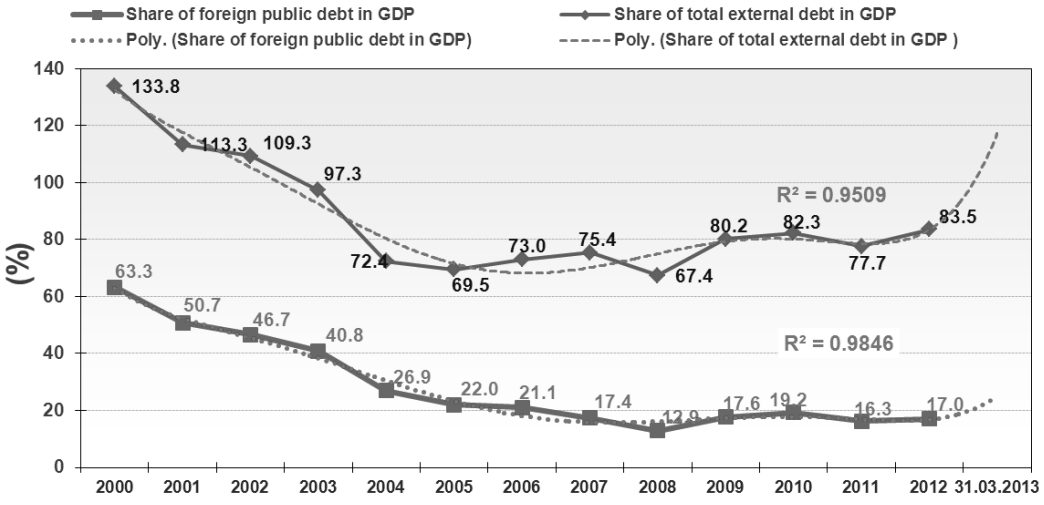
Figure 10. Moldova's external debt dynamics during 2000–2012 (stock at end of the period)



Source: elaborated by the author based on the data of National Bureau of Statistics and National Bank of Moldova.

The situation is a little different when we talk about public external debt to GDP, which constituted 63.3%in 2000and only17.2% at the end of 2012(Figure 11).

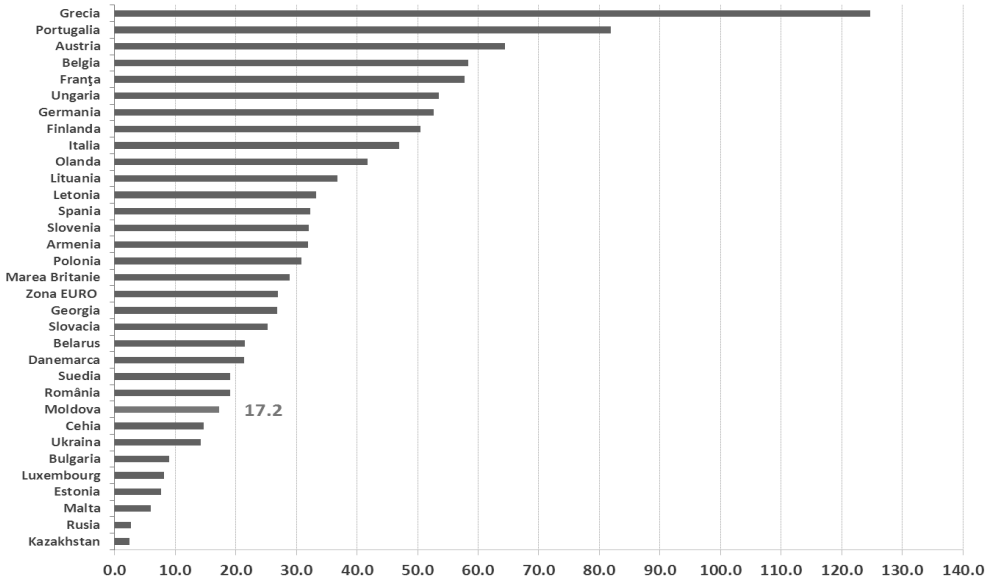
Figure 11. Dynamics of Moldova's external debt and public debt to GDP during 2000–2012



Source: elaborated by the author based on the data of National Bureau of Statistics and National Bank of Moldova.

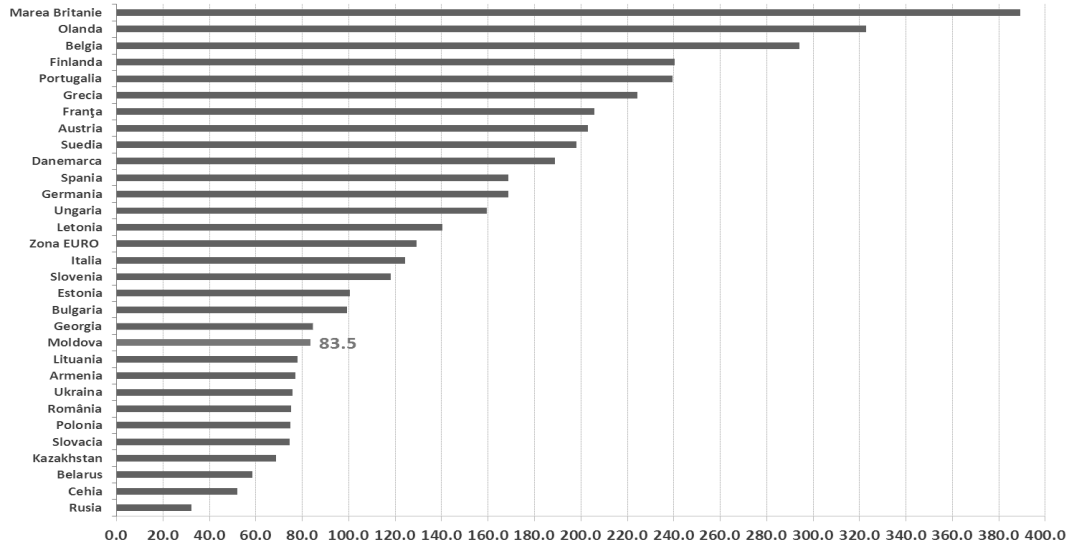
Noteworthy is the fact that according to the external debt to GDP ratio and the public external debt, Moldova's situation is much lower than of most European developed countries and almost similar to neighboring states (Ukraine, Romania, Bulgaria) (Figures 12, 13) and, thus, we can consider that currently this does not affect the country's economic security.

Figure 12. Dynamics of external public debt ratio to GDP during 2012 in some countries, (%)



Source: elaborated by the author based on the data of EUROSTAT

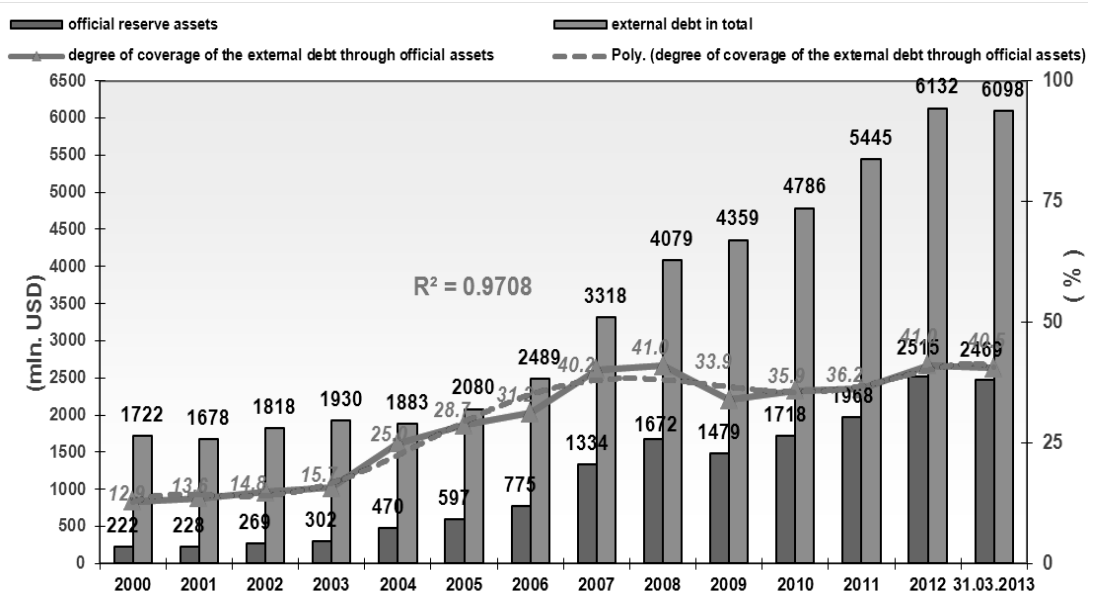
Figure 13. Dynamics of the total external debt to GDP ratio during 2012 in some countries, (%)



Source: elaborated by the author based on the data of EUROSTAT

Similarly, the coverage of external debt through state's exchange reserves is also growing, constituting 40.5% by the end of March 2013 (Figure 14).

Figure 14. Dynamics of Moldova's external debt and official reserve assets during 2000–2013



Source: elaborated by the author based on the data of Global Competiveness Report for 2013–2014

Sustainable growth – opportunities and threats

Of course, the economic and financial crisis, faced by most world countries, has generated processes capable of changing economic and social system globally and the recovery rates of economic growth in the pre–crisis period. The economic recovery as a whole could become, for some states, a long process full of uncertainties. Under the given situation, a special importance is given to the development of new models, recognizing that competitiveness and efficiency will be the drivers of sustainable growth. In this context, the issue of economic competitiveness, of acquiring and maintaining competitive advantages, using efficiently the factors causing them, and over all sustainable development of the national economy becomes a priority and an actual issue in insuring a sustainable economic growth.

It is worth mentioning that Moldova is considered today as having a transition economy, from one based on intensive use of primary factors, towards one based on investments (Table 1). For the first type is specific the concentration of exports to industries that exploit the advantage of low price of primary factors (natural resources, climate, labor force), usually with low competition, subcontractor industries, which are weak or absent, low purchasing power, which makes the market less attractive, and techniques and technologies are largely imported, thus, making the economy very sensitive to global economic crisis and changing exchange rates, whilst, for the second type, competition is the result of efficient production growth and improvement of products and services' quality.

Table 1. Distribution of world states by level of development in 2013

Level 1	Transition from level 1 to 2	Level 2	Transition from level 2 to 3	Level 3
Bangladesh	Algeria	Albania	Argentina	Australia
Benin	Azerbaijan	Bosnia Hertsegovina	Brazil	Canada
Burkina Faso	Armenia	Bulgaria	Croatia	Cyprus
Kampuchea	Bhutan	China	Estonia	Czech Republic
Ethiopia	Egypt	Ecuador	Russian Federation	Hong Kong
India	Gabon	Georgia	Kazahstan	Israel
Kyrgyzstan	Iran	Macedonia	Latvia	Japan
Nepal	**R. Moldova**	Montenegro	Lithuania	Norway
Nigeria	Mongolia	Romania	Poland	Slovenia
Pakistan	Philippine	Serbia	Turkey	EU 15 states
Tajikistan	Venezuela	Ukraine	Hungary	USA
...	...	...	...	...
38 countries	**20 countries**	**31 countries**	**22 countries**	**37 countries**

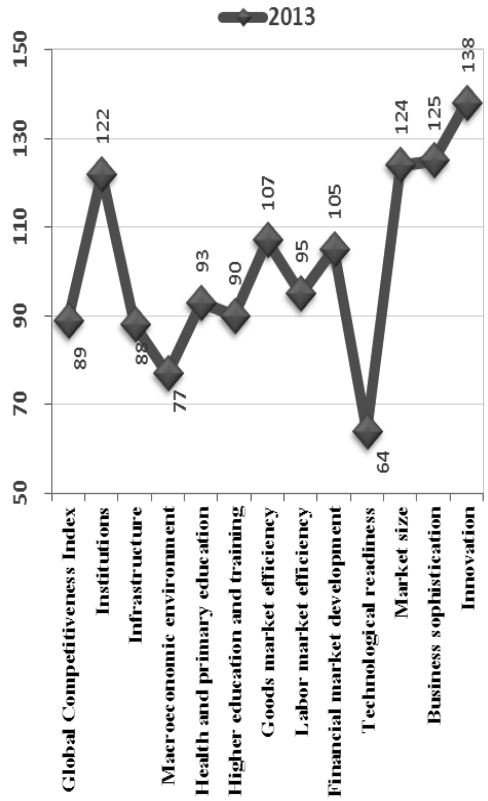
Source: own study.

The Republic of Moldova continues to have serious gaps in competitiveness compared to the absolute majority of European countries, in all the determinants of competitive ability and the largest gap occurs primarily in terms on innovation and R & D, information society, being placed in the Global Competitiveness Report for 2013–2014, elaborated by the World Economic Forum, on position 138 for "Innovation" (position 135 in previous Report), and "The complexity of business" – 125 (position 121 in 2012) (Figure 15).

Among the ranking factors with positive impact on the Global Competitiveness Index of the Republic of Moldova in 2013 can be considered:

- malaria cases to 100000 population – position 1,
- business impact of malaria – position 1,
- business costs of terrorism – position 10,
- imports as a percentage of GDP – position 20,
- internet access – position 23,
- women in labour force – position 28,
- legal rights index– position 28,
- general government debt, % GDP – position 29,
- fixed telephone lines – position 32,
- flexibility of wage determination – position 34,
- pay and productivity– position 34,
- total tax rate, % of GDP – position 40,
- time to enforce a contract/days – position 43,
- business costs of crime and violence– position 54,
- government budget balance, % of GDP – position 59,
- mobile telephone subscriptions – position 59.

Figure 15. Moldova's Global Competitiveness Index in 2013



Source: elaborated by the author based on the data of Global Competiveness Report for 2013–2014

At the same time, as factors with negative impact on Global Competiveness Ranking of the Republic of Moldova in 2013, which must be a country's priority in order to improve competiveness be considered:

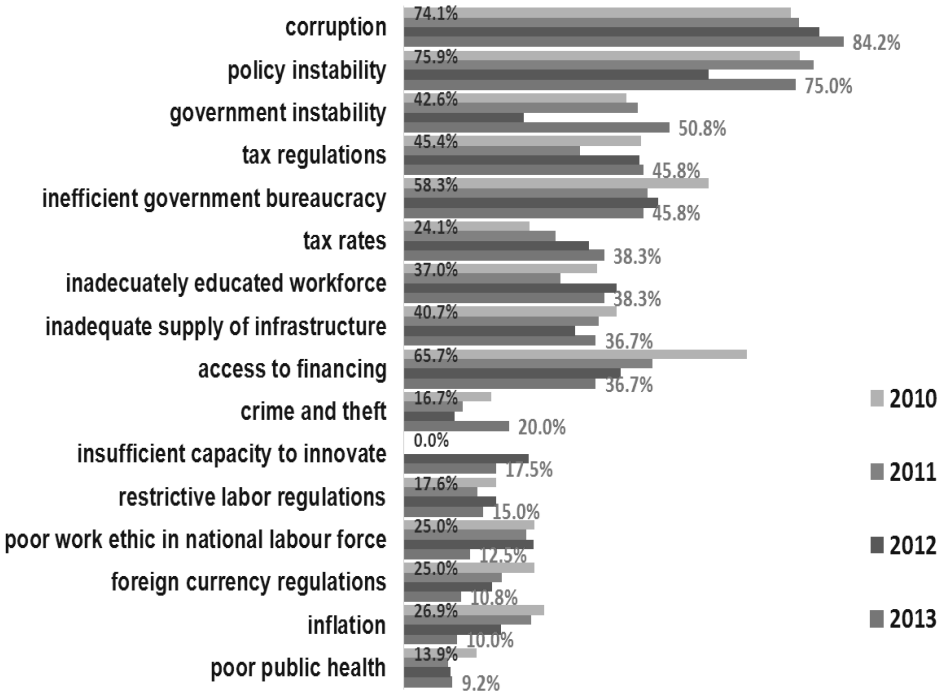
- quality of roads– position 148,
- company spending on R&D– position 148,
- state of cluster development – position 147,
- country capacity to attract talent – position 146,
- judicial independence – position 145,
- company spending on R&D – position 142,
- gov't procurement of advanced tech products – position 139,
- quality of port infrastructure – position 138,
- agricultural policy costs – position 134,
- capacity for innovation – position 134,
- effectiveness of anti–monopoly policy – position 133,
- extent of market dominance – position 133,
- availability of scientists and engineers – position 131,
- quality of scientific research institutions – position 132,
- property rights – position 131,

- university–industry collaboration in R&D – position 129,
- local market financing equity– position 127,
- degree of customer orientation – position 126,
- domestic market size index – position 126,
- quality of air transport infrastructure – position 116.

Business success or failure, within an economy, can be caused by a wide range of factors that impact negatively or positively the development of the real business. However, the experience of U.S., Japan and other countries demonstrates that the competitiveness of these countries began at the level of certain companies. This can be seen in the works of famous scientists in the field (M. Porter, J. Schumpeter, etc.). When talking about national economy, in fact refer to business competitiveness of companies participating directly in the competitive struggle, both on domestic and foreign market. If, in order to survive, a company only needs to continuously adapt to the environment in which it operates, then, in order to be competitive, it needs to comply with certain favoring rules. The environment, in this case, can be understood as a set of performances that are presented as the legal, political, cultural and economic environments, but also the essential changes of the system of values and social behavior in general.

Starting from the above mentioned, within the national survey conducted among 108 companies from all the regions of the country and representing most important sectors of the national economy, the respondents were asked to indicate from a provided list, five the most problematic factors for business development in Moldova. The research has shown that the factors with the greatest negative impact on business performance can be considered those stated in (Figure 16):

Figure 16. Incidence of negative factors in doing business



Source: elaborated by the author based on the results included in the Global Competiveness Report for 2010–2013.

1. Corruption – mentioned by 84.2% of surveyed companies (in 2012 – 79.6%),
2. Policy instability – factor mentioned by 75.0%% of all surveyed enterprises (in 2012 – 58.4%),
3. Government instability – 50.8%,
4. Tax regulations– 45.8%,
5. Inefficient government bureaucracy – 45.8%.

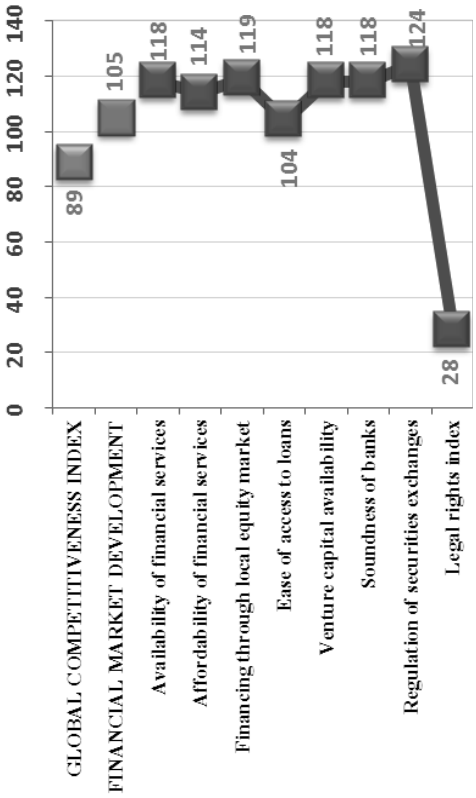
However, human health is not considered a great thereat for business, a factor mentioned only by 9.2% respondents, inflation (10%), restrictions on currency market (10.8%).

With reference to the degree of Financial Market development, the Republic of Moldova was placed on the Global Competiveness Report on 105 ranking (which influenced negatively the general ranking – 89), but it is better than the one of some East–European countries like Greece (ranking 138), Bosnia and Herzegovina (ranking 113) and Albania (ranking 128), or some CIS countries like Russian Federation (ranking 121), Kyrgyzstan (ranking 112), Ukraine (117).

A better appreciation among the indices related to the degree of Moldovan financial market development in 2013, was given to the legal rights index on financial market– ranking 28 and ease of access to loans – ranking 104 (Figure 17).

However, among the factors with negative impact on Moldova's competitiveness ranking, according to the financial market index, we can mention: financing through local equity market – ranking 124, financing through local equity market regulation of securities exchanges – ranking 119, soundness of banks – 118, venture capital availability – ranking 118, availability of financial services – ranking 118.

Figure 17. Financial Market Development Index in 2013



Source: elaborated by the author based on the data of Global Competiveness Report for 2013–2014

It is worth mentioning that the recent activities on the financial market have proven that we have a stable banking system, but we must admit that it is also less integrated into international financial flows; the banking system continues to be characterized by a relatively high degree of concentration and a relatively low level of competition, there is a low density compared to the EU banking network. Despite the strong development of the banking system, the Republic of Moldova has still a huge potential for growth on this market, including the volume of loans and banking services to individuals and businesses. The banking system restructuring is an absolute necessity and, in the context of our desire of European integration, we must admit that we need competitive banks, both nationally and regionally and, why not, on European and global levels.

Conclusion

Therefore, as conclusions to the present paper we can state the following:

1. The main problems that Moldova's economy is currently facing are not economic and are manly related to:
   - Unsolved Transnistrian conflict and lack of a clear perspective of the future of the Republic of Moldova, causing political instability and low investment attractiveness,
   - Unreformed judiciary system, respectively, distrust in property protection, with similar consequences,
2. Economic and financial crisis, experienced by most countries, has determined the necessity to seek new models of development, recognizing that during the post–crisis period competitiveness and efficiency will be the key factors of sustainable growth,
3. Now that Moldova is perceived in the world as having a transition economy, based on intensive use of primary factors, it becomes important to continue structural reforms and implement a model of economic development based on investment, innovation, export growth and diversification, both geographically and in terms of diversity,
4. During the post–crisis period, commercial banks have become the main intermediary in the relation savings – investments, thus, their financial stability and functionality has become a prerequisite in ensuring the country's sustainable growth.

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2. *The Global Competitiveness Report 2013–2014*. *World Economic Forum*, Switzerland, Geneva 2012.
3. Data of the National Bureau of Statistics of the Republic of Moldova (*www.statistica.md*).
4. Data of the National Bank of Moldova (*www.bnm.md*).
5. Data of the EUROSTAT (*www. epp.eurostat.ec. europa.eu/portal/page/portal/eurostat/home*).
6. Data of the International Monetary Fund (*www. imf.org/external/index.com*).

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PROSPECTS OF FOREIGN INVESTORS PARTICIPATION IN UKRAINIAN BANKING SYSTEM

Summary

In this article is explored the activity of banks with foreign capital in Ukraine, are defined positive and negative consequences of its impact on the domestic banking system. Is conducted the analysis of banks with foreign capital. Predictions about the future presence of foreign capital in Ukrainian banking system are made.

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Introduction

Events in Ukrainian economy and politics during 2013–2014 years have caused significant changes in the attraction of foreign capital in the banking system of Ukraine. This phenomenon and its consequences require thorough economic researches.

The penetration of foreign capital into the national banking systems as industrially developed as well as with the transition economies has become widespread and has become the dominant trend in the global economy. An important determinant, which led to a significant increase in the participation of foreign investors in the functioning of the banking system, can be considered the process of European integration of Ukraine. This problem acquires a special content, given the fact that our country is still experiencing an acute shortage of investment resources. Thus considerable space in credit and investment area namely long–term financing is empty.

The presence of banks with foreign capital in the banking system of Ukraine is in the interest of the national financial system, helping to attract foreign investment and strengthen the capacity of social and economic development. However, the crisis of 2007–2008, unstable political and economic situation led to major changes in the structure of foreign capital in the banking system of Ukraine. Accordingly, the

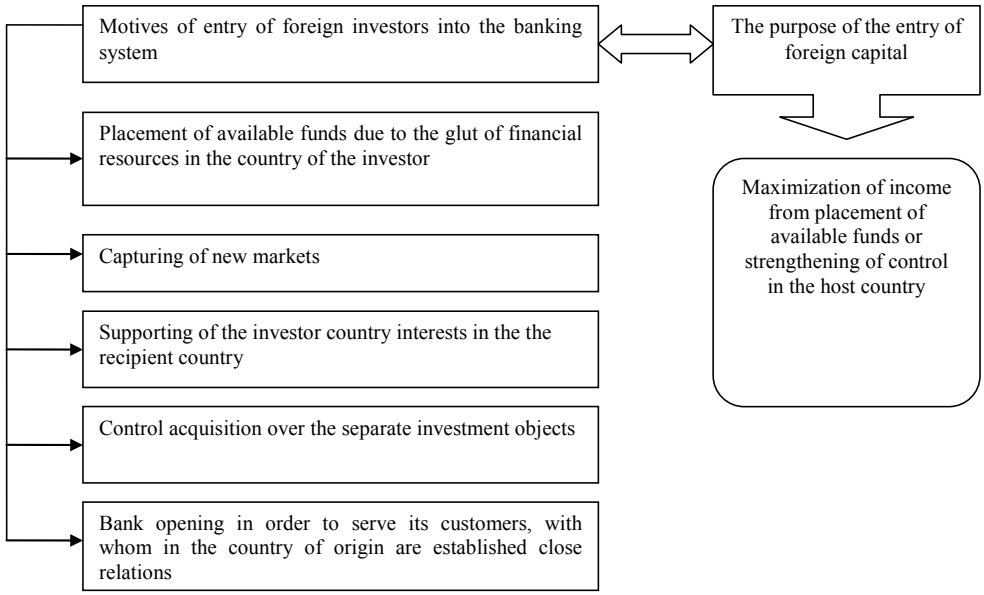
aim of the article is to study the current trends and forecasts about the participation of foreign investors in the Ukrainian banking system.

Positive aspects and risks of attracting foreign capital into the banking system

The intensity and the speed with which foreign banks took possession of the Ukrainian financial market in the 2000s, requires in–depth study of issues related to both the presence and the possible directions of influence of these banks in the development of the national banking system and the Ukrainian economy.

The main purposes of the entry of foreign capital are either maximizing revenue or increasing control of the country. At the same motives the entry of foreign capital into the banking system of the recipient country may be different (Figure 1).

Figure 1. Motives of entry of foreign investors into the banking system



Source: own elaboration.

Foreign investors have the right to influence the development of the banking system of Ukraine by:

- equity participation in the management of resident banks;
- creation of foreign banks;
- acquisition of existing financial and credit institutions.

The arrival of foreign investors in the market of banking services in Ukraine has for long been a topic of hot debates between supporters and sceptics of financial liberalization. Today, among scientists there is no single opinion on the effects of increasing the share of foreign capital in the structure of the banking system.

For example, R. Levin, examining the relationship of efficiency of banking activity and financial liberalization, concluded that the greater proportion of foreign banks in the capital of the banking system increases the overall efficiency by reducing its overhead costs of banks. B. Dayge, L. Goldberg,

and D. Kinney point out that foreign banks tend to have higher lending volumes than their domestic competitors[1]. D. Gladkyh[2] argues that banks with non–residents contribute to enhance the investment process, the development of private enterprise and the removal of Ukrainian economy on the path of sustainable economic growth.

In scientific studies V. Heyets[3] and K. Pavluk[4] believe that the presence of foreign capital in the domestic financial market will increase the efficiency of Ukrainian banks in attracting advanced banking technologies, expanding the range of provided services, will attract foreign investors, creating sources of investment resources. Yu. Umantsiv highlights that the arrival of foreign capital with a good reputation is an important factor in the development of the banking sector of the state: it will bring into Ukraine new technologies, new financial products, banking culture of corporate management and will provide greater competition[5].

Foreign scientists N. Hermes and R. Lensink argue that the arrival of foreign banks leads to an increase in reserves to cover loan losses as local banks do not want to lose their share of the banking market and provide loans on more favourable terms to customers[6].

However, other scientists have drawn attention to the negative effects of foreign banks activity. For example, O. Baranovskyi[7] and A. Yepifanova[8], believe that excessive concentration of foreign capital will cause complete destruction of the national banking sector. T. Kovalchuk, A. Sukhorukov and N. Sheludko (Filonova I.B., 2011) believe that the inflow of foreign capital into the country causes unstable development of the economy and threatens its financial safety.

Other part of national scientists, including T.S. Smovzhenko, O.O. Drugov, O.I. Kiryeyev, are committed to the idea of limiting the inflow and operation of foreign bank capital in Ukraine and justify their strict guidelines by the need in strengthen national financial and credit markets over a certain incubation period. In their view, liberalization can bring positive effect only after increasing the competitiveness of the banking system of Ukraine[9].

According to Y. Khramova[10], there are some circumstances where the expansion of foreign capital in Ukraine need to be limited. This situation occurs when the level of monopolization or control of the market by certain players – banks is one that allows them to dictate terms to customers and competitors. The main threat is weak diversification or over–reliance by one source of resources (as with other activities, including gas supply).

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[1] I. Ivasiv, R. Kornyliuk, *The impact of foreign banks on Ukraine's banking system, "*Herald of the National Bank of Ukraine" 2011, No. 10, pp. 84–91.

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[3] V. Heyets, *Foreign capital in the banking system of Ukraine,* "Mirror Weekly. Ukraine" 2007, No. 26 (605).

[4] C.V. Pavluk, *Function of foreign commercial banks in Ukraine: tendencies and problems,"*Finance of Ukraine" 2006, No. 6, pp. 143–150.

[5] Yu. Umantsiv, *The development of the national banking system in condition of a globalizing world economy*, "Herald of the National Bank of Ukraine" 2006, No. 10, pp. 60–65.

[6] N. Hermes, R. Lensink, *Foreign bank presence, domestic bank performance and financial development,* "Journal of Emerging Markets Finance" 2004, No. 3 (2), pp.207–229.

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[8] A.O. Yepifanova, , *Methodological components of effective development of the banking sector of Ukraine,* University book, Sumy 2006.

[9] T.S. Smovzhenko, O.I. Kiryeyev, O.O. Druhov, *A new stage of development of the banking system of Ukraine: increase of the participation of foreign investors: monography,* 2008, p. 231.

[10] Yu. Khramova, *Why should we separate something if in the current Ukreksimbank almost all mechanisms are established,* "Mirror Weekly" 2007, No. 7 (636), p. 8.

In the opinion of World Bank economists, the markets of developing countries, which Ukraine also belongs to, foreign banks are more efficient than local, due to[11]:

- the stability of the parent bank,
- cheaper funding,
- a greater propensity for innovation and superior quality of supervision in the country of origin.

Research of O. Havrylchuk dedicated to comparative effectiveness of foreign and local banks in Poland, is covering a sample that includes banks, which own 95% of banking assets of the country. Her conclusion: foreign banks a really more effective against Polish, but only if the foreign bank is established with the institutions, and not bought by foreign owners of a Polish bank. The author notes that the efficiency of the former Polish banks after their absorption by international financial groups did not undergo significant changes[12].

Abroad, many works devoted to evidence the relative effectiveness of foreign and local banks using econometric methods the relationship between ownership and bank efficiency and profitability of its work were published. Usually is stating that the state ownership of banks is the least efficient of all private, and foreign banks are more efficient than private national. The main arguments for this claim – advanced banking technologies and accumulated human capital of the parent bank, which is used by "daughters"[13]. J. Bonin and his colleagues have attempted a comprehensive study to test the effectiveness of a comparison of foreign and local banks. The sample included 856 observations for the period of 1996–2000 in 225 banks from eleven countries of Central and Eastern Europe (CEE). The main results are next. In Central and Eastern Europe private property itself – is not a guarantee of efficiency of banks, and there was no statistical evidence that state ownership is less effective than national–private. However, the banks controlled by foreign strategic investors, raise more private donations and give out more loans than local private and state banks of the same magnitude. Increasing the efficiency by transferring control over the bank into the hands of foreign investors amounted to at least 6% and by the equity of the bank in international institutional investors (such as EBRD) – 9%. It should, however, mention that in the foreign ownership, particularly ownership of EBRD could appear initially more successful banks – at least because they held a specific procedure for prior checking[14].

In a study based on the material of CEE countries A. Vernikov shows that banks which belongs to foreigners in the region are growing at the same rate as the privatized or created on the basics of local private banks[15]. Thus, in most CEE countries, including Ukraine, market–leaders of small business lending were foreign banks, of consumer finance – domestic banks. In most developed countries the picture is different – foreign banks are inferior in efficiency to local, which is particularly well illustrated by the USA and Germany example. Foreign banks usually have much more expensive passive base, as there is an access to small depositors, which serves as a cheap source of funding, usually in complicated loyalty force to their banks. The author also takes into account the positive aspects of foreign banks influence on the capitalization of the banking system.

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[11] Sh. Perera, M. Skully, J. Wickramanayake, *Bank market concentration and interest spreads: South Asian evidence,* "International Journal of Emerging Markets" 2010, vol. 5, No. 1, pp. 23–37.

[12] O. Havrylchuk, *Efficiency of the Polish Banking Industry: Foreign versus Domestic Banks,* "Journal of Banking and Finance" 2006, No7 (30), pp. 1975–1996.

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[14] J.P. Bonin, I. Hasan, P. Wachtel, *Bank Performance, Efficiency, and Ownership in Transition Countries,* "Journal of Banking & Finance" 2005, No. 29 (1), pp. 31–53.

[15] A.V. Vernikov, *A foreign bank capital in the countries with transitional economies,* Extended abstract of Doctor's thesis, Moscow 2005, p. 46.

An analysis of a number of publications shows that the growth of the share of foreign capital in the banking system leads to mostly positive effects, but, under certain conditions can also be a threat to its stability and economic security of the country as a whole.

Among the positive effects of foreign capital share increase in the banking system, we can distinguish:

1. increasing of banks credit resources and strengthening the stability of their sources by diversifying capital and shareholder base,
2. economic growth and stabilization of the national economy through foreign direct investment,
3. formation of the share capital sources for domestic financial systems, especially in support of post–crisis efforts recapitalization,
4. implementation of the international experience of banking and the implementation of international financial transactions; introduction of new banking technologies; improving organizational and financial management of banks, customer service,
5. the active switch to international standards of supervision and regulation of banking practices,
6. implementation of international experience in financial recovery, reorganization and restructuring of banks, which becomes very important in terms of future mergers, acquisitions and mergers of banks,
7. improving the efficiency of the banking system – as a result of increased competition in the banking market,
8. increasing international financial rating of Ukraine and increasing foreign investment in its economy,
9. the development of financial markets and market infrastructure; increasing the volume of transactions, introduction of new financial services (especially for corporate clients and foreign investors),
10. increasing the capitalization of domestic banks, including mergers and acquisitions of small banks; consolidation of banks; withdrawal from the market of economically weak banks, thereby increasing confidence in the domestic banking system,
11. promotion of International Trade and involvement in the country's economic of potential investors because foreign banks bring with them not only their own operations but also part of the business of its corporate clients and contacts in the field of international trade and foreign exchange transactions,
12. system preferences of banks with foreign capital activity, because the capital adequacy ratio and profitability are higher than in the system as a whole, and in a smaller proportion of the total assets of unprofitable assets that potentially could materially affect the structure of the banking sector in Ukraine,
13. market sales of shares of Ukrainian banks to foreign investors, which is a good thing in terms of improving their capitalization and transparency,
14. the ability to reduce the cost of mortgage and consumer loans through the experience of foreign banks on foreign capital markets. In fact the main sources of resources to foreign capital banks are Ukrainian deposits, and Ukrainian citizens unlikely will cheaply give their savings even to institutions with a worldwide reputation. In addition, some conditions of Ukrainian banks foreigners consider too liberal. For example, French banks offer housing loans for 15, and Ukrainian – for 25 years,
15. increasing transparency and security of the banking sector, improving the quality of banking services and their cheapness,
16. narrowing opportunities for money laundering,
17. reducing liquidity dependence of the banking system from political and economic risks,
18. the improvement of organizational and financial management of the bank, as foreign banks are always in highly competitive environment, first, have non–price techniques to attract customers; second, they work with the minimum margin, which is different from the interest margin of domestic banks that reaches 10% or more and it is an evidence of imperfect asset and liability bank management,
19. expanding the range of banking products in the field of services optimization for enterprises engaged in foreign economic activity, especially in the so–called non–traditional banking services (factoring, leasing, property management, etc.),

20. formation of conditions for transparent functioning of banks, as banks which are representing Western capital, adheres not only to the rules of "know your customer", but to the rule of "client must know his bank",
21. creating of effective incentives for the consolidation of the banking system,
22. improving interaction with strategic foreign investors in the real economy sector,
23. should also mention the social aspect of foreign banks arrival – the creation of new jobs.

However, along with the positive impact of foreign capital on domestic banking system, there is also a negative, such as:

1. danger of foreign banks control over the banking market in Ukraine, sharpening inter–bank competition and increasing competitive pressure on domestic banks that can help increase financial risk and weak the entire national banking system,
2. the threat of bankruptcy for domestic banks that are unable to cope with the growing competitive pressure, which can lead to financial instability,
3. additional risks to the banking system should be allocated among the major risk of bankruptcy of the parent bank, speculative risk, political risk, dependent development. Implementation of these risks could cause destabilization of the banking system, reducing public confidence in the banks,
4. selective servicing by foreign banks only of best customers. As a rule, foreign banks prefer highly corporate business, foreign trade financing, financing of large companies and securities transactions,
5. lack of interest in working with small firms, especially those that do not comply with international accounting standards,
6. disclaimer of foreign banks from the market development after reducing their profitability, which may lead to a deterioration of the economic situation in the country.
7. probability of enhancing volatility in the domestic financial markets through the entry of foreign banks that have high international rankings and amounts of capital,
8. the outflow of capital abroad, as during the crisis in their host country or foreign country banks often leave the market,
9. complications of banking supervision over the operations of banks from the side of public administration and the possibility of strengthening of foreign control over the banking system of Ukraine, which could adversely affect the level of economic security,
10. the intensification of social tensions in the country because of priority foreign banks step in buying large domestic banks are restructuring and recent dismissal of employees,
11. vulnerability increasing of the banking sector of Ukraine to fluctuations in global financial markets and in the banking sector of the country of the foreign bank.

It should be noted also that the increase of participation of foreign investors in the functioning of the banking system of Ukraine stimulates the growth of a variety of financial risks.

The level of risk for the economy of the host country of foreign capital presence in the banking system or the level of benefits from the phased implementation of this process will depend primarily on clear mechanisms for prudent policy to protect national interests and competitiveness of the banking system. Particularly relevant these issues at this stage of development are for Ukraine.

The risk of foreign capital presence in the banking system – is the objective–subjective category, which is related to the uncertainty of the effects of foreign capital on the level of the banking system and the economy of the recipient country. Thus the uncertainty of these effects depends on a number of priority essential factors, namely:

- the level of development of the national economy of the recipient country, economic and political stability,
- the level of projected economic efficiency investment of capital in that country,
- capitalization and competitiveness of the banking system of the recipient country,
- share of foreign capital in the banking system of the country,

- regulatory methods used to protect national interests,
- financial market trends in the context of globalization,
- strategies and tactics of financial interventions implementation of developed countries on markets of the host country,
- the level of openness of the financial system and of the economy to foreign investors.

Risks of foreign capital presence in the banking system of the country is spectral, ie the consequences of the global nature of manifestation they affect the economic, social, structural, financial, competitive, political and other spheres of activity. This leads to a comprehensive approach for their classification and content.

Results of the analysis of international experience has shown that despite the positive impact of an increase in foreign capital in the banking system, there are also risks. The risk of loss of economic sovereignty, the risk of dependence of the banking system, functional risk, public confidence in the banking system, the risks of concentration in the banking sector, competition risk, the risk of inefficient export structure, the risk of disruption of the financial and credit mechanism of the country, the risk of changes in the structure market, political risks and a number of others.

Thus, the study showed that the risk level of foreign capital in the banking system of the recipient country, their species classification, the impact on economic, social and political development is strongly dependent on the stages of the penetration of foreign capital and banking system of the host country, the share of foreign banks in structure of the banking system of the host country[16].

Without going into the debate of different approaches regarding the definitions of concepts and categorical apparatus, we note that, from the standpoint of national legislation "bank with foreign capital" as a bank in which the share of capital owned by at least one foreign investor is not less than 10 percent[17]. This interpretation takes into account the participation of foreign capital in the bank, which share is more than 10% and does not consider the possibility of funds invested by several investors under this amount.

The current state of foreign investments in the banking system of Ukraine

The entry of foreign banks in the banking system of Ukraine, caused by globalization and integration, is objectively a necessary process that contributes to capital influx, revival of market competition, improvement of banking services. However, this process has certain risks, for instance, threat for domestic banks to lose their position in the banking market of Ukraine[18].

Ukraine's banking system is suffering from the negative effects of the political crisis and foreign intervention. Ukrainian banks were aware that 2014 will be very difficult. However, the bankers were certainly not ready to such big commotions. It is worth noting that, according to Forbes–Ukraine, the number of unprofitable banks in the first six month amounted to 35 financial institutions. According to the official data of the National Bank of Ukraine as of 07.24.2014 – 17 banks are in the process of liquidation, in 15 of them liquidators are taking measures to exclude them from the Unified State Register of legal entities and natural persons–entrepreneurs in accordance with Article 98 of the Law of Ukraine «On banks and banking activity»[19].

On January 1, 2014 Hryvnia exchange rate was 7.99 UAH/$. By July 1 the exchange rate had changed to 11.8 UAH / $ and by 14 August – to 13.11 UAH/$. Given the exchange rate, it appears that the assets of the banking system amounted to $ 159.9 billion on 1 January, and by the beginning of July they

[16] S. Smovzhenko, O.I. Kiryeyev, O.O. Druhov, *A new stage of development* …, op. cit., p. 231.

[17] The Law of Ukraine „*On Banks and Banking Activity*" (2 August 2014) http://zakon1.rada.gov.ua/laws/show/2121–14

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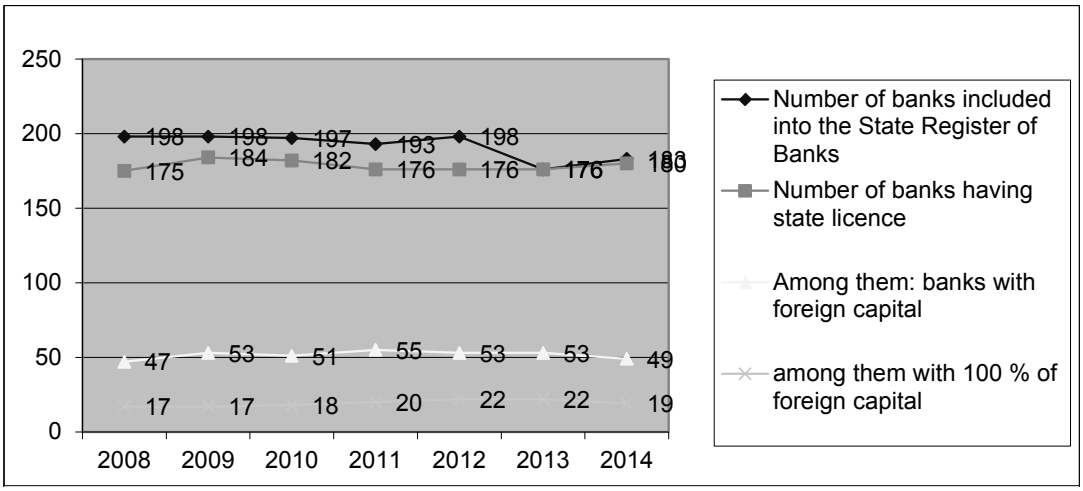
[19] The official site of the National Bank of Ukraine. The main indicators of banking acticity. (8 September 2014) http://www.bank.gov.ua

declined by almost a third – to $ 110.62 billion, or by $ 49.28 billion. According to the NBU, in July 2014 the capital of banks in Ukraine compared to 01.01.2014 reduced by 14% – to 178.2 billion UAH.

Analyzing the data of Figure 2 we can say that changes in the structure of the banking system of Ukraine took place in each period. When it comes to the recent changes, in the period from 01.01.2014 till 01.07.2014, two banks were removed from the State Register of Banks, and the number of banks with a banking license dropped by 6 and is (as of 01.07.2014) 174 banks. Temporary administration was introduced in more than 10 banks.

The entry of foreign capital in Ukrainian banking system started in the late 90–ies of the last century. According to the NBU, as of 01 01. 2001 22 banks with foreign capital were operating in Ukraine, including 7 banks with 100% foreign capital. The share of foreign capital in the banks' authorized capital was 13.3%.

Figure 2. Dynamics of changes in the number of banks for the period over 01.01.2008– 01.07.2014 years



Source: the official data of The National Bank of Ukraine, 2014.

The number of banks with foreign capital in 2013, compared with the previous year, decreased by 4 banks, and in 2014 their number increased again. Therefore, as of 01.07.2014 there were 51 banks with foreign capital in Ukraine, 19 banks are wholly owned by foreigners (100% of the authorized capital). The share of foreign capital in banks in Ukraine since 2012 has been steadily declining and as of 01.07.2014 was 32.3%, a 7.2% decrease compared to 2013 year.

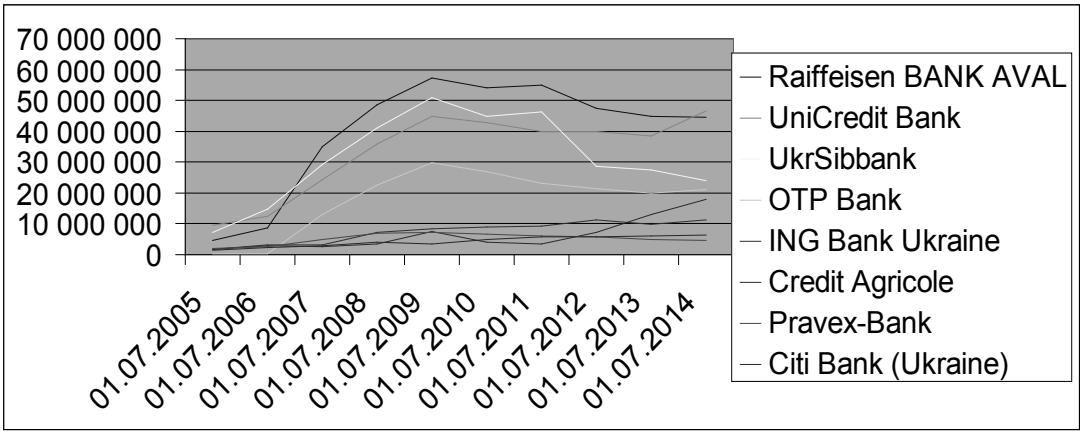
To analyze the efficiency of banks with foreign capital in Ukrainian banking market it is expedient to evaluate the share which they have in each group. From among the 15 banks that form the first groups, 10 have a share of foreign capital, 7 – the overwhelming share of foreign capital. From the 18 banks in the second group – 8 have a share of foreign capital, from 22 banks in the third group – 12, and from 118 banks of group IV – 21. Four of the largest banks are controlled by Russian investors. The ownership of foreign investors in the capital of the second group of banks is highly concentrated (90 – 100% of the capital). Significant role in financing banks of groups II, III and IV is played by capital which originates from Cyprus, the Netherlands, Germany, Austria, Britain, Hungary, France, Poland, Greece, Kazakhstan.

Banks, which European investors left were not major or systemic. According to the analysis of the dynamics of assets for 01.07.2005–01.07.2014, the country was left by the investors of the second–tier

banks, the volume of their assets dropped sharply after the crisis and was about 10 billion UAH at the beginning of 2012. Another group of financial institutions whose shareholders left the Ukrainian market, were small banks with total assets less than 4 billion, the change of their owners was unlikely to have a significant effect on the banking system[20].

Figure 3 clearly shows that the major Western European banks with developed territorial network and assets of over 20 billion remain on the market despite the significant loss of market share caused by bad debts. Top managers of the system European banks «daughters» often deny rumors of sale, which occurred more than once and were dissaminated by media.

Figure 3. Dynamics of assets of the biggest foreign banks with Western owners (mln UAH)



Source: the official data of The National Bank of Ukraine, 2014.

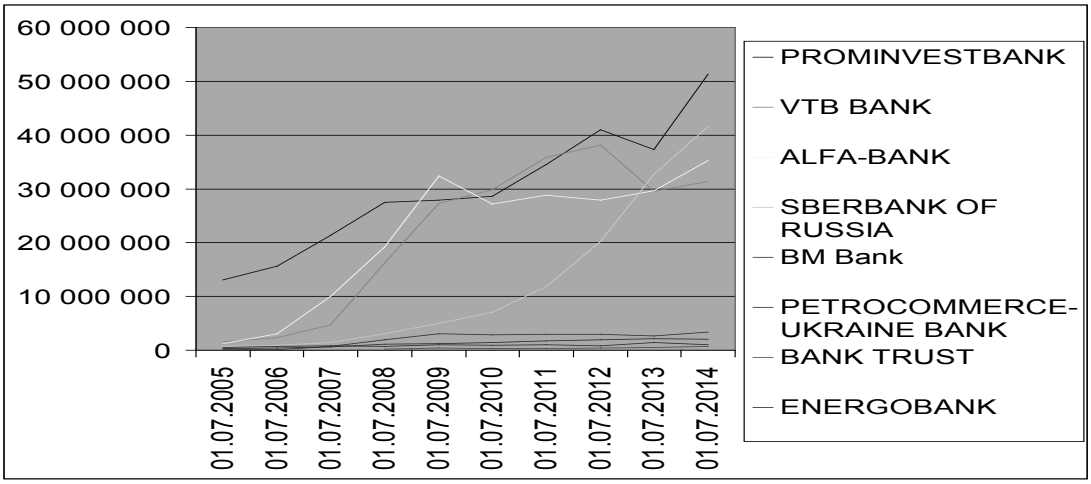
In fact, the sale of assets of the European giants «daughters» in the current environment will lead to significant investment losses, but their high market share stimulates at least to hold out until better times, when the price will be higher.

A group of Russian banks in Ukraine compared to European ones looks particularly contrasting: all banks show growth of assets and capital (Figure 4). Banks with state capital are particularly successful in the Ukrainian market – VTB and Sberbank, which have indirect access to budget resources and state guarantees of the Russian Federation, supported by significant income from oil and gas exports. It should be noted that the rapid growth of the share of Russian financial institutions in the banking system of Ukraine is supported by geopolitical goals of their owners[21].

[20] R.V. Kornylyuk, Ye. E. Sikorsky, *Foreign banks in Ukraine: Exit of European investors,* "Finance, Accounting and Auditing" 2013, No. 2 (22), pp. 68–76.

[21] R.V. Kornylyuk, Ye. E. Sikorsky, *Foreign banks in Ukraine* …, op. cit., pp. 68–76.

Figure 4. Dynamics of assets of the biggest foreign banks with Russian owners (mln UAH)



Source: the official data of The National Bank of Ukraine, 2014.

As we can see from the above analysis, in the reported year there is a decrease of foreign investors in the banking system of Ukraine. This trend, in its turn, will get in the way of developing European business standards, risk management and transparency of banks. The main causes of Western banks leaving the banking system of Ukraine are: – limited financial support from the parent structures caused by financial problems in Europe; introduction of stricter „Basel III" requirements to capital adequacy; high standards of national accounting that generated higher costs of creating reserves; instability of Ukrainian banking market; critical political crisis and military conflict in the East.

Thus, in the present context of globalization and financial integration in the global economic system and the banking system of Ukraine presence of foreign banking capital has become an integral part of the effective functioning of national economies, as foreign investors are investing not only own capital, but also promote the use of international experience of the banking business. So, we can say that today the banks with foreign capital are active participants in the competition in the domestic financial market, but to further increase the investment potential of Ukraine's banking system and its stimulatory role in the socio–economic development requires a systematic approach to the regulation of foreign capital in banking sector in Ukraine.

Predictions on participation of foreign capital in the banking system in Ukraine in future

When summarizing the research it is possible to make some forecasts (for ten–year period) on the participation of foreign capital in the banking system of Ukraine. There are a few forecasts as future participation of foreign investors in it depends on the political direction of Ukraine's economy development. Namely, in case of stabilization of the political situation and the implementation of the course for an accelerated European integration of Ukraine (1 scenario), considering the past experience of the impact of European integration of Eastern Europe into the EU on the development of their banking systems, the number of banks with European and American capital will increase significantly – their share in banking system of Ukraine (both in number and in terms of assets and capital) I going to be not less than 65–70%, state banks will make the balance. Russian banks will minimize their presence in the Ukrainian market, their share will amount to 3–5%.

When balancing between the EU and Russia the future of foreign capital in the banking system of Ukraine is vague and situational. In case of solving problems in Eastern Ukraine and restoring economic stability over the next 2–3 years Ukrainian banking market to some extent will restore attractiveness to foreign investors, and keep it for Russian ones. As a result, the share of Russian and Western banks will change situationally, but in general will grow as compared to Ukrainian banks. One can predict that their total share in the structure and assets of the banking system will increase and to 2024 will reach 60–65%. Several large state and private banks, controlled by Ukrainian capital will continue to work inUkraine.

In case of freezing political problems and instability in the economy over the next 3–4 years, in 10 years we can expect preservation of the ratio of foreign capital to the Ukrainian one, the share of Russian capital being increased and European reduced. Experience shows that Russian investors mainly pursue political goals, and Western – economic ones. Taking into consideration that political interests of Russia will include Ukraine, the share of Russian investment in the domestic banking system will remain. European investors will gradually leave Ukraine because of high risks.

Conclusion

Results of the study enabled the following conclusions:

1. The presence of foreign banks in Ukraine is one of the manifestations of the processes of globalization and international integration in the financial relations between states. The increase in the volume of foreign capital in the banking sector shows the adaptability of the domestic banking system to international requirements and standards, civility of financial relations between the state, foreign and domestic banking institutions; enhances the image of Ukraine as a new nation in the international financial markets; enhances competition in the financial and credit sphere,
2. Stopping the processes of globalization in the financial sector is impossible, but managing in the interests of national economic development is needed. Such issues are particularly relevant at the current stage of the seizure of domestic financial markets by foreign banks,
3. Increasing participation of foreign investors in the functioning of the banking system of Ukraine stimulates the growth of a number of financial risks,
4. The main conclusions are made based on the results of the statistical analysis of the impact of foreign capital in the banking system of Ukraine are:
   - as of 01.07.2014 in Ukraine there were 51 banks with foreign capital, including wholly owned (100% of the share capital) of 19 banks. The share of foreign capital in banks in Ukraine since 2012, is steadily declining and as of 01.07.2014 was 32.3%, which is 7.2% less than the year 2013,
   - there was a way out of some foreign investors. With subsidiaries of Western banks in the market were left mostly "big players" who are trying to keep the leading positions and adapt to the new post–crisis conditions, changing the structure of assets and branch lines of credit,
   - a group of Russian banks in Ukraine against the background of European looks especially contrast, all banks show a growth of assets and capital. Particularly successful in the Ukrainian market are banks with state capital – VTB and Sberbank of Russia.

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INTERNATIONAL EXPERIENCE OF IMPLEMENTING AND MANAGING ENERGY–CONSERVATION POLICIES

Summary

The experience of implementing policies on energy efficiency proves that to achieve the best results, energy efficiency should be integrated into other areas of economic and social policies – from industrial development to transport, housing and communal services and the environment, that is, almost into all areas of the state. This is study is an attempt to analyse energy efficiency standards, methods, measures on improving energy efficiency in EU.

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Introduction

In recent years many leading government and non–governmental international organizations put priority on facilitating challenges related to improving energy efficiency of the economy, fundamental reduction of unproductive consumption of fuel and energy at a global and regional levels. These tasks are usually closely connected with other important social problems – shortage of a country's own fuel and power resources, dependence on countries–exporters of oil and gas, negative impact of fluctuations of prices for natural resources, and especially protection of the natural environment that surrounds people when fuel and energy are being used.

Improving the energy efficiency of the world's economies is a common problem, because efficient economy in terms of energy efficiency is the basis for sustainable development of any country and the implementation of its national interests. This is confirmed by the experience of the world's industrialized countries development. Of course, each country seeks and finds its own way out of the energy crisis. But recognition of energy efficiency as one of the foundations of implementing state energy policy and creation of effective mechanisms of these processes governance is common and compulsory for all countries.

Compulsory measures on improving energy efficiency

Developed countries have realized practical significance of the importance of energy conservation and energy efficiency policies as a result of 1973–1974 oil crises, when for several months prices for oil, the main energy resource, have increased several times. It is since the mid 70's that most of the developed

countries have been implementing policies and programs to improve energy efficiency. Successful implementation of such policies and programs is as well carried out due to the wide implementation of methods and practices of energy efficiency. They help overcome informational, institutional, political, regulatory and market barriers and create an environment in which industrial enterprises are able to put into practice energy efficient technologies, methods and practices[1].

The policy of foreign countries in energy conservation area involves using three types of measures on improving energy efficiency, namely compulsory, stimulating and educational ones. Let us examine them in more detail.

Compulsory measures include legislated standard and regulatory acts and initiatives (primarily, the EU Directives should be named among the examples of using such measures). Introduction of environmental taxes, strict regulation requirements for energy efficiency of buildings, energy effective labeling, compliance with international standards in the field of energy are compulsory measures.

Nowadays, environmental taxes are used by most foreign countries (especially the EU) and excised from the economic entities having negative environmental impact. It makes them use traditional energy resources less and seek alternative sources of energy. Thus, Directorate of taxes and customs duties of the EC divided environmental taxes into seven groups by the areas of use: energy taxes (on motor fuel, on energy fuel, on electricity); transport taxes (taxes on covered kilometers, taxes when buying a car); fees for pollution (emissions of air pollutants and emissions into water basins); fees for waste disposal in landfills and their treatment; taxes on emissions of substances causing global changes (ozone depletion); tax on noise; fees for the use of natural resources. Quotas on pollutant emission is also the way to limit consumption of traditional energy resources.

When it comes to the requirements to energy efficiency in buildings, to perform this task the German Energy Agency developed a package of new laws and regulations, which includes strict requirements to both protecting structures (construction and physical characteristics) and installed equipment. The main German document is the Law on Energy Conservation (Energieeinsparverordnung (EnEV)), which in 2009 was revised to increase control over energy consumption. According to EnEV owners of old buildings should not just increase heat insulation and use energy conseravation measures during each repair, renovation, remodeling or rebuilding the buildings, but with increasing their living space owners are required to ensure compliance with EnEV 2009. Starting from 2009, in new buildings not less than 20% of the annual thermal energy needs should be met by energy derived from renewable sources (biofuels, solar, geothermal energy). According to the EnEV 2009 law, every building must necessarily have the energy passport where energy consumption and prospects of savings as a result of energy efficiency measures are written. The energy passport is a document required for real estate transactions. Houses with green energy passport have a much higher price than inefficient buildings. The EnEV 2009 law also spells responsibility of organizations – contractors that install energy saving equipment and carry out energy efficiency measures[2].

The corresponding energy efficiency standards are developed in most of developed countries. In the US, in particular, there are three competing standards for so called "green buildings": Green Globes, Model Green Homebuilding Guidelines, and Standard 189P. The price for this property in the US is constantly growing, while, according to builders, the cost of new houses is only 3–5% higher.

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[1] A.I. Shevtsov, V.O. Barannik, M.G. Zemlyanyi, T.V. Ryauzova, *Energoefektyvnist u regionalnomu vymiri: problemy ta perspektyvy [Energy efficiency in the regional dimension: problems and prospects],* Natsionalnyi instytut strategichnyh doslidzhen in Ukrainian, Kyiv 2014, p. 5.

[2] *Pro svitovyi dosvid vprovadrzennya energozberigayuchyh zahodiv [About the global experience in implementing energy efficiency measures*]. *www.minregion.gov.ua.* Retrieved from http://www.minregion.gov.ua/zhkh/reforma–zhitlovo–komunalnogo–gospodarstva /pro–svitoviy–dosvid–vprovadzhennya–energozberigayuchih–zahodiv–u–zhitlovo–komunalnomu–gospodarstvi–991852 [in Ukrainian].

Energy labeling. According to the EU Commission Directives on energy and transport, the manufactures are required to place the EU energy efficiency label on packaging of most consumer goods, the basic properties of consumer goods being written there. The efficiency of using energy is denoted by classes – from A at G. Class A has the lowest energy consumption, G is the least efficient. In 2010 the new № 2010/30/EC Directive came into force, which includes not only household products that are the bases of energy efficiency in the process of final consumption of housing services but also expands the scope of regulation to industrial and commercial devices and equipment, as well as to products which do not consume energy itself, but can have a significant direct or indirect impact on its economy in housing management and communal service (e.g. protecting structures of buildings and structures).

International standards. At present in the world the most popular standard is ISO 50001 – the international standard created by the International Organization to regulate power supply systems[3]. It determines requirements for installation, implementation, maintenance and improvement of the energy management system. The standard is designed to perform the following tasks: assisting enterprises in more efficient use of existing energy consuming assets; assisting in evaluation of objects in terms of energy efficiency and prioritizing the implementation of new energy–preservation technologies; providing means for improving energy efficiency throughout production chain. Certification for compliance with these standards is a significant achievement for enterprises towards energy–efficient production.

Stimulating measures on improving energy efficiency

Stimulating measures are referred to a number of different methods and tools which make enterprises, public institutions, citizens interested in pursuing energy saving measures, namely liberalization of energy markets, using contracting tool (energy service contracts), encouraging the use of local fuels and generating heat and energy from alternative sources, financial support (grants, tax relief, cheap loans, subsidies), the development of alternative energy sources.

In 1991–1992 Norway carried out liberalization of electricity market, within which the main principle of efficiency was declared – high electricity prices that reflect its real value may make investments in the energy sector profitable, while low prices make implementation of most programs in this area impossible. Norwegian policy of increasing energy efficiency is based on: promoting flexibility in supply procedures, reducing direct dependence on electricity used in heating purposes, increasing the share of renewable energy sources in the total energy balance of the country.

In 2000 the Norwegian Parliament declared a number of procedures and actions to improve energy efficiency, among them – a significant reduction in energy consumption, alternative energy development, the use of heat pumps and exhaust heat, wind power installation. Special attention was paid to the efficiency of energy–intensive sectors, particularly housing and communal services (here in after – housing), the decline in the use of electricity for domestic heating, renewable energy development and environmental protection. To realize these goals on June 22, 2001 the Royal Ministry of Petroleum and Energy of Norway established a company ENOVA SF, whose aim was to stimulate market participants to safely and efficiently produce and use energy. To achieve the purposes of ENOVA SF, the Norwegian Parliament established the Energy Fund and allocated grants of up to 5 billion krons (about 650 mln. euros). The source of funding is tariff tax of energy distribution. ENOVA SF also finances investment programs in the field of increasing energy efficiency of state and municipal buildings, regularly conducts

[3] *Energy management* is an activity to promote rational use of energy resources, based on receiving power–technological information by means of accounting, carrying out typical power–technological measurement and inspection, analyzing the effectiveness of using energy resources and implementing energy efficiency measures.

information campaigns for the population about the need to save energy, conducts trainings and provides education[4].

The use of local fuels is an important component of regional energy efficiency programs, as there is an urgent need to reduce the consumption of imported energy, the amount of harmful emissions produced due to the use of traditional energy resources, to maintain own reserves of hydrocarbon energy resources.

All developed countries actively promote the development of alternative energy sources, mainly using green tariffs[5], preferential loans, subsidies and grants that are directed to alternative energy sources. Developed countries are actively funding research and development projects on alternative sources.

In 1994 Sweden introduced "environmental bonus" for the use of wind turbines, which made it possible to reduce taxes on energy generated at wind electric stations, and the producers and consumers of electricity generated from biomass are exempt from environmental taxes and have some other benefits.

The "green" certification system was established by the law, which came into force on 1 May 2003. According to this law, producers of electricity using solar, wind, biomass, geothermal energy, wave energy or small hydropower plants (less than 1.5 MW), get 1 certificate per every kWh., and all the consumers (except for enterprises of energy –intensive industries) are obliged to buy these certificates and use them in their energy balance. If producers fail to find buyers of their certificates, government must buy them. For customers, who have not purchased a sufficient number of certificates, penalties are anticipated[6].

Educational measures on improving energy efficiency

Educational methods are mainly focused on energy consumers and aimed at creating a new culture of consumption, which is based on careful environmental management and conscious choice of energy–saving technologies. Government agencies and non–governmental organizations of the countries leading in the field of energy preservation regularly conduct seminars, trainings, educational programs designed to change the culture of energy consumption towards its saving. To apply educational methods they create public education centers for small and medium–sized enterprises that conduct free training for their staff on the need to save energy and on using energy–saving technologies in the workplace; carry out activities of consultants on energy saving, who on a free bases inform the public and businesses about energy–saving programs and activities; carry out educational programs on energy saving and environmental protection for children, students.

Conclusion

Thus the leading countries of the world set up advantageous structures of energy consumption and fuel and power complex balance (FPC), by creating effective energy conservation policy which is foremost orientated on the effective use of own energy resources. Low energy consumption per unit of goods, their quality being high, are characteristic for these countries' industry, which is provided by state–of–art energy conservation technologies and high–efficiency equipment. Experience of the developed countries proves that a problem of energy–conservation is a complex problem: it is related to innovative changes of the production equipment, to the use of the newest technologies, the search of

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[4] Pro svitovyi dosvid vprovadrzennya energozberigayuchyh zahodiv [About the global experience in implementing energy efficiency measures]. *www.minregion.gov.ua.* Retrieved from http://www.minregion.gov.ua/zhkh/reforma–zhitlovo–komunalnogo–gospodarstva /pro–svitoviy–dosvid–vprovadzhennya–energozberigayuchih–zahodiv–u–zhitlovo–komunalnomu–gospodarstvi–991852. [in Ukrainian].

[5] *Green tariff* is a special rate when purchasing electricity generated by alternative source.

[6] Vykorystannya energozberigayuchyh tehnologii v krajinah EU: dosvid dla Ukrainy. Analitychna zapyska. [Energy efficient technologies applying in EU: experience for Ukraine. Analytical note], *http://www.niss.gov.ua.* Retrieved from http://www.niss.gov.ua/articles/262/.[in Ukrainian].

new energy sources, to the solution of environment protection problems etc. Solution of this problem is possible only under condition of conducting the purposeful state policy of energy–conservation, which on the whole is one of the criteria of assessing the international authority of a country, including assessing its investment attraction.

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SELECTED FORMS OF PROFESSIONAL ACTIVATION OF POLAND'S UNEMPLOYED

Summary

The paper presents selected forms of activation of Poland's unemployed. During the latest economic downturn, the unemployment rate in Poland increased. At the end of 2013, it stood at 13.4%. Unemployment affects not only young people, very much the same as in developed countries, but also the 50+ who are made redundant in the wake of corporate restructuring. Less than 14% of the registered unemployed collect unemployment benefits. The methods for activation of the unemployed have to be adapted to suit the structure of unemployment. In the55+ age group, a significant proportion of the unemployed are job seekers who are permanently unemployed for more than two years. Their activation requires prolonged training to supplement their knowledge and accustom them to new technologies. Young people need professional internships to gain experience. Employers are looking for people with experience because people who go into employment immediately after completion of education are less productive and fail to ensure high quality of process execution.

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Introduction

Today, unemployment is one of the most difficult social and economic problems faced by various countries. Part of the population which has the potential to take a job and has the requisite qualifications fails to find one and often remains destitute. Unemployment mainly affects young people who are just entering the job market. These young people do not have the experience required by employers, who are looking for experienced people able to bring in high performance. In Poland, people aged 50+ find it increasingly difficult to find a job. Although they have the necessary experience, they cannot keep pace with the challenges involved in the implementation of technical innovations and new production technologies. The rise in unemployment in the last few years has been caused not only by the economic recession. It was undoubtedly fuelled by factors such as the introduction of ever newer technologies that reduce the need for human labour, job seekers' inadequate qualifications and corporate restructuring aimed at reducing production costs. Faced with a declining demand for products in the wake of the economic downturn, companies are forced to cut costs and product prices to stay in business.

The effects of unemployment create problems for businesses and the state alike. Falling tax revenues coupled with an increase in unemployment benefits a well budget deficits. Thus, the reduction in unemployment becomes a government priority. The main responsibility for finding new jobs rests with Employment Offices and Employment Agencies.

The paper presents selected forms of activation of the unemployed. It presents the role of local government employment offices and employment agencies in the face of a 2014 change in legislation regarding their functioning and a change in the use of occupational internship. The article shows the pace of development of self employment or establishment of social cooperatives by the unemployed and the volume of aid allocated towards this end from the Labour Fund.

Poland's unemployment level

Unemployment is measured by means of the unemployment rate i.e. the percentage of unemployed people in the group of people who are occupationally active. In practice, the number of people with the unemployed status or declaring that they are looking for a job is often higher than the number of the unemployed. Some of the people registered in employment offices either work illegally or are not interested in getting a job for a variety of reasons. People registered as unemployed cite the following reasons for their lack of interest in taking up a job: caring for children, being elderly or disabled, lack of skills and a need to enhance education or a willingness to retain benefit entitlement. Some people just do not feel like working[1].

From the point of view of the GDP and economic growth prospects, it is the number of employees, rather than the number of unemployed people that is significant. For this reason, the employment rate i.e. the percentage of working people in the group of people of working age (typically 15–64 years of age), is a better measure of a country's inhabitants' contribution to that country's economic development. The higher the ratio, the greater the proportion of people of working age being gain fully employed. The advantage of employment rate in the evaluation of the use of labour resources in comparison to the unemployment rate is that the former is not sensitive to changes in economic activity. In practice, two countries may have similar employment rates and significantly different unemployment rates[2].

The causes of unemployment are varied, the most often being social factors, institutional factors and individual factors. The size of unemployment depends on a country's economic system and its current labour market policy. It is associated most commonly with the level of investment and sustainable employment of workers in the newly established, modern work places of the public and private sectors. Economists state that the main reasons for the fall in employment and rise in unemployment are institutional factors. First and foremost, there are all manner of regulations that affect household members' decisions regarding their provision of labour and the creation of job by businesses. "The main elements of the institutional structure involve the legal protection of employment, extent of non–wage labour costs, minimum wage level, bargaining power of trade unions, solutions in the field of active and passive policies on the labour market and the extent of product market regulation"[3].

Polish statistics evidence nearly 2.2 million people being permanently unemployed (Table 1).

Yet, only a few of them are entitled to the unemployment benefit. In 2013, this entitlement was enjoyed by a mere 13.8% of the registered unemployed. This situation requires change in the legal environment. An unemployed person is entitled to unemployment benefits only if she/he can prove that he/she was

[1] They have been explained more extensively [In:] J. Czapiński, A. Sierpińska–Sawicz, *Poziom bezrobocia w Polsce i jego skutki dla przedsiębiorstw*, „Ekonomika i Organizacja Przedsiębiorstw" 2014, No. 11.

[2] W. Wojciechowski: *Skąd się bierze bezrobocie,* Fundacja Forum Obywatelskiego Rozwoju – FOR, Warszawa 2008, p. 5.

[3] W. Wojciechowski: *Skąd się bierze bezrobocie* …, op. cit., pp. 6–8.

employed a total of at least 365 days and drew down at least the minimum wage in the 18 months preceding the date of registration. These requirements are not met by people who have been registered as unemployed for more than a year in the last two years. Neither can the benefits be granted to those who have the appropriate work experience, but worked only part–time and earned less than the average wage. The benefits are granted for six months in *powiats* (second–level units of local government and administration) in which on 30 June of the preceding year, the unemployment rate did not exceed 150% of the national average, while in those where it exceeded 150% of the national average, the benefits are drawn for a year. Unemployed people aged 50+ and having at least a 20–year qualifying period also receive the benefits for one year. The decrease in the number of people receiving unemployment benefits is due, amongst others, to the increase in the number of long–term unemployed and the elderly.

Table 1. Poland's unemployment level and rate in 2005–2013

Description	2005	2006	2007	2008	2009	2010	2011	2012	2013
number of registered unemployed (‘000 people)	2859.5	2576.9	1987.8	1528.7	1683.9	1904.7	1904.7	2016.7	2176.6
Unemployment rate as at end of December, %	17.6	14.8	11.2	9.5	12.1	12.4	12.5	13.4	13.4
Percentage of unemployed people with unemployment benefit in total population of unemployed people	13.5	13.5	14.3	18.4	20.1	16.7	16.5	16.8	13.8
Number of registered unemployed aged 50+, (‘000 people)	466.1	445.8	409.5	340.9	345.2	403.8	428.7	459.8	502.8
Percentage of unemployed people aged 50+ in total population of unemployed people, %	16.3	17.3	20.6	22.3	20.5	21.2	21.8	22.8	23.1
Number of registered unemployed people aged 55+ (‘000 people)	128.9	152.2	159.4	148.5	145.9	188.5	219.2	247.0	291.4
Percentage of unemployed people aged 55+ in total number of registered unemployed people, %	4.2	5.4	7.1	8.7	8.3	9.1	10.3	11.5	12.6

Source: Eurostat, GUS, MPiPS, www.stat.gov.pl/subjectarea/ unemployment– unemploymentrate (downloaded 20.09.2014) and J.K. Kowalski, *Zawód: bezrobotny po pięćdziesiątce*, „Dziennik Gazeta Prawna” 2014, No. 132 of 10 July 2014.

The number of the registered unemployed aged over 50 increased by a size able 35 400 people during the period in question. In a group of over half a million registered unemployed people aged 50+, as many as 317400 are aged 55 and over. It is almost 2.5 times more than in 2005. While during the first four years of the period in question, the number of older unemployed dropped, starting in 2009 it began to mount a steady climb. During the economic downturn, older staff were the first to be laid off by companies. These workers usually earn more than young ones, therefore, the dismissal of senior people cuts manufacturing costs. This is particularly important in a period of falling demand for goods and the need to reduce prices. In addition, employers lay off the elderly before they begin being protected from redundancy, which protection starts four years before retirement. Companies do not want to employ people who will shortly reach the four–year period of protection preceding retirement. Many employers believe that older people have out dated skills, some of them cannot cope with the new technologies and IT solutions. In many jobs which rely on physical stamina, the performance of older people is lower than that of the young ones. In addition, older people are more prone to become ill and are therefore less available than young people.

The problem of unemployment among older people in the Polish economy is deepening. In 2005, people aged 55+ accounted for 27.6% of the total number of the registered unemployed aged over 50, and in 2014 such people accounted for 63% of the registered unemployed.

The situation of older people in the labour market was to have been improved, amongst others, by a program dubbed "Solidarity between generations 50 plus", which began in late 2008. Despite a number of incentives for employers, it did not bear the expected fruits as evidenced by the data in Table 1. The Employment Promotion and Labour Market Institutions Act sets out many incentives for companies to promote the employment of older people. It exempts companies from contributions to the Labour Fund and Guaranteed Employee Benefits Fund when they employ women aged 55+ and men aged 66+. This relief is also granted for one year to companies that employ unemployed people aged 50+. The Act reimburses companies for up to six times the average salary for costs incurred in connection with equipping or enhancing the work station manned by an unemployed person designated to take up the post by a labour office. Often there is a need to tailor the work station to the potential of older people to make it less burdensome by refitting lighting, providing the appropriate tools or setting the right pace of work which may reduce performance. In addition, the employer may, amongst others, be reimbursed for 80% of the cost of training of people aged 45+. Additionally, the number of days of sick leave for which the employer pays in staff aged 50 + was reduced to 14 days"[4].

In EU countries, on average, more than half of the elderly are in employment. The highest employment rate of people aged 50+ is reported in Sweden (73.6%), Germany (63.5%), Estonia (62.6%) and Denmark (61.7%). About 60% of older people are employed in the Netherlands and the UK.

In Poland, a mere 40% of the people aged 50–64 are employed, a figure comparable to that in Luxemburg and Hungary. Slovenia, Greece and Malta reveal very low employment rates in this age group.

[4] J.K. Kowalski, *Zawód: bezrobotny po pięćdziesiątce* …, op. cit.

Table 2. Employment rate of people aged 55–64 in EU Member States at the end of 2013

Country	Employment rate	Country	Employment rate
Sweden	73.6	France	45.6
Germany	63.5	Austria	44.9
Estonia	62.6	Slovakia	44.0
Denmark	61.7	Spain	43.4
Holland	60.1	Italy	42.7
UK	59.8	Belgium	41.7
Finland	58.5	Romania	41.5
Latvia	54.8	**Poland**	**40.6**
Lithuania	53.4	Luxemburg	40.5
Czech Republic	51.6	Hungary	38.5
Ireland	51.3	Croatia	36.5
Cyprus	49.6	Malta	35.9
Bulgaria	47.4	Greece	35.6
Portugal	46.7	Slovenia	33.5

Source: J.K. Kowalski, *Zawód: bezrobotny po pięćdziesiątce* …, op. cit.

Employment Office support for the unemployed

The problem of growing unemployment has created the need for a well thought–out and consistent policy aimed at reducing the unemployment level. Each country is committed to solving the unemployment problem. Active in this field are employment offices run by voivodships (voivodship is a province, the highest–level unit of local government and administration), and most of all–local employment offices with which the unemployed person has direct contact. Through these contacts, they pursue social policies developed at the Ministry of Labour and Social Policy, having examined and adjusted them to the needs of the local labour market. Thanks to the employment offices, the unemployed may tap into different forms of occupational activation such as socially useful work, public works, internships and training enabling professional training in the work place, training loans originating in the Labour Fund, economic activity aid originating in the Labour Fund granted to the unemployed person to support him/her in starting his/her own business.

On 1 January 2015 new rules on the allocation of funds promoting employment will come into effect. The most effective employment offices will receive more funds. The new allocation of funds is based on two principles: 75% of the funds earmarked for occupational activation will depend on the level of unemployment (its rate and the number of unemployed) and 25% on the effectiveness of employment offices' effort aimed at the activation of job seekers. More money will flow to those employment offices which place their unemployed the most effectively. This allocation system will motivate offices to step up their search for jobs[5]. In addition, their staff will be paid for the actual results of their job search. The changes are introduced through an amendment to the Promotion of Employment and Labour Market

[5] www.praca.gazetaprawna.pl

Institutions Act. The staff of employment offices are to be motivated with money originating the Labour Fund, from which they can receive bonuses. The earmarked amount stands at 7% of the sum planned for occupational activation. Once the reform has taken effect, 5% of these fundswill be allocated to finance customer service officers' salaries, and 2% as awards for employees of *powiat* employment offices, payable according to the results achieved in the field of occupational activation.

Employment agencies operations

Employment offices may outsource job search to private employment agencies which will be paid from the resources of the Labour Fund. Such agencies must be selected by tender, in accordance with the requirements of the public procurement law. The procedure set out by the law is rather complicated. Statutory deadlines on e.g. receiving bids from bidders, or making arrangements through negotiations must be kept.

The number of employment agencies in Poland is presented in Table 3.

Table 3. Number of employment agencies in Poland in 2005–2013

Description	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Number of employment agencies	1979	2637	3132	3811	2941	2998	3537	3800	4600
Growth rate	–	133.2	118.8	121.7	77.2	101.9	118.0	107.4	121.0

Source: Krajowy Rejestr Agencji Zatrudnienia oraz Ministerstwo Pracy i Polityki Społecznej, www.kraz.praca.gov.pl.

The number of employment agencies in Poland is growing steadily. However, many of the mare one–person businesses that are notable to exert pressure on employers to protect all of workers' rights. Employment agencies are involved mainly in job search for the long–term unemployed who have difficulty finding a job because of social or health problems.

The following may outsource tasks concerning the activation of the unemployed to employment agencies[6]:

1. **provincial (voivodship) offices.** Provincial employment offices select an employment agency and conclude a contract with it for the provision of employment activation services. Selected *powiat* employment offices set to the long–term unemployed eligible for this support, who were afforded profiles II and III (degree of difficulty in finding a job). The *powiat* employment offices must pool a group of at least 200 unemployed people from one *powiat* to be referred to provincial offices. The agency's fee for finding employment for one unemployed person for a minimum of 6 months amounts to a maximum of three time the average salary,
2. ***powiat* employment office**. *Powiat* employment offices conclude a contract with an employment agency on bringing about employment of an unemployed person who is affected by a peculiar situation on the labour market. The contract of employment should last at least 6 months and civil law contracts are permissible. In the case of failure, the agency pays back its fee in proportion to

[6] Employment Promotional and Labour Market Institutions Act, „Official Journal" of 2013, No. 674, as amended.

the non–performance of the task (i.e. it retains a portion of its fee owing for the effective period of employment).

This model involving the outsourcing of activation measures by provinces is inflexible. If *powiat* employment offices were able to outsource the services autonomously, by passing the organizational procedures at the provincial level, the system would be much more flexible.

Other institutions offering occupational support

In addition to the most important institution supporting the unemployed, i.e. the Employment Office, there are many other governmental and non–governmental organizations, which offer assistance in job search. Sometimes, they give psychological counselling offering emotional support and helping meet new challenges. These entities are mainly different kinds of associations and foundations pursuing common goals of a non–profit nature. The people working for NGOs are passionate about engaging in their activities and fundraising. These NGOs include[7]:

- work clubs offering mutual support and help the unemployed,
- psychological and pedagogical counselling centres,
- Voluntary Labour Corps,
- University Career Centres,
- business incubators,
- Volunteering.

Work clubs offering mutual support and help the unemployed. Members of these clubs come together, integrate and show mutual support and understanding. Thanks to the clubs, unemployed members meet people in a similar situation, people with similar problems, people who are like–minded and as a result they find it easier to open up, which is often the beginning of a valuable therapy.

In the club, the unemployed person learns the art of self–presentation. He or she must become able to demonstrate his/her qualities to enhance the chance of getting a job.

In the club, members can also get assistance in writing official documents, train to master the skills of face–to–face conversation or a phone call with the employer, write the necessary documents on computer and make copies of letters required for job search. Overall, work clubs are created by the unemployed for the unemployed. In Poland, they are not quite trusted as yet since the unemployed often do not understand this form of self–help.

Psychological and pedagogical counselling centres discharging their obligations by running diagnostic, counselling and preventive activities within an educational environment. In terms of counselling, the centres do psychological and educational tests for children and youths, parents and teachers.

Voluntary Labour Corps are designed to prevent social exclusion and marginalisation of young people aged 15–25. Their task is to create for youths conditions conducive to improvement of professional qualifications, as well as to participate in the organization of school–time and vocational training, organises as unemployment for students, search and prepare job offers and participate in organising the ad–hoc works and public works, VLC give all sorts of advice on how to find a job and send people to vocational courses.

University Career Centres are entities within universities set up to help students enter the job market by matching students with prospective employers. They assist students in finding a job and making decisions about their future careers. These centres establish contacts with employers, arrange meetings

[7] Z. Wołk, *Kultura pracy, etyka i kariera zawodowa*, Wydawnictwo Naukowe Instytutu Technologii Eksploatacji – PIB, Radom 2009, p. 205.

and presentations for them, and inform them about the situation on the local labour market. The meetings are also of use for universities as they promote themselves and acquaint students with the labour market.

Business incubators assist people who are not able to go into self–employment for lack of funds or business premises. Business incubators provide premises and provide legal and financial advice on certain terms. Thanks to them, would–be entrepreneurs can gain experience and under the supervision of specialists overcome the first obstacles and difficulties. Such assistance continues until the entrepreneur becomes independent. Incubators for aspiring entrepreneurs protect them against bankruptcy or serious problems, and at the same time promote consistent pursuit of the direction of the start–up's development.

Volunteering is a voluntary, non–profit activity serving the general good, going beyond family ties, camaraderie and friendship. Work in volunteering promotes self–actualisation, creates opportunities for the acquisition of new non–business experience but can also help acquire professional skills. Volunteer work creates an opportunity to verify a volunteer's knowledge and skills. Through volunteering, people develop their interests and gain experience in new areas. When applying for a job in certain professions, volunteering experience comes at a great premium and increases the candidate's chances to get a permanent job. The competencies are appreciated in such areas as social assistance, social work or the health service.

Occupational internships for the unemployed

One attractive form of activation of the unemployed, in particular of graduates, is internship. According to the Polish Quality Framework and Practices, internships should stem from a company's business needs and be part of the verification of young people's knowledge and skills and contribute to their adaptation to work conditions in companies. However, many companies use internships to take on people with several years of experience for minimum rates of pay or even for without one. Employees agree to such conditions hoping to get a foot in the door to a permanent job. So far, companies used internships for the unemployed subsidised by employment offices but treated interns as providers of cheap labour. Hence the *powiat* employment offices have made changes in contracts with employers appending clauses committing employers to retain interns after the internship.

On 27 May 2014, new forms of assistance for the unemployed were introduced. Amendments to the Employment Promotion and Labour Market Institutions Act tidied up the issue of internships and introduced such instruments as[8]:

- **internship voucher** entitling the unemployed to serve a 6–month internship at the employer of his/her own choice, if the latter undertakes to employ the trainee afterwards for the next six months. The competent employment office covers the cost of the unemployed person's internship, costs of travel to and from the place of the internship and the costs of medical or psychological check–ups,
- **education voucher** entitling the unemployed person to have a training course of his/her own choice refunded. The competent employment office covers the cost of training up to the amount of the average salary, including medical or psychological checkups, travel to the training site and accommodation,
- **employment voucher** guaranteeing the employer that he will receive a refund over a 12–month period of a part of the salary and social security contributions up to the amount the unemployment benefits if he hires a person who has such a voucher from the employment office. The employer must not lay the employee off for six months after the end of the refund period,
- **settlement voucher** designed to cover the costs of setting up a business or residence outside the place of residence. It provides a grant to the unemployed person of up to 200% of the average wage in the economy. In order to become eligible, however, the unemployed has to take a job or start a business

[8] Employment Promotional and Labour Market Institutions Act, „Official Journal" of 2014, No. 598; Employment Promotional and Labour Market Institutions Act, "Official Journal" of 2013, No. 674, as amended.

at least 80km from the place of current residence, the total travel time by public transport in both directions must exceed 3 hours and the period of employment or running the business must total at least 6 months.

Of all these forms of support, the most popular among is the internship voucher because young people see it as an opportunity to train within an employer of their choice, for whom they would like to work in the future and with whom they would want to pursue a career for a long time. Employers have six months to weigh up the employee. They must continue employing the trainee for another six months. After this period, they receive a1 500 PLN bonus from the Labour Fund.

Trainees expect that during the internship they will have the opportunity to participate in actual processes and projects, and take employment afterwards and that the employer will give them good references that will help them get a job with another company, should they not be able to take up work with the employer who offered them the internship. In their opinion, internships primarily have an educational value, especially if they expose them to a good mentor or training programmes.

The increase in internship and training spending can only temporarily reduce the problems resulting from the mismatch between the needs of the labour market and the system of vocational education or excessively high labour costs compared to productivity of young people. The experience of OECD countries shows that the level of expenditure on active labour market policies is not the decisive factor leading to sustainable growth in employment levels. A decline in unemployment could come from a reduction in some non–wage components of labour costs, which limit the legal employment of low–skilled workers and young people just entering the labour market. In order to minimise the impact of the reduction in wage related costs, e.g. social security contributions, for the state budget, the tax burden should be shifted from direct levies to in direct taxes.

Own business

One way of reducing unemployment is to start one's own business. People who set up their own businesses may be eligible for a grant from the Labour Fund. The money originates in mandatory contributions paid by employers for people subject to retirement and disability insurance and from EU funds. To obtain a grant to start his/her own business, an unemployed person must prepare a business plan that is weighed up by experts. An unemployed person who has an idea for a business venture must complete a course at which he/she gains the basic knowledge of how to be an entrepreneur. The grant originating in the Labour Fund can be used, amongst others, to pay the costs of legal assistance, consulting and advisory services relating to the taking up of such business activities, and its amount is specified by a contract. This amount, however, cannot be higher than five times the average salary. The number of companies set up over the subsequent years and the amounts allocated for this purpose are presented in Table 4.

The figures in Table 4 indicate that the number of new businesses grew rapidly prior to 2010. 2010 saw 76 900 new companies established in Poland and over 1 389 000 PLN allocated. This means that an average 18 100 PLN were allocated towards the establishment of a new company by the Labour Fund. 2011 witnessed a threefold decline in the number of newly established companies and an average of 15 600 PLN per company spent to set it up. In the next two years, the figures were 17 100 and 19 200 PLN respectively. The maximum amount that an unemployed person could receive to set up his/her own business was 20 000 PLN.

Companies set up from the grants boast a higher survival rate than those founded without state support. It seems, however, that the statistics are overstated due to legal solutions in place. An unemployed person who founded a company from a grant cannot disband the business until after 12 months have expired from its establishment, otherwise he/she would have to return the funds received. In Poland, two in three companies disappear from the market before they are five years old. Research indicates that a company

founded by 40–year–olds boasting higher education are most likely to survive. The survival rate in the first year is77%, compared to nearly 33% after five years. This is much less than the EU average, where five years after establishment, one in two companies remain in business. The more the country is developed, the more experience in the operation of enterprises it has, which reduces the threat of bankruptcy[9]. The survival of the company depends on the entrepreneur's suitability, his/her ability to respond to emergency situations, the type of business, access togrants, loans, etc. CSO data show that companies which since their beginning employ staff boast the greatest chance of survival on the market and five years into business, 40% of these companies are still in business, while in firms without paid employees, the percentage of firms that survive in the market is only 30%. Currently work continues on amending the Employment Act. This would allow the unemployed to take a business–establishment loan amounting to twenty times the average salary, with a repayment period of seven years.

Table 4. Number of established companies and related amounts originating in the Labour Fund

Description	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of companies set up by unemployed people and grants arising in the Labour Fund (‘000)	24.9	34.9	45.1	51.9	63.9	76.9	26.9	40.1	41.4
Growth rate in % Previous year =100	–	140.2	129.2	112.9	123.1	120.3	35.0	149.1	103.2
Money originating in the Labour Fund and allocated to the commencement of business activity by the unemployed people (million PLN)	300	375	537	699	1094	1389	420	686	795
Growth rate, % Previous year =100	–	125.0	143.2	130.2	156.5	127.0	30.2	163.3	87.5
Average amount to set up a new company (‘000 PLN)	12.0	10.7	11.9	13.5	17.1	18.1	16.6	17.1	19.2

Source: MPiPS, MF.

The unemployed can get funding for a social cooperative on a basis similar to that when they start their own business[10]. A social cooperative can be set up by a group of at least five people who intend to do business together. They are usually unemployed, disabled, or participating in social employment. People

[9] *Bankructwa przedsiębiorstw. Wymiar teoretyczny, statystyczny i rzeczywisty,* [In:] *Bankructwa przedsiębiorstw. Efektywność postępowań upadłościowych*, Biuletyn PTE, (Ed) E. Mączyńska, Warszawa, PTE 2013, No. 1, p. 26.

[10] The main rules underlying the establishment of social cooperatives are governed by two Acts: Social Cooperatives Act of 27 April (O.J. of 2006, no. 94, item 651 as amended), and Cooperatives Act of 16 September 1982 (O.J of 2013, item1443).

joining the cooperative must first determine the scope of their activity, draw its Articles of Association and adopt them at the founders' meeting. They are the key document underlying the functioning of the cooperative. The Articles define, among others, the purpose and object of operation, members' rights and obligations as well as the internal organisation. People undertaking business activities in the form of a social cooperative may obtain financing from a *powiat* employment office. The maximum grant per member of the cooperative who is also a founder, does not exceed four times the average wage in the national economy. By contrast, a person who joins the cooperative after its formation may receive up to three times the average wage. In practice, the financing may be lower. The decision on the final amount of the grant rests with the head of the employment office. It should be added that, in accordance with EU regulations governing the award of public assistance, grants for the establishment of co–operatives will be a *de minimis* aid, which is permissible state aid, amounting to a maximum of 200 000 Euro over the last three years preceding the application. A major problem with the functioning of social cooperatives involves satisfaction of the conditions under which the aid is provided by the employment office. If the cooperative fails to meet these conditions and breaches the contract, it will have to repay the funds received with interest. The obligation to repay the grant will also arise when the cooperative operates less than 12 months[11].

The economic and social effects of unemployment

Long–term unemployment brings about a real threat of social pathologies, reduces the chances of finding a job, which in turn leads to people's material land social degradation[12].

The difficulties in finding a job affect primarily people with low qualifications.

Unemployment is a waste of resources available in the economy and contributes to the reduction of people's income. The effects of unemployment are reflected not only in the economic but also in the social, political and psychological sphere. From the point of view of the economy, the economic impacts of unemployment are the most severe. The economy suffers losses due to unused labour potential as a driver of economic growth. The country's GDP also suffers.

The state takes the brunt of the financial burden, both in the form of both direct and indirect costs. Direct costs are the state's expenditures on the reduction of unemployment (unemployment benefits and active labour market programs), as well as an increase in spending on the financing of social welfare institutions, police, health and education. Indirect costs charged to the state are associated with a decrease in budget revenue resulting from a decline in employment related tax revenues and an increase in unemployment, and the income of various special–purpose funds, mainly social insurance fund and labour fund[13].

Lack of jobs leads to the emigration of highly educated people, especially young people who cannot find a job at home. These losses are difficult to estimate and unambiguously determine if one assumes that emigration is one method of combating unemployment. According to Poland's Central Statistical Office data, 2.17 million people have emigrated from Poland. Emigration promotes the inflow of capital into the country, gaining new experiences, learning entrepreneurship, and the search for market niches. One should distinguish, however, between permanent and temporary emigration and in this context to weigh its economic consequences for the country. The loss of young people educated in the country will only serve to exacerbate Poland's demographic problems.

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[11] Ordinance of the Minister of Finance and Social Policy on award of funds to set up a business activity in Line with principles established for social cooperatives, dated 23 April 2012, O.J. 2012, item 456.

[12] B. Kozłowska, *Długotrwałe bezrobocie*, „Rynek Pracy MKUP" 2001, No. 1, p.5.

[13] E. Kwiatkowski, *Bezrobocie. Postawy teoretyczne*, Wydawnictwo Naukowe PWN, Warszawa 2006, pp. 81–82.

All of these negative consequences of long–term unemployment also have significant political implications. There is no approval for the ruling party, stock market grows less vigorously, exchange rates suffer greater fluctuations, which, in turn, may lead to a deterioration of the balance of foreign trade. Social unrest can be incited muchmore easily.

Unemployment also has psycho–social implications, including:

- deterioration of unemployed people's standard of living,
- frustration of entire social groups and of individuals, which is reflected in the family atmosphere and in the upbringing of children,
- worsening of unemployed people's contacts with the environment,
- increased risk of social pathologies such as drug addiction, alcoholism and crime.

Of particular concern are the manifestations of any pathology among young people continuing to remain unemployed over extended periods of time. The difficulty in finding a normal job leads people to seek illegal and often criminal sources of income. This leads to the alienation of social groups made up of young people, who should form the corner stone of the society's development.

Conclusion

To sum up, it must be emphasised that unemployment in the modern economy is widespread. However, there are considerable cross–country differences in the level of unemployment and its types across different age groups, people of different qualifications and different regions. In Poland, the unemployment problem affects more people in the of 50+ age group than young people. This results from the fact that educated young people have emigrated to countries where it is easier to find a job even if it is often incompatible with their qualifications. In the last few years more than 2 million people have left the country.

Under these conditions, it is extremely important to take steps to activate the unemployed and help them find a job at home. The state takes a series of measures aimed at reducing unemployment. State intervention in the labour market comes down to job placement, provision of training and subsidising employment and other projects undertaken locally in line with the level of unemployment. Job placement aims to reduce the time of job search by bringing information about vacancies. Vocational training allow for improving the skills of the unemployed so that they match employers' needs. Supported employment is designed to reduce labour costs incurred by the employer and motivate him to increase employment. These projects are financed from the state budget, the Labour Fund, the local governments budgets and EU funds earmarked for financing the activation of the unemployed. Support measures are available to both the unemployed and to employers.

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TRUST AND DECISION MAKING IN THE CONDITIONS OF UNCERTAINTY AND RISK IN THE LIGHT OF THE EMPIRICAL RESEARCH INTO POLISH HOUSEHOLDS

Summary

The paper is devoted to the role of trust in the process of making decisions by consumers on the market in the conditions of uncertainty and risk. It discusses the significance of trust in the conditions of risk. The dimensions of trust are identified on the individual level (of intra–group variance) and on the household level (of inter–group variance). In order to assess the trust scale analysis, the model of confirmatory factor analysis was built. The analyses were conducted with the use of the data gathered as a result of a survey carried out throughout Poland.

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Introduction

On the contemporary, competitive market the significance of trust is growing. It results, among others, from significant information asymmetry between the parties in the transaction processes. Decisions are taken by single entities or groups of entities (e.g. households) on the market, concerning the choice of specific goods, services or points of sale. In addition to purely economic factors, more and more often they also include the element of trust. Trust enables to overcome possible doubts, obstacles, inconveniences, and in the first place it gives a chance to limit risk which is always present in every transaction on the market. Mutual trust between the parties in a transaction, including an important dimension of trust which is credibility, implies forming permanent relations between the entities. Individual dimensions of trust determine decisions taken by consumers on the market.

The article attempts to outline the essence of trust, a factor influencing market decisions made by household members. To present the issue thoroughly, the model of confirmatory factor analysis was built with the use of the data gathered as a result of the survey carried out throughout Poland[1].

[1] All Poland's survey was carried out within the framework of Grant NCN UMO –2011/01B/HS4/04812.

The role of trust in the market decision making process

Trust is a phenomenon characteristic for the contemporary times, related to the labour division and specialisation[2]. There are many competing conceptualizations of trust. They reflect various contexts of its analysis, as well as the multidisciplinarity and multidimensionality of the notion[3]. Although there is not an explicit definition of trust, in the majority of over a hundred definitions a statement occurs that trust takes place in the conditions of uncertainty and in the environment of risk. Uncertainty and risk are characteristic for the contemporary, complex social environment. According to P. Sztompka, such a situation inclines to the creation of specific "bets" as for certain actions of others in the future, thus granting or refusing trust to them[4]. For the contemporary society, trust is "a way of taming risk and counteracting uncertainty"[5]. According to Falkowski and Tyszka, the strive for the limitation of risk is multi–faceted. For example, the uncertainty of a buyer, concerning obligations, repair and maintenance services, etc., includes functional risk, whereas inadequacy of the price, or possible implicit costs concern financial risk. The risk of undesirable side effects is related to the concern about harmful effects of using a product, whereas uncertainty related to personal satisfaction from the product includes psychological risk[6]. Risk and uncertainty usually appear when there is asymmetry between the partners of the transaction. In the firm – consumer relations, the lack of balance between the parties in the transaction arises, among others, from the fact that for the buyer (most often the weaker party) the partner is a firm/institution with its organization, financial, technical, information advantage, etc. Due to the mentioned asymmetry, the buyer's trust and the subjective belief that the firm will not use its advantage in an unauthorized way is a significant factor influencing choices made by buyers on the market. It also builds the firm's credibility, the effect of which may be the trust of the parties to each other. The processes of exchange taking place in the common climate of trust bring about bigger effectiveness of the market.

An analysis of the trust scale – the model of confirmatory factor analysis

In order to isolate the dimensions of trust which reach (assumedly) the "deeper" level of the studied reality and are revealed in the market processes, in the first stage of the analysis the factor analysis was applied, including 10 positions of the trust scale[7]. For this, the data gathered as a result of conducting

[2] W.M. Grudzewski, .K. Hejduk, A. Sankowska. M. Wańtuchowicz, *Zarządzanie zaufaniem w przedsiębiorstwie. Koncepcja, narzędzia, zastosowania ,* Wyd. Oficyna Wolters Kluwer Business, Kraków 2009, pp. 13–30.

[3] M. Bugdol, *Problem zaufania w usługach*, „Problemy Jakości" 2009, December, p. 23.

[4] P. Sztompka, *Socjologia. Analiza społeczeństwa*, Znak, Kraków 2004.

[5] P. Sztompka, *Zaufanie: fundament społeczeństwa*, Znak, Kraków 2007.

[6] A. Falkowski, T. Tyszka, *Psychologia zachowań konsumenckich*, Gdańskie Wydawnictwo Psychologiczne, Gdańsk 2001.

[7] The statements of the trust scale (question 6 of the survey questionnaire.); 1. In the situation of uncertainty and risk, the purchase of goods/services is influenced by the basic components of risk, such as: credibility, honesty, reliability, competences. 2. In the case of concluding risk incurred transactions, trust is of crucial significance. 3. On the competitive market, trust to the partners in a transaction, points of sale of goods and services, etc., to a small degree determines the conclusion of the transaction. 4. High qualifications of the personnel distinctly influence trust to the point of sale of goods and services. 5. The lack of trust to the chosen point of sale of goods and services influences the purchase decision if the goods and services are offered at a relatively low price. 6. Professional marketing activities and the proper atmosphere of the point of sale do not influence the credibility of the point of sale of goods and services. 7. Goodwill, honesty, loyalty and standing by obligations in a predictable way influence directly the conclusion of a transaction with a specific firm (e.g. trading, service, financial one). 8. The most important is the accomplishment of the set goal; the firm's (e.g. trading, service, financial one) goodwill is not important if there is a probability to achieve significant benefits (e.g. financial ones). 9. Modern management of a firm (e.g. trading, service, financial one) influences its positive image. 10. Damage to the image of a firm (e.g. trading, service, financial one, etc.) does not matter if it is possible to achieve bigger financial benefits in return.

Table 1. The structure of factor loadings – the level of respondents

Adopted designations	**1**	**2**
P61	0.677*	0.015
P62	0.691*	– 0.015
P63	0.057	0.278*
P64	0.297*	– 0.031
P65	0.096*	0.393*
P66	0.024	0.345*
P67	0.374*	0.132*
P68	0.006	0.726*
P69	0.179*	0.029
P610	– 0.055	0.745*
Correlation of factors with GEOMIN rotation		
	1	2
1	1.000	
2	0.430*	1.000

Note: (*) significant values on the level of α=0.05.
Source: own study based on the calculations in the Mplus 7.1 programme.

Table 2. The structure of factor loadings – the level of households

Adopted designations	**1**
P61	0.694*
P62	0.616*
P63	0.509*
P64	0.290*
P65	0.745*
P66	0.610*
P67	0.635*
P68	0.882*
P69	0.228*
P610	0.901*

Note: (*) significant values on the level of α=0.05.
Source: own study based on the calculations in the Mplus 7.1 programme.

Table 3. Model fit indices

Indices	Value
Information Criteria	
Akaike (AIC)	27416.636
Bayesian (BIC)	27671.467
Sample–Size Adjusted BIC (n* = (n + 2) / 24)	27509.479
Chi–Square Test of Model Fit	
Value	163.198*
Degrees of Freedom	69
P–Value	0.0000
RMSEA (Root Mean Square Error Of Approximation)	
Estimate	0.035
CFI/TLI	
CFI	0.896
TLI	0.865
SRMR (Standardized Root Mean Square Residual)	
Value for Within	0.050
Value for Between	0.141

Source: own study based on the calculations in Mplus 7.1 programme.

all Poland's survey were used (Grant NCN UMO –2011/01B/HS4/04812). On the level of individual respondents, 1.093 consumers took part in the survey, whereas on the level of households 419 units were surveyed. The average number of people in the household was 2.6. Restricted maximum likelihood with the corrected estimation of standard errors was the estimation method. The variables representing statements of the scale of a negative character were adequately recoded, namely (p63n = 6 – p63; p65n = 6 – p65; p66n = 6 – p66; p68n = 6 – p68; p610n = 6 – p610;). Then, multi–level coefficients of reliability of the TT ("transactional trust") and EB ("ethical behaviours") scales were calculated based on the model parameters (factor loadings and error variances). The structure of factor loadings selected on the basis of the assessments of the two–level model fit is presented in Tables 1 and 2.

Multi–level models require the consideration of multi–dimensional reliability of measurement[8] (Geldhof, Preacher and Zyphur 2013). Indicators of reliability – McDonald's Ω and Bentler's H on the level of respondents for the first dimension are on the same, relatively low level. The first factor (comprising significant indicators) includes the positions concerning transactional trust in the conditions of uncertainty (P61, P62, P64, P67, P69), whereas the other one is more strongly related to ethical behaviours (P63, P65, P66, P68, P610). On the other hand, reliability of scale measured with the indicators – McDonald's Ω and Bentler's H on the level of household (for one dimension) is acceptable

[8] J. Geldhof, K. J. Preacher, M. J. Zyphur, *Reliability Estimation in a Multilevel Confirmatory Factor Analysis Framework,* "Psychological Methods" 18/2, pp. 1082–989, DOI: 10.1037/a0032138.

Table 4. Parameters of the internal model (respondents)

Adopted designations	**Model estimation**	**Standard errors**	**Critical ratios**	**P level**
”ZT” through factor loadings for the first dimension				
P61	0.463	0.046	9.965	0.000
P62	0.451	0.046	9.779	0.000
P64	0.188	0.044	4.244	0.000
P67	0.224	0.044	5.068	0.000
P69	0.117	0.043	2.688	0.007
”O” through factor loadings for the second dimension				
P63N	0.047	0.047	2.320	0.020
P65N	0.190	0.053	3.583	0.000
P66N	0.216	0.053	4.053	0.000
P68N	0.539	0.064	8.363	0.000
P610N	0.526	0.061	8.663	0.000
Covariances between the first and the second factor				
“O” with “ZT”	0.141	0.092	1.530	0.126
Variances factors				
”ZT”	1.000	0.000	999.000	999.000
“O”	1.000	0.000	999.000	999.000
Residual Variances				
P61	0.249	0.037	6.674	0.000
P62	0.278	0.033	8.311	0.000
P64	0.561	0.039	14.299	0.000
P67	0.413	0.035	11.906	0.000
P69	0.585	0.040	14.524	0.000
P63N	0.604	0.037	16.340	0.000
P65N	0.723	0.046	15.562	0.000
P66N	0.844	0.055	15.343	0.000
P68N	0.400	0.069	5.827	0.000
P610N	0.437	0.061	7.149	0.000

Source: own study based on the calculations in Mplus 7.1 programme.

and is, respectively, 0.89 (p=0.00) and 0.92 (p=0.00). It means that the trust scale is reliable on the level of the measurement of households.

Taking into account the creation of the model of confirmatory factor analysis, the next step was to calculate the intraclass correlation coefficients. The procedure enables to find out what part of the variance of the components is explained by the interclass variance (i.e. the variance on the level of household).

The model of two–level confirmatory factor analysis is based on the decomposition of the covariance matrix into two mutually independent (orthogonal) matrices, namely intraclass covariance matrix and extra class covariance matrix. The intraclass covariance matrix was estimated, and average covariances and correlations for interclass variance were calculated. On the basis of the estimated intra and inter class matrices the model of two–level confirmatory factor analysis was built.

Table 3 presents the model fit indices.

As the fit indices show, the two–factor model is well fit to the data. It is proven by the low values of RMSEA and high values of CFI and TLI indices. When making the assessment from the point of view of residual indices, we can claim that the model for interclass variances is characterized by the lower mean squared error than the extra class variance model. It proves that the intraclass variance model is fit better to the data. Tables 4 and 5 present the model parameters.

Table 4 shows the parameters of the internal model (respondents), and Table 5 shows the parameters of the external model (households).

Table 5. Parameters of the external model (household)

Adopted designations	Model estimation	Standard errors	Critical ratios	p Level
”Z” through factor loadings for the first dimension				
P61	0.292	0.047	6.253	0.000
P62	0.266	0.048	5.553	0.000
P64	0.121	0.047	2.590	0.010
P67	0.268	0.042	6.357	0.000
P69	0.099	0.044	2.246	0.025
P63N	0.296	0.053	5.554	0.000
P65N	0.441	0.057	7.807	0.000
P66N	0.320	0.050	6.443	0.000
P68N	0.507	0.047	10.768	0.000
P610N	0.492	0.051	9.560	0.000
Absolute terms; means				
P61	3.860	0.030	128.144	0.000
P62	3.880	0.030	127.260	0.000
P64	3.751	0.031	121.866	0.000
P67	4.003	0.029	139.496	0.000

P69	3.720	0.030	124.214	0.000
P63N	3.166	0.036	88.014	0.000
P65N	3.318	0.039	85.993	0.000
P66N	3.315	0.038	87.065	0.000
P68N	3.759	0.038	97.804	0.000
P610N	3.704	0.038	96.820	0.000
Variances				
"Z"	1.000	0.000	999.000	999.000
Residual Variances				
P61	0.089	0.031	2.916	0.004
P62	0.104	0.028	3.678	0.000
P64	0.142	0.034	4.211	0.000
P67	0.084	0.028	3.037	0.002
P69	0.128	0.031	4.122	0.000
P63N	0.210	0.044	4.770	0.000
P65N	0.130	0.047	2.742	0.006
P66N	0.163	0.047	3.442	0.001
P68N	0.077	0.031	2.487	0.013
P610N	0.074	0.031	2.397	0.017

Source: own study based on the calculations in Mplus 7.1 programme.

Buying roles of household members versus the trust level

The influence of trust on the decisions to buy certain goods depends on fulfilling by consumers so–called "buying roles" in their households. Therefore, the scale was used to assess the influence of buying roles of household members in the area of everyday goods, durable goods and transactions on the financial market. Five groups of entities which have so–called buying role, namely decision–makers, buyers, initiators, informers and consultants were distinguished. It was assumed that the reference level (RL) will be on the level of so–called buying role of the consultant. Individual variables were the dimensions of transactional trust (TT) and ethical behaviours (EB) on the level of individual consumers and overall trust (T) on the level of household. The model fit indices included in Table 6 mostly suggest (except for the value of c2 statistics) proper fit of the models to the data (RMSEA < 0.08 and CFI > 0.90).

Table 6. Buying roles of household members versus the trust level

Independent variable	Individual level (regression)		Family level (regression)		Model fit (Model assessment)	
	TT	EB	T	Chi–square, d.f., p level	CFI	RMSEA
Buying roles (everyday goods):						
decision–maker	– 0.02	0.02	–	282.31	0.87	0.03
buyer	– 0.05	0.03	–	137		
initiator	– 0.13*	0.01	–	0.00		
informer	– 0.03	0.07	–			
consultant (reference level)	0.00	0.00	–			
Buying roles (durable goods):						
decision–maker	– 0.03	– 0.11	–	221.82	0.91	0.02
buyer	0.05	– 0.01	–	137		
initiator	– 0.13*	– 0.01	–	0.00		
informer	0.00	– 0.13*	–			
consultant (reference level)	0.00	0.00	–			
Buying roles (finance):						
decision–maker	– 0.05	– 0.08	–	196.42	0.94	0.02
buyer	0.03	– 0.02	–	137		
initiator	– 0.08	– 0.03	–	0.00		
informer	– 0.01	– 0.03	–			
consultant (reference level)	0.00	0.00	–			

Note: (*) significant values on the level of α=0.05.
Source: own study based on the calculations in Mplus 7.1 programme.

As it is presented in Table 6, the level in the area of everyday goods and durable goods, the role of the purchase initiator is related to the lower level of transactional trust in comparison with the consultant. The role of the informer in the area of durable goods is connected with the lower level of ethical behaviours (when compared to the consultant). On the other hand, financial decisions on the financial market do not differentiate the level of trust in the structure of buying roles.

Conclusion

On the contemporary, competitive market, trust in the transaction process is indispensable. Trust in buying relationships is a significant factor which influences taking buying decisions in the conditions of uncertainty and risk. One can even claim that in the situation when there is no parametricity between the entities, and the relations between them are often complicated: *"No trust, no transactions"*. As a result of the conducted procedures, the model of confirmatory factor analysis was created, and the results of

the analysis in which the trust scale was used prove that the trust level is varied due to buying roles in households.

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PART III

DECISION–MAKING FACTORS OF OPTIMIZATION, RELIABILITY AND INNOVATION PROCESSES IN ENTERPRISES

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THE IMPACT OF RELIABILITY ON THE COSTS OF THE USE OF VEHICLES

Summary

The objective of the research was to develop an effective use model based on the reliability of a vehicle (a technical object). Reliability is directly related to the quality ofvehicle services.

The results of the conducted study confirm the hypothesis that there is a statistically significant correlation between the impact of the reliability of a vehicle on the economics of its use. The developed costs of use model describes a correlation between necessary outlays and the reliability of vehicles in service.

For the needs related to preventing unexpected decreases in reliability below the accepted levels and avoiding excessive costs of use, the authors present the usefulness of adaptation methods for predicting the reliability of vehicles.

The general conclusion of the research study is the confirmation of the assumption that the knowledge of the characteristics of costs from the perspective of reliability facilitatesoptimal and well–grounded planning of material resources and vehicle services and repair. It leads to developing methods for vehicle reliability optimisation.

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Introduction

In the context of analysing the use of technical objects attention should be given to the determination of technical and economic parameters based on the use of those objects in past periods. New models of machines and vehicles put into service have a significant impact on optimal periods of use as well as the costs of use. The impact of technical advancement – new highly advanced technologies – is reflected in the introduction of new generation machines which meet users' current requirements. The applied technologies and resulting technically complex designs often pose major problems caused by the damage of the components of machines.

Because vehicles are examples of the most commonly used machines, the construction of which is based on solutions developed by most technical areas, the paper gives special attention to these technical objects. Vehicles are used in very diversified conditions, being technical objects characterised by high technical and economic sensitivity, which makes them an effective tool for measuring the impact of technical parameters on the economics of use. Economic factors play a significant role in making decisions on the use of technical facilities. On the other hand, in absolute terms, technical criteria constitute a major factor affecting the economics of the use of machines and vehicles.

Reliability and durability are the major factors which determine the effective use of vehicles[1]. The development of measurement and IT methods facilitated real–time analyses, contributing to a quick collection of data on reliability and implementation opportunities aimed to increase a vehicle'sreliability and effectiveness. The next step of reliability–oriented activities, having a major impact on the effective use of vehicles, is gathering information on a vehicle's future state of repair. Such information can be exclusively obtained on the basis of methods for predicting reliability coefficients[2]. This issue is of major significance in the context of the use of vehicles. Damage done to the elements of machines and, consequently, the entire machines, have a significant impact not only on the quality and economics of use but, in particular, on a broadly understood safety of use.

The objective of the research presented in the paper was to develop an effective use model based on the reliability of a vehicle (a technical object). Reliability is directly related to the quality ofvehicle services. The hypothesis was formulated that there is a statistically significant correlation between the impact of the reliability of a vehicle on the economics of its use. The developed costs of use model describes a correlation between necessary outlays and the reliability of vehicles in service. For the needs related to preventing unexpected decreases in reliability below the accepted levels and avoiding excessive costs of use, the authors present the usefulness of adaptation methods for predicting the reliability of vehicles.

The economics of vehicle service and an assessment of a vehicle's state of repair

The rationality (economics or effectiveness) of the use of fixed assets is one of the most significant aspects of the use of their components, in this case – vehicles. It is the factor which determines the functioning of the entire company – the owner of resources, and it is directly related to the use of resources and, consequently, the reliability and quality of fixed asset components. The reliability of a vehicle determines the costs of its use. Rationality is described by means of the economics of the use of a vehicle, thus being affected by the impact of reliability ratios on vehicle service costs which are incurred in order to maintain a desirable state of repair[3].

A significant role is played by an economic aspect of the use of vehicles, which includes the following issues:

- value of objects in service (vehicles),
- cost of use,
- costs resulting from damage and accidents.

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[1] *Inżynieria niezawodności*, (ed.) J. Migdalski, ATR Bydgoszcz, ZETOM Warszawa 1992; J. Kaczmarek, S. Młynarski, *Uwarunkowania niezawodnościowe i organizacyjne w gospodarowaniu majątkiem trwałym*, [In:] *Konkurencyjność polskich przedsiębiorstw na rynku UE. Wybrane aspekty*, Prace i Materiały Wydziału Zarządzania Uniwersytetu Gdańskiego, No. 2/2006, pp. 259–274.

[2] J. Magiera, *Prognozowanie niezawodności w kombinowanym systemie transportowym*, PAN, Kraków 1998.

[3] J. Kaczmarek, S. Młynarski, *The rationality and optimization of the use of assets – active assurance of safety and reliability*, [In:] *Dilemmas of the contemporary economy facing global changes*, (ed.) J. Kaczmarek, T. Rojek, Cracow University of Economics, Cracow 2012,pp. 191–204.

The economics of use, as already mentioned, is greatly affected by repair and service costs, and the relevant activities are directly related to the state of reliability of a vehicle in service. The issue of reliability is closely linked with a number of aspects concerning the functioning of a vehicle. Reliability is one of the numerous characteristics of the system of the use of vehicles, or the characteristics of an individual vehicle. The role of reliability and the increasing perception of its correlation with quality increases the significance of reliability as one of the major characteristics of vehicles.

Reliability as a measurement of the ability to effectively perform specific functions can be defined in various ways, depending on the type of user needs. Depending on the type and purpose of a vehicle, a set of characteristics is identified which describe the original features of a vehicle and which ensure its proper functioning and expected reliability in a specific period of time. This is the reason for which the initial stage of the designing period consists in setting objectives and identifying tasks, i.e. functions, to be performed by a vehicle during the period of its service. Consequently, the selection of optimal vehicle original features is conditioned by the knowledge of enforcing factors as well as the knowledge of wear and tear processes which occur in the course of using a vehicle. Obviously, the process of designing, manufacturing and using vehicles should consider normal wear and tear and the possible effects of damage and accidents. Therefore, it is necessary to take preventive measures aimed to avoid accidents and mitigate their negative effects.

The major objective of reliability analysis is to determine vehicle reliability ratios[4] as well as to identify the most deficient systems and elements, and thus to affect the construction of vehicles which perform specific transport tasks. Attention given to reliability–related needs in designing and production processes contributes to continuous improvements in the quality of vehicles.

Importantly, vehicle users give much attention to opinions on the reliability of vehicles that they possibly wish to purchase. Apart from the choice of a brand, a type of vehicle and its design, increasing significance is attributed to the reliability of a specific product. High reliability is referred to active and passive driving safety, the comfort of use and low costs of service. The costs of the use of vehicles are frequently the most important factors affecting buying decisions.

The impact of reliability ratios on the costs of vehicle service and repair aimed to achieve good state of repair gives interesting insights into the economics of the use of vehicles. In this context, a simulation analysis was conducted for which the input data were the actual figures related to the reliability and service costs of a random sample of vehicles.

The generation of the costs of use is closely related to the reliability and quality of technical services which ensure a good state of repair[5]. The required state of repair can be achieved through a well–organized service system, supported by reliability ensuring methods in which estimating reliability ratios is based on the active methods for predicting a vehicle's state of repair[6].

During the process of technical services, prior to the performance of tasks, a vehicle is subject to an overall inspection. An inspection of the actual state of repair follows preventive services. Depending on the obtained results, the location of damage is identified and repair is carried out, followed by the prediction of reliability in the future periods of use. The decision on putting a vehicle into service is conditioned by positive prediction results. Thus, predictions in a general system of technical services play the role of a predictive inspection of the state of repair. Predictions aim to identify a vehicle's future sate of repair.

It can be inferred from the above that current inspections combined with well–grounded predictions provide a broad picture of a vehicle's state of repair. Users get information on a vehicle's current and future state of repair. It has special significance in the case of vehicles in continuous operation when possible malfunctions pose a threat to human lives, involve high costs or disturb road traffic[7].

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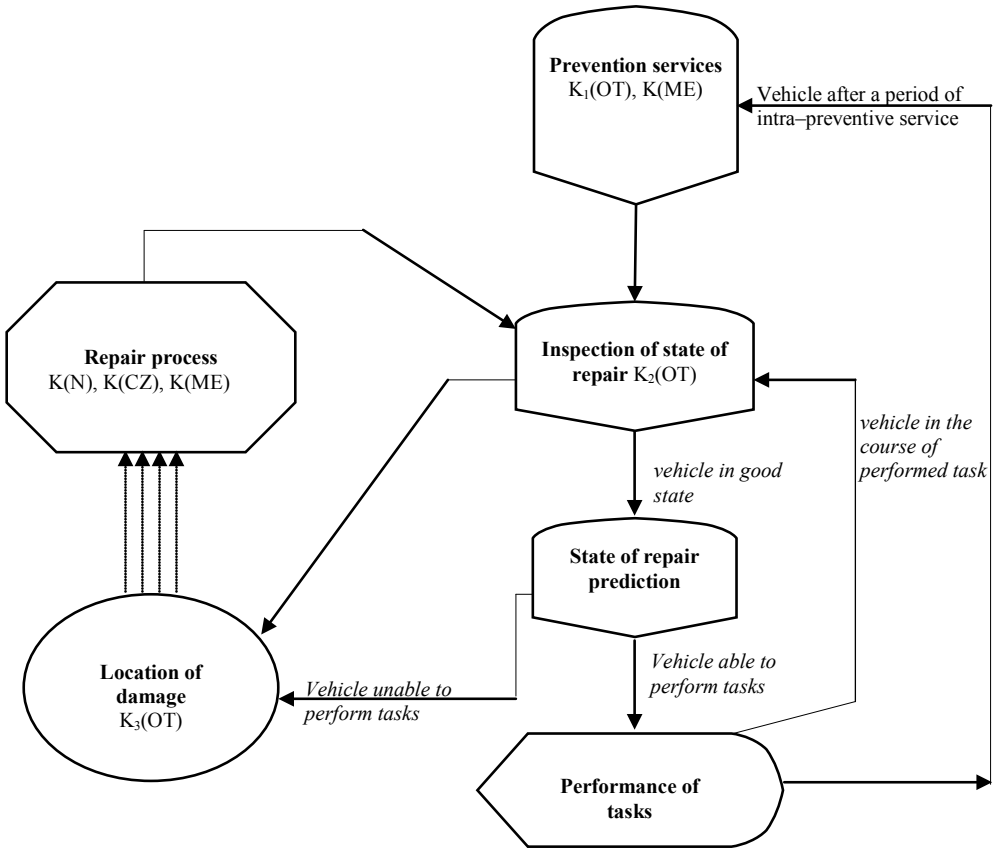
[4] *Zużycie i niezawodność*, (ed.) J. Oprzędkiewicz, CPPGSMiE PAN, Kraków 1995.

[5] F.S. Piasecki, *Zagadnieniaorganizacji obsługi technicznej maszyn i środków transportowych*, PNTTE, Warszawa 1996.

[6] J. Magiera, *Prognozowanie niezawodności*…, op. cit.; F.S. Piasecki, *Zagadnienia organizacji*…, op. cit.

[7] Z. Smalko, *Ocena niezawodności i podatności diagnostycznej obiektów technicznych w warunkach niepewności*, „Zagadnienia Eksploatacji Maszyn", 1988.

Figure 1. Technical services process and state of repair prediction



Note: $K_{1,2,3}$(OT) – cost of technical service, K(ME) – cost of materials, K(N) – cost of repair, K(CZ) – cost of spare parts.
Source: authors' research.

The effective management of the use of vehicles is conditioned by the estimation of vehicle reliability carried out in the course of service. It facilitates adjustment of the results of inspections to the commonly used system of reliability ratios. The correctness of the obtained results is verified on the basis of statistical tests. It leads to formulating conclusions concerning the performance of selected vehicles in specific conditions as well as the levels of user confidence.

The analyses of vehicles, due to their structural and technological diversity, can pose a number of problems. Therefore, it is frequently necessary to adopt simplified assumptions which transform the actual durability and reliability ratios into theoretical considerations. Problems related to the determination of reliability ratios have been dealt with by a number of scientific centres. Also, literatures give much attention to correlations between time factors and reliability assessment methods[8]. Much less consideration is given to the current monitoring of reliability properties and the determination of reliability in real

[8] W. Adamkiewicz, L. Hempel, A. Podsiadło, R. Śliwiński, *Badania i ocena niezawodności maszyny w systemie transportowym*, Wydawnictwa Komunikacji i Łączności, Warszawa 1983; *Inżynieria niezawodności*…, op. cit.; *Zużycie i niezawodność*…, op. cit.

time in the course of the use of vehicles. It is a complex issue which requires an analysis of factors accompanying the process of use as well as factors directly related to a given vehicle in service. An overall analysis of those factors is complicated due to their diversity and the nature of their mutual correlations.

The achievement of rational reliability levels should be referred to classical normative models based on economic theory. For this purpose, it is necessary to adopt certain assumptions. A defined set of factors which describe a vehicle's utility is divided into two sub–groups. The first one comprises the attributes of the scale of objectives which can be achieved in connection with the use of a vehicle. The combination of the values of these attributes is referred to as the productivity of service which, in this particular case, is represented by a distance covered in kilometers. The second sub–group comprises all the attributes that determine the level of reliability. The combination of these values is referred to as system (vehicle) reliability. Because reliability and productivity are inherent to the use of vehicles, it may be interesting to refer reliability considerations to the classical methods of economic productivity analysis (in this case productivity is understood as the number of kilometers covered or the volumes of cargo transported).

The analysis is based on the function of production (here: the function of use). It is a model for transforming resources in a vehicle characterised by a given level of productivity (of use). The function of production describes a correlation between production and the outlays of production factors. Consideration should be given to outlays related to the use of vehicles and the resulting effects. Similarly, the function of reliability should be a starting point for analysing the reliability of vehicles and systems. It is a resource transformation model for vehicles and systems characterised by a specific level of reliability. It can be used to describe correlations between reliability and necessary outlays for maintaining the required level of reliability.

The above factors are identified with production factors. The outlays of resources are measured by physical or monetary units, similarly to the function of production. In both cases, the transformation of resources and means comprises the process of using and spending different types of material assets: labour, qualifications and monetary resources. The function of reliability can be analysed with the use of marginal reliability R_{kr} in relation to resources K. Marginal reliability describes changes to a vehicle's reliability when technical and financial resources are increased in the course of its use[9]. In the analysed case reliability R is measured by physical values. Empirical observations indicate that in a number of cases decreases in marginal reliability are accompanied by increased resources. It implies that a given marginal resource measured by reliability decreases if the use of a vehicle increases excessively, while the volumes of other resources remain unchanged.

Optimization of the time of the use of vehicles

The rapid development of transport and increasing user expectations necessitate developing rational methods for ensuring the appropriate mutual impact of such significant scientific areas as technology, reliability and economics. Vehicles are constructed in the course of a production process. At this stage, a manufactured vehicle is characterised by specific technologies, reliability and costs.

The most general definition of reliability describes significant values, specified for given conditions, reflecting a vehicle's ability to meet specific requirements. This ability is dependent on a vehicle's design, manufacturing technology as well as the conditions of service. However, in a comprehensive approach to the use of vehicles attention should be given to the value of a vehicle and the costs of its use.

[9] Z. Fortuna, B. Macukow, J. Wąsowski, *Metody Numeryczne*, WNT, Warszawa 1993; J. Kaczmarek, S. Młynarski, *Effectiveness of the means of production – construction,technology and use aspects*, [In:] *Global and regional challenges of the 21st century economy*. *Studies from economics and management*, (ed.) R. Borowiecki, A. Jaki, Cracow University of Economics, Cracow 2011, pp. 279–292.

The analyses of reliability are aimed to develop methods for constructing vehicles characterised by highest reliability standards in given conditions. The achievement of this goal requires identifying quantitative reliability measures and developing analytical and reliability assessment methods. In this context, a significant role is played by the manner of detecting the causes of technical failures, reductions in the number of undesirable changes, improvements in performance, counteracting defects through early detections of failures, and replacement of those components which decrease reliability or cause damage to vehicles.

Finding effective solutions aimed to increase reliability is based on the following steps[10]:

- developing formalised reliability assessment models,
- identifying optimal technological and construction solutions,
- predicting reliability in the course of use,
- developing systems for the use of vehicles, ensuring the required level of reliability.

Currently, efforts are being made to increase reliability through standardising the durability of components and reducing manufacturing costs.

The above tasks are aimed to achieve the following objectives:

- implementing programmes of and methods for assessing durability and reliability, and identifying marginal states aimed to detect weak links,
- giving consideration to durability and reliability in designing and manufacturing processes,
- implementing criteria and methods for the technical and economic assessment of durability and reliability.

Most of the above activities are carried out by vehicle manufacturers, contributing to the construction of highly reliable and durable vehicles at optimal costs. On the other hand, vehicle users attribute significance to such factors as value, diminished value, costs of transport and costs of use. These factors, apart from a vehicle's reliability and durability, determine the choice of purchased vehicles.

An analysis of the economics and safety of vehicles should give attention to the mutual impact of economic factors related to the cost of use and technical factors described by a vehicle's reliability. The means of transport generate costs arising out of the use of vehicles as well as costs directly attributed to transport activities. The costs of use comprise the costs of technical services, the costs of repair and other maintenance costs necessitated by maintaining a vehicle's good state of repair. On the other hand, direct costs of transport activities (transport of goods) include the costs of materials used in transport (fuel, electricity, etc.) as well as direct operating costs (e.g. drivers). The use of vehicles involves the costs of performing transport tasks. The total costs of performing transport tasks is the resultant of all incurred costs, directly correlated with a vehicle's reliability and safety.

Let K_E represent the costs of use, K_P – the costs of transport, and K_C – the resultant of transport generated costs, dependent on a vehicle's reliability. Relations between particular costs and reliability are defined by functions $F_1(R)$, $F_2(R)$ and $F_3(R)$ which describe changes to incurred costs[11]:

$$K_P = F_1(R) \tag{1}$$

$$K_E = F_2(R) \tag{2}$$

$$K_C = F_3(R) \tag{3}$$

$$K_C = K_E + K_P \tag{4}$$

$$F_3(R) = F_1(R) + F_2(R) \tag{5}$$

[10] W. Adamkiewicz, L. Hempel, A. Podsiadło, R. Śliwiński, *Badania i ocena niezawodności*…, op. cit.; *Zużycie i niezawodność*…, op. cit.; F.S. Piasecki, *Zagadnienia organizacji*…, op. cit.; Z. Smalko, *Ocena niezawodności*…, op. cit.

[11] *Inżynieria niezawodności*…, op. cit.

The value of optimal reliability R_{opt} for the resultant of both criteria described by functions F_1 and F_2 is based on the determination of the value of R for which function F_3 assumes a minimal value:

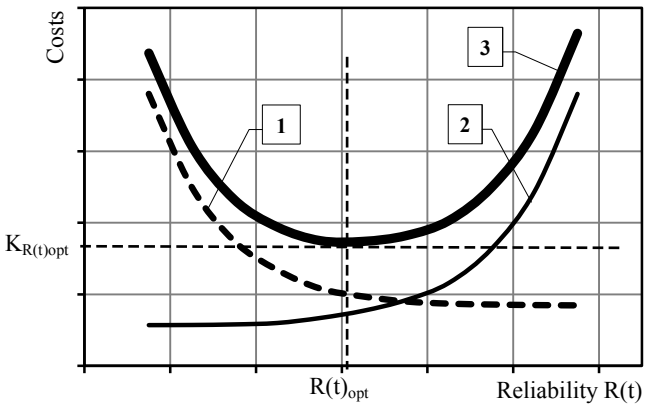
$$\frac{dK_C}{dR} = 0 \tag{6}$$

$$\frac{dF_3(R)}{dR} = \frac{dF_1(R)}{dR} + \frac{dF_2(R)}{dR} = 0 \tag{7}$$

The concept is presented in graphic form in Figure 2.

An optimal level of reliability determined in the above described way facilitates the effective management of available transport resources. A vehicle's reliability and costs of manufacture are mainly affected by the design and construction process. However, the costs of use are also determined by a vehicle's construction, the quality of labour and the manner in which a vehicle is used.

Figure 2. Correlation between a vehicle's reliability and incurred costs (ideal case)



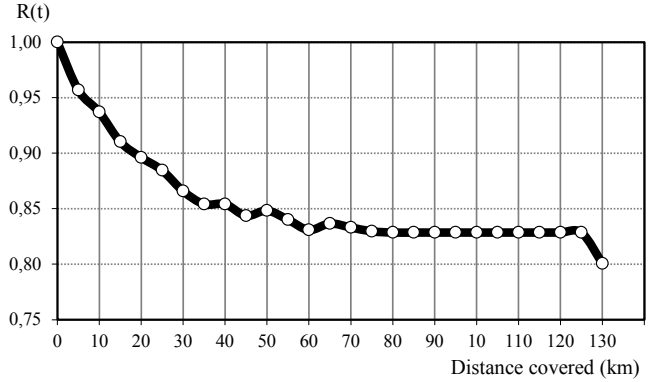
Note: correlation with (1) – costs of transport, (2) – costs of service and repair, (3) – total cost (1 and 2).
Source: authors' research.

Reliability and a synthesis of the costs of use

The conducted empirical study of motor–cars (a sample of 3,186 cars and 114,696 unit observations) indicates that the costs of overhauls, repair and technical service represent only a certain share of the total costs of the use of vehicles. The major and decisive costs result from the diminished value of vehicles in service. Diminished value, apart from other less significant factors, is caused by a vehicle's deteriorating technical parameters – reliability and durability. Those factors, as indicated by the results of the study, have a major impact on the costs of use. In real–life conditions it is difficult to maintain the required level of reliability of such complex objects as vehicles. Complying with required and economically justified reliability standards is conditioned by a logistically efficient system of inspections, repairs and overhauls.

The results of the conducted analysis are presented below as the empirical characteristics of reliability function for the analysed sample of vehicles in a given period, showing a monotonous trend. The steady character of the data results from a formalised cycle of technical services (see Figure 3).

Figure 3. The actual changes to reliability function based on empirical data



Source: authors' research.

A well–planned process of service and preventive activities is fundamental to ensuring the required level of reliability and safety. An important role in assessing a vehicle's effective performance is played by a Service Reporting and Analytical System. It facilitates recording technical service costs, which, along with the costs generated in the system of the use of vehicles, provides the possibility of balancing revenues and expenditures related to particular types of vehicles in a given company.

Transport companies employ special technical teams to deal with service programming. Such teams prepare schedules for the inspections or repairs of particular vehicles. Vehicles are selected on the basis of their mileage and a period of time after their last inspection or repair. The repair steering process consists in making current adjustments to inspection and repair schedules as well as in identifying necessary action to be taken in the case of emergency and post–accident repairs. The service steering process can be fundamental to service systems in which the scope of service and time schedules are dependent on the needs arising out of a vehicle's state of repair[12]. However, it requires commonly applied technical diagnostic systems. Vehicles are subject to inspections according to fixed schedules. Also, emergency and post–accident services are provided. Major repairs are outsourced to specialised units.

Professionally organised transport companies make use of formalised vehicle service systems. They provide technical services which can be divided into three groups:

1. the system of obligatory scheduled inspections:
   - daily service,
   - seasonal service – spring and winter,
   - obligatory technical inspection,
2. the system of sequential service,
3. the system of unplanned service:
   - current repairs,
   - emergency repairs,
   - post–accident repairs,
   - sale, scrapping.

Daily service consists in checking a vehicle's sub–assemblies which are significant from the point of view of traffic safety: adrive system, brakes, lights and doors. On detecting defects, a service team

[12] J. Magiera, M. Krupa, S. Młynarski, *The quality of the operating systems of municipal transport services and the efficiency of the utilization of means of rail transport*, [In:] *Súčasné Problemy v Koľajovych Vozidlách*, XVI Medzinárodná Konferencia PRORAIL 2003, Žilina 2003, pp. 87–92.

transfers a vehicle to an emergency repair unit. The time of repair, apart from direct costs of repair, leads to a loss resulting from failure to perform transport tasks. A transport company will make efforts to put a vehicle into service or, possibly, not to distort the normal schedule of service to continue generating company profits. In this case, profitability is a significant indicator.

Vehicle profitability is understood as a vehicle's ability to generate profit in a specified period of time. Profit is generated when revenues exceed the costs of use.

Vehicle profitability is defined by the following indicators[13]:

- indicator of cumulative total costs of use (K_s),
- indicator of generated profit (K_d).

The indicator of cumulative total costs of use (K_s) is the sum of two values:

- cumulative costs of use (K_e),
- capital costs (K_k).

$$K_s = K_k + K_e \tag{8}$$

Cumulative costs of use comprise the costs of use, maintenance and repair, as well as emergency costs (both direct and indirect). A certain share of these costs can be attributed to reliability.

Capital costs (K_k) are components of prime costs and are related to the continuous diminishing of a vehicle's value, including amortization charges and necessary outlays for the purchase of new vehicles.

As a result, annual expenditures (K) on the recovery of initial outlays can be expressed as follows:

$$K = \frac{(K_w - K_l)}{n_o} + (K_w - K_l) \cdot \frac{i}{2} \cdot \frac{(n_o + 1)}{n_o} + K_l \cdot i \tag{9}$$

where:

K_w – initial prime cost (cost of manufacture and purchase),
K_l – theoretical residual value of a liquidated vehicle at the end of the period of its use,
n_o – number of years in service (equivalent of durability),
i – interest rate.

The above correlation is applied when a vehicle is declared out–of–service after a certain period of time (n_o). This value describes the durability of a vehicle based on empirical data.

Equally useful information is provided by losses resulting from early out–of–service declarations. In this case the value of a vehicle is higher and can be expressed by means of the following relation:

$$K_n = \frac{n_a}{n} \cdot K_{na} = \frac{n_a}{n} \cdot a \cdot K_w \tag{10}$$

where:

K_w – initial prime cost (cost of manufacture and purchase),
K_{na} – pre–determined value after a period of time n_a (a basic correlation – percentage "*a*" of costs of manufacture K_w),
n_a – general durability of vehicle,
n – number of years in service ($n < n_a$),
a – percentage of costs of manufacture K_w after pre–determined period of time n_a.

[13] R. Borowiecki, J. Kaczmarek, J. Magiera, S. Młynarski, *Eksploatacja taboru szynowego komunikacji miejskiej. Niezawodność, jakość, ekonomika*, Wyd. Akademii Ekonomicznej w Krakowie, Kraków 2004.

The above correlation is empirical in character – it is based on the empirically proven frequency of replacing worn–out components with new ones.

The presented correlations facilitate determination of the analysed vehicle's capital costs:

$$K_{kn} = (K_w - K_n) \cdot \left(\frac{i}{n_a} + \frac{i \cdot (n_a + 1)}{2n_a} \right) + K_n \cdot i \tag{11}$$

where:

K_{kn} – capital costs when expected durability is *n*– years,

n_a – vehicle's expected general durability.

The empirical research of the cost of use is based on the actual data concerning expenditures on technical service aimed to maintain the required level of reliability. The synthesis of the total costs of use facilitates verification of partial costs and their sequential simulation. The costs of use are the sum of costs directly related to service operations, including labour, spare parts and materials used in repairs.

$$K_e = \sum_{i=1}^{n} [K_i(r) + K_i(c)] \tag{12}$$

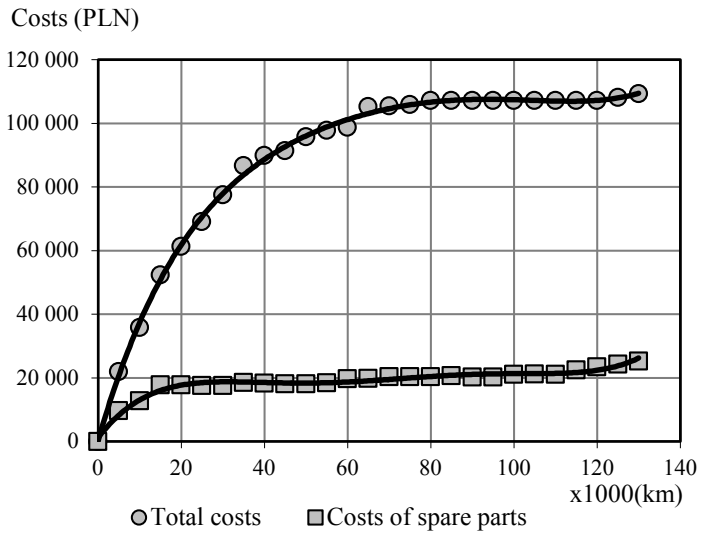
where:

$K_i(r)$ – costs of service and repair activities (labour),

$K_i(c)$ – costs of spare parts and materials used in repairs.

The costs of spare parts for ensuring the required level of reliability in relation to the total costs of use are presented in Figure 4.

Figure 4. The actual total costs of servicing and costs of spare parts in the function of mileage (km)



Source: authors' research.

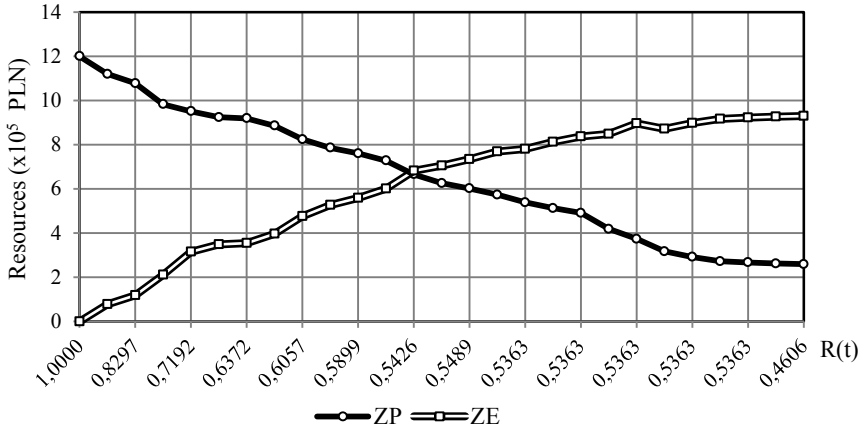
A distinct disproportion between incurred costs results from the aging of vehicles and the necessity of additional activities including disassembly, replacement and restoring a good state of repair.

An analysis of the above relations leads to an attempt to develop an effective use model dependent on the level of reliability. In this case a comprehensive approach to reliability is adopted – it indicates that reliability is directly referred to the quality of service. Reliability is the resultant of a vehicle's specifications determined by the manufacturer, and the system of technical services – the factors affected by a vehicle's user.

The conducted analyses confirm a major impact of a vehicle's reliability on the economics of its use. The costs of use model describes the relation between necessary expenditures and the level of reliability. It should be noted that the analysis is based only on the costs incurred in the course of service. Other important components of the user's total costs include the value of a vehicle and the loss of value resulting from technical factors and deteriorating performance (attributable to the costs of use).

The correlation between the loss of resources caused by reduced reliability (resulting from vehicle–related factors – the loss of its value) and the loss of resources related to expenditures on maintaining reliability (costs of service and repair) is presented in Figure 5.

Figure 5. The characteristics of resources for maintaining reliability



Note: Z_P – vehicle–related resources, Z_E – use–related resources.
Source: authors' research.

The effective prevention of unexpected decreases in reliability below acceptable levels and excessive costs of use can be facilitated by vehicle reliability prediction methods. For this purpose, adaptation prediction methods turn out to be very useful. The obtained reliability predictions facilitate estimating necessary expenditures which prevent decreases in reliability[14]. The knowledge of specific costs in the function of reliability leads to the optimal and justified planning of material resources, servicing and repairs.

An attempt has also been made – on the basis of the analyses of the costs of use – to offer a prediction model for these costs. The function of predicting the costs of use is based on the available prediction algorithms, while approximations are based on the method of least squares and a function in the form of a generalised polynomial.

The method of least squares is frequently used in approximations, ensuring good approximations of functions with the use of polynomials of various degrees (discussed in literatures)[15]. It is characterised

[14] Z. Pawłowski, *Prognozy ekonomiczne*, PWN, Warszawa 1973.

[15] E. Allgower, K. Georg, *Numerical Continuation Methods, an Introduction,* Computational Mathematics, Springer Verlag, Berlin, Heidelberg, New York, No. 13/1990, p. 388; G.E.P. Box, G.M. Jenkins, *Analiza szeregów czasowych*, PWN, Warszawa 1983; Z. Fortuna, B. Macukow, J. Wąsowski, *Metody numeryczne*…, op. cit.

by the fact that the approximated function is described by a set of discrete values, frequently riddled with measurement errors. Mean–square approximation is described below.

Analysing a function described by a discrete set of arguments:

$$f(x) = f(x_i),\ x_i \in X, \tag{13}$$

where X represents normalised linear space, for $i = 1, 2, \ldots, n$, we try to identify such a function $F(x_i) \in X$ with a predetermined form in which quality indicator:

$$I = \sum_{i=1}^{n} \left[f(x_i) - F(x_i) \right]^2 \tag{14}$$

assumes a minimal value. Let us assume that function $F(x)$ is described by a generalised polynomial in space X_m ($X_m \subset X$), while:

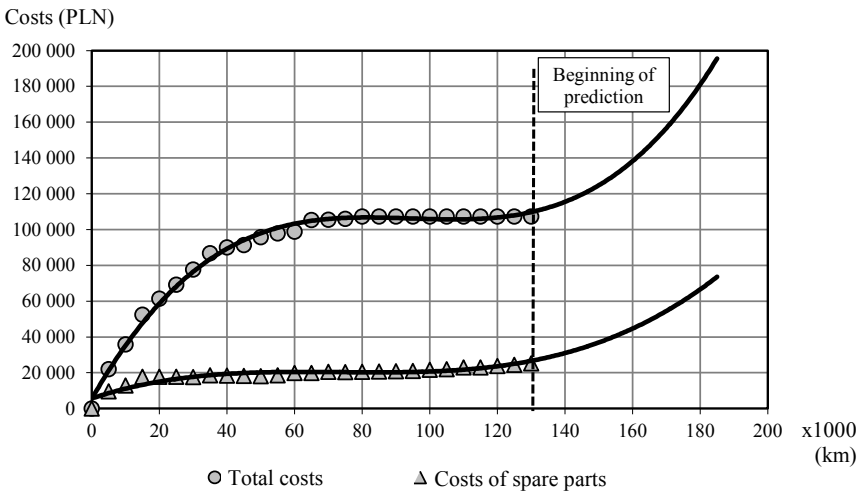
$$F(x) = \sum_{j=0}^{m} a_j \varphi_j(x), \tag{15}$$

then a minimal value of sum (14) will depend on coefficients a_i of a generalised polynomial. The problem of best approximation is then solved by finding such values of coefficients a_i for which sum (14) is minimal.

In connection with the above, for the discrete values of characteristics presented in Figure 6, the approximation of the model for empirical indicators of the costs of use is based on correlations (16) and (17), where independent variable x represents the value of a vehicle's mileage:

- total costs of use:
  $k_e = -0{,}0013x^6 + 0{,}1608x^5 - 7{,}6473x^4 + 193{,}51x^3 - 2961{,}8x^2 + 28236x - 25221$ (16)
- cost of spare parts:
  $k_c = 0{,}0658x^5 - 5{,}0344x^4 + 145{,}15x^3 - 1940{,}2x^2 + 12006x - 9008{,}6$ (17)

Figure 6. Characteristics of the approximation function and technical service cost prediction



Source: authors' research.

Accurate predictions facilitate the planning of expenditures on the servicing and repair of vehicles, preventing the need for adjusting financial plans and reallocating resources. Predictions can play an even more important role in balancing the costs of use and setting economic criteria for planning the replacement of the means of transport[16]. The proposed prediction algorithms are based on the examination of vehicles, carried out in periods preceding the beginning of the prediction. Because the prediction model is based on real–life situations, the obtained results reflect the actual conditions in which the analysed vehicles are used, being an adequate source of *a priori* information.

Conclusion

In the rapidly developing car industry the major problem faced by modern systems for the use of vehicles is ensuring active and passive safety as well as economic viability. The hitherto applied systems do not keep regular records of the use of vehicles, which couldfacilitate monitoring reliability characteristics and their impact on the economics of the use of vehicles. Therefore, the knowledge of reliability characteristics is of key significance to decision–making processes in the engineering and economics of vehicles.

Assessments of the reliability of mechanical systems are based on a number of highly advanced estimation and reliability analysis methods. Many of those methods can also be applied in assessing the economic indicators of the use of technical facilities. The verification of the presently applied reliability assessment systems points to the lack of relations between theory and practice, which is true of most systems operating in Poland. Leading car manufacturers and transport companies belong to data base networks which store information on the use of vehicles. It facilitates the use of best practices in managing the use of vehicles in transport systems, ensuring the highest standards of reliability and user safety. The incorporation of economic factors into the algorithms of the engineering of the use of technical facilities can lead to positive effects, being the subject of current research studies.

The objective of the research presented in the paper was to develop an effective use model based on the reliability of a vehicle (a technical object). Reliability is directly related to the quality ofvehicle services. The results of the conducted study confirm the hypothesis that there is a statistically significant correlation between the impact of the reliability of a vehicle on the economics of its use. The developed costs of use model describes a correlation between necessary outlays and the reliability of vehicles in service. The general conclusion of the research study is the confirmation of the assumption that the knowledge of the characteristics of costs from the perspective of reliability facilitatesoptimal and well–grounded planning of material resources and vehicle services and repair. It leads to developing methods for vehicle reliability optimisation.

Implementing a system for the use of vehicles, cooperating with other systems for ensuring reliability and the economics of use, is a very difficult and expensive project which requires major changes to the structure of the existing systems. The presented solutions to some of the problems of reliability and the economics of the use of vehicles can be treated as an introduction to research work undertaken in this field of study.

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[16] Z. Pawłowski, *Prognozy ekonomiczne*…, op. cit.

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ECONOMIC AND ENVIRONMENTAL ASPECTS OF USING OF COOLING SYSTEMS IN AUTOMOBILE

(Control of contaminant emission and reduction of fuel consumption)

Summary

Transportation, including motor cars, is one of many sources of environmental pollution. This paper presents two systems used in motor cars – cooling system of internal combustion engine and air conditioning system.

Now ecology is very important but also numerous decision aspects cannot be ignored either. Therefore it is necessary to very carefully analyse all the factors to compromise and choose an optimum solution. While developing technologies special attention is always paid to the system durability and reliability.

This paper also present economic aspects of using cooling systems in vehicles especially air conditioning. Economic aspect is also important as ecological. Sufficient application both systems relevantly impact on restriction of cost of air protection by limit fuel consumption.

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Introduction

The growing degradation of the natural environment encouraged many countries all over the World to undertake prevention measures aimed at reducing negative effects of civilization development. The publication of the report of the Secretary–General of the United Nation[1] and report of The Club of Rome[2] had an impact on the growing environmental awareness.

The environment protection ranges from suitable selection of production technology, especially implementation of "clean technology", diverse selection of products, services, and processes that include renewable materials and energy sources, dramatically reduce the depletion of natural resources, and cut or eliminate emissions and wastes.

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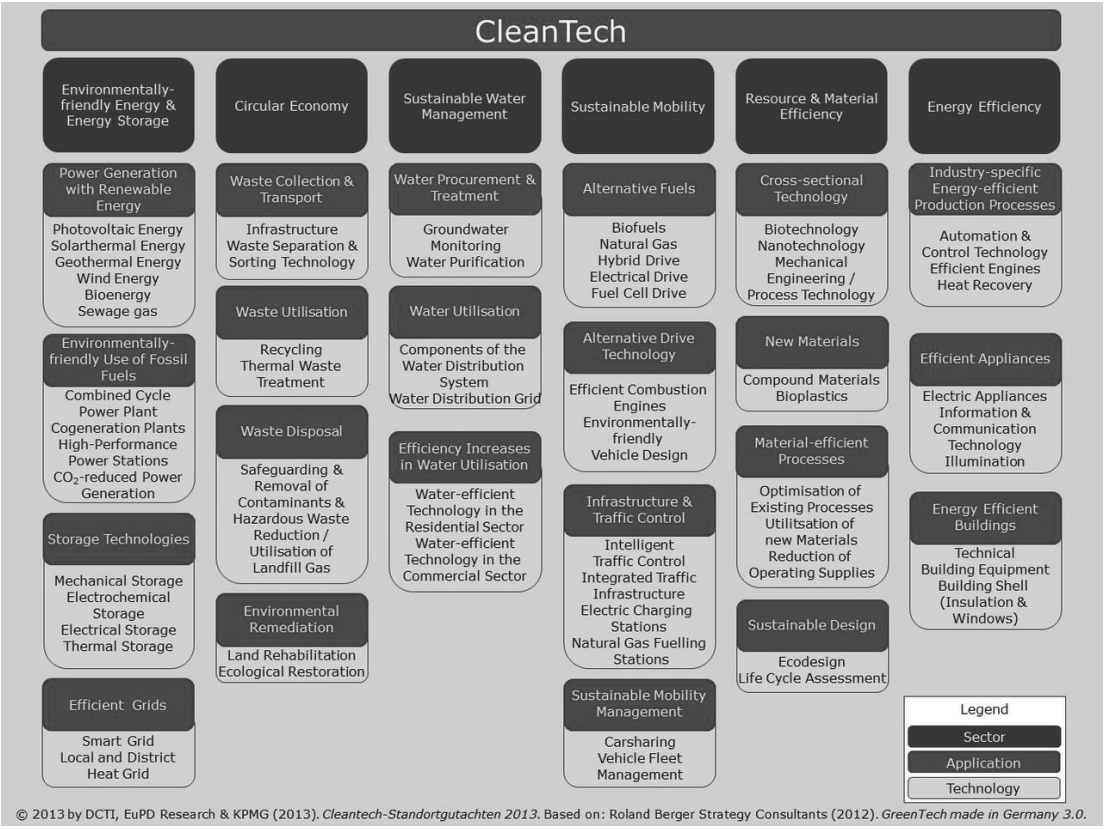
[1] U. Thant, *Report of the Secretary–General: The problems of human environment*, UN, New York, 1969. First time in history this document presented data testifying about the destruction of natural environment and resultant from this consequences appealed all countries to well–balanced enjoyment from natural resources of The Earth and to protection of ecosystem.

[2] D.H. Meadows, D.L. Meadows, J. Randers, W.W. III Behrens, *Report to The Club of Rome's. Limits to Growth*, 1972. The subject of the study was shocking forecast cautioned against global economic and energetic crisis.

Figure 1. The scope of the implementation of the concept of "clean technology"



Source: *CleanTech–Standortgutachen*, DCTI, EuPD Research and KPMG, 2013; *GreenTech made in Germany*, Roland Berger Strategy Consultants, 2012.

Transportation, including motor cars, is one of many sources of environmental pollution. This paper presents two systems used in motor cars, i.e. cooling system of internal combustion engine which is a source of heat energy expelled to the atmosphere and air conditioning system which is also heat energy source but additionally a source of refrigerant blown out to the atmosphere during the breakdown[3]. Economic aspect is also important as ecological. Sufficient application both systems relevantly impact on restriction of cost of air protection by limit fuel consumption.

Principle of cooling an internal combustion engine

When a combustion engine operates a large amount of thermal energy is generated. It is not transformed into useful work, therefore needs to be discharged to the environment. Part of the energy

[3] D. Skrzyniowska, *Wybrane czynniki ziębnicze – substancje zubożające warstwę ozonową*, Czasopismo Techniczne, 2012.

(ca. 30%) is expelled with hot exhaust gases, and the remaining part has to be released in some other way. Cooling systems are a solution to this problem[4].

Cooling systems hold a temperature range of the engine's unit. The first way of cooling the engine was a natural method by unforced flux around the ribbed surface of the engine. This system was not effective enough and did not keep constant temperature of the engine.

Therefore direct forced cooling was implemented as more efficient. The intensity of air flow through the engine in the course of a slow drive or a stop could be increased. This solution, however, requires supplying energy to the engine fan, which means a loss of some useful power supplied by the engine. The rotational velocity of the fan can be controlled thanks to which the cooling intensity may be adjusted to the operating conditions. This system is not very accurate.

Therefore direct forced cooling was implemented but this required supplying energy to the engine drive. In the third option the engine is cooled with an indirect system with a forced cycle of coolant.

An indirect cooling system with liquid cycle provides more stable and more efficient cooling than the previous systems. Among the main advantages of this system are good discharge of heat, lower temperature of engine's operation, attenuation, stiffening and possible use of the heat for heating the driver's cabin (use of waste heat). This design has also disadvantages, and among the most important ones are longer engine's warm–up, higher production costs and more frequent failures than in the previous option.

The main elements of the cooling system are: radiator, pump, fan, thermostatic valve, heat exchanger, housing. The entire system is charged with cooling liquid.

History of cooling systems development

Well operating cooling systems should be charged with an appropriately selected liquid. In the beginning cooling systems were based on water, which had high specific heat, and was also an environmentally–friendly and very cheap substance. Trying to make a good refrigerant of water, it was necessary to provide it with low freezing temperature, high bubble point, anti–corrosion features and stability. Besides the refrigerant should neither react with rubber elements nor leave residue. The best known substance meeting these conditions was a solution of water and glycol.

Considering the costs of production and period of biodegradation, ethylene glycol has been selected. Its bubble temperature is 197ºC, freezing temperature only –13ºC. The presence of water component causes that lower freezing temperatures can be reached. The most universal percentage composition is 50% of water, 49% of ethylene glycol and 1% of antioxidant, anti–corrosion and alkali reserve additives. This mixture has a freezing temperature of –40ºC and bubble temperature 107ºC in the atmospheric pressure conditions.

First vehicles were produced at the beginning of the 20th century but many solutions have survived until now, e.g. almost all vehicles are equipped with indirect cooling systems. The first major design assumptions focused on how to prevent the engine from overheating. Later new items were also put on the list of improvements to be done. Now the development directions can be divided into categories which are presented in Table 1.

[4] M. Wrona, *Eksploatacja układów chłodzenia*, praca dyplomowa, Instytut Pojazdów Samochodowych i Silników Spalinowych, Wydział Mechaniczny, Politechnika Krakowska 2013.

Table 1. Development trends in cooling systems

Design features	Energy conversion	Ecological problems
Reliability	Efficiency of heat exchange	Air pollutants emission elimination
Durability	Evenness of cooling	Coolant toxicity
Mass, dimensions		Worn components recycling
Service comfort		
Maintainability		

Source: author's own research.

The significance of each of the features largely depends on the purpose of the vehicle. Now ecology is very important but also numerous decision aspects cannot be ignored either. Therefore it is necessary to very carefully analyse all the factors to compromise and choose an optimum solution.

While developing technologies special attention is always paid to the system durability and reliability. The best design assumptions create bases thanks to which appropriate materials can be selected, resistance to thermal, chemical and mechanical factors provided and computer analyses made. Integrated elements are introduced, e.g. heat exchanger for cooling liquid and oil, thus limiting the size of the sub–assemblies. By using efficient cores the dimension of the cooling systems and the volume of the circulating cooling medium can be reduced. The service comfort and maintainability of the cooling systems can be provided by locating sub–assemblies in accessible places, where the failures can be easily diagnosed.

The availability of air cooling the engine is limited, especially when the vehicle is exploited in difficult conditions. The cooling system has to be adjusted to the quickly changing external conditions. The precise control systems are a basic element thanks to which the pressure in the system can be flexibly changed or the thermostat valve regulated to provide the engine with optimum thermal conditions. The cooling evenness is another important aspect. When the distances between particular design elements are small the large differences of temperature may result in unexpected failures of the driving unit.

Ecology may have a decisive influence on the engine cooling technology nowadays. Despite the limitations it imposes it becomes more and more popular as a source of numerous advantages. Nonetheless the newest engine designs are restrictive about very accurate thermal conditions. Considerable quantities of thermal energy are generated while combusting a mixture of fuel and air and they have to be quickly overtaken by the cooling medium. By maintaining proper temperature on the head the required parameters of the engine can be reached at lower fuel consumption, and so lower emission of waste gases. The issue of toxicity of the coolant and recycling of the used parts of the system have been neglected so far. Metal parts do not create a problem and the rubber items are durable therefore are replaced rarely.

The exploitation of the cooling system should not create any problems either therefore attention should be paid to their reliability and life. Operation conditions of the engine have a strong effect on the heating rate and accuracy of control of temperature in the system.

The production technology does not bring about any problems therefore producers may venture to adjust the products to the financial condition of the purchaser. The automation of the production processes resulted in higher quality of sub–assemblies without any effect on the price, which consequently led to the higher competitiveness of the new products.

Although nowadays engines have higher unit powers and high piston velocity, the volume of the cooling system remains on the same level. Minimization of the liquid's heating time is connected with the lower volume of the cooling system. This however can be done if the output capacity of the latter is maintained. The development of modern cooling systems was focused on providing thermal stabilization of the engine's operation and possibly most accurate control of temperature in the system. By introducing electrically–regulated sub–assemblies it was also possible to develop the diagnostics of the cooling system. By monitoring parameters on a continuous basis it is possible to quickly diagnose failures. The development of the constituents results in their complicated build, which frequently makes fixing of such sub–assemblies impossible for technical or mainly economic reasons.

Principle of automobile air conditioning system (AAC)

Another cooling system installed in automobiles is the air conditioning system. It is used for providing appropriate comfort for the driver. A human staying in stable and comfortable conditions can reach his maximum intellectual and manual abilities. The installations providing favourable conditions inside the vehicle should be designed in congruence with the respective standards and regulations, accounting for the preservation of energy and safety rules.

Air conditioning systems in vehicles are designed to treat and supply air to the cabin. The air should have appropriate parameters, mainly temperature and humidity of air, and ability to maintain these parameters within an admissible range. This can be done with the use of a cooling device where the cooling agent plays the role of a cooler. When the medium is flowing through the cooler, its thermodynamic state changes. The changed state of the agent can create environmental hazard (in the case of a leakage it may get to the atmosphere causing the ozone layer depletion, ODP) and to the user (burns, intoxication). Moreover, electrical energy powering the compressor cooler's drive is generated with the use of fuels indirectly increasing the global greenhouse effect (GWP).

Medium R134a has been used in the air conditioning systems for years. However, because of its environmental impact (see table 2.), now it is not admitted to use. Investigations are being carried out to find a safer coolant with equally good thermodynamic characteristics. The medium circulating in the air conditioning system of a vehicle should meet the environmental requirements, i.e. be environmentally–friendly[5]. Therefore, pro–ecological cooling agents are gaining in importance nowadays, e.g. CO_2 (GWP and ODP are zero), and R1234yf which was hesitantly introduced.

It was for the first time when CO_2 was proposed by Alexander Twining in Great Britain in 1850, and used by Lowe in USA in 1869 and by Linde in Europe in 1881. In the age of freon it was put aside because of its high working pressure and much poorer cooling efficiency parameters. Now attention was paid to carbon dioxide again, mainly in view of ecological value.

The comparison of environmental properties of both coolants reveals the dominance of R1234yf. However, the opponents quote the simulated car crash results according to which this substance is dangerous for the health and life of the humans. The coolant R–1234yf may be kindled, and after having contact with fire–fighting substances (mainly water) is transformed into the toxic hydrofluoric acid. The present analyses have not confirmed that the new agent is fully safe.

[5] A. Skrzyniowski, D. Skrzyniowska, *Dlaczego CO_2* w układach klimatyzacji samochodowej?, Czasopismo Techniczne – Mechanika, Vol. 10, 2012; A. Skrzyniowski, D. Skrzyniowska, *Searching for new alternative refrigerant for automobile air–conditioning*, Journal of KONES, Vol. 13, No 1, 2006, pp. 167–175.

Table 2. Chemical properties of cooling agents

Coolant	Chemical formula	ODP	GWP	Kindling point*	Boiling point	Characteristic feature
R12	CF_2Cl_2	1.0	7300	non–combustible	–29.8°C	
R134a	CHF_2C	0.0	1430	non–combustible	–26.3°C	
R744	CO_2	0.0	1	non–combustible	–57°C	
R1234yf	$C_3H_2F_4$	0.0	4	405°	–30°C	decomposes aluminium, magnesium and zinc

Note: (*) the kindling point is the lowest temperature at which a combustible substance will spontaneously ignite in a normal atmosphere without an external source of ignition, e.g. spark.
Source: author's own research.

Economic usage of air conditioning by application of advanced solutions of air conditioning control (mode ECO)

It is used mode control ECO – economic air conditioning work in order to limit of petrol consumption used to air conditioning. Kind of compressor used in air condition impacts on petrol consumption: with electromagnetic clutch or with electrovalve. Work mode of fan and air condition work also influence on economic efficiency. Control system and regulation for example Neural Network (ANN) replaces override of air conditioning work[6]. Properly fitted air conditioning with advanced control system can limited petrol consumption in large measure and in that drive utilities of vehicle with air conditioning.

The ideal Carnot cycle is a cycle composed of isentropic compression and expansion and isothermal heat addition and heat rejection. The thermal efficiency of a Carnot cycle depends on absolute temperatures of the two reservoirs in which heat transfer takes place, and for Carnot power cycle coefficient of performance (COP) for refrigeration is:

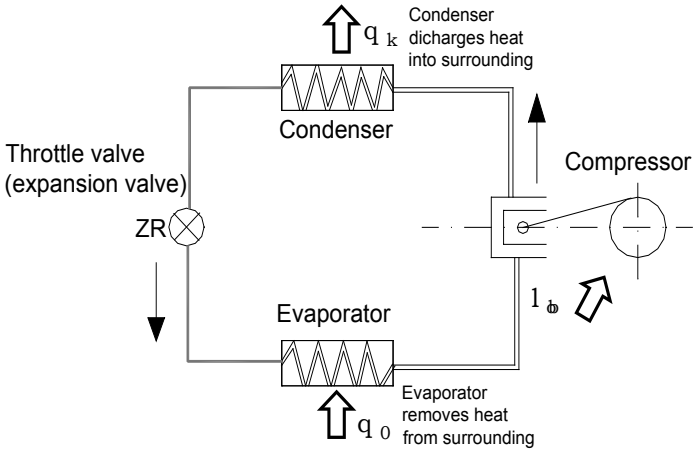
$$\varepsilon_{C\,z} = \frac{T_o}{T_k - T_o} \tag{1}$$

where:

T_o, T_k – inlet temperature, outlet temperature, K,
$\varepsilon_{C,z}$ – coefficient of performance.

[6] M. Hosoz, H.M. Ertunc, *Artificial neural network analysis of an automobile air conditioning system*, Energy Conversion and Management, 2006; H. Khayyam, J. Abawajy, R.N. Jazar, *Intelligent energy management control of vehicle air conditioning system coupled with engine*, Applied Thermal Engineering, 2012.

Figure 2. A typical single – stage vapor compression refrigeration system



Source: author's own research.

Conversion of energy in engine is described by effective watt–hour efficiency of engine η_e[7]:

$$\eta_e = \frac{N_e}{\dot{Q}_{ch,p}} = \frac{N_e}{\dot{m}_p W_d} \tag{2}$$

where:

η_e – effective watt–hour efficiency of engine,
N_e – brake horse power (effective power), W,
$\dot{m}_p$ – burned mass flux of fuel, kg/s,
W_d – calorific value, kJ/kg.

Amount of fuel needed to air condition:

$$\dot{m}_p = \frac{N_e}{\eta_e W_d} \tag{3}$$

Simple calculations show how turn fuel consumption with changing of demand of power to air condition.

Air conditioning in cars needs on average 7–11 kW.

Granted that density of fuel is 800 kg/m3 and power for air conditioning 7 kW:

$$\dot{m}_p = \frac{7\ \text{kW}}{0{,}4 \cdot 40\ 000\ \frac{\text{kJ}}{\text{kg}}} = 1{,}575\ \frac{\text{kg}}{\text{h}} \rightarrow \dot{V}_p \approx 2\ \frac{\text{l}}{\text{h}} \tag{4}$$

Granted that density of fuel is the same and power for air conditioning 11 kW:

$$\dot{m}_p = \frac{11\ \text{kW}}{0{,}4 \cdot 40\ 000\ \frac{\text{kJ}}{\text{kg}}} = 2{,}475\ \frac{\text{kg}}{\text{h}} \rightarrow \dot{V}_p \approx 3\ \frac{\text{l}}{\text{h}} \tag{5}$$

[7] S. Postrzednik, G. Przybyła, Z. Żmudka, *Influence of IC engine load on the energy conversion efficiency in the system*, Czasopismo Techniczne – Mechanika, Vol. 7, 2008.

Increase demand of power by 75 % (7 to 11 kW) leads increase fuel consumption by about 1 l/h.

Conclusion

In the age of global warming, the environmental impact of particular elements of the cooling system in automobiles creates a serious hazard which should be controlled and reliability of the system – maintained on an optimum level.

The development trends in the cooling systems compromises between decision values. Popular ecological policy imposes certain limitations, also bringing about considerable advantages, e.g. improvement of engine parameters thanks to the proper thermal regulation.

In the case of a CO_2–based automobile air conditioning system (if no other alternatives are available) is the most advantageous solution to be used. Cooling systems employing CO_2 as a cooling medium have been tested by companies specializing in automobile cooling and air–conditioning systems for years (Behr, Delphi). Another advantage of CO_2 over R143a lies in the time needed for lowering the temperature inside the vehicle exposed to the sunrays (car parked in an unshaded place on a sunny day). Therefore, if no other coolant which would be an alternative for hazardous substances is found, CO_2 remains the most important agent to be used in mobile and stationary air conditioning systems as far as its thermodynamic and environmental aspects are concerned.

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5. Postrzednik S., Przybyła G., Żmudka Z., *Influence of IC engine load on the energy conversion efficiency in the system*, Czasopismo Techniczne – Mechanika, Vol. 7, 2008.
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10. Thant U., *Report of the Secretary–General: The problems of human environment*, UN, New York, 1969.
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INNOVATION AND GROWTH VS. ECONOMIC CRISIS

Summary

Growth in Poland in the last two decades has been based on capital accumulation and on improving productivity driven by technological change. Endogenous growth theory shows how innovation, knowledge spillovers, and R&D are indeed key factors driving self–sustained, long–term economic growth. Growth in countries below the notional technological frontier is mainly driven by diffusion and absorption of new technologies from countries on the frontier that are new–to the–firm or new–to–the country below the frontier but not to the world.

A country's absorptive capacity is a key driver of economic growth and industrial productivity, but it requires a favorable investment climate, an educated workforce, and R&D on the part of absorbing firms. Trade flows, foreign direct investment (FDI), and labor mobility and training are important channels for firms to access technology. But technology absorption is not automatic. While R&D investment oriented to new–to–the–world innovations is predominant in economies on the technological frontier, in countries below the frontier, such as Poland, R&D principally serves the need for firms to absorb new technologies and keep up with existing global technological trends. R&D is critical for the identification, acquisition, and assimilation of new technologies and for supporting implementation on the part of the firm. Firm–level R&D does not solely contribute to innovation.

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Introduction

The current crisis is the first of this severity to hit many countries, since they have shifted to knowledge based service economies where investment in intangible assets is of equal importance as investment in machinery, equipment and buildings. Efforts to stimulate the economy need to both reflect the current drivers of economic growth and take advantage of the process of "creative destruction" to accelerate structural shifts towards a stronger and more sustainable economic future[1]. Innovation policies need

[1] E. Canton, H. Uhlig, *Growth and the cycle: Creative destruction versus entrenchment,* "Journal of Economics" 1999, Vol. 69, No. 3/October, pp 239–266; M. Dziura, *Technology Systems for Sustainable Development in Poland*, "The Business & Management Review" 2012, Vol. 2, No. 2, Academy of Business and Retail Management; M. Dziura, *Innovation Policy in Poland – Challenge for Intensive Growth*, "The Business & Management Review' 2012, Vol. 2, No. 2, Academy of Business and Retail Management; G.M. Grossman, E. Helpman, *Innovation and growth in the global economy*, MIT Press, Cambridge, MA 1991.

to be adapted to current conditions both in terms of how such policies are crafted to work, but also as elements of stimulus packages that may often be the foundation for these medium– and long–term initiatives. Some countries are developing a strategic response to the crisis focusing on two priority areas: finance, competition and governance; and restoring long–term growth. As part of this strategic response, governments in many countries have analysed the likely impact of the downturn on the drivers of long–term economic growth and the innovation related items in policy responses of major countries.

The economic crisis has prompted an immediate response by governments to avoid a collapse of the financial and banking systems and limit the economic effects of the credit crunch. Such policies aim at stabilising the economy and initiating a rapid recovery[2]. But policies also need to ensure that the recovery is durable, *i.e.* based on sustainable growth. The crisis should not damage the drivers of long–term growth, but should instead be used as a springboard to accelerate structural shifts towards a stronger, fairer and cleaner economic future. Failing to do so might lead only to a temporary recovery as the macroeconomic and structural roots of the current downturn would remain untouched. This implies integrating long term concerns in the short term policy packages currently assembled by governments and implementing specific policies aimed at strengthening the supply side of the economy. While the impact of some of the latter actions may emerge in the medium– to long–term, they warrant consideration now because:

- they add credibility to government's borrowing demands that are imposing long–term debt, thus making a contribution to fiscal sustainability;
- they take advantage of structural changes imposed by the crisis to accelerate a redeployment of resources from ailing activities to those that offer the largest longer term economic and social benefits. The foundation for these medium– and long–term initiatives consists of[3]:
- fostering innovation through promoting entrepreneurship,
- investing in smart infrastructure,
- encouraging R&D,
- green investment,
- upgrading the skills of workers,
- steering market actors towards innovation related investments, and
- accelerating activities for which barriers may have been too high otherwise.

The crisis determinants of long–term growth

The available evidence suggests that the crisis has already begun to affect innovation. Historically, business R&D expenditure and patent filings have moved in parallel with GDP, slowing markedly during the economic downturns of the early 1990s and of the early 2000s. Data on trademark filings, that reflect

[2] D. Archibugi, A. Filippetti, *Is the Crisis Striking Innovation? Evidence from Europe* (September 19, 2009). Available at SSRN: http://ssrn.com/abstract=1475664; M. Kanerva, H. Hollanders, *The Impact of the Economic Crisis on Innovation. Analysis based on the Innobarometer 2009 Survey*, Thematic Paper, European Commission, D.G. Enterprises, Brussels 2009; *Green Growth: Overcoming the Crisis and Beyond*, OECD, Paris 2009; *Policy Responses to the Economic Crisis: Investing in Innovation for Long–Term Growth,* OECD, Paris 2009; *How Are Firm in Eastern and Central Europe Reacting to the Financial Crisis?* Enterprises Note No. 8. World Bank Group, New York 2010.

[3] D. Archibugi, M. Denni, A. Filippetti, *The technological capabilities of nations: A review of the synthetic indicators,* "Technological Forecasting and Social Change" 2009, Vol. 76, No. 7, pp. 917–931; R. Borowiecki, M. Dziura, *Innovation Policies in the Financial Crisis*, „Organization and Management" 2010, No 1 (139); *Financial Crisis Is Expected to slow R&D Investment*. EurActive 2008, Article 176728, 28/10/2008, http://www.euractiv.com/en/science/financial–crisis–expected–slow–rdinvestment/article–176728; *Doing R&D or Not (In a Crisis) That Is the Question*, Joint Research Centre, EU, European Commission, Brussels 2011.

the creation of new goods or services, with or without technological content, shows that the business cycle is affecting a wide range of innovation.

Evidence for the current crisis confirms these findings. Corporate reports for the fourth quarter of 2008 in many cases already show a decline or slower growth in R&D spending. Forecasts for 2011 confirm the trend[4]. A McKinsey survey of 500 large businesses worldwide indicated that over 30% expect to spend less on a R&D in 2011 while more than 20% forecast an increase. R&D is declining because it is mainly financed from cash flow (retained earnings), which contracts in downturns. At the same time, as banks, markets and investors have become more risk averse; firms face difficulties in tapping into external sources of funding to support their investments in R&D. Business R&D is also being re–oriented towards short–term, low–risk innovations, while longer term, high risk innovation projects are being cut first[5]. The decline in business R&D risks affecting the stock of knowledge as highly trained researchers and innovators lose their jobs. Small, innovative firms are particularly hard hit because in many cases their primary asset is intangible in nature (*e.g.* an idea or a patent) and difficult to value, making it hard to borrow against, or sell, to stay afloat. The crisis can, however, magnify the competitive advantage of research intense firms who seize the opportunity to reinforce market leadership through increased spending on innovation and R&D. Many of today's leading firms such as Microsoft or Nokia were established or transformed in the "creative destruction" of economic downturns. And several of today's leading technology firms such as Samsung Electronics, or Google strongly increased their R&D expenditures during and after the "new economy" bust of 2001[6].

Fading support by the financial system for firms, and especially new entrants, is a major concern in the current context, underscoring the primary importance of fixing the financial system. Growing aversion to risk combined with other factors (such as difficulties for investors to exit) is already drying up many sources of seed and venture capital. The total amount of venture capital investment in the United States started declining at the beginning of 2008, and the fall accelerated at the end of 2008 and beginning of 2009. Total investment in the 1st quarter of 2009 was down 60% as compared with the 1st quarter of 2008, while 1st sequence investment was down 65%. Venture capitalists are concentrating their efforts on helping firms survive that are already part of their investment portfolio – not on new start–ups. In China, the number of Initial Public Offerings fell substantially at the end of 2008 as did venture capital investment, notably in high technology sectors[7].

Economic crises are historically times of industrial renewal. Less efficient firms fail while more dynamic ones emerge and expand. Creative destruction is an essential engine of long term efficiency in market economies, and it intensifies in downturns. Available data for many countries point to a sharp increase in bankruptcies and business failures in recent months. New business models and new technologies, particularly those allowing a reduction in cost, often arise in downturns, as was the case with low–cost airlines which grew out of the recession of the early 1990s. As dominant players weaken, they open space for new players and innovators.

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[4] C.W. Barrett, C.S. Musso, A. Padhi, *Upgrading R&D in a downturn,* "The McKinsey Quarterly" 2009, No. 02.

[5] *The 2008 EU Survey on R&D Investment Business Trends*, European Commission, Brussels 2009) – http://iri.jrc.ec.europa.eu/research/docs/survey/2008/JRC51800.pdf.; R. Griffith, *How Important is Business R&D for Economic Growth and Should the Government Subsidise It?,* IFS Briefing Notes. Institute for Fiscal Studies, London 2000; D. Guellec, B. van Pottelsberghe de la Potterie, *From R&D to Productivity Growth: Do the Institutional Settings and the Source of Funds of R&D Matter?,* "Oxford Bulletin of Economics and Statistics" 2004, 66 (3), pp. 353–378.

[6] C.W. Barrett, C.S. Musso, A. Padhi, *Upgrading R&D in a downturn ...,* op. cit.; M. Cincera, C. Cozza, A. Tübke, P. Voigt, *Doing R&D or not (in a crisis), that is the question,* "IPTS Working Paper on Corporate R&D and Innovation" 2010, No. 12; *Financial Crisis Is Expected to slow R&D Investment* …, op. cit.; *Doing R&D or Not (In a Crisis) That Is the Question ...,* op. cit.

[7] D. Archibugi, M. Denni, A. Filippetti, *The technological capabilities of nations ...,* op. cit.; D. Archibugi, A. Filippetti, *Is the Crisis Striking Innovation? Evidence from Europe* …, op. cit.

However, economic downturns can have a detrimental effect on the creation of new, innovative businesses when access to financing dries up. Economic growth suffers doubly in the long term since innovative new firms exert competitive pressure on established firms pushing them to innovate. Barriers to entry are higher during downturns: studies for the United States, for example, show that fewer manufacturing firms enter during recessions, and that these firms are (on average) larger and more efficient than firms created during expansion phases.

Small and medium–sized enterprises (SMEs) in most countries are now confronted with a clear downturn in demand for goods and services if not a demand slump, crimping cash flow. And many SMEs are faced with two additional problems: *a*) increased payment delays on receivables which add – together with an increase in inventories – to an endemic shortage of working capital and a decrease in liquidity and *b*) an increase in reported defaults, insolvencies and bankruptcies[8].

The sharp decline in trade, foreign direct investment and access to international financing, poses a risk to the global supply chains that underpin innovation. These supply chains are critical sources of new knowledge and learning. They provide companies with technical expertise, knowledge of foreign markets, critical business contacts and international partners. The current decline of trade and investment flows could have severe consequences for these knowledge transfers and for innovation at the global level. Trade is not at the origin of the crisis, but since it binds economies closely together, it helps to spread developments from one country to another – the negative developments as well as the positive.

The risks to global value chains emerge not only from the decline in international trade, but also from key suppliers facing bankruptcy, and from firms re–considering their investment strategies and retrenching to core markets. Protectionist policies could exacerbate these risks. It would increase the input costs for domestic industries and would penalise exporters twice, through higher costs and through retaliation from other countries.

Firms now rely on a global business model, and retrenchment risks disrupting international links, affecting growth and future innovation in most economies. Co–ordination of government actions can help address these risks, can produce a more effective, longer–lasting solution and can also result in positive spill–over effects[9].

Crisis–driven layoffs are on the rise in many countries and experience from previous recessions shows that many skilled workers will become unemployed. High–tech industries (like IT, aeronautics or pharmaceuticals) and knowledge intensive services (like financial services) are announcing layoffs almost daily. This human capital will quickly depreciate if the downturn is protracted. However, such talent could make an important contribution to the many innovative businesses that have experienced a shortage of skilled workers in the recent past, or could contribute to a new wave of innovative entrepreneurship.

Education and training are particularly important in the current crisis. In times of recession, budget constraints (in government, households and businesses) tend to reduce expenditure on education and training. On the other hand, due to rising unemployment, demand for training increases. Support for education and training during the current crisis can help displaced workers find new job opportunities and can thus support the restructuring process.

Efforts to promote a greener economy can also be compromised by the current crisis. Lower oil prices have already reduced incentives to switch to alternative energy sources – and the declining prices of raw materials are reducing pressures to use these resources more efficiently. Environmental innovation is also affected as consumers buy less expensive goods. Firms are therefore reluctant to introduce innovations

[8] *Developmental Challenges of Contemporary Economies. Management – Finance – Restructuring*, (ed.) R. Borowiecki, T. Rojek, Cracow University of Economics, Cracow 2011; *Wyzwania rozwojowe. Poland 2030. Development Challenges*, KPRM (Chancellery of the Prime Minister), Warsaw 2009; *How Are Firm in Eastern and Central Europe Reacting to the Financial Crisis?* …, op. cit.

[9] A. Rodriguez–Pose, R. Crescenzi, *Research and development, spillovers, innovation systems, and the genesis of regional growth in Europe,* "Regional Studies" 2008, Vol. 42, No. 1, pp. 51–67.

because it is more difficult to reap a price premium. Moreover, as banks have reduced credit, process innovations that could reduce costs (*e.g.* energy saving equipment) are more difficult to implement, as they imply capital investments. New entrants are also limited by lack of venture capital and declining market prospects.

On the other hand, the prospect of industrial restructuring creates opportunities for new and greener businesses, whereas the depreciation of currently installed equipment (due to business downsizing or closure) offers opportunities for the promotion of environmentally friendly investments.

Innovation will be one of the keys to emerging from the downturn and putting countries back on a path to sustainable – and smarter – growth. Many governments have incorporated measures to strengthen innovation in their stimulus packages, and can also take action to improve their long–term potential for innovation[10].

The negative impact of the crisis on innovation is important as the crisis has magnified widely acknowledged market failures in innovation financing. Investment in innovation is now considered even more risky and some of the longer term investments in new technologies are particularly affected. Moreover, stimulus measures offer an opportunity to put available resources for innovation (notably skilled labour) to good use. In supporting private investment in innovation, care should be taken to ensure that government spending provides good value for money; the less promising innovation projects are among those abandoned first by the private sector and there is no reason to revive these with public money. Policies that can be considered in this context include[11]:

- focusing public support on promising research and innovation affected by the crisis, *e.g.* long–term and risky research, research conducted by start ups, and research addressing societal challenges (environment, ageing, etc.). Using existing instruments and vehicles for support can help maximise the short term impact,
- well–designed public–private partnerships can help enhance the resilience of investments in R&D over the business cycle. One way of achieving this could be through adjusting the balance of public and private funding over the business cycle. Such partnerships can also be used at the local or regional level, *e.g.* in innovative clusters, to ensuring that government funds reach new and small players, thus reducing the risk of capture by "strong players",
- as with other investments in infrastructure, investments in research infrastructure can contribute both to stimulating demand in the short term and supply in the longer term,
- open and competitive public procurement can also be used to support R&D, especially where it contributes to solving social challenges, *e.g.* mobility, energy or health.

Governments also need to focus on medium to long–term actions to strengthen innovation. Abroad range of policy reforms will be needed in most economies to respond to the changing nature of the innovation process and strengthen innovation performance to foster sustainable growth and address key global challenges. This involves, amongst others, fostering innovation in all its forms and broadening the focus of innovation policies beyond support for R&D.

Governments can prepare for the next phase of innovation–led productivity growth, for example, by encouraging the entry and expansion of new businesses or the exit or re–orientation of existing businesses facing difficulties. Several policy avenues can be considered in this regard[12]:

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[10] F. Castellacci, *Innovation and economic growth in Europe: Evolutionary perspectives,* Centre for Technology, Innovation and Culture, Oslo 2004.

[11] I. Begg, *Regulation and supervision of financial intermediaries in the EU: The aftermath of the financial crisis,* "Journal of Common Market Studies" 2009, Vol. 47, No. 5, pp. 1107–1128; R. Borowiecki, M. Dziura, *Innovation Policies in the Financial Crisis …,* op. cit.; M. Dziura, *Innovation Policy in Poland – Challenge for Intensive Growth …*, op. cit.; Academy of Business and Retail Management; *Policy Responses to the Economic Crisis …*, op. cit.

[12] *The Effects of the Financial Crisis on European Research Policy*, European Commission Brussels 2008. http://ec.europa.eu/research/social–sciences/pdf/ev22–synthesis–report_en.pdf.

- encourage firm entry and growth, *e.g.* by reducing the administrative cost of creating a new company; reducing the barriers to growth of small companies; more favourable conditions for the survival and restructuring of ailing businesses (instead of quasi–automatic bankruptcy) should be considered; or developing microcredit for "necessity–driven" entrepreneurs, *e.g.* through loan guarantees to banks;
- ease the liquidity constraint faced by small firms. The measures that have been put in place by countries can be classified in three different groups:
  a) measures supporting sales and preventing depletion of SMEs' working capital such as export credit and insurance, factoring for receivables, tax reductions and deferrals, and better payment discipline by governments,
  b) measures to enhance SME's access to finance, mainly to credit through bank recapitalisation and expansion of existing loan and credit guarantee schemes;
  c) measures aimed at helping SMEs to maintain their investment level and more generally their capacity to respond in the near future to a possible surge in demand through investment grants and credits, accelerated depreciation, and R&D financing.

Several countries have introduced policies that are intended to support industries particularly affected by the economic crisis, such as the car industry. Introducing or increasing government subsidies to producers may undermine the long–term production capacity of the economy. Even if subsidies boost short term demand, they can backfire by postponing needed restructuring and wasting taxpayer funds. Furthermore, these subsidies can be protectionist measures, and may provoke retaliation from other countries and a global reduction in growth potential. Such measures therefore need to remain selective, and avoid bailing out firms which are not competitive[13].

The current crisis could also have negative effects on the communication sector which has been investing in high speed broadband networks and next generation switching technology. Telecommunication incumbents have historically had strong cash flow positions but face increasing difficulties raising sufficient capital. Smaller new entrants, with fewer assets and lower cash flow, may be disproportionately affected by capital shortages. There is also concern that incumbents will use the financial crisis as a means to obtain regulatory concessions from governments in exchange for promises to invest. Such concessions would have negative effects on the development of long term competition in the sector, innovation and lower prices.

Investment in high speed broadband communication networks that are part of economic stimulus packages must be accompanied by regulatory frameworks which support open access to networks and competition in the market. Such investment should also aim at stimulating the use of information and communication technologies (ICTs) to secure economic and social benefits. Linking ICT investment with other large physical infrastructure investment, such as buildings, roads, transportation systems, health and electricity grids, allows them to be "smart" and save energy, assist the aging, improve safety and adapt to new ideas. These infrastructures can also lower the barriers to entrepreneurial activities and provide means for the efficient and "green" delivery of energy, mobility and important social services – training, job search and networking[14].

The crisis also presents an opportunity to raise investment in human capital. Support for education and training can accelerate the healthy transition to new jobs and emerging opportunities. It is also essential for innovation, which requires a broad set of skills. Building such skills starts in primary school and continues through firm based training and lifelong education.

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[13] *The Effects of the Financial Crisis on European Research Policy* …, op. cit.; M. Kanerva, H. Hollanders, *The Impact of the Economic Crisis on Innovation* …, op. cit.

[14] *Europe 2020. A European Strategy for Smart, Sustainable and Inclusive Growth,* EC European Commission, Brussels 2010.

The crisis offers an opportunity and an incentive to improve efficiency in the use of energy and materials, to move towards more sustainable manufacturing, and to develop new green businesses and industries. Dealing effectively with many environmental challenges will require investment in innovative energy efficient buildings and transport systems, alternative energy supplies and "smart" electricity grids, pollution control, as well as investments in environmental infrastructures, such as sea walls to protect coastlines. Investing in the environment is thus an important element of many of the stimulus packages being put in place by governments of high developed and emerging economies. As with other elements of the stimulus packages, "green" investments should not be used as a cover for protectionist measures. Support programs, for example, should not be tied to the purchase of nationally–produced construction materials.

The crisis can also be a spur to much needed structural reform, where there is an opportunity for both economic and environmental gains. It provides an opportunity to reform or remove policies that may be expensive, inefficient and environmentally harmful.

Policy reforms will also improve the incentives for innovation, as they remove distortions in the market. At the same time, investors need a clear and credible price signal now to invest in a greener future. It is not a choice between better pricing *or* stimulation of technological innovation: both are vital. Analyses clearly show that better pricing will likely be one of the best triggers for the development and diffusion of greener technologies. New technologies, such as carbon capture and storage (CCS), will not be aggressively deployed in the coming decades without a clear carbon price. Even with such a price, however, the development and implementation cost of some technologies may be very high initially, and government investments in demonstration facilities may be needed.

Governments will also have to share the risk of new technologies with the private sector. A number of co–financing measures are already being employed by countries, including: R&D tax credits and public procurement policies to help stimulate private investment; public–private collaboration on R&D projects, including research clusters together with academic institutions; and selective targeted measures to support innovation in small and medium–sized enterprises (SMEs). Public R&D policies are particularly important now, when the private sector may have more difficulty making such investments. In the energy sector, public R&D has been falling since the early 1980s and greater public spending could potentially have a high return[15].

Today's world is one in which most economies increasingly rely on knowledge and services to drive their performance, where investment in intangible assets is of equal importance as investment in machinery, equipment and buildings. Efforts to stimulate the economy must therefore reflect the current drivers of economic growth, and take advantage of industrial renewal to accelerate the important structural shifts underway.

Governments will need to assess the longer–term impact of the crisis on innovation especially since many look to innovation–induced growth as a spark for re–igniting growth. In all likelihood, the crisis will accelerate changes already underway: the increasing internationalisation of investments in innovation; the growing role of countries such as Brazil, Russia India and China (BRIC) in the global geography of innovation; the increasing reliance on "open" innovation strategies that rely on partnerships and collaboration to share costs and spread risk; and the broadening of the range of actors who are innovating, including users and consumers making use of the Internet as a collaborative platform. But the crisis could also have a detrimental impact as aversion to risk takes root, as reinforced nationalism puts limits on trade and migration and as tight economic conditions lead to an increase in cybercrime that could erode trust in the Internet[16].

[15] *Financial Crisis Is Expected to slow R&D Investment* …, op. cit.

[16] *Green Growth: Overcoming the Crisis and Beyond* …, op. cit.; *Policy Responses to the Economic Crisis* …, op. cit.

Innovation policies should be adapted to current conditions, in terms of policy design for both short–term stimulus packages, as well as medium– and long–term initiatives[17]. Policy instruments will have to be adapted to the more international and open character of innovation and to the central importance of non technological innovation. Equally important, innovation policies must form part of a coherent and well designed government strategy that takes account of the interactions and complementarities between different policies and increases the overall efficiency of resource allocation. In the current context, it will be particularly important that policies in response to the crisis will continue to provide sufficient incentives for risk taking, a key driver of innovation.

Innovation and long–term growth vs. the economic crisis

Governments in many countries are currently launching economic stimulus packages to address the economic downturn. Most governments have expressed the concern that their economic stimulus package should not only be limited to raise aggregate demand in the short run but also help raise aggregate supply and restore favourable conditions for innovation and growth. As a result, the recovery packages include measures directed towards areas such as investment in modern infrastructure, research and development (R&D), support to innovation and to small and medium–sized enterprises (SMEs), education, and the greening of the economy. The goal is to secure competitiveness and a new foundation for growth while using the downturn as a chance to begin work on several long–term goals, such as improving energy efficiency[18].

In many countries governments have developed a strategic response to the crisis focusing on two priority areas: finance, competition and governance; and restoring long–term growth (OECD, 2009). The economic crisis also increases the importance and the urgency of the innovation strategies. It is crucial to identify the strategies adopted by member countries to foster innovation and long–term growth in above elements of their policy responses. The first section of this part of the paper sets out the broad characteristics of the economic stimulus packages (*i.e.* their size and main features). The second section discusses measures relating to innovation and long–term growth. The third section discusses project selection, co–ordination, oversight and evaluation of these measures related to innovation and long–term growth.

Almost all countries have introduced discretionary measures in response to the crisis, though the crisis driven stimulus packages represent only one among other effects on government revenue and spending (e.g. the operation of automatic stabilisers).

Based on a consistent approach to the definition of packages, the size of fiscal packages, introduced as a direct response to the crisis and measured by their cumulated impacts on fiscal balances over the period 2008–10, amounts to about 3.5% of area wide 2008 GDP[19]. The crisis related fiscal injection was typically expected to be strongest in 2009, although again with some variations between countries.

However, there is considerable variation in the size of packages across countries, partly reflecting the severity of the economic crisis, the fiscal position before the onset of the crisis and the size of automatic stabilisers. As a share of GDP, the size of the economic stimulus packages ranges between 0.1% of GDP to over 5.0% of 2008 GDP. An unweighted average of countries introducing positive stimulus packages implies a typical stimulus package amounting to more than 2.5% of GDP over the period 2008–10. But five countries (Australia, Canada, Korea, New Zealand and the United States) have introduced fiscal packages amounting to 4.0% of 2008 GDP or more, the US package – at about 5.5% of 2008 GDP –

[17] S.M.S. Krammer, *Drivers of national innovation in transition: Evidence from a panel of eastern European countries*, "Research Policy" 2009, Vol. 38, No. 5, pp. 845–860.

[18] G.M. Grossman, E. Helpman, *Innovation and growth in the global economy* …, op. cit.

[19] *Green Growth: Overcoming the Crisis and Beyond* …, op. cit.

being the largest. Countries with the largest absolute spending are the United States, Germany, Japan, Canada, Spain, Australia and Korea (in decreasing order)[20].

Most countries have adopted broad ranging stimulus programmes, adjusting various taxes and spending programmes simultaneously. A majority of countries have given priority to tax cuts over boosting spending (although Japan, France, Australia, Denmark and Mexico are clear exceptions). On the spending side, all countries have launched and/or brought forward public investment programmes. Australia, Poland, Canada and Mexico are projected to be the most pro–active in this domain, with an increase in public investment as a response to the crisis close to 1.0% of 2008 GDP or more. Denmark, France and Japan also have a clear focus on public investment. Transfers to households have often been made more generous in particular for those on low incomes. A few countries (including the Czech Republic, Japan, Korea, Portugal, Mexico and the Slovak Republic) have also announced larger subsidies to the business sector[21].

A few countries are also carrying out significant economic stimulus packages, *e.g.* China (USD 585 billion, 19% of GDP), Brazil (USD 152 billion, 15% of GDP), Russia (USD 101 billion, 8% of GDP), Chile (USD 4 billion, 2.8% of GDP) although definite figures and exact spending details are hard to break out for most of these countries.

A comparison of the absolute or relative size of these stimulus packages and their components is challenging for various reasons.

First, most plans await political ratification and implementation and thus their details are still changing. Moreover initial plans are often followed up with additional measures (*e.g.* the case of Australia, Chile, Germany, the Netherlands, Slovenia, Switzerland, Japan or India who developed several packages)[22].

Second, the exact financial details and how the priorities are weighted in budgetary terms are usually still uncertain. In some cases the plans propose new budgetary allocations (*i.e.* amounts which are supplementary to initial 2008, 2009 and 2010 budgets), whereas in many other cases they also propose to carry planned government spending forward (*i.e.* relabeling of planned expenditures). Also often the figures quantifying the size of the recovery packages are not for identical time periods (some covering 2009–2010 whereas others cover shorter or longer time horizons).

Third, the size of these plans usually does not take into account automatic stabilisers which work as a tool to dampen fluctuations in real GDP without any explicit policy action by the government. Analyses show that there is an inverse correlation between the size of discretionary fiscal packages announced/ implemented among countries and the strength of so called automatic stabilisers.

Fourth, these figures do not take into account legislative or regulatory changes which might have important impacts (*e.g.* changing rules and procedures to facilitate the acceleration of planned investments and public procurement, introduction of new innovative R&D tax credit mechanisms).

Nonetheless, this is an attempt to provide a comparative, quantitative and qualitative description and analysis of certain aspects of crisis related stimulus packages of some countries.

Most economic stimulus packages aim to stimulate demand in the short term (injecting cash into the economy and protecting existing jobs). However, most governments also plan to foster medium– to long–term growth through investments which have repercussions on the supply side[23].

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[20] *Green Growth: Overcoming the Crisis and Beyond* …, op. cit.; *Policy Responses to the Economic Crisis …*, op. cit.

[21] *Wyzwania rozwojowe. Poland 2030. Development Challenges* …, op. cit.; R. Rapacki, M. Próchniak, *The EU Enlargement and Economic Growth in the CEE New Member Countries*, European Economy, European Papers 2009, 367 (April), European Commission Directorate General Economic and Monetary Affairs, Brussels; K. Richter, M. Krzak, *Poland: From Crisis Resilience to Robust Growth,* [In:] *The Great Recession and Developing Countries. Economic Impact and Growth Prospects,* (ed.) Nabli M. K., World Bank, Washington, DC 2011; *How Are Firm in Eastern and Central Europe Reacting to the Financial Crisis?* …, op. cit.

[22] *Policy Responses to the Economic Crisis …*, op. cit.

[23] *Policy Responses to the Economic Crisis …*, op. cit.

The nature of plans can be distinguished between:

- measures aimed at saving banks and the financial system – excluded from the scope of this document, where possible,
- measures aimed at supporting businesses (tax cuts – including cuts in value added tax rates, short–term credit guarantees, reduction of non–wage labour costs, stimuli for retaining or hiring staff),
- measures aimed at particular industrial sectors (notably the automobile and the construction sectors),
- measures to support household consumption and reduce their exposure to the crisis (including tax cuts, cash payouts to households, unemployment benefits, support to low earners such as pensioners, cuts in healthcare costs, home owners' grants), and finally,
- measures relating to innovation and long–term growth, which are the focus of this paper.

Certain measures also take the form of regulatory adjustments (*e.g.* non–financial measures to stimulate green technologies).

Most economies focus on the following themes in existing economic stimulus packages[24]:

- improving the infrastructure (*e.g.* roads, mass transit, information and communication technologies [ICT]),
- support for science, research and development (R&D) and innovation,
- investment in human capital, education/training (including schools, teachers),
- promoting the investment in and uptake of green technologies and innovations to foster energy–efficiency and sustainable economic growth,
- support for innovation and entrepreneurship (including support for innovation and investment in small and medium–sized enterprises [SMEs], venture capital, etc.).

Most countries announce that they are implementing the above measures in order to emerge stronger from the crisis through sustainable investments in infrastructure, research and other means to secure competitiveness and a new foundation for growth in the future.

The measures relating to innovation and long–term growth

In terms of financial weight, infrastructure investments, education and sometimes green technologies are the first and second most important of these spending items in stimulus packages. Yet, in many cases the above components of economic stimulus packages are related: *e.g.* additional financial measures in favour of infrastructure overlap with spending on R&D (new laboratories) and spending on the education category (new schools). Similarly, investments in green technology contain some spending for more energy–efficient housing (*i.e.* infrastructure) or R&D (fostering research in renewable energy). Some more medium–term impacts also exist, *e.g.* scientific research results fostered by increased R&D budget might later prove useful for the development of "smarter" infrastructures (*e.g.* intelligent transport systems) or greener technologies.

The policies are only part of the government responses to the economic crisis and only a broader analysis can yield an understanding of all public measures and their impacts.

Most economic stimulus packages contain a focus on improving the national infrastructure – mostly through public works. The targeted infrastructure investments are mostly concerned with roads, railroads (including freight networks), public transport, airports, childcare facilities, schools and universities, hospitals, energy networks and security, and a modern ICT infrastructure.

Non–regulatory measures in the field of infrastructure are also heavily concerned with the streamlining of the approval process of (large) infrastructure projects.

Investments in R&D and innovation are a priority in economic stimulus packages. In principle, through these measures governments formulate and adhere to R&D spending targets (including increases

[24] *Policy Responses to the Economic Crisis ...*, op. cit.

in R&D funding, or measures for specific research areas, and investments in R&D infrastructure), stimulate private R&D investments (including through R&D tax credits, public procurement), implement measures for SMEs, and policies with a particular concern for R&D employment and skills and innovation (*e.g.* avoiding unemployment of young researchers and loss of skills)[25].

In a few cases, the plans also include non–regulatory measures to spur certain innovations, *e.g.* regulations spurring or directing research in life sciences (*e.g.* on issues such as stem cell research) or directing green technology research areas (*e.g.* standards on renewable energy, etc.). Institutional issues such as public–private collaboration and knowledge transfer, and international co–ordination are part of very few stimulus plans but still appear only marginally, *e.g.* in the area of life sciences or green technologies. An example is the launch in 2009 of the EU's public–private partnerships for a total of EUR 3.2 billion of research on European green cars, energy efficient buildings and factories of the future, all of which will address green technologies[26].

Looking at the R&D and innovation components in greater detail, the EU has urged its member states to increase planned investments in education and R&D (consistent with national R&D targets) and consider ways to increase private sector R&D investments, for example, by providing fiscal incentives, grants and/or subsidies. Priorities of the Lisbon Agenda are again of increased relevance (large research infrastructures, knowledge transfer schemes, joint R&D programmes, mobility of researchers and international co–operation).

The EU also urged to reduce by up to 75% the fees for patent applications and maintenance. Finland has announced that it will keep to its target of extending R&D expenditures to up to 4% of GDP, Norway has allocated more than NOK 1.8 billion in direct grants for R&D and innovation, and Sweden has allocated additional funding of SEK 5 billion for university R&D and SEK 3 billion for public R&D institutions. Norway, Germany has pledged EUR 900 million for R&D in small and medium–sized enterprises in 2010 and 2011 and EUR 500 million are intended to foster the development of hybrid and other clean car technologies. Besides measures relating to its R&D tax credits, France is planning to foster nanotechnology research with EUR 70 million and to support ICT research networks for higher education. Some measures in Europe were focused on R&D employment[27].

Support for education and training that enables the transition to new jobs and emerging opportunities is also recognised as important in existing stimulus plans. Some countries even choose to put this at the heart of their recovery plans (*e.g.* the United Kingdom, Germany). Next to investments in childcare facilities, schools, and university infrastructures, countries are mostly focusing on encouraging firms to retain their staff, to recruit new employees and to foster skills. Such measures frequently focus on helping SMEs or fostering entrepreneurship.

Policy makers are using the crisis as an opportunity to undertake "green" infrastructure investments. The stimulus packages aim to make an impact on improving energy efficiency and speeding the move to a low–carbon economy, in particular also through support for related research, science and pilot projects. The promotion of energy saving and new energy technologies (*e.g.* next generation solar power) as well as tax measures that encourage green investment or the purchase of green products rank high in these plans.

The EU stimulus plan includes calls on member states to improve the energy efficiency of the housing stock and public buildings and promote the rapid take up of 'green' products. A fund for energy,

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[25] C.W. Barrett, C.S. Musso, A. Padhi, *Upgrading R&D in a downturn* …, op. cit.

[26] *Green Growth: Overcoming the Crisis and Beyond* …, op. cit.; *Policy Responses to the Economic Crisis …*, op. cit.

[27] *Doing R&D or Not (In a Crisis) That Is the Question* …, op. cit.; *Regional Innovation Scoreboard (RIS) 2009*, DG Enterprise and Industry, European Commission, Brussels 2010; D. Hodson, L. Quaglia, *European perspective on the global financial crisis: Introduction,* "Journal of Common Market Studies" 2009, Vol. 47, No. 5, pp. 939–953; D.M. Johnson, *High–tech indicators: Assessing the competitiveness of selected European countries,* "Technology Analysis & Strategic Management" 2010, Vol. 22, No. 3, pp. 277–296; *How Are Firm in Eastern and Central Europe Reacting to the Financial Crisis?* …, op. cit.

climate change and infrastructure projects is planned. Innovative financing models will be elaborated. Performance requirements and measures to promote green products are a priority.

Many countries are devising schemes to help firms (and in particular small and medium–sized enterprises, SMEs) and entrepreneurship. Measures include tax breaks for companies, initiatives intended to bridge liquidity gaps (*e.g.* ensure banks keep lending to business, government backed loan guarantees or loans for small firms, export credit guarantees), the simplification and speeding up of administrative procedures, the promotion of start–ups and entrepreneurship, employment plans that allow SMEs to avoid lay–offs, and directing government procurement to young or smaller firms while also ensuring the rapid payment of invoices to SMEs.

Next to non–financial measures mentioned as part of the five themes identified above (notably the measures to green the economy), most countries propose a simplification and speeding up of administrative procedures, mostly with regard to starting up a company, public procurement, tendering rules and initiating construction work (including building permits, especially for large infrastructures).

Details on how the stimulus packages will be governed and executed, how individual projects will be selected, how these will be co–ordinated across different government entities and levels and evaluated are only starting to emerge. In most cases the precise mechanisms of how to allocate, disburse or oversee the sums proposed through the economic stimulus packages have not been decided upon.

More work is needed on identifying which specific projects can be implemented in a relatively short time span to boost demand but which also meet the objective of having a supply side effect in boosting innovation and the fundamentals for long–term growth.

Conclusion

The most developed countries (and especially Poland) are focusing on measures to restore long–term growth – this is the part of their strategies to the economic crisis. This paper shows how current economic stimulus packages include measures directed towards investment in research and development, a modern infrastructure, education, the greening of the economy, support to innovation and to SMEs.

This paper should also help setting priorities and uncovering good practices, including in the area of evaluation and co–ordination of planned measures and increased international co–operation. It can also help debates on how to reconcile necessary short–term stimulus measures and plans to foster long–term economic and sustainable growth.

Raising employment, improving skills, and enhancing technology absorption and innovation could help offset the projected decline in potential growth and put Poland back on track for even higher growth rates. To achieve these goals, it would be worth to pointed out the following findings and recommendations in the area of innovation:

- improve the investment climate to spur firm investments in R&D,
- channel public funding to support co–inventions in addition to domestic inventions, to promote international collaboration and knowledge spillovers,
- establish a system of insider privatization, that is, transfer of ownership to research and development institutions (RDIs) managers and researchers, (excluding the real estate), to complete the restructuring of commercialized RDIs and those volunteering for privatization,
- reform the RDI financing system to strengthen applied research and links with the needs of the Polish companies (especially small and medium enterprises) and industry.

To conclude, more analyses will be needed to monitor the implementation and assess the impact of these economic recovery measures.

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EVALUATING INNOVATION ACTIVITIES IN SMALL AND MEDIUM ENTERPRISES IN POLAND

Summary

The relatively low degree of innovativeness of Polish companies and economy compared to other EU countries makes this problem still the subject of the research in which authors try to investigate the reasons for this state of affairs. Innovation has become not only a very important factor of success and growth of any company, but rather a necessity. Small and medium–sized enterprises are forced to implement innovations because they are under constant pressure of the environment, competitors in the market. Intensifying innovative activity is one of the main tasks of small and medium–sized enterprises (SMEs) nowadays. The aim of the study was to present the problem of Polish innovation activities of small and medium–sized enterprises (SMEs), to analyse the determinants of innovation activity of SMEs.

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Introduction

Small and medium enterprises (SMEs) play an important role in modern economies because of their flexibility and ability to innovate. In nearly every country, SMEs play a significant role in providing employment opportunities and supporting large scale manufacturing firms. SMEs are a source of innovation in all industries and they provide jobs for the citizens of the countries concerned. They also offset the negative economic trends and support the restructuring of industries. 21.6 million small and medium–sized enterprises, i.e. 99% of all European enterprises contribute to creating 88.8 million jobs, 66.8% of total employment and 58.1% of the value added[1]. Innovation plays a key role in building the competitiveness of SMEs. Empirical studies support the existence of the relationship between innovative

[1] *Annual Report on European SMEs 2013/2014* – A Final Report, July 2014, SME Performance Review 2013/2014, European Commission, Directorate-General for Enterprise and Industry, http://ec.europa.eu/enterprise/policies/sme/facts–figures–analysis/performance–review/files/supporting–documents/2014/annual–report–smes–2014_en.pdf; J. Choudrie, N. Culkin, *A qualitative study of innovation diffusion: the novel case of a small firm and KTP*, Journal of Small Business and Enterprise Development, 2013, 20(4), pp. 889–912.

behaviour of SMEs and their performance[2]. SMEs are increasingly recognizing the need to develop and implement innovations, resulting among other things from ever shorter product life cycles. Innovation implementation can be for SMEs a way to gain competitive advantage[3], to reinforce the market position or gain a larger market share, to increase the effectiveness of operations, improve reputation, and decrease costs[4]. However, SMEs are vulnerable to negative influences of business environment[5], and only half of them survive longer than five years[6]. Small businesses are experiencing difficulties related to access to capital and expertise, sometimes they lack experience. In the environment of SMEs, there are several programmes and instruments supporting their development. The use of these opportunities often determines the possibilities and directions of development of these enterprises. A characteristic here is a large variation in the occurrence of the instruments, their diversity and different rules for their use[7].

Innovations in SMEs are an issue rarely discussed in the relevant literature compared to innovations in large companies. The measurement of the aspects of innovation capability is rare in SMEs, although innovation capability and measurement are positively related[8]. Undoubtedly, small and medium–sized enterprises rely more on informal research and development activities difficult to measure, and they are less likely than large companies to use external sources of knowledge (advisory services and licenses). However, SMEs innovate and use it as part of gaining and maintaining their market position[9].

Innovative activities of SMEs in Poland

Innovation is any change, favourable by definition, in different areas of the organization activity, introducing progress compared to the existing state, developed in or outside the organization, being a response to the needs signaled or satisfying the needs previously unrevealed. It's a process to adopt any

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[2] T. Norek, *Efficiency of Innovation Processes in Polish Small and Medium–sized Enterprises (SMEs). A Proposed Assessment Method and Results of Empirical Research*, International Journal of Management and Business Studies, 06/2014, 4(2); Ch.M. Mahemba, E.J. Bruijn, *Innovation activities by small and medium–sized manufacturing enterprises in Tanzania*, Creativity and Innovation Management, 2003, 12(3), pp. 161–172; A. Gunasekaran, L. Forker, B. Kobu, *Improving operations performance in a small company: a case study*, International Journal of Operations & Production Management, 02/2000; 20(3), pp. 316–336.

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[4] I. Cooke, P. Mayes, *Introduction to Innovation and Technology Transfer*, Norwood, MA, Artech 1996.

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change pertaining to a device, system, process, policy, or service that is new to the organisation[10]. The basis for developing and implementing innovation is appropriate knowledge resources in the form of inventions, industrial designs, acquired licenses, proprietary copyright, know–how, formulas, etc. It can be assumed that the essence of innovation is knowledge and learning. Innovative activity involves businesses engaging in different types of scientific, technical, organizational, financial and commercial activities, which are intended to lead to innovation implementation. Some of these activities are innovative, while others are not new, but are necessary for the implementation of innovation. Innovative activities also include research and development (R&D), which are not directly related to the development of a specific innovation.

In 2013 there were about 21.57 million active enterprises in EU28[11] (1.4 million companies operate in Poland (see Table 1), which places the Polish economy in the sixth place in the EU in terms of their number. However, compared with the EU average, the SME sector in Poland is increasingly dominated by micro–enterprises, whose share in the total number of companies is 95.7% (in the EU – 92.2%). The share of small enterprises in the SME sector in Poland (3.0%) is about half the size of the EU average (6.2%), while the share of medium–sized companies is close to the EU average (1.1% – Poland, 1.0% – EU)[12].

Table 1. The SME sector in Poland in comparison with the EU in 2012

Type of enterprise	Number of enterprises			Employment			Value added (EUR million)		
	Poland		EU–27	Poland		EU–27	Poland		EU–27
	Number	%	%	Number	%	%	Number	%	%
Micro	1 339 817	95.7	92.2	3 060 776	37.4	29.6	27 000	16.6	21.2
Small	41 961	3.0	6.5	973 749	11.9	20.6	21 000	13.0	18.5
Medium	14 930	1.1	1.1	1 547 126	1.9	17.2	35 000	21.9	18.4
SMEs total	**1 396 708**	**99.8**	**99.8**	**5 581 651**	**68.2**	**67.4**	**83 000**	**51.5**	**58.1**
Large	3 175	0.2	0.2	2 607 341	31.8	32.6	79 000	48.5	41.9

Source: *SBA Fact Sheet 2012 Poland*, European Commission, http://ec.europa.eu/enterprise/policies/sme/factsfiguresanalysis/performancereview/files/countriessheets/2012/poland_en.pdf.

You may notice a correlation between the size of companies and their innovative activity. Although small and medium–sized enterprises dominate in the market in terms of their number, their share in the total number of innovation active enterprises is not even half (small enterprises constitute 9.5%, medium–sized – 26.3%). In 2009–2011, compared to the previous two years, there was a decline in

[10] T.E. Brown, J.M. Ulijn (eds), *Innovation, entrepreneurship and culture: The interaction between technology, progress and economic growth.* Northampton 2004, MA, Edward Elgar; L. Lesaková, *Inovácie – imanentná súčast' podnikania v globálnom ekonomickom prostredí',* [In:] Determinanty inovačnej aktivity malých a stredných podnikov v SR*,* Banská Bystrica 2008, Ekonomická fakulta UMB, pp. 7–20.

[11] *Annual Report on European SMEs 2013/2014 – A Final Report, July 2014*, SME Performance Review 2013/2014, European Commission, Directorate-General for Enterprise and Industry, http://ec.europa.eu/enterprise/policies/sme/facts–figures–analysis/performance–review/files/supporting–documents/2014/annual–report–smes–2014_en.pdf.

[12] *Annual Report,* op. cit.; 2013 SBA Fact Sheet, Poland, http://ec.europa.eu/enterprise/policies/sme/facts–figures–analysis/performance–review/files/countries–sheets/2013/poland_en.pdf.

the share of innovation active enterprises in both the industrial enterprises (from 18.1% to 16.9%) and services sector (from 13.5% to 12.3%) in the overall number of these entities.

Given the Polish profile of the SBA (Small Business Act), which was improved in next years since 2004–2005, when the majority of indicators (including internationalization, skills and innovation, the single market, financing, flexible administration) were below the EU average, four could not be calculated due to the lack of data, and only in the category of entrepreneurship Poland performed much better than the average level in the whole Union. In 2010–2011, the results close to the EU average were noted in the areas of funding (access to financing sources) and in the first think small category. In both these categories, the results were better than in the previous period examined, which shows an upward trend. In 2012, already three areas were above the EU average: entrepreneurship, financing and environment. The remaining seven areas are not yet at the sufficiently satisfactory level, and the area of "skills and innovation" is the worst. Despite the fact that the situation for SMEs was improving, in 2009–2011, compared to the previous two years, there was decline in the share of innovation active enterprises in both the industrial enterprises (from 18.1% to 16.9%) and in the service sector (from 13.5% to 12.3%) in the total number of these entities. Undoubtedly, the economic crisis has negatively affected the innovative activity. Investments are of great importance to enterprises, including small and medium–sized ones. The level of innovation in SMEs determines the volume of investments in small entities. Without investments it is not possible for a company to function in the contemporary socio economic conditions. Investments are one of the most important ways for a company to grow. Investments should enable the company to stay afloat in the market and compete, providing it with such features as modernity, innovation, flexibility and adaptability. Significant importance of investments for the SME sector is confirmed by the data on the volume of investments made by small entities[13]. In the subsequent years until 2008, an increase in investment was reported. However, the economic crisis has slowed down the dynamics of investment in small, medium–sized and large enterprises. Such a slowdown has not been observed as regards the smallest companies. The volume and sources of financing investments made by SMEs are presented in Tables 2 and 3.

Table 2. Capital expenditures of enterprises in 2003–2011 in Poland (in PLN million)

Years	Enterprises (number of people employed)				
	Total	**0–9**	**10–49**	**50–249**	**> 249**
2003	77 397	10 088	10 680	16 259	40 370
2004	90 392	11 364	11 689	21 944	45 395
2005	99 973	11 842	10 613	21 703	55 815
2006	114 340	14 179	12 845	28 041	59 275
2007	144 280	18 321	15 827	34 759	75 373
2008	160 539	20 356	19 011	34 942	86 230
2009	143 751	21 853	16 416	30 806	74 676
2010	141 939	24 848	16 877	29 598	70 616
2011	161 240	28 282	18 757	33 785	80 416

Source: *Report on the state of small and medium–sized enterprises in Poland in 2011–2012*, PARP 2013.

[13] R. Wolański, *Wiedza i innowacje w małych i średnich przedsiębiorstwach – postęp czy stagnacja*, [In:] *Koniunktura gospodarcza a relacja podmiotów gospodarczych*, Akademia Ekonomiczna w Katowicach 2009, pp. 223–237.

Table 3. Sources of financing investment in the corporate sector in 2011 in Poland (in %)

Enterprises	Own funds	Budgetary funds	Domestic borrowings	Foreign funds	Other sources	Unfunded expenditure
Total	69.96%	4.29%	10.21%	6.84%	4.81%	3.88%
Small	59.44%	3.34%	19.26%	10.81%	6.46%	0.70%
Medium	65.58%	3.68%	16.63%	7.98%	4.69%	1.44%
Large	73.72%	4.72%	5.99%	5.62%	4.52%	5.44%

Source: *Report on the state of small and medium–sized enterprises in Poland in 2011–2012,* PARP 2013.

One of the most commonly used indicators to assess the innovativeness of enterprises is the percentage of companies implementing product or process innovations[14]. Product innovations allow you to gain competitive advantage through a change in the product/services that the company offers, and process innovations allow the rationalization of production. In the case of medium–sized companies, they introduced twice as many product innovations as organizational and marketing ones (see Table 4).

Table 4. Types of innovations implemented by companies of all sizes

Type of Innovation	Enterprises		
	Small	Medium–sized	Large
Product and process innovations	9.5	26.3	52.9
Organizational innovations	5.9	14.2	36.6
Marketing innovations	5.9	11.4	30.4

Source: *Activity of non–financial enterprises in 2011*, CSO 2013.

Innovation is an area, which is a matter of concern in the case of SMEs in Poland. In this area, Poland is significantly different from the EU average. In the ranking of innovation for 2013, Poland was ranked in the third group of "Moderate innovators". After dropping from the Moderate to the Modest innovators in 2012, Poland has returned to the group of Moderate innovators by achieving an innovation performance slightly above 50% of the EU average. Poland is performing below the average of the EU for most indicators. Relative weaknesses are in Non–EU doctorate students (Poland: 1.9%, EU27: 24.2%), PCT patent applications in societal challenges (Poland: 0.25%, EU27: 0.9%) and License and patent revenues from abroad (Poland: 0.21%, EU27: 0.77%). Relative strengths are in Non–R&D innovation expenditures (Poland: 1.02%, EU27: 0.56%) and Youth with upper secondary level education (Poland: 89.8%, EU27: 80.2%). High growth is observed for Community designs (Poland: 4.76%, EU27: 4.75%), Community trademarks (Poland: 3.21%, EU27: 5.91%) and R&D expenditures in the business sector (Poland: 0.33%, EU27: 1.31%). Strong declines in growth are observed in Innovative SMEs collaborating with others (Poland: 4.2%, EU27: 11.7%), New doctorate graduates (Poland: 0.5%,

[14] J. Łapiński, *Działalność innowacyjna przedsiębiorstw przemysłowych w Polsce*, [In:] *Innowacyjność 2010*, PARP, Warszawa 2010, pp. 7–67.

EU27: 1.7%), SMEs innovating in–house (Poland: 11.3%, EU27: 31.8%) and Sales share of new innovations (Poland: 8.0%, EU27: 14.4%)[15].

The results of research conducted by the Central Statistical Office and the Polish Agency for Enterprise Development indicate that capital expenditures are closely linked to the acquisition of fixed assets by enterprises: investment in machinery, equipment, land, buildings were between 65 and 85% of the declared expenditures on innovation in the past decade, while expenditures on research and development were only 10% of this amount, the purchase of rights and licenses – about 15%. As regards SMEs, the capital expenditures on buildings and structures in 2011 amounted to approx. 50%, on machinery and equipment – approx. 30%, the means of transport – approx. 18%. The smaller the company, the greater the share of expenditures on buildings and structures (micro – 54.6%, small – 62.1%, medium – 41.0%, large – 39.9%) and means of transport (micro – 23.7 %, small – 11.1%, medium – 18.0%, large – 9.0%). Less economic potential of small entities, and the scale of the costs associated with these investments cause that smaller enterprises can spend less on machinery and equipment (micro – 21.7%, small – 25.6%, medium – 40.5%, and large – 49.9%), which results in their under–investment in technology[16]. Most companies do not have departments dealing with research and development, development and transfer of knowledge and innovation. It should also be noted that large companies play the leading role in investing in innovation in Poland.

The effectiveness of innovation processes in SMEs

The basic characteristics of innovation management in small and medium–sized enterprises can be described as follows:

- innovative activity objectives – to develop new products and organizational solutions, allowing companies to gain competitive advantage,
- basic sources of product innovation – requirements of customers, suppliers of equipment and materials for production, professional publications,
- basic sources of organizational innovation – top management, management standards requirements,
- a way of developing new products – R&D activities conducted in an informal manner as part of company's current operations; the functioning within the framework of network structures;
- a way of managing the process of innovation – an informal approach to management; lack of resources and competencies to manage large and complex systems and processes; no skills to implement long–term innovative projects;
- characteristics of the decision–making process – effective communication, an informal decision–making mode translates into faster action and changes;
- access to new technologies – limited; their competencies are often limited to one/few areas of technology; focus on selected aspects of the research and development activity;
- methods of assessing introduced innovations – the assessment conducted by top management based on competencies and experience.[17]

Unfortunately, the level of innovation of Polish SMEs is much lower than the level of innovation of SMEs in most EU– 27 countries. In the Innovation Union Scoreboard report published in 2011 by the InnoMetrics research institute for the European Commission, own innovative activity of SMEs was

[15] *2013 SBA Fact Sheet. Poland,* http://ec.europa.eu/enterprise/policies/sme/facts–figures–analysis/performance–review/files/countries–sheets/2013/poland_en.pdf.

[16] *Innovation Union Scoreboard 2014*, European Commision, EU 2014, http://ec.europa.eu/enterprise/policies/innovation/files/ius/ius–2014_en.pdf; *Report on the state of small and medium–sized enterprises in Poland in 2011–2012*, PARP, Warszawa 2013.

[17] B. Kalinowski, *System zarządzania wspierający innowacje*, [In:] *Ekonomika i organizacja przedsiębiorstwa*, Instytut Organizacji i Zarządzania w Przemyśle „ORGMASZ", No 7, 2010, pp. 46–47.

rated as very poor (the value of SII –Sumary Innovation Index[18]) for Poland was 13.76, while the EU27 average was 30.31), similarly the cooperation of SMEs in terms of innovation with other companies in the market (Poland = 6.4, the EU27 average = 11.16) and the sale of innovative products and services, new from the point of view of the market or the company (Poland = 9.84, EU27 average = 13.26)[19].

The findings of the research on the effectiveness of innovative activities, conducted by T.Norek can be referred to, which indicate that half of the surveyed companies (50%) have a low level of innovation (innovation level <10%), which classifies them in the category of non–innovative companies. Only 6% of the surveyed companies could be regarded as innovative companies, which have implemented new products or services over the past three years (innovation level> 10%). These results show that the surveyed companies do not have sufficient innovative potential, which enables the implementation of innovative projects. Other research by this author confirms this thesis and shows that the surveyed companies have the lowest innovation potential in the areas of innovation assessment and planning, communication and organization or financing the innovative activity[20].

External and Internal determinants of SME innovativeness

Innovativeness of enterprises from the SME sector must be supported by the appropriate innovation policy in Poland, understood as the process of promoting innovative activity of enterprises. The measures contained in the innovation policy should motivate entrepreneurs to innovate, they should reduce the difficulty of making and implementing innovation, reduce the degree of risk and uncertainty and to provide advisory support to entrepreneurs who are not fully familiar with the mechanisms of implementing innovation[21]. SMEs often do not conduct innovative activity because without having own funds, they cannot or are not able to raise external capital. Another barrier is the lack of knowledge, on the one hand due to the lack of competence of the owner or managers, on the other hand due to the lack of separate R&D units in small and medium–sized enterprises. Uncertain demand also is a big barrier to this type of companies because if they launch the wrong product, they may end up bankrupt. The SME sector has bigger problems than large companies in finding and evaluating a variety of external resources, their assimilation, transformation and use; small companies are more vulnerable to the quality and openness of the environment[22].

The huge role of the environment is, which has a very important impact on the innovation capacity of enterprises. However, the effective implementation of innovation and reasonable management of innovation capacity in the company requires the focus primarily on such external conditions, which turn out to be crucial. External conditions consist of different factors, which are not equally important. Company's innovation activities are also largely influenced by factors created by the region in which it operates. These factors are mainly: the labour market, resources of technical knowledge and scientific information, and the willingness of institutions to finance activities burdened with a high degree of risk[23].

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[18] Metoda tworzenie indeksu SII została szczegółowo opisana w raporcie: *Innovation Union Scoreboard 2011*, ISBN 978–92–79–23174–2.

[19] T. Norek, *The effectiveness of innovative processes implemented by the SME's companies. Presentation of the results of empirical research*, Mendel University in Brno, Czech Republic, 7–8.03.2013.

[20] T. Norek, *The effectiveness*…, op. cit.

[21] H. Mizgajska, *Zmiany aktywności innowacyjnej małych i średnich przedsiębiorstw po akcesji do Unii Europejskiej na przykładzie Wielkopolski*, [In:] *Problemy innowacyjności przedsiębiorstw innowacyjnych*, (ed.) H. Mizgajska, UE, Poznań 2010, pp. 9–26.

[22] J. Mądra, *Bariery innowacyjności przedsiębiorstw z sektora MŚP*, http://www.ptzp.org.pl.

[23] K. Poznańska, *Uwarunkowania innowacji w małych i średnich przedsiębiorstwach*, Dom Wydawniczy ABC, Warszawa 1998.

According to Lesakova[24] the most important factors include: (a) innovation policy framework – is represented by innovation policies, strategies and documents supporting the creation of innovative business environment in the national and regional context; (b) macroeconomic framework – represents the economic basis for the effective innovation policy (e.g. the level of public expenditure on R&D, investments into education); (c) institutional framework – is constituted by institutional infrastructure to support the innovation activities (various ministries and institutions, regions and regional institutions, state and private institutions, agencies at national as well as regional level, whose direct or indirect task is to stimulate innovation in the areas of their competence).

SMEs have characteristics that are beneficial from the point of view of innovation processes and can be their innovative advantage compared to large companies, namely: they have flexible and entrepreneurial management structures that allow them to adapt to the changing market, no bureaucracy and administrative constraints, informal and effective internal communication, willingness of managers to take risks, ability to exploit new high–risk markets, SMEs often do not have the earlier, now partly obsolete generations of technology, so they do not burden the introduction of new technologies.

Innovation capacity of the company is shaped by key elements: (a) financial potential – their own funds and funds available in financial and non–financial institutions, (b) human potential – the staff employed, their number, structure and their competences, (c) material potential – the structure of the production potential, the ability to quickly adapt production to the changing needs of the market, the state of the machinery, (d) knowledge – technical knowledge and information from the market[25]. The importance of internal innovation capacity is highlighted, which includes resources and competences available to the company, and that can be used in the current innovative activity. The following are also of great importance: physical resources collected, gathering information about the latest trends in technological development, evaluating information and decision–making in different areas of company activity such as finance, marketing, and production and product development.

At the same time, the analysis of the models of the innovation implementation in the company[26] and research on innovation determinants[27] reveal that the key factor regulating efficient implementation of the innovation processes is the internal innovation potential of companies. The list of required conditions includes: culture supporting innovation, creativity enforced by the market, the will and ability to learn, the ability to profit from company's competences to conduct innovation processes, internal communication, issue of planning projects in the field of innovation and financing of innovative projects[28].

In addition to staff as an element forming the internal innovation capacity, Żołnierski[29], also lists research and development (isolated R&D units, R&D being conducted, contracted services, etc.) and technology (computers and ICT technology, machinery and equipment, as well as their degree of modernity).

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[24] L. Lesaková, *Evaluating Innovation Activities in Small and Medium Enterprises in Slovakia*, MEB 2009 – 7th International Conference on Management, Enterprise and Benchmarking, Budapest, http://kgk.uni–obuda.hu/system/files/2_Lesakova.pdf.

[25] K. Poznańska, *Uwarunkowania…,* op. cit.

[26] T. Lager, *Managing Process Innovation, From Idea Generation to Implementation*, Imperial College Press, London 2011; J. Tidd, J. Bessant, *Managing Innovation. Integrating Technological, Market and Organisational Change*, Wolters Kluwer Business, Warszawa 2011.

[27] B.H. Hall, N. Rosenberg, *Economics of Innovation*, Elsevier, North Holland 2010.

[28] T. Norek, *Key barriers to the development of effective innovative activity of Polish SME companies*, Global Business & Economics Anthology (GBEA) 2013, http://www.academia.edu/5507577/Key_barriers_to_the_development_of_effective_innovative_activity_of_Polish_SME_companies_v2.

[29] A. Żołnierski, *Potencjał innowacyjny polskich małych i średniej wielkości przedsiębiorstw*, Polska Agencja Rozwoju Przedsiębiorczości, Warszawa 2005.

Innovativeness perceived in terms of a subject is seen as a specific competence. According to the theory of competence[30], it includes knowledge, skills, values, attitudes, and they are components of the company innovation potential, including a set of resources enabling it to achieve the innovation–related objectives. A category of *competence* (here as a component of innovation) is gradable, which means that through appropriate interaction (management, coordination) it may influence the change in its states[31]. Four areas are crucial to effectively implement innovation: leadership behaviour, management processes, people and skills, organizational culture and values[32]. On the basis of these areas, sustainable internal competence is built for innovation as a continuous process, not incidental, short–term effort. A prerequisite for the effective team activity, whose task is creative, innovative problem solving, is the openness and willingness to share knowledge and experiences with others. This approach is partly due to personality determinants of team members, so organizational culture is also important here, which can effectively promote or inhibit cooperation, exchange of knowledge, experience and ideas. A key to the development of innovation in an organization is support, and encouragement for every employee to seek and discover unconventional, non–standard ways of achieving objectives and performing tasks. Thanks to the participation, an employee has greater responsibility, but also bigger motivation (he/she is not only the „robot", an individual carrying out a superior's order). However, it is necessary to create an environment giving a sense of security, lack of fear, both of criticism and „theft" of the idea by co–workers, and a transparent incentive system taking into account the initiative of employees and rewarding for their active participation in the innovation process, while allowing and accepting impractical solutions, mistakes and risk associated with them. Personality of team managers, who initiate new projects, or give the „green light" to the initiatives submitted by employees, is also significant[33]. Excessive formalization and bureaucratization of processes, as well as extensive control structures are not conducive to innovation. They both delay the decision–making processes, and inhibit the creativity of employees.

Conclusion

The SME sector is characterized by a dynamic approach to the environment. Such companies quickly respond to the changing needs and preferences of potential customers. Very often they have very accurate understanding of the market situation and as a result it is a lot easier for them to take on new investments and projects. Small and medium–sized enterprises are one of the main factors of socio–economic growth of the state. They are a kind of stimulus to the development of the economy. Undoubtedly, however, SMEs and in particular the smallest, local companies, with little capital, have limited opportunities to be innovative companies. For such companies the primary goal is to survive in the market. Therefore, there are few innovative companies among small enterprises. Medium–sized enterprises have a much better situation, there are 15% innovative companies among them. Activities characteristic of innovation

[30] R.E. Boyatzis, *The competent manager: A model for effective performance*, John Wiley & Sons, New York 1982; C. Lévy–Leboyer, *Kierowanie kompetencjami. Bilanse doświadczeń zawodowych*, Poltex, Warszawa 1997.

[31] T. Bal–Woźniak, *O potrzebie wykorzystywania nowych form koordynacji współpracy w zarządzaniu innowacyjnością*, [In:] *Nierówności społeczne a wzrost gospodarczy*, 2013, No 30, Uniwersytet Rzeszowski, Katedra Teorii Ekonomii i Stosunków Międzynarodowych, pp. 404–423.

[32] A. Leiponen, *Skills and innovation*, International Journal of Industrial Organization, 2005, 23, pp. 303–323, http://dx.doi.org/10.1016/j.ijindorg.2005.03.005; P. Loewe, J. Dominiquini, *Overcoming the barriers to effective innovation*, Strategy & Leadership, 2006, 34(1), pp. 24–31, http://dx.doi.org/10.1108/10878570610637858.

[33] M.T. Brouwer, *Weber, Schumpeter, and Knight on Entrepreneurship and Economic Development,* Journal of Evolutionary Economics*,* 2002, 12(1–2), pp. 83–105, http://dx.doi.org/10.1007/s00191–002–0104–1; J.A. Schumpeter, *The Economy as a Whole, Seventh Charter of the Theory of Economic Development,* Industry and Innovation*,* 2002, 9(1–2), pp. 93–145; K. Szczepańska–Woszczyna, *SMEs managers – the need for competence*, Acta Technologica Dubnicae, 2014, 1(1), pp. 1–15.

such as R&D, possession of patents, licenses, trademarks, modern, unique products depend on SMEs to a small extent. The real innovativeness of SMEs remains at a low level and improves very slowly. As regards innovation, growth is very slow and relates mainly to medium–sized enterprises.

Among SMEs, there is a group of truly innovative companies, mostly medium–sized. These companies differ significantly from the others and they are an example of an innovative approach to business. They are also a proof that you cannot say that innovativeness of SMEs has not improved at all. It is at a low level, but it does not stagnate. However, there is also no progress in innovativeness of all SMEs. The proportion of really innovative SMEs is very small.

SMEs have yet to make a lot of effort so that progress in their innovativeness could be observed. First of all, they should strive more towards this goal, using their own potential and opportunities emerging in the environment. The positive factors include new legislation on capital expenditures and a possibility to use structural funds. Currently, one should be happy that SMEs innovations do not stagnate.

Despite the difficulties SMEs are increasingly aware of the need for such activities in the area of innovation, a number of companies undertaking such projects is steadily growing. Small and medium–sized enterprises are forced to implement innovations because they are under constant pressure of the environment, competitors in the market. Although the financial and economic crisis has significantly slowed down investments made by SMEs and their capital expenditures, they are slowly regaining their pre–crisis level. However, the process of innovation implementation in small and medium–sized enterprises requires support, both financial and in terms of education.

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OPEN INNOVATION AND COOPERATION ON INNOVATION AMONG ENTERPRISES IN POLAND

Summary

According to the latest theories and practice, innovations are the result of numerous, complex interactions among units, organizations and environment in which they operate. The development of innovation theories and processes shows further evolution of these phenomena and together with all processes in today's economy it will result in the emergence of more complex and realistic models of innovation process. An example of such a model is open innovation. The most important aspect of this concept is the assumption that in the world of widespread and easily available knowledge enterprises cannot rely only on their own research but should share the knowledge and accept solutions from other companies. The article is aimed at presenting the model of open innovation along with the evolution of innovation models, as well as presenting the findings of research conducted by the author.

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Introduction

The 21st century intensified changes on the market, which made entrepreneurs introduce changes in innovation models. Global competition, short cycle of products' life and technological progress resulted in the innovation process becoming more expensive and riskier. This, consequently, forced entrepreneurs to share R&D risk and cooperate with other enterprises and organizations.

According to the latest theories and practice, innovations are the result of numerous, complex interactions among units, organizations and environment in which they operate. The development of innovation theories and processes shows further evolution of these phenomena and together with all processes in today's economy it will result in the emergence of more complex and realistic models of innovation process. An example of such a model is open innovation. The most important aspect of this concept is the assumption that in the world of widespread and easily available knowledge enterprises cannot rely only on their own research but should share the knowledge and accept solutions from other companies. The changes on the market resulting from technological progress, especially the development of electronic communication systems and the Internet, have led to fast, easy and common information transfer, which has in turn contributed to the growth of R&D internationalization.

The article is aimed at presenting the model of open innovation along with the evolution of innovation models, as well as presenting the findings of research conducted by the author.

The paper consists of theoretical part (discussing the evolution of innovation models and the essence of open innovation model) and empirical part (discussing cooperation on innovation among Polish enterprises and multinational corporations operating in Poland based on the author's own survey).

Evolution of innovation models

The innovation landscape has changed since new phenomena emerged, e.g. fast and easy information and technology transfer, technological progress, knowledge diffusion, electronic data exchange, global market, and global consumer. Hence, many enterprises have changed their innovation models.

Defining innovation process, one can provide two definitions. Following Schumpeter, the innovation process is a certain sequence of events: starting from an idea (invention), through implementation (innovation) and dissemination (imitation)[1].

W. Janasz defines innovation process as generating an innovative idea (regardless of what this idea is about or in what area of innovation it has been drawn), then creating, designing and implementing it for the first time. The main stage in the process involves launching a new product or adopting a new solution[2]. The innovation process, as the definition says, consists of phases and stages interacting with one another.

We can look at innovation processes from different perspectives: economy, enterprise or separate innovation. No matter which approach we use, an innovation process generally consists of two phases: the creation of an innovation and its dissemination.

Innovation models have evolved from simple linear models. Good examples are: the technology–push model (up to the second half of the 1960s) and the market pull model (in the 1970s). More recent innovation models try to build more complexity and interaction into the framework and explicitly stress the need for openness towards external partners in innovation and R&D. The "third–generation" innovation model combines the technology–push and need–pull models by stressing linkages and feedback loops between R&D and marketing. The subsequent integrated model of the 1980s ("fourth–generation") emphasizes innovation as a broadly parallel process with cross–functional integration and parallel development within the company and with external collaborators.

R. Rothwell claimed at the beginning of the 1990s that there were five generations of innovation models[3]. His last 'fifth–generation' model combines integration networking with information technology, based on networking of marketing, R&D, production and customers. However, this model has the same structure of the innovation process (R&D, production, customer, marketing) as the models of the 'first–generation' (see Table 1.).

Can we already start talking about the "sixth–generation" innovation model? The answer seems to be positive. The end of the 1990s and the first decade of the 21st century brought new solutions, structures and, finally, new approach towards development. Thus, the 'sixth–generation' model is an answer to the changes in the global environment and its influence on enterprises. Moreover, enterprises themselves have changed: their structure, ties (so networking enterprise emerged), emphasis on cooperation. In this model attention is paid to knowledge as a separate category and the processes managing the knowledge as well as learning processes. Innovation processes should be planned in a way to enable the following: creating new knowledge, managing the existing knowledge, storing up the knowledge, transferring the

[1] J. Schumpeter, *Teoria rozwoju gospodarczego*, Warszawa 1960.

[2] W. Janasz, K. Janasz, A. Świadek, J. Wiśniewska, *Strategie innowacyjne przedsiębiorstw*, Wydawnictwo Naukowe Uniwersytetu Szczecińskiego, Szczecin 2001, pp. 194–197.

[3] R. Rothwell, *Successful Industrial Innovation: Critical Factors for the 1990's*, „R and D Management" 1992, No. 22.

Table 1. Six generations of innovation models

Generation	Key features
First and second	The linear models – need–pull and technology–push
Third	Interaction between different elements and feedback loops among them – the coupling model
Fourth	The parallel lines model, integration with the firm, upstream with key suppliers and downstream with demanding and active customers, emphasis on linkages and alliances
Fifth	Systems integration and extensive networking, flexible and customised response, continuous
Sixth	Open innovation, self–learning system

Source: own study on the basis of R. Rothwell, *Towards the fifth–generation innovation process*, „International Marketing Review", 1994, Vol. 11, No. 1, pp. 7–31.

knowledge or using it again. Different kinds of boundaries are crossed: between enterprises, between sectors participating in innovation processes, in taking advantage of the experience of many organizations and their employees. Finally, new problems have emerged,[4] i.e. the protection of intellectual property and regulations in an innovation chain.

The 21st century strengthened the substantial changes on the market, which made enterprises change their innovation models. The innovation process is becoming more expensive and risky due to global competition, short product cycle, technological progress. As a consequence, enterprises start to share risk doing research with other enterprises and organizations, apply the open innovation model and enter enterprise networks.

The model of open innovation

Nowadays, it is more and more difficult to create innovations on a world scale, taking advantage of own resources. Innovations on a company or state level (i.e. diffusion of innovations) are more common. Spontaneous inventions made by ingenious inventors working alone are rare. The traditional opinion that an innovation derives from one's great mind full of new ideas is not true anymore when we observe our reality. Modern innovations are the outcome of systematic, often very expensive research requiring cooperation among many units or bigger teams representing different fields of knowledge and various institutions. Our today's market with its global competition constantly make companies release new products. A new approach towards the innovation process has emerged: the open innovation model[5].

[4] Own study on the basis of: D. Nobelius, *Towards the sixth generation of R&D management,* "International Journal of Project Management", 2004, Volume 22, Issue 5, pp. 369–375; P.K. Ahmed, *Sixth generation innovation: innovation management systems into the future*, "European Journal of Innovation Management" 2000, No 3, pp. 112–114; J. Baruk, *Zarządzanie wiedzą i innowacjami,* Wydawnictwo Adam Marszałek, Toruń 2006*,* p. 122.

[5] H.W. Chesbrough shows this approach giving examples of global concerns' innovation strategies (Xerox, IBM, Intel) in the book: *Open Innovation. The New Imperative for Creating and Profiting from Technology*, Harvard Business School Press, Boston 2003.

The assumption that companies can and should use both external and internal ideas for their innovations processes is basic here. The open innovation business model takes advantage of both external as well as internal sources of ideas without a fear that some company's own idea when used by others will lead to this company's loss of profits coming from this idea. Quite the opposite, companies are unable to take advantage of all their ideas by themselves, so share them willingly with their environment, which results in a higher number of innovative products. Such productivity would not be possible in closed processes.

In the open strategy of innovations the following rule is the most basic: the maximization of values coming from different ideas (both company's ideas as well as the external ones). This approach means that the formal framework of organization is just symbolic and does not stop the flow of knowledge between the organization and its environment. Companies that adopt the open innovation strategy both enthusiastically develop ideas which were created by others as well as make their own ideas available to other organizations which find them more interesting. Sometimes company's own ideas are transferred to other enterprises deliberately (e.g. start–ups) in order for them to be developed without the company's internal powers' influence.

In the closed approach, organizations do not share their knowledge and, moreover, their ideas stay inside an enterprise, being assessed at various levels. A lot of ideas are rejected and never used. On top of that, they are eliminated, not by the market or consumers, but employees of the enterprise who find the ideas irrelevant or useless at some moment.

The concept of the open innovation is new neither in the literature on the subject nor in enterprises' activity. However, only H.W. Chesbrough's book issued in 2003 under this title[6] started a broad discussion on the subject between theoreticians and practitioners.

The novelty of Chesbrough's concept is based on the fact that the process of open innovation has become an integral part of the innovation strategy of an enterprise and its business model. In the first decades of the 20th century industrial enterprises in the USA cooperated and ordered solutions in outside R&D laboratories. We can say that they used the open innovation model[7]. However, the situation changed drastically after the 2nd World War. In the 1950s and 1960s the first generation model of the innovation process (described in the previous chapter) with its closed approach was in the lead. The new open innovation model contrasts with this approach.

A vast majority of enterprises has no doubts that there has been a change in the perception of the innovation process and its implementation. A traditional approach to innovations – based on the results of own R&D centers, long lasting and expensive research protected against competition – is coming to an end. Other issues are important on the market: the time of reaction to consumer needs or the cooperation in an innovation chain, which enables to share costs and risk of the innovation undertaking.

Innovation are becoming more and more global, hence the innovation model is more and more open[8].

Table 2 shows different definitions of open innovation found in the literature.

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[6] H.W. Chesbrough, *Open innovation. The New imperative for creating and profiting from technology*, Harvard Business School Press, Boston 2003.

[7] D. Teece, *Technological change and the nature of the firm*, in: Dosi et al., *Technical change and economic theory*, Pinter Publishers, 1988.

[8] M. von Zedtwitz, O. Gassmann, *Market versus technology driven in R&D internationalisation: Four different patterns of managing research and development*, "Research Policy", 2002, 32, pp. 1259–1285.

Table 2. Definitions of open innovation

Author	Reference	Definition
H. Chesbrough	*Open innovation. The New imperative for creating and profiting from technology*, Harvard Business School Press, Boston 2003.	Open innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to markets, as the firms look to advance their technology. Open innovation combines internal and external ideas into architectures and systems whose requirements are defined by a business model.
H. Chesbrough	*Open Business Models: How to Thrive in the New Innovation Landscape*, Harvard Business School Press, Boston 2006.	Open innovation is the purposive inflows and outflows of knowledge to accelerate internal innovation and expand the markets for external use of innovation Open innovation means that companies should make much greater use of external ideas and technologies in their own business, while letting their unused ideas be used by other companies. This requires each company to open up its business model to let more external ideas and technologies flow in from the outside and let more internal knowledge flow to the outside.
J. West, W. Wanhaverbeke, H. Chesbrough	*Open Innovation: Researching a New Paradigm*, Oxford University Press, 2006.	Open innovation is both a set of practices for profiting from innovation, and also a cognitive model for creating, interpreting and researching these practices.
J. West and S. Gallagher	*Challenges of Open Innovation: The Paradox of Firm' Investment on Open Source Software*, R&D Management, 2006, Vol. 36, No. 3, pp. 319–331.	Open innovation systematically encourages and explores a wide range of internal and external sources for innovation opportunities, consciously integrates that exploration with firm capabilities and resources, and broadly exploits those opportunities through multiple channels.
Ch. Leadbeater	*Open Business* (2007), Open Platform to Develop and Share Innovative New Business Ideas. *www.openbusiness.cc/2007/03/14/two–faces–of–open–innovation*	There are two faces of open innovation: Open Innovation IN is the basic model where ideas flow into companies from different sources (crowdsourcing). Open Innovation OUT is where a group of people, a movement, sometimes a company, create a kernel or a platform, with some tools, onto which people can add their ideas and contributions. Open Innovation IN narrows down a wider set of contributions into a funnel of corporate development. Open Innovation OUT is designed to allow a process of evolutionary innovation that accretes and grows as each new person adds their piece of information, code or module.

Source: *Open Innovation in the Global Networks*, OECD 2008.

The open innovation model by Chesbrough is not the only one which adopts open approach to innovation processes. There are other approaches employed in practice, based on similar rules and built on one foundation – openness, cooperation, using own and strange ideas, sharing knowledge[9]. The critics of Chesbrough claim that the division into close and open models is artificial[10]. According to the author, this debate has and will have a rather theoretical character, and the idea of openness – old or new – is just a good solution for enterprises, especially Polish ones, in which the cooperation between science and industry is weak[11].

Cooperation on innovation among enterprises in Poland – survey findings

Survey on the internationalization of R&D and factors contributing to innovation, including cooperation in this scope, was carried out in the following two groups: Polish enterprises and international companies (multinational corporations)[12]. The main aim of the survey was to identify motives behind cooperation on innovation as well as risk posed by such cooperation in the context of open innovation.

Table 3. Type of activity conducted by enterprises in Poland

Type of activity	Number of Polish enterprises	Structure (%)	Number of multinational enterprises	Structure (%)
Automobile	2	5.0	4	12.1
Electronic	6	15.0	5	15.1
IT	9	22.5	13	39.4
Pharmaceutical	4	10.0	2	6.1
Aeronautical	0	0.0	1	3.0
Chemical	4	10.0	1	3.0
Foodstuffs	5	12.5	2	6.1
Machinery and equipment	5	12.5	3	9.1
Textile	1	2.5	0	0.0
Metal	4	10.0	2	6.1
Altogether	40	100.0	33	100.0

Source: own elaboration.

[9] For the model of open innovation implemented by Nokia see: K. Kozioł–Nadolna, A. Świadek, *Innovation Process Models with Emphasis on Open Innovation model*, „Folia Oeconomica Stetinensia", 9 (17), 2010, Szczecin 2011.

[10] L. Dahlander, D. Gann, *How open is innovation?* Conference article: *Appropriability, proximity, routines and innovation*, Copenhagen 2007. Chesbrough did research in huge American enterprises (e.g. Lucent, Intel, IBM, 3Com, Millenium Pharmaceuticals), applying the openness model on a large scale. Authors doubt whether it is possible to probe the phenomenon of openness in the economy.

[11] See: *Działalność innowacyjna przedsiębiorstw w Polsce*, GUS, Warszawa 2009.

[12] For all the results of the survey see: Kozioł–Nadolna K., *Internacjonalizacja działalności badawczo-rozwojowej w kształtowaniu procesów innowacyjnych przedsiębiorstw w Polsce*, CeDeWu, Warszawa 2013.

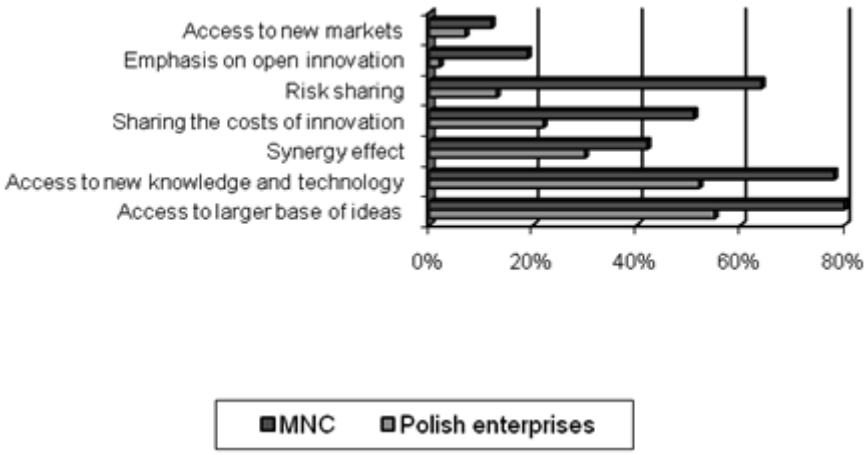
Questionnaire survey was conducted among selected entities. It was carried out in the second half of 2011 and addressed to 94 transnational corporations and 102 Polish enterprises via e–mail. As a result, 33 transnational corporations responded, i.e. 35% of chosen firms and 40 Polish enterprises, i.e. 39% of chosen firms. On the basis of the survey and empirical observation, 57 R&D centers established by multinational enterprises in Poland were identified.

Enterprises function in ten sectors of economy. Table 3 presents detailed data.

Motives behind cooperation on innovation vary a lot. As it has already been stated, cooperation lays foundation for open innovation.

According to the survey results, more than a half of Polish enterprises placed special importance on access to larger base of ideas (55%) as well as access to new knowledge and technologies (52%). 30% of enterprises were inclined to believe that cooperation enabled them to make use of synergy effect, whereas one fifth of respondents paid special attention to sharing the costs of innovation. The lowest percentage of respondents mentioned risk sharing, access to new markets and emphasis on open innovation. The last–mentioned option was selected by only 2% of enterprises, probably due to the fact that Polish entrepreneurs neither know nor understand the concept of open innovation (see Figure 1).

Figure 1. Reasons behind cooperation on innovation



Source: own elaboration.

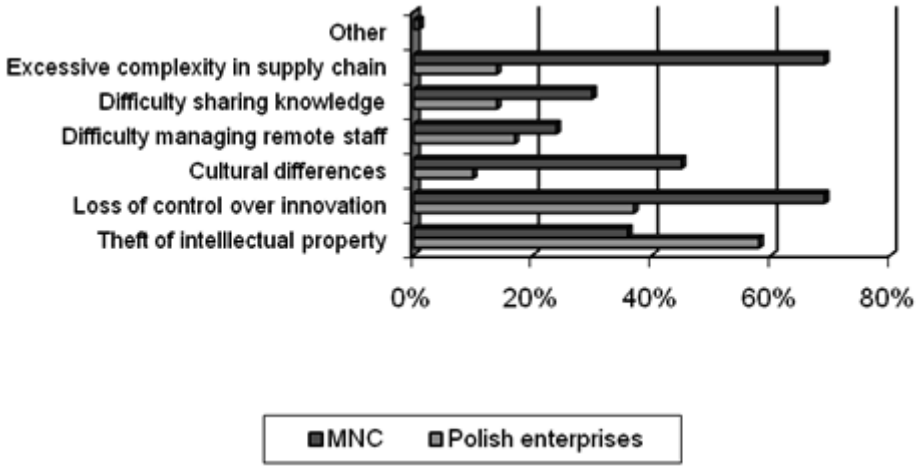
As for the main reason behind cooperating on innovation, 80% of multinational corporations mentioned access to larger base of ideas as well as access to new knowledge and technologies. Nearly two thirds of respondents placed special importance on sharing the risk of research, whereas more than a half (51%) paid attention to sharing the costs of innovation. 42% of enterprises considered synergy effect major advantage gained from cooperation. Low percentage of entrepreneurs responding to the survey placed emphasis on open innovation and access to new markets (19% and 12% respectively).

The analysis of the aforementioned declarations allows to notice certain similarities between motives that inspire Polish enterprises and multinational corporations to cooperate. Reasons mentioned by both groups are: access to larger base of ideas and access to new knowledge and technologies.

Needless to say, cooperation is burdened with certain risk. Since innovations introduced by firms are rigorously protected (which is reflected in the fact that emphasis on open innovation is not placed by

high percentage of respondents), Polish enterprises expressed their concern over the theft of intellectual property (58%). Furthermore, they considered cultural differences (10%), excessive complexity in supply chain (14%) and difficulty in sharing knowledge (14%) the least significant aspects – see Figure 2.

Figure 2. Risk posed by cooperation on innovation according to Polish enterprises and multinational corporations operating in Poland



Source: own elaboration.

Multinational corporations expressed their concern over the theft of intellectual property to a lesser extent (36%) and declared that the highest risk was posed by excessive complexity in supply chain (69%) as well as loss of control over innovation (69%). This seems logical since MNC operate (cooperate) as part of a network consisting of several dozen or a few hundred organizations.

Conclusion

A growing number of researchers and managers are unanimous as to the fact that the way innovations are understood and implemented has already changed. Traditional approach to innovation, based on findings reported by own R&D centres as well as long–lasting and expensive research protected against competitors, is no longer the case. What is of major importance on the market are time and prompt response to consumer needs. So is cooperation as part of innovation chain which allows to share the cost and risk of an innovative undertaking. Hence the popularity of open innovation models.

Nevertheless, the results of the survey into motives behind cooperating on innovation indicate that in Polish enterprises emphasis on open innovation plays minor role when making a decision to collaborate. This factor was selected by only 2% of the firms participating in the survey, which may stem from the fact that Polish entrepreneurs do not know the concept and do not understand the idea of open innovation. As for multinational corporations, 19% considered the aforementioned factor important.

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PART IV

FINANCIAL ASPECTS OF FUNCTIONING AND CONTROL OF FIRMS AND PUBLIC INSTITUTIONS

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PRIVATE COST OF CAPITAL MODEL (PCOC)

Summary

In the paper the Capital Asset Pricing Model (CAPM) and the Arbitrage Pricing Model (APM), i.e. the most widely used models of estimating cost of equity, were presented. Then, a new model of calculating private cost of capital was introduced. It is the Private Cost of Capital Model (PCOC) – a new concept based on the Pepperdine PCOC survey project which was launched in 2007 by J.K. Paglia. It might be worthwhile to conduct a similar survey among private companies in Poland and other countries to get direct estimates of the private cost of capital.

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Introduction

The cost of capital can be defined as the minimum expected rate of return on a given investment which offsets the risk of investing money in that particular venture. The cost of capital is a function of risk: the higher the risk, the higher the expected return. It is also defined as opportunity cost, which represents the return the investor might earn when investing his or her money in alternative projects of a similar risk profile. As a result, the cost of capital is an opportunity cost or the cost of lost opportunities rather than a classical cost of investing money. It is estimated as the total return which an investor might expect on a similar amount invested in a portfolio of securities (projects) bearing similar risk.

Nearly in all the methodologies for estimating the cost of capital which are known in the theory and applied in practice, expected returns are calculated based on historical data describing the activity of public companies[1]. The differences in these methodologies concern, among others, the average measure used (arithmetic or geometric mean), the size of the sample, time series available, exclusions and other adjustments, etc.

The use of stock data is imperfect, however, in its describing listed companies only, and disregarding non–public companies (also known among investors as "private" companies)[2]. In the paper the most

[1] Among other methods, the most popular one is the so–called DCF method (for estimating the cost of capital), which derives the cost of capital as an internal rate of return (IRR) where cash flows predicted by analysts are considered equal with the company's current market valuation. See e.g. J.J. Siegel, *The Application of the DCF Methodology for Determining the Cost of Equity Capital*, "*Financial Management"* Vol. 14, No. 1 (Spring, 1985), pp. 46–53.

[2] In terms of numbers, public companies are in minority practically in all the countries across the world, although they might be very significant to the economy. In the United States as of the end of June 2013 there were 4,920 public

important methods of estimating the cost of equity are discussed and a new method for estimating the cost of capital tailored to the specific profile of private (non–public) companies is proposed. It is a so–called the Private Cost of Capital Model (PCOC).

Methods of estimating the cost of equity

The cost of equity is estimated with a variety of methods. In the United States and other market economies the cost of equity is usually estimated with the following methods and models:

1. Capital Asset Pricing Model (CAPM) – a single–factor valuation model.
2. Arbitrage Pricing Model (APM) – a multifactor valuation model.
3. Approach based on the Dividend Growth Model (DGM) – in this approach valuation is based on the predicted future dividend and its growth rate.
4. Discounted Cash Flow Method (DCF method) – in this approach the cost of capital is estimated based on cash flow predictions made by analysts and the current stock prices;
5. Fama–French Model – a three–factor valuation model.
6. Butler–Pinkerton Model (BPM) – a single–factor valuation model using the so–called total beta, incorporating the company's total risk, i.e. systematic and company–specific risk.
7. Build–up Approach – based on build–up of individual risk components.

There are two methods (also known as models or theories) which are widely recognised in the theory of valuation:

- CAPM – Capital Asset Pricing Model,
- APM – Arbitrage Pricing Model, which is a multi–factor asset valuation model.

Combined application of the two models gives rise to many difficulties, particularly complications related to measurement. Nonetheless, both models are correct in theoretical terms as they incorporate risk and expected inflation. Application of CAPM involves estimation of three factors which jointly define the cost of capital:

- risk–free rate of return,
- market risk premium,
- systematic (market) risk.

The *CAPM* model is a widely applied method used to estimate the cost of capital in developed countries, where the data essential to determine the cost of capital of a given listed company, i.e. the risk–free discount rate, the expected market return and the risk index (beta) of this company, are relatively easily available. With reference to non–public companies, the main problem is to estimate the index risk. The formula of the CAPM model is as follows[3]:

$$k = R_f + \beta(R_m - R_f) \tag{1}$$

where:

k – after–tax cost of equity,
R_f – risk–free discount rate,
R_m – expected rate of return on the market (average return on the stock market),
β – risk index reflecting the volatility of returns for a given company in reaction to changes in returns on the market.

companies, against 5,434 in 2005 and 7,194 in 2000.

[3] This formula may be found in most of the textbooks on finance, financial analysis and management accounting. See e.g. F.R. Kaen, *Corporate Finance*, Blackwell, Cambridge (USA) 1995, p. 294 and *Ibbotson Cost of Capital 2009 Yearbook*. Morningstar, Chicago 2009, p. 22.

The model is sometimes called a single–factor model as it requires sole estimation of one variable measuring sensitivity of returns (i.e. the beta coefficient). CAPM offers different results depending on the techniques used to estimate individual components of the model. The differences concern the risk–free rate (which, in turn, implies the category of the market premium used), as well as the methods used to estimate the market premium (arithmetic or geometric mean) and the risk index.

CAPM is used to estimate the cost of equity capital which under this approach is a function of individual risk index describing given share's sensitivity to the returns yielded by the economy as a whole (usually represented by the stock market index). The *APM*approachalso enables estimation of the cost of equity but unlike the previous model it uses a variety of factors to determine the risk of a given business[4]. The set of these variables can vary with the situation, and the most popular factors include[5]: the difference between interest on long– and short–term bonds, inflation rate, sales growth rate in the manufacturing industry, difference between high– and low–risk returns on corporate bonds. In practice, also other very specific factors may be incorporated (such as commodity price indices for a given industry, income level in certain groups of population, energy price index, oil price index, consumption of certain resources, etc). The *APM* model is defined as follows:

$$k = R_f + \sum_{i=1}^{p} \beta_i [E\{R_i\} - R_f] \tag{2}$$

where:
k – after–tax cost of equity,
R_f – risk–free discount rate,
β_i – risk index reflecting volatility of returns for a given company in reaction to changes in i,
p – number of risk factors in the model,
$[E\{R_i\} - R_f]$ – market risk premium for the i–th factor.

There is no standard, universal APM approach. The set of variables can vary with each economy, industry or group of companies. It can also change over time. On the one hand, it may be considered as the model's weakness but on the other it may be also seen as its strength (better reflection of the reality). Further in the text, estimations of the cost of equity using the two methods, CAPM and APM, in selected US companies are presented. The five–factor APM model used by the Alcarcompany takes into account the sensitivity of returns of individual stocks to the returns on the following factors:[6]

1. short–term inflation (SINF),
2. long–term inflation (LINF),
3. short–term interest rates (INT),
4. bankruptcy risk premium (PREM),
5. monthly gross national income (GDP).

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[4] The assumptions of the *APM* model (sometimes also referred to as *APT – Arbitrage Pricing Theory*) may be found in the majority of textbooks on finance, investment and financial analysis. Cf. e.g. R.A. Haugen, *Modern Investment Theory*. Prentice–Hall, Englewood Cliffs 1993, pp. 260–273.

[5] Cf. N.F. Chen, R. Roll, S.A. Ross: *Economic Forces and the Stock Market*, „Journal of Business" 1986, No 59, pp. 383–403. An interesting attempt to apply the *APM* to the estimation of the cost of capital in various industries was made 20 years ago by a group of American researchers in their project commissioned by the Institute of Quantitative Research in Finance. Cf. M.A. Berry, E. Burmeister, M.B. McElroy, *Sorting Out Risks Using Known APT Factors*, „Financial Analysts Journal" 1988, March–April, pp. 29–42.

[6] M. Grinblatt, S. Titman, *Financial Markets and Corporate Strategy*, McGraw–Hill, Boston 1998, p. 374.

Both the CAPM and APM models have their limitations, which is why business valuation practitioners are more inclined to apply the build–up approach[7]. Further in the text the author will focus on the methods of estimating the cost of capital in a transborder (international) dimension.

New method of estimating the cost of capital in private companies

In the end of June 2013, in Poland, there were more than 4 million entities operating in the national economy, of which 364,428 were companies. Among those companies there were 303,551 limited companies and 10,332 joint stock companies[8]. On the other hand, at the beginning of September 2013, there were 890 public companies, including 443 companies listed on the main and secondary markets of the Warsaw Stock Exchange and 447 companies listed on the alternative NewConnect market. These data show that public companies in Poland represent 8.6% of joint stock companies and only 0.24% of all the companies. There is no doubt that business valuation professionals will more often face valuations of private rather than public companies.

The estimation of the cost of capital in non–public companies is usually based on the data and statistics available for public markets (stock markets) with appropriate adjustments tailored to specific characteristics of private companies. The most recognised method used to estimate the cost of equity in valuation of non–public companies is the Build–up approach, which – similarly to other methodological concepts – is based on historical data[9].

The new method of estimating the cost of capital tailored to the needs of income–based valuation of private companies referred to as PCOC (Private Cost of Capital) was proposed by John Paglia and Robert Slee. The model is based on the results of a research project conducted by the Pepperdine University, which was started in 2007. In the questionnaire survey carried out under the project, expectations concerning returns were gathered for many sectors of private (non–public) capital markets; the questions were asked to various lenders (offering different types of debt or equity capital) who conveyed the details concerning a variety of criteria to be met by investors. Questionnaire surveys are conducted online in semi–annual periods; the surveys are addressed to professional financiers[10].

The PCOC model is as follows[11]:

$$PCOC = \sum_{i=1}^{N}[(CAP_i + SCAP_i) \cdot MV_i \div MVT] \tag{3}$$

where:

N – number of sources of capital,
MVi – market value of each capital type *i*-class (*i*-class capital structure),
MVT – market value of each capital in total (all class represented),
CAPi – the median of expected rate of return on capital type *i*-class,
SCAPi – specyfic CAP risk adjustment of the type of capital *i*-class.

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[7] For more on this method see: D. Zarzecki, *Użyteczność metody składania w szacowaniu kosztu kapitału własnego*, „Przegląd Organizacji" 2010, No. 2, pp. 36–40. Methods of estimating the cost of equity arealsodescribed in D. Zarzecki, *Metody wyceny przedsiębiorstw*, Fundacja Rozwoju Rachunkowości w Polsce, Warszawa 1999, pp. 147–201 and 245–260.

[8] *Zmiany strukturalne grup podmiotów gospodarki narodowej w rejestrze Regon, I półrocze 2013*. Central Statistical Office, Warszawa 2013, p. 31.

[9] See: D. Zarzecki: *Użyteczność metody składania w szacowaniu kosztu kapitału własnego*, „Przegląd Organizacji" 2010, No 2, pp. 36–40.

[10] G.R. Trugman, *Understanding Business Valuation. A Practical Guide to Valuing Small and Medium Sized Businesses*, AICPA, New York 2012, pp. 483–486 and R. Slee, J.K. Paglia, *Private Cost of Equity Capital Model*, „The Value Examiner, A Professional Development Journal for the Consulting Disciplines", March/April 2010, pp. 23–31.

[11] R. Slee, J.K. Paglia, *Private Cost…*,op. cit, p. 14.

Table 1. Private Cost of Capital data (gross annualized rates %)

No.	Source of financing	Description	I Quartile	Median	III Quartile
			%		
1.	Bank (Cash Flow loan)	Amount$1M loan	5.4	6.5	7.1
2.	Bank (Cash Flow loan)	Amount$50M loan	3.8	5.0	6.3
3.	Bank (Cash Flow loan)	Amount$100M loan	3.6	4.8	6.1
4.	ABL*(asset–based financing)	Amount$1M loan	6.5	12.0	18.0
5.	ABL(asset–based financing)	Amount$50M loan	3.0	3.3	4.0
6.	ABL (asset–based financing)	Amount$100M loan	2.8	3.0	3.5
7.	Mezzanine Funds	Amount$1M EBITDA	18.0	20.0	22.0
8.	Mezzanine Funds	Amount$25M EBITDA	17.9	18.5	19.0
9.	Private Equity Funds	Amount$1M EBITDA	25.0	30.0	30.8
10.	Private Equity Funds	Amount$25M EBITDA	25.0	28.0	30.0
11.	Private Equity Funds	Amount$50M EBITDA	22.0	25.0	30.0
12.	Venture Capital	Startup	35.0	40.0	50.0
13.	Venture Capital	Early Stage	30.0	35.0	45.0
14.	Venture Capital	Expansion	20.0	30.0	40.0
15.	Venture Capital	Later Stage	20.0	30.0	35.0
16.	Angels	Seed	30.0	50.0	100.0
17.	Angels	Startup	30.0	40.0	75.0
18.	Angels	Early Stage	25.0	35.0	50.0
19.	Angels	Expansion	20.0	30.0	40.0
20.	Angels	Later Stage	20.0	30.0	40.0
21.	Factor	Amount $ 100K/month	58.5	74.5	88.2
22.	Factor	Amount $1M/month	35.4	41.2	53.6
23.	Factor	Amount $5M/month	31.3	32.7	35.4

Note: (*) ABL – Asset–Based Lenders.
Source: based on *Pepperdine Private Capital Markets Project Winter 2011 Report*, December 2010. Adapted from G.R. Trugman, *Understanding Business Valuation. A Practical Guide to Valuing Small and Medium Sized Businesses*, AICPA, New York 2012, p. 484.

There are the following steps to determining PCOC[12]:

1. To determine the appropriate capital types by whichto compare, review the credit boxes described in the most current Pepperdine survey (see Table 1).
2. Selectthe appropriate median CAP from the survey results for each qualifying capital type.

[12] R. Slee, J.K. Paglia, *Private Cost…*, op. cit., p. 29.

3. Apply a specific CAP risk adjustments (SCAPi – *risk adjustments*) to the selected median capitaltype based on a comparison of subject results to the appropriate survey credit box. Use 1 i 3 quartile as a guide to this adjustment.
4. Determine the market value of each capital type (MVi), and then calculate the percentage of capital structure for each CAP (MVi/MVT).
5. Multiply each weight of capital structure component by its CAP.
6. Add individual percentages to derive PCOC.

In mathematical terms, PCOC is in fact the weighted average cost of capital. The major difference between PCOC and WACC is the method used to collect information essential to estimate individual components of the cost of capital. The classical WACC method uses historical data from public markets (cost of equity) and the actual borrowing rate in the credit market adjusted by the so–called tax shield (cost of debt)[13]. In the PCOC method, on the other hand, all the data comes from the questionnaire survey and refers to the actual current expectations concerning returns for various categories of financing dedicated to private companies.

In a survey conducted in spring 2010 by M.A. Harjoto and J.K. Paglia in the US market (350 correctly filled questionnaires in total), the following findings were made: debt accounted for 25% of total financing in private companies, after–tax cost of capital amounted to 8.4%, cost of equity – to 2%, effective tax rate – 32% and WACC – 16.67%[14]. WACC in private companies turned out to be twice as high as in the case of public companies[15].

The strength of this model lies in the fact that an analyst does not need to make adjustments to account for the differences between larger publicly traded companies and the much smaller privately held firms that we value. The measurements applies directly to privately held businesses. However, before one relies on this study for the basis of his/her discount rate, must be aware of the issues surrounding the PCOC model. The primary weakness in the PCOC study is that it is based on a survey of expected rates of return. The problem with expected rates of return is that they are not always right. The expectations compiled by the PCOC survey are simply opinions. In the best times, expectations may not be on point with actual results. In times of great uncertainty, as has been the case since 2008, expectations may be completely off track. On top of this, by nature, the accuracy of surveys can be reduced by lack of honesty and potential personal motivations of respondents to drive results in a certain direction. Furthermore, the latest survey received 2,000 total responses, but individual types of financing, in some cases, received fewer than 100 responses. With this sample size, the results can easily be skewed by inaccurate responses[16].

Conclusion

In the traditional approach to valuation of non–public companies, it is assumed that the cost of capital estimated for public companies is the right reference for estimating the cost of capital also in private companies. The PCOC model, however, is based on a different assumption – that the public and private markets are not similar enough to consider them substitutes. Each of them has its specific, unique types

[13] The cost of debt is in fact the marginal borrowing rate determined based on the analysis of the existing loan agreements, interviews with lenders and observations of the current market rates used in companies with similar ratings. See: M.L. Zyla, *Fair Value Measurement. Practical Guidance and Implementation*, John Wiley & Sons, Hoboken 2013, p. 298.

[14] M.A. Harjoto, J.K. Paglia, *Cost of Capital and Capital Budgeting for Privately–Held Firms: Evidence from Business Owners Survey*, "Journal of Accounting and Finance" 2012, Vol. 12(5), p. 83.

[15] A. Damodaran, *Cost of Capital by Sector*, NYU Stern School of Business. 2010 [9 September 2011], http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/wacc.htm.

[16] G.R. Trugman, *Understanding Business Valuation…*, op. cit., p. 485–486.

of risk as well as expectations concerning returns. There are also structural differences. PCOC uses also market data on non–public companies (broad investors) which are suitable for private companies[17].

The application of the PCOC model to estimation of the cost of capital in private companies is a relatively simple, interesting and intuitive method of estimating the cost of capital. It would be valuable to consider conducting a similar survey in Poland and other countries. The results might provide an alternative method to estimate the cost of capital in non–public companies – which represent a vast majority of business entities in any economy.

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[17] R. Slee, J.K. Paglia, *Private Cost*..., op. cit., p. 31.

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DISCRIMINATOR MODELS IN THE RISK ASSESSMENT OF BUSINESS

Summary

Assessment of current financial condition may be an effective assessment tool used by business environment: borrowers, contractors, investors, auditors. Methods and models of financial analysis are well discussed in the literature, both Polish and foreign. The aim of the article is to present the applicability of Polish discriminatory bankruptcy prediction models, assessment of the financial health of companies based on ratio analysis, and finally comparing the results obtained.

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Introduction

Rating the company's ability to do business in the future and evaluate the risks are the basis for all decisions made by the leading data entities. Proper diagnosis of the financial health of the company and bankruptcy risk assessment provides information on past and a present economic and financial situation the company, its business performance, development opportunities.

Failure to grasp the situation can lead to making wrong decisions that will result in the deterioration of the company on the market. In the literature, one can find a number of proposals quantification causes of bankruptcy (bankruptcy) of the company. The most general division of the reasons for this distinction microeconomic and macroeconomic. Causes include microeconomic endogenous causes which lie in the company. For these reasons, a firm has an impact. Macroeconomic causes of bankruptcy is the reason that shape the conditions of the companies in the economic system[1]. The main objective of this paper is the use of selected Polish models dis–discriminatory analysis to assess the financial condition of operators and forecasting the threat of bankruptcy, as well as the diagnosis of their financial situation using traditional ratio analysis. At the same time, actions were taken for comparison of the results obtained by different methods. The study involved four operators involved in the production of malt. Used financial data from the years 2009–2010 entities included in the Polish B Screens.

[1] E. Nowak, *Rachunkowość jako źródło informacji o sytuacji finansowej przedsiębiorstw w ocenie zagrożenia upadłością*, „Barometr Regionalny" 2007, No. 12, p. 65 et seq.

Analysis of the discriminant

Discriminant analysis is a statistical method that allows for the distribution and classification of objects according to a specific criterion. This method allows the classification of objects based on multiple variables simultaneously. Dependent variable is a variable quality. To examine the threat of bankruptcy the company used as a linear discriminant function:

$$Z = a_0 + a_1X_1 + a_2X_2 + ... + a_kX_k \quad (1)$$

where:

Z – dependent variable (the financial situation: good/bad),
a_0 – constant,
a_i – discriminatory factors ($i=1, 2,..., k$),
X_i – variables explanatory ($i=1, 2,..., k$).

Determined the value of the discriminant function is compared to a threshold value, which allows for the appropriate qualification of an object[2].

Discriminatory models are also referred to in the literature as a function of Z–score, because the condition of the company take evaluation to analyze a single indicator. This indicator combines different financial indicators on a weighted. With the function value is determined on the basis of information contained in the financial statements. This method allows for unambiguous assessment of the situation of the company.

Due to the number of variables that are used to build the model, can be divided into one–dimensional and multidimensional models. Thanks to the possibility aggregate various financial ratios are often used multivariate models.

The advantages of the classical discriminant analysis may include the ease of understanding and ease of use, taking into account a number of variables through the use of weights, getting the multidimensional space by transforming one dimension, to assess the situation on the basis of the meter, the ability to determine the effect of individual variables on the dependent variable, high accuracy of classification in the analysis of the threat of bankruptcy of enterprises[3]. The disadvantage is their discriminatory models become outdated quickly, which is a result of changes in economic conditions. The applicability of these models is limited territorially, ie. Polish models are in Polish conditions, such models. German in Germany. Another disadvantage of discriminant analysis models is that they do not include so–called event. extraordinary[4].

Bankruptcy prediction models

The first work in the field of forecasting bankrupt companies using discriminant analysis published in 1968. And were taken by E. Altman[5]. Using 5 financial ratios built on the model that was used to assess the financial condition 66 companies. Research continued many authors who have developed models

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[2] M. Kasjaniuk, *Zastosowanie analizy dyskryminacyjnej do modelowania i prognozowania upadłości przedsiębiorstw,* „Barometr Regionalny" 2006, No. 6

[3] A. Ptak–Chmielewska, *Wykorzystanie modeli statystycznych w ocenie ryzyka upadłości przedsiębiorstw,* webcache.googleusercontent.com/search?q=cache:b10fKiwA4c4J:www.sgh.waw.pl/katedry/kzfp/konferencjeseminaria/konferencja2013/prezentacje/ptak_apch_ppt_short.ppt+&cd =8&hl=pl&ct=clnk&gl=pl

[4] E. Bombiak, *Modele dyskryminacyjne jako metoda oceny sytuacji finansowej przedsiębiorstwa,* „Zeszyty Naukowe Akademii Podlaskiej w Siedlcach" 2010, Vol. „Administracja i Zarządzanie", No. 86.

[5] E.I. Altman, *Financial Ratios, Discriminant analysis and the prediction of corporate bankruptcy*, „Journal of Finance" 1968, Vol. 23, No. 4.

for different economies[6]. The changes that have taken place in the Polish economy in the 90s twentieth century. Caused the bankruptcy prediction models interested in the Polish authors, who drew attention to the inadequacy of foreign models to Polish conditions. Polish first quantitative research work on the bankruptcies of companies is by D. Hadasik[7]. The authors further work on the use of discriminant analysis in predicting the risk of bankruptcy in Poland are: A. Holda, E. Mączyńska and M. Zawadzki, J. Gajdka, D. Stos and D. Wierzba.

Hadasik's model

D. Hadasik presented 9 discriminant analysis models to assess the risk of bankruptcy. The research sample was dominated by state–owned companies, limited liability companies, independent and equity. As the company "failed" to classify these companies, which in 1991–1997, submitted an application for bankruptcy. Formula (2) shows the most frequently used in the analysis model D. Hadasik:

$$Z_{HD} = 2{,}36261 + 0{,}365425\ W_1 - 0{,}765526\ W_2 - 2{,}40435\ W_3 + \\ +1{,}59079\ W_4 + 0{,}00230258\ W_5, - 0{,}0127826\ W_6 \quad (2)$$

where:
W_1 – current assets / current liabilities,
W_2 – (current assets – inventory) / current liabilities,
W_3 – total liabilities / total assets,
W_4 – (current assets – current liabilities) / total liabilities,
W_5 – receivables / sales,
W_6 – inventories / sales.

Hołda's model

Hołda took the survey 40 companies in poor financial condition and 40 in good condition. The group was homogeneous and consisted of companies that have been classified under the numbers 45–74 in the European Classification of Economic Activities. A. The study covered the years 1993–1996 Tributes. Work on the final formula of the model includes 3 stages, then the number of 28 financial ratios, which take into account Hołda, reduced to 5. The final form of the discriminant function has the form given by formula:

$$Z_H = 0{,}605 + 0{,}681\ W_1 + 0{,}0196\ W_2 + 0{,}157\ W_3 + 0{,}00969\ W_4 + 0{,}000672\ W_5 \quad (3)$$

where:
W_1 – current assets / current liabilities,
W_2 – (total liabilities / total assets) x 100,
W_3 – (net profit / average total assets) x 100,
W_4 – (average liabilities / cost of sales pro–products, goods and materials) x 365,
W_5 – revenues from total activity / average total assets

[6] www.wne.sggw.pl/czasopisma/pdf/EIOGZ_2010_nr82_s17.pdf.

[7] D. Hadasik, *Upadłość przedsiębiorstw w Polsce i metody jej prognozowania,* Zeszyty Naukowe, Vol. II, No. 153, Wyd. Akademii Ekonomicznej w Poznaniu, Poznań 1998.

Mączyńska's model

Mączyńska with Zawadzki in 2006 published the results of their research. 7 models they developed early warning, his research conducted on a sample of 80 companies listed on the Stock Exchange in Warsaw, using the financial statements for the years 1997 to 2001 and calculated on the basis of their financial ratios. In initial studies, they used 45 indicators characterizing profitability, liquidity, debt level, operational efficiency and growth companies. The final version of the model is represented by formula[8]:

$$Z_H = 1{,}5\ W_1 + 0{,}08\ W_2 + 10{,}0\ W_3 + 5{,}0\ W_4 + 0{,}3\ W_5 + 0{,}1\ W_6 \tag{4}$$

where:
W_1 – (gross profit + depreciation) / liabilities,
W_2 – total assets / liabilities,
W_3 – earnings before taxes / total assets,
W_4 – earnings / annual income,
W_5 – inventory / annual income,
W_6 – annual income / total assets.

Gajdka and Stos's model

This model was developed by the authors (like model Mączyńska and Zawadzki) for the assessment of the financial health of companies listed on the Warsaw Stock Exchange. The authors have developed a model based on a 34–item sample of enterprises, among which 17 had filed for bankruptcy, and 17 were classified as those whose financial condition is good. In the model Gajdka and Stos discriminant function has the form described by formula:

$$Z_{GS} = 0{,}7732059 - 0{,}0856425\ W_1 + 0{,}0007747\ W_2 + 0{,}9220985\ W_3 + \\ + 0{,}6535995\ W_4 - 0{,}594687\ W_5 \tag{5}$$

where:
W_1 – revenues from sales / total assets (average per year),
W_2 – (current liabilities / cost of manufacturing production sold) x 365,
W_3 – net profit / total assets (average per year),
W_4 – gross profit / net sales,
W_5 – total liabilities / total assets (average per year).

Wierzba's model

This model is based on the 48–item trial–sized enterprises, among which 24 were classified as those whose financial situation is bad and 24 in good financial condition. For companies in poor financial condition willow used data from the financial statements of the prior year than the one in which the company announced bankruptcy. His research carried out in such a way that on the basis of similarities chose a pair of companies in bad and good financial condition.

Wierzba's model takes the form of discriminant function described by formula:

$$Z_W = 3{,}26\ W_1 + 2{,}16\ W_2 + 0{,}3\ W_3 + 0{,}69\ W_4 \tag{6}$$

[8] www.wne.sggw.pl/czasopisma/pdf/EI0GZ_2010_nr82_s17.pdf.

where:
W_1 – (profit from operations – depreciation) / total assets,
W_2 – (profit from operations – depreciation) / sale of products,
W_3 – assets / total liabilities,
W_4 – working capital / total assets.

Poznan model

Poznan model was developed by M. Hamrol, B. Czajka and M. Piechocki on the basis of the financial statements of 100 Polish commercial companies. Poznań model is defined by formula:

$$Z_p = 3{,}562\ W_1 + 1{,}588\ W_2 + 4{,}288\ W_3 + 6{,}719\ W_4 - 2{,}368, \quad (7)$$

where:
W_1 – net profit / total assets,
W_2 – assets – stocks / current liabilities,
W_3 – constant capital / total assets,
W_4 – profit or loss from sales / sales.

Every presented model has a so–called. crossing point on the basis of which shall be decided in the financial condition of the company (see Table 1).

Table 1. Interpretation of results

Model name	Criterion
Hołda	$Z_H < -0{,}3$ the company at risk of bankruptcy $-0{,}3 < Z_H < 0{,}1$ the probability of declaring bankruptcy is undefined $Z_H > 0{,}1$ good financial company
Mączyńska	$Z_M < 0$ the company at risk of bankruptcy $0 < Z_M < 1$ company with a rather weak result, but not at risk of bankruptcy $1 < Z_M < 2$ the company fairly good $Z_M > 2$ very good company
Wierzba	$Z_W < 0$ difficult financial situation of the entity $Z_W > 0$ good financial entity
Hadasik	$Z_{HD} < 0$ difficult financial situation of the entity $Z_{HD} > 0$ good financial entity
Poznan model	$Z_p < 0$ the difficult financial situation of the entity $Z_p > 0$ good financial entity
Gajdka and Stos	$Z_{GS} < 0{,}45$ the company at risk of bankruptcy $Z_{GS} > 0{,}45$ the company in a good financial position

Source: own study based on: A. Hołda, *Wykorzystanie analizy dyskryminacyjnej do prognozy upadłości spółek rynku kapitałowego,* „Nasz Rynek Kapitałowy" 2002; M. Hamrol, B. Czajka, M. Piechocki, *Upadłość przedsiębiorstwa – model analizy dyskryminacyjnej*, „Przegląd Organizacji" 2004, No. 6; D. Wierzba, *Wczesne wykrywanie przedsiębiorstw zagrożonych upadłością na podstawie wskaźników finansowych – teoria i badania empiryczne*, Zeszyty Naukowe No. 9, Wyd. Wyższej Szkoły Ekonomiczno–Informacyjnej w Warszawie, Warszawa 2000; D. Hadasik *Upadłość przedsiębiorstw w Polsce i metody jej prognozowania,* Zeszyty Naukowe, Vol. II, No. 153, Wyd. Akademii Ekonomicznej w Poznaniu, Poznań 1998.

Ratio analysis

Ratio analysis is one of the most important areas of economic analysis. It is the depth and detail analysis of financial statements, and the most widely used tool for structural analysis, temporal and spatial. All activities ratio analysis is treated as an extension of general (initial) data analysis of the balance sheet and profit and loss account. You can: evaluation of the past, present and future operating results; identification of areas of the company improperly managed and potentially dangerous; assessment of the financial condition of the enterprise in a short time and predict whether its financial condition allows expansion in the long term. Just like discriminant analysis, ratio analysis also has advantages and disadvantages. Among the advantages of simplicity, replace the measurement of phenomena, common use of indicators, allowing for comparisons in space, enabling the identification of critical areas for action, which allows for the recognition of this method as an early warning system. The disadvantages include lack of generic indicators; failure to state reasons for adverse events; the danger of misinterpretation of indicators.

The multiplicity of indicators presented in the literature to assess the company's financial condition meant that a further analysis of selected few that synthetically describe the condition of the company. In order to assess the financial situation of companies involved in the production of malt were used[9]:

- current ratio (CR),
- debt ratio (DR),
- gross margin indicator (WRB_r),
- rate of return on equity (ROE),
- long term debt to total assets ratio (LTDR).

Results and Discussion

To study sample were enrolled only those entities that publish their financial statements in Polish Monitor B. The study included four operators: Danish Malting Group Poland Ltd., Soufflet Poland Ltd., Słodownia Strzegom Ltd., GlobalMalt Poland Ltd.

Table 2. The value of the discriminant function for operators in the 2012

Company / Model	GlobalMalt		Strzegom		Soufflet		Danish	
	Value of the function Z	Financial condition	Value of the function Z	Financial condition	Value of the function Z	Financial condition	Value of the function Z	Financial condition
Gajdka	0.25	B	0.84	G	1.00	G	0.97	G
Wierzba	1.15	G	2.92	G	3.83	G	1.74	G
Mączyńska	–0.63	B	1.68	SG	9.95	G	3.45	G
Hołda	2.38	G	1.15	G	9.97	G	2.22	G
Hadasik	0.13	G	0.50	G	1.55	G	1.66	G
Poznan model	–3.18	B	1.06	G	2.79	G	2.72	G

Note: G – good, SG – so good, B – bad.
Source: own study.

[9] M. Szewczyk, A. Zygmunt, *Ocena kondycji finansowej przedsiębiorstw branży produkcji metalowych wyrobów gotowych Opolszczyzny w kontekście rozwoju regionu,* Barometr Regionalny. Analizy i prognozy, Wyższa Szkoła Zarządzania i Administracji w Zamościu, No. 2 (28), Zamość 2012.

Table 3. The value of the discriminant function for operators in the 2013

Company / Model	GlobalMalt		Strzegom		Soufflet		Danish	
	Value of the function Z	Financial condition	Value of the function Z	Financial condition	Value of the function Z	Financial condition	Value of the function Z	Financial condition
Gajdka	0.34	B	0.86	G	0.77	G	0.94	G
Wierzba	1.37	G	2.89	G	2.85	G	1.49	G
Mączyńska	0.36	SB	1.44	SG	4.19	G	3.32	G
Hołda	1.33	G	1.11	G	3.23	G	9.92	G
Hadasik	0.90	G	0.75	G	1.40	G	–0.45	B
Poznan model	–1.23	B	0.81	G	7.20	G	1.67	G

Note: G – good, SG – so good, B – bad, SB – so bad.
Source: own study.

Analyzed entities are companies with limited activities and were entered into the National Court Register in 2001., except for the Danish which registered business in 2004. To assess the financial condition of enterprises used models presented in the article. On the basis of the value of the discriminant function from the qualified person as one whose financial condition is bad or good.

Tables 2 and 3 show the results obtained on the basis of Polish considered discriminatory bankruptcy prediction models. In 2012 Słodownia Strzegom, Soufflet and Danish are classified according to all models as a company in good financial condition. In the case of a company GlobalMalt discriminant function values Gajdka, Mączyńska, and Poznan model indicate the threat of bankruptcy. A similar situation occurred in the case of the analyzed actors and models in 2013. With the exception of Danish malt house, which according to the model Hadasik in 2013. Was classified as one whose financial situation is bad. In the case of a malthouse GlobalMalt situation was classified as bad by the same models – Gajdka, Mączyńska, and Poznan model.

Table 4. The results of ratio analysis

Indicator	GlobalMalt		Strzegom		Soufflet		Danish	
	2012	2013	2012	2013	2012	2013	2012	2013
CR	0.907	6.014	0.599	0.506	1.330	3.380	1.857	1.306
DR	0.001	0.833	0.134	0.110	0.102	0.199	0.318	0.033
WRB_r	8.344	5.698	7.721	8.763	6.067	7.804	6.651	8.157
ROE	–0.365	0.010	0.415	0.282	0.362	0.258	0.150	0.199
LTDR	0.014	8.594	1.036	0.603	0.119	0.303	0.322	0.034

Source: own study.

The results lead to the conclusion that the ability to settle its current liabilities malting industry enterprises varies (see Table 4.). In two of the four analyzed companies have been identified for the period 2012–2013 problems with repayment of current assets current liabilities. Enterprises GlobalMalt and Strzegom note lower than other current liquidity level. This phenomenon may be a sign of bankruptcy. The analysis has demonstrated to have the ability to repay current liabilities over current assets Soufflet and Danish.

Total debt ratio determines what is the share of foreign capital in the financing of the company's assets. Liabilities in excess of 2/3 of its assets may indicate a high risk of losing the company's ability to service debt. Total debt ratio results in the treatment of the company by the banks when applying for loans to finance operations. The ratio of long–term debt to equity ratio allows for a high degree of coverage of the statement equity commitments. Low values indicate WOZ indicator of good corporate financial policy. In 2012, the debt ratio reached its lowest value for the company GlobalMalt, and in 2013 – for Danish.

The values of gross margin shows a more complete picture of the effectiveness of activities in time. In the case of three of the analyzed companies (except GlobalMalt) saw an increase in the value of WRSB what is increase sales profitability over the years 2012–2013.

Expressed as a percentage ROE allows not only easy to compare the profitability of investments in the shares of a particular company with capital to invest in alternative ways, eg. Bank deposits, government bonds, but also allows eg. To determine the desirability of the company's profits earmark for development purposes, instead of paying dividends to shareholders. In the case of a malthouse Strzegom, Soufflet and Danish recorded high efficiency equity, ROE values range from 0.15 in 2012 to 0.282 in 2013. This means that in these companies reported a budget surplus.

Conclusion

The discriminant analysis models and indicators of financial analysis can be an effective tool to investigate the financial condition of a company operating in the Polish conditions. This article has been converted prediction models selected Polish bankruptcy. The results obtained on the basis of the presented models are similar. By way of the calculations were selected only one entity in danger of bankruptcy, and that is the GlobalMalt. For this company, the value of the discriminant function is determined on the basis of the model Gajdka, model, and model Poznan and Mączyńska pointed to the threat of bankruptcy. The resulting values of profitability and cash flow allow for recognition of the financial situation of enterprises for the good. According to traditional ratio analysis, none of the companies presented in the text is not in danger of bankruptcy. When considering the above risk assessment methodologies for bankruptcy should be considered and the results carefully. Collected in the study results obtained from a homogeneous sample can therefore differ from the results obtained from tests on which the estimation models

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APPLICATION OF BUSINESS VALUATION STANDARDS IN POLAND – EVIDENCE FROM RESEARCH

Summary

The paper presents the results of a survey of business valuation practice in Poland. The aim of this study was to assess the application of valuation standards and standards of values by practitioners involved in the valuation of companies in Poland. The survey was conducted on a sample of 191 respondents between February and April 2011. The population of entities under survey consists of: authorized NewConnect[1]/Catalyst advisers, brokers, valuation analysts working for leading consulting firms, and experts appointed by the court. The evidence from the research demonstrates that a vast majority of business valuation professionals in Poland applies the standards of value as well as business valuation standards in their practice. They are mostly members of professional organisations, which indicates that active organisations associating professionals in a field impose application of certain professional standards. As a consequence, particularly in the case of lawsuits it may cause unjustified transfers of value between the parties.

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Introduction

Business valuation is one of the key challenges in the contemporary economics. Its relevance is related to the ever increasing demand for reliable value estimates. Such estimates may be delivered only provided a precise definition of the desired category of value and application of the appropriate

[1] NewConnect is a new market financing the growth of young companies with a large growth potential, organised and operated by the Warsaw Stock Exchange. It has started in 2007. Whereas Catalyst is the bond market, which was launched in 2009. It operates on transaction platforms of the Warsaw Stock Exchange and BondSpot (formerly MTS CeTO). Catalyst comprises four trading platforms. Two platforms operated by the WSE (a regulated market and an alternative trading system) are dedicated to retail investors; two BondSpot markets (regulated market and ATS) are dedicated to wholesale investors.

valuation standard. In general terms, business valuation standards may be defined as norms which provide basic requirements which each business valuation needs to meet or general principles and rules for business valuation. Based on those general principles, a detailed "valuation procedure" may be derived. The definition may be supported by the interpretation presented by M.J. Matschke and G. Brösel[2]. Although the authors do not use the term "business valuation standards" explicitly, yet they mention "business valuation principles" instead. Those principles should be understood as "a system of norms regulating the business valuation process, i.e. a set of procedures of valuation and derivation of results, which is as free of inconsistencies as possible". World–wide business valuation standards use the terms "standard of value" or "basis of value"[3] for defining the type of value appropriate for a given valuation engagement. Selection of a given standard of value defines all the parties involved in the real or hypothetical transaction as well as the terms and conditions of the transaction. Business valuation professionals find the standard of value the most essential element which determines the selection of assumptions, and the choice of methods and techniques employed throughout the valuation procedure[4]. Since both the standard of value and valuation standard are crucial to the process and outcome of valuation, it seems noteworthy to investigate whether business valuation experts in Poland see the need for applying valuation standards and standard of value. If so, it is interesting what standards (of value and valuation) they use in their practice of valuation. Similar studies were conducted by C. McParland, A. Adair and S. McGreal[5]. All these authors investigated both the awareness and perception of the harmonisation of valuation standards in selected European countries. Their studies aimed to identify the most relevant factors supporting and impeding the process of developing a universal valuation standard. In Poland, no such studies have been carried out so far. Nonetheless, the problem of business valuation standards has been addressed by authors of various theoretical studies, including W. Patena, K. Maślankowski, P. Szymański, A. Jaki and D. Zarzecki[6].

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[2] M.J. Matschke, G. Brösel, *Wycena przedsiębiorstw. Funkcje, metody, zasady*, Oficyna Wolters Kluwer, Warsaw 2011, p. 357.

[3] The term "standard of value" is defined in the International Glossary of Business Valuation Terms and has been employed internationally by organisations such as: Accounting Professional and Ethical Standards Board (Australia), American Institute of Certified Public Accountants (USA), American Society of Appraisers (USA), Canadian Institute of Chartered Business Valuators (Canada), National Association of Certified Valuation Analysts (USA), Institute of Business Appraisers (USA). The term "basis of value", in turn, has been introduced by the International Valuation Standards, and its definition has been later copied by the European Valuation Standards. Another interpretation of this term is provided in the standards developed by the Hong Kong Business Valuation Forum, which comprises organisations such as: The Hong Kong Institute of Surveyors, The Hong Kong Society of Financial Analysts, The Royal Institution of Chartered Surveyors.

[4] J.E. Fishman, S.P. Pratt, W.J. Morrison, *Standards of Value, Theory and Applications*, Wiley 2007, p. 21.

[5] C. McParland, A. Adair, S. McGreal, *Valuation standards: A comparison of four European countries,* Journal of Property Investment & Finance, Vol. 20, Issue 2, 2002, pp. 127–141.

[6] See: W. Patena, K. Maślankowski, *Standardy wyceny przedsiębiorstw – nowa propozycja*, Finansowy Kwartalnik Internetowy „e–Finanse", Vol. 6, No. 2, 2010, pp. 26–39; W. Patena, *W poszukiwaniu wartości przedsiębiorstwa*, Wolters Kluwer, Warsaw 2011, pp. 33–57; P. Szymański, *Standardy wyceny przedsiębiorstw*, [In:] *Zeszyty Naukowe Uniwersytetu Szczecińskiego nr 520, Finanse, Rynki finansowe, Ubezpieczenia nr 14*, (ed.) D. Zarzecki, Drukarnia Wydawnicza im. W.L. Anczyca, Szczecin 2008, pp. 567–570; P. Szymański, *Standardy wyceny biznesowej w wybranych krajach – implikacje dla Polski*, [In:] *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu nr 48. Zarządzanie finansami firm – teoria i praktyka*, (ed.) B. Bernaś, Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu, Wroclaw 2009, pp. 804–813; P. Szymański, *Standardy wyceny biznesowej (wyceny przedsiębiorstw i kapitału własnego) na świecie a przeszły polski standard wyceny biznesowej*, [In:] *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu nr 158, Zarządzanie finansami firm – teoria i praktyka*, (eds.) B. Bernaś, A. Kopiński, Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu, Wroclaw 2011, pp. 394–403; D. Zarzecki: *Formalne aspekty wyceny przedsiębiorstw – zarys problemu*, [In:] *Zeszyty Naukowe Uniwersytetu Szczecińskiego nr 549, Ekonomiczne Problemy Usług nr 39, Finanse 2009 – Teoria i praktyka. Finanse przedsiębiorstw*, (eds.) A. Bielawska, L. Dorozik, J. Iwin–Garzyńska,

In short, the aim of this study, and hence the contribution to the discipline of finance, is the evaluation of business valuation practices in Poland, concentrating in particular on the following aspects:

- application of the standards of value by business valuation professionals in Poland,
- application of business valuation standards by business valuation professionals in Poland.

The results are presented in four sections. The first section describes the research methodology. Section two characterises the population. Sections three and four present the results of research into the application of the standards of value and valuation, respectively. The layout of the study is a reflection of the above–mentioned aims of the research.

Research methodology

The methodology employed in this research combines elements of literature study and questionnaire survey. An analysis of the evidence from the survey will aim at the identification of the factors which exert the most impact on the application of the standards of value, valuation standards and the control premium by business valuation professionals in Poland. The results may stimulate further discussion on business valuation practice in Poland.

The survey was conducted among 191 respondents between February and April 2011. A mixed approach was employed, incorporating both quantitative and qualitative variables. The population included authorised NewConnect/Catalyst advisers, analysts from brokerage houses, analysts from the leading consulting companies, and court experts. It was selected in the course of analysis of the applicable law and based on the expert knowledge of the research team members. The procedure of selection of respondents comprised three stages. In the first stage the groups of professions which deal with business valuation were identified. Next, the members of those groups were identified. Based on the publicly available data, contact information about 71 authorised NewConnect/Catalyst advisers, 53 brokerage houses and 13 consulting companies was gathered. The analysis also includes court experts from 45 district courts. Since not all the lists of experts provided information about the specialisation "business valuation", experts from related fields, such as: financial analysis, banking, accounting or property valuation, were also included in the database constructed for the purpose of the study. In the last stage the database was verified – people and institutions were excluded who in fact did not deal with business valuation or refused to participate in the research. As a result, 8 authorised NewConnect/Catalyst advisers, and 17 brokerage houses were excluded from the database. The final database included 88 court experts from 24 district courts; in 21 district courts no specialists dealing with business valuation or financial analysis, banking, accounting or property valuation were found.

The data was collected through self–enumeration – the respondents filled in individually the form delivered[7]. The questionnaire was sent by e–mail to 191 respondents. The structure of the sample has been presented in Table. The study was carried out between February and April 2011. 128 complete questionnaires were received in response, which were later subject to one–dimensional analysis (responsiveness indicator at 67%).

Wydawnictwo Naukowe Uniwersytetu Szczecińskiego, Szczecin 2009, pp. 146–156; D. Zarzecki, *O standardach wyceny przedsiębiorstw. Zarys problemu*, [In:] *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu nr 144, Efektywność – rozważania nad istotą i pomiarem,* (eds.) T. Dudycz, G. Osbert–Pociecha, Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu. Wroclaw 2010, pp. 561–603; A. Jaki, *Mechanizmy procesu zarządzania wartością przedsiębiorstwa*, Wydawnictwo Uniwersytetu Ekonomicznego w Krakowie, Krakow 2012.

[7] T. Walczak, *Zasady projektowania i realizacji badań statystycznych*, Central Statistical Office, Warsaw 1999, pp. 60–62.

Table 1. The structure of the population surveyed

Items	Initial size of the database, before exclusion of people and institutions which do not deal with business valuation or refused to participate in the research		Number of respondents which were sent the questionnaire		Number of respondents who returned the questionnaire	
	Number	Structure	Number	Structure	Number	Structure
Authorised NewConnect/ Catalyst advisers	62	29%	54	28%	47	37%
Analysts from brokerage houses	44	20%	27	14%	14	11%
Authorised NewConnect/ Catalyst advisers and analysts from brokerage houses	9	4%	9	5%	2	2%
Analysts from consulting companies	13	6%	13	7%	8	6%
Court experts	88	41%	88	46%	57	45%
Total	**216**	**100%**	**191**	**100%**	**128**	**100%**

Source: own study.

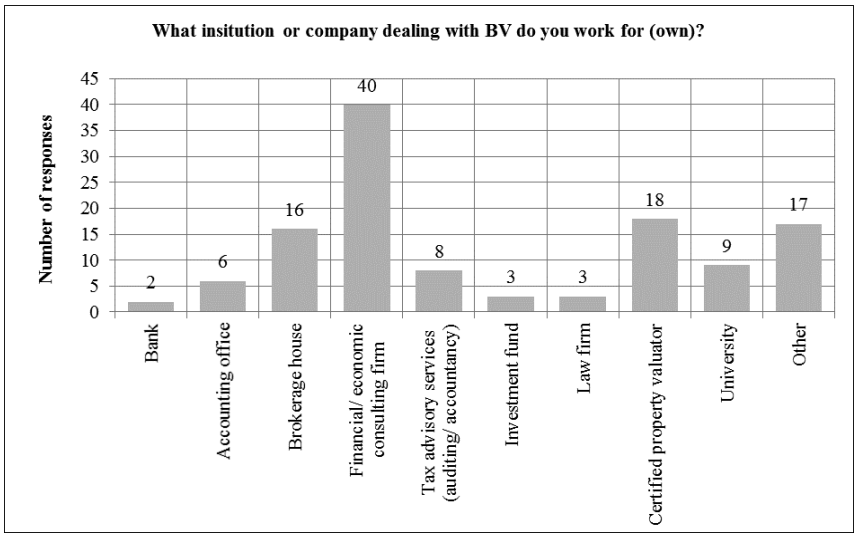
To sum up, the research covered the whole population, yet due to the fact that not all the respondents returned the complete questionnaire, the study cannot be considered comprehensive. Owing to the responsiveness at the level of nearly 70%, the sample may be considered as representative.

Description of the population

From the viewpoint of the profile of the population, the following attributes are essential: type of employer, and licences or certificates related to business valuation held by the respondent. The largest group among the 98 respondents who indicated the type of their employer[8], comprised employees of consulting companies specialising in financial and economic or tax–related issues (40% in total). The distribution of respondents by the type of their employers has been presented in Figure 1.

[8] As many as 21 out of 98 respondents work for two or even three types of organisations.

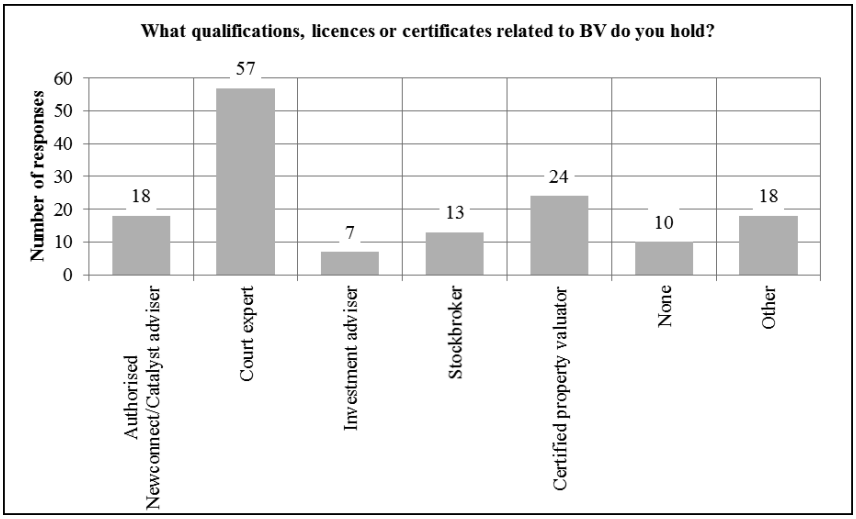
Figure 1. Breakdown of respondents by type of employer



Source: own study based on the questionnaire survey.

The question whether the respondent holds any licences or formal affiliations related to business valuation, in turn, was replied by 75% of respondents, and the most popular answer was the competence of a court expert. 46% of people (who replied to this question) held at least two types of licences, whereas more than 7% – had at least three of them. Other types of qualifications/ licences/skills included: ACCA, ASA, chartered accountants, Bomis certificate, tax adviser, Recognised European Valuer, MBA, CFA, tax authorities experts, MRICS, trustee, real estate broker and property manager licence. The distribution of the respondents by the type of licences and certificates held is presented in Figure 2.

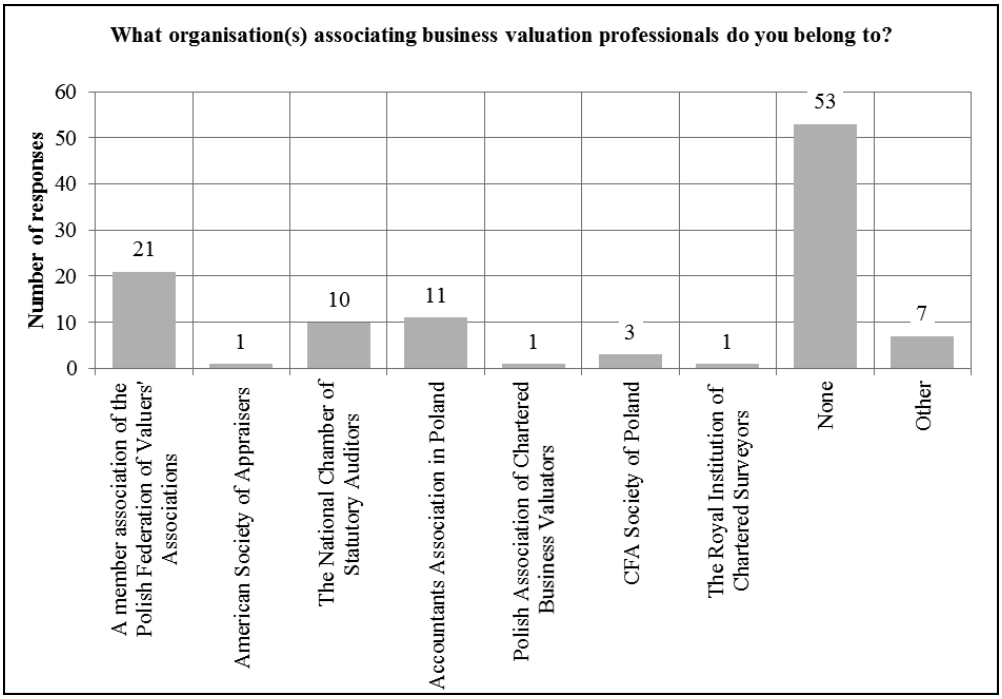
Figure 2. Breakdown of qualifications and licences held by respondents



Source: own study based on the questionnaire survey.

The purpose of the next question was to evaluate whether the environment of business valuation practitioners in Poland is organized, and to what extent. Hence the respondents were asked the following question: "What organisation(s) associating business valuation professionals do you belong to?". The answers were provided by 96 respondents, as shown in Figure 3.

Figure 3. Distribution of respondents by the type of organisation associating business valuation professionals (*)



Note: (*) Apart from the answers presented above, the respondents were also able to choose from other renowned institutions related to business valuation, including: The Canadian Institute of Chartered Business Valuators, The Institute of Business Appraisers, The National Association of Certified Valuation Analysts, American Institute of Certified Public Accountants, The Hong Kong Institute of Surveyors, The Hong Kong Society of Financial Analysts. None of the respondents, however, indicated membership in any of these organisations.
Source: own study based on the questionnaire survey.

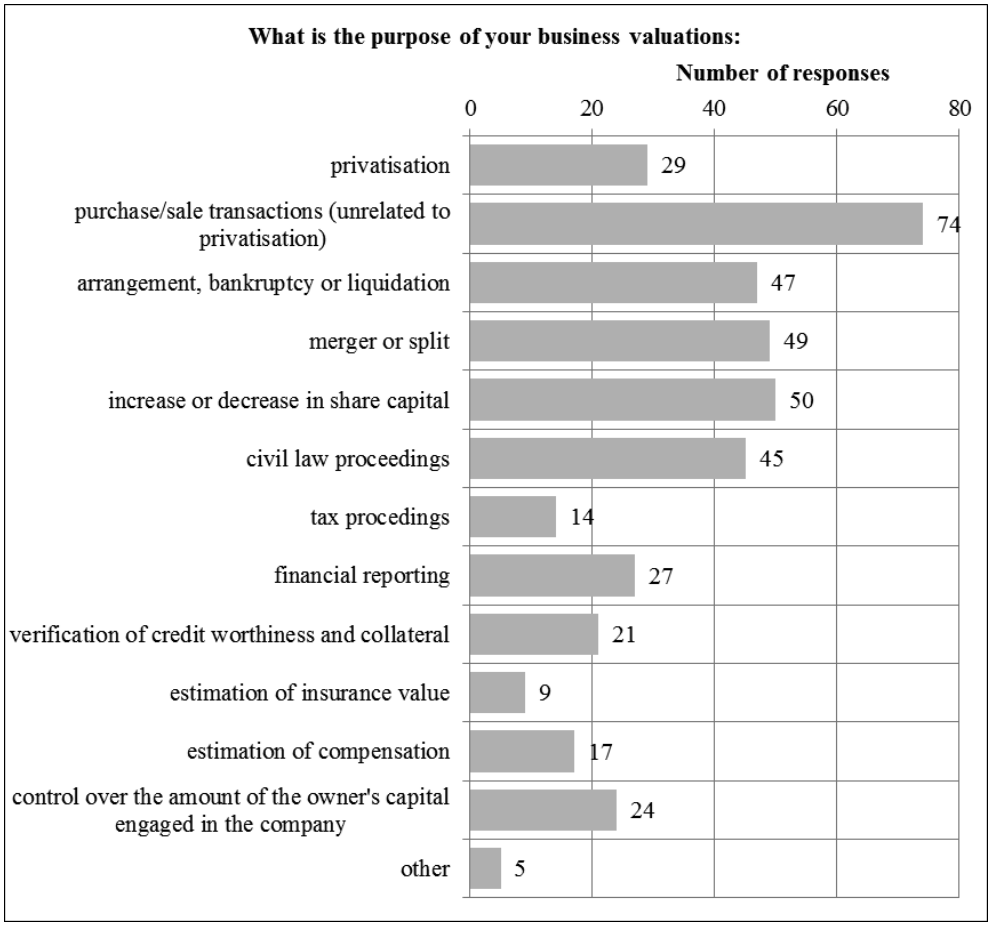
The majority of respondents (approximately 55%) were non–associates. 43 professionals in total belonged to at least one organisation. Those respondents most frequently were members of only one organisation (32 out of 43). Ten of them, however, held membership of two organisations.

Next, the respondents were asked to indicate the purposes of their valuations. A precise answer to such question is crucial to the valuation process, as the purpose determines the standard of value, the set of methods applied and the assumptions made prior to valuation[9]. In certain cases the purpose of

[9] See: D. Zarzecki, *Metody wyceny przedsiębiorstw*, FRR, Warsaw 1999, p. 59; S.P. Pratt, *The Legal Context Often Determines Meaning of Value,* [In:] *The Best of Shannon Pratt*, BVR 2006, pp. 176–178.

valuation determines also the type of regulations concerning the valuation procedures which need to be employed. In Poland, for instance, the valuations commissioned for the purpose of privatisation need to comply with the procedures set by the Regulation of the Council of Ministers on the company analysis carried out before the shares held by the Treasury are offered for sale[10]. What purposes served the valuations prepared by the respondents participating in the survey? Answers to this question are analysed in Figure 4.

Figure 4. Breakdown of respondents by the purpose of valuation



Source: own study based on the questionnaire survey.

The question was replied by 96 respondents. The survey revealed that a vast majority of valuations served the purpose of simple purchase/sale transactions unrelated to the process of privatisation. This answer was selected by 77% of respondents.

[10] Regulation of the Council of Ministers of 30 May 2011 on the company analysis carried out before the shares held by the Treasury are offered for sale (Journal of Laws/Dz.U. 2011, No. 114, Item 663, as amended).

Application of the standards of value

In order to analyse whether business valuation professionals operating in the Polish market apply standards of value, they were asked the following question:

1) What standards of value (bases of value) do you apply in your business valuation practice?

Respondents were given the following selection of answers:

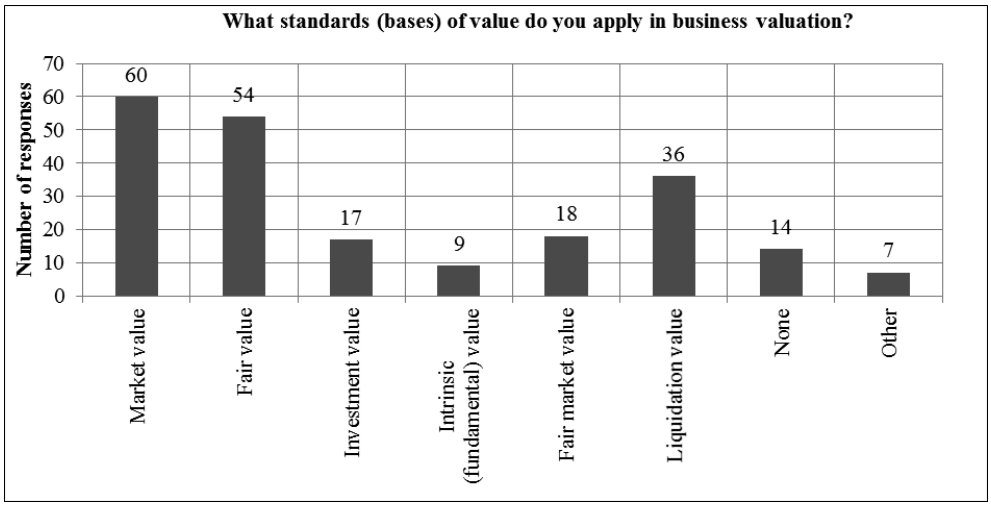
- Market value – according to the definition of the International Valuation Standards 2007 it is the estimated amount for which a property should exchange on the date of valuation between a willing buyer and a willing seller in an arm's–length transaction after proper marketing wherein the parties had each acted knowledgeably, prudently, and without compulsion.
- Fair value, which is defined in the International Financial Reporting Standards as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.
- Investment value, which is defined in the International Glossary of Business Valuation Terms as the value to a particular investor based on individual investment requirements and expectations (in Canada, the term used is "value to the owner").
- Intrinsic (fundamental) value – according to the International Glossary of Business Valuation Terms, it is the value that an investor considers, on the basis of an evaluation or available facts, to be the "true" or "real" value that will become the market value when other investors reach the same conclusion. When the term applies to options, it is the difference between the exercise price and strike price of an option and the market value of the underlying security.
- Fair market value – it is defined in the International Glossary of Business Valuation Terms as the price, expressed in terms of cash equivalents, at which property would change hands between a hypothetical willing and able buyer and a hypothetical willing and able seller, acting at arms length in an open and unrestricted market, when neither is under compulsion to buy or sell and when both have reasonable knowledge of the relevant facts (in Canada, the term "price" should be replaced with the term "highest price").
- Liquidation value – according to the definition of the International Glossary of Business Valuation Terms, the net amount that would be realized if the business is terminated and the assets are sold piecemeal. Liquidation can be either "orderly" or "forced".
- I do not apply any standards of value.
- Other.

The distribution of answers to the above question is presented in Figure 5.

The question concerning the application of the standards of value was answered by 80 respondents. Standards of value are used in business valuation by slightly more than 62% of respondents. Nearly 34% indicated they used two standards of value (27 out of 80 respondents who apply any standards of value), 44% use more than two, and 22% apply one standard in their valuations.

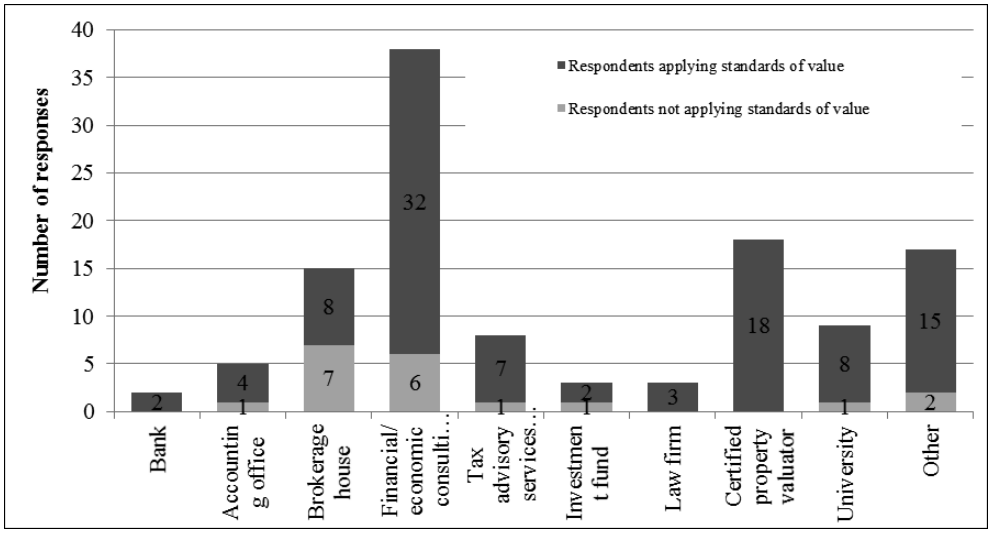
It is noteworthy to observe here that the standards of value were applied by the majority of respondents, regardless of the type of their employer. Valuation practitioners employed by brokerage houses, however, are a professional group which stands out here; they rarely relate to any standard of value (positive answers provided by less than 54% of respondents). For respondents working for companies offering economic/financial consulting services, on the other hand, the figure was entirely different – only 16% of respondents in this group admitted they refrained from applying any standards of value. It should be pointed out that the standards of value were used in all the valuations prepared by professionals employed by certified property valuators (see Figure 6).

Figure 5. The structure of respondents by the standard of value they apply in their valuation practice



Source: own study based on the questionnaire survey.

Figure 6. The number of respondents applying and not applying standards of value by type of employer (personalised questionnaire)



Source: own study based on the questionnaire survey.

More than 94% of respondents working for certified property valuators pointed to market value as the standard of value they use in their practice. This category was also indicated by the majority of respondents employed by financial/economic consulting companies (more than 68% of respondents employed by those firms). In the group of employees of brokerage houses it is fair value which prevails

among the answers. This category of value is also most popular among respondents employed by accounting offices and tax advisory companies. Liquidation value was another relatively frequent choice of valuation practitioners – it was indicated by more than 42% of professionals working for financial/economic consulting companies, 50% of certified property valuators and 75% valuation practitioners employed by universities (cf. Table 2).

Table 2. Distribution of answers by type of employer and standard of value applied (personalised questionnaire)

Standard of value / Employer	Market value	Fair value	Investment value	Intrinsic/ fundamental value	Fair market value	Liquidation value	No standard of value used	Other
Bank	2	2	0	0	1	1	0	0
Accounting office	1	4	0	0		1	1	0
Brokerage house	4	6	1	2	1	0	7	2
Financial/economic consulting firm	26	15	10	6	11	16	6	1
Tax advisory firm (auditing/accountancy)	4	5	2	1	2	4	1	0
Investment fund	1	0	0	0	1	1	1	0
Law firm	2	2	0	0		1	0	0
Certified property valuator	17	14	3	0	3	9	0	1
University	7	5	1	0	4	6	1	0
Other	12	13	5	2	5	10	2	3

Source: own study based on the questionnaire survey.

Standards of value were applied by all the respondents offering services as certified property valuators. The majority of them were associated, which provides evidence supporting the thesis that organizations associating professionals in a field impose application of certain professional standards. Nearly 92% of respondents who hold a license of a certified property valuator admitted that they applied market value as a standard of value in their valuations. This category of value was also indicated by the majority of court experts (more than 71% of respondents with this type of qualifications) and authorised NewConnect/catalyst advisers (nearly 65% of respondents holding this type of qualifications). The largest share of respondents who do not refer to any standards of value in their valuation reports was observed among stockbrokers.

The evidence from the survey presented in this section was intended to reveal whether business valuation professionals operating in the Polish market apply the standards of value in their practice. The evidence suggests that the majority of respondents do apply standards of value. A closer analysis of this evidence, however, does not enable an unambiguous conclusion to be reached as to whether they are able to choose the appropriate standard to suit the purpose of valuation. It should be also mentioned that there is one professional group (employees of brokerage houses) who in the majority do not apply any standards of valuation at all. It may imply that the environment of business valuation professionals in Poland is strongly diverse and has not worked out common valuation standards yet. These issues, however, require further, more detailed exploration.

Application of valuation standards in Poland

In order to find out whether business valuation professionals in Poland apply valuation standards in their practice, all the respondents were asked the following question:

1) Do you apply valuation standards in your practice?

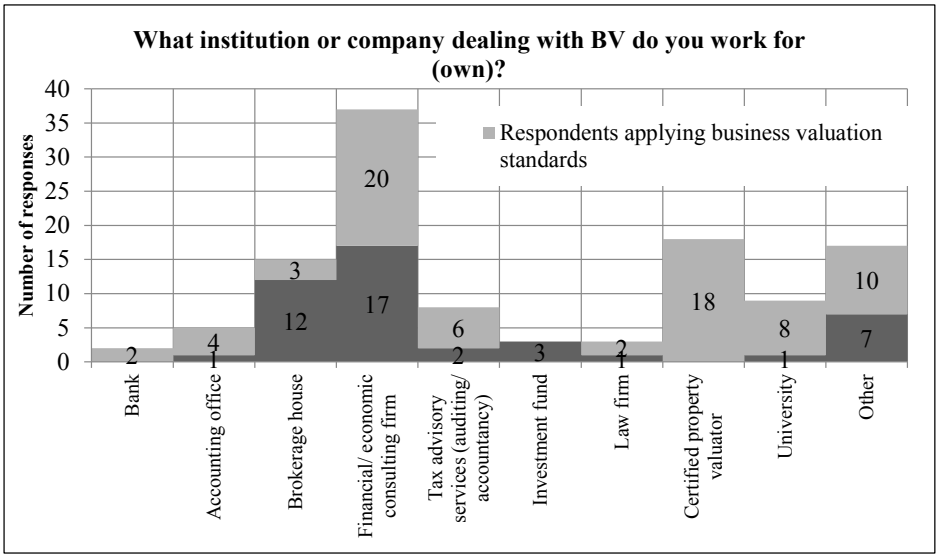
Next, the respondents who gave an affirmative answer to this question were asked:

1) What valuation standards do you apply to your practice of business valuation?
2) What is the purpose of applying the valuation standards you indicated above?

The first question, regarding the application of valuation standards, was responded by 93 professionals. Valuation standards are applied by slightly more than 61% of respondents (57 out of 93). In the next stage of the research, the authors wanted to find out whether the type of employer was in any way related to the fact of applying (or not) valuation standards. To explore it the answers provided by respondents representing different companies or institutions were compared and contrasted (cf. Figure 7).

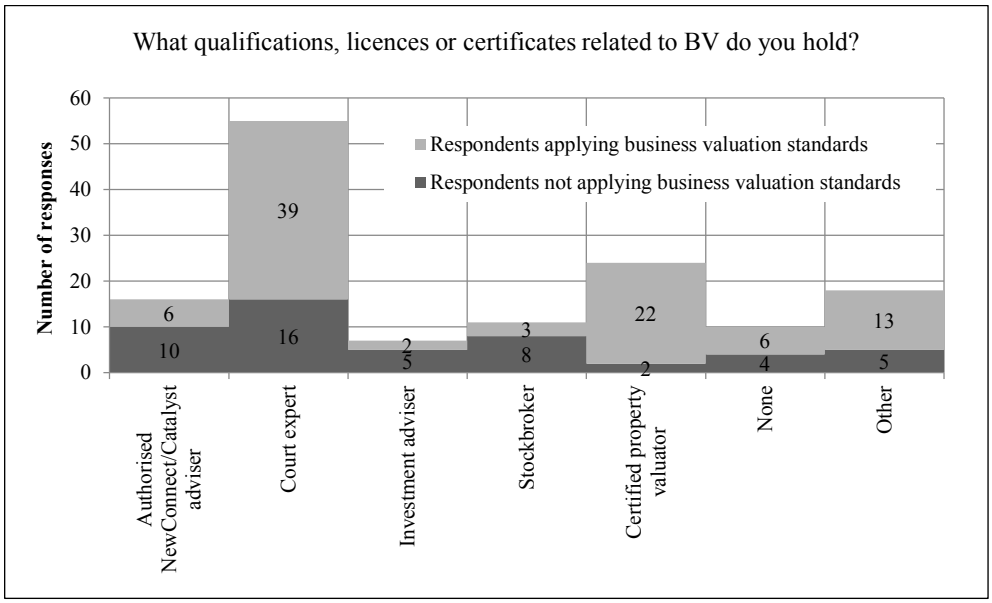
The results indicate that there might be a relationship between the type of employer and application of valuation standards. Valuation standards were applied by all the respondents employed by a certified property valuator. The structure of responses among representatives of brokerage houses, in turn, is entirely different. Only 20% of them admitted they did apply valuation standards in their practice. Similar conclusions can be reached for the relationship between the application of valuation standards and the licenses and certificates related to business valuation held by the respondent, which raises concern regarding reliance on work performed by brokers (cf. Figure 8).

Figure 7. Structure of respondents applying and not applying valuation standards by the type of employer



Source: own study based on the questionnaire survey.

Figure 8. Relationship between application of valuation standards and the licences and certificates related to valuation held by the respondent



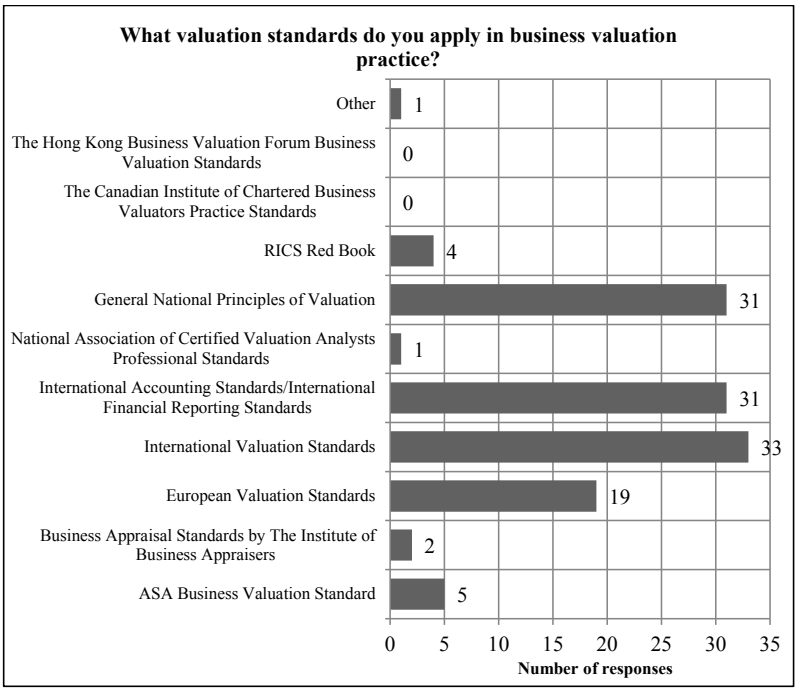
Source: own study based on the questionnaire survey.

The above analyses reveal that the valuation standards were applied mostly by respondents related to the profession of a certified property valuator. This professional group dealing with business valuation is unique. Their environment is strongly consolidated which is supported by the evidence shown above. Unlike the representatives of other professions subject to the survey, the majority of certified property valuators are members of professional organisations. Does it translate into the type of valuation standards applied by the respondents? In order to find out, all the answers of respondents who admitted they that used valuation standards in their practice were analysed (cf. Figure 9).

According to the replies indicated by respondents, it is the International Valuation Standards which are most frequently referred to in business valuation. A large group of respondents applied also International Accounting Standards and the General National Principles of Valuation (GNPV). The GNPV are addressed, above all, to the group of certified property valuators as they provide principles for property valuation. The GNPV specify, among others, procedures to be complied with by certified property valuators dealing with BV; this group of regulations has been published as Interpretation Note No. 5 "The general principles of business valuation". The National Board of the Polish Federation of Valuers' Associations (PFVA) adopted the Note on its assembly on 11 April 2011. Prior to the introduction of the Note, there was no law in force to regulate the process of business valuation.

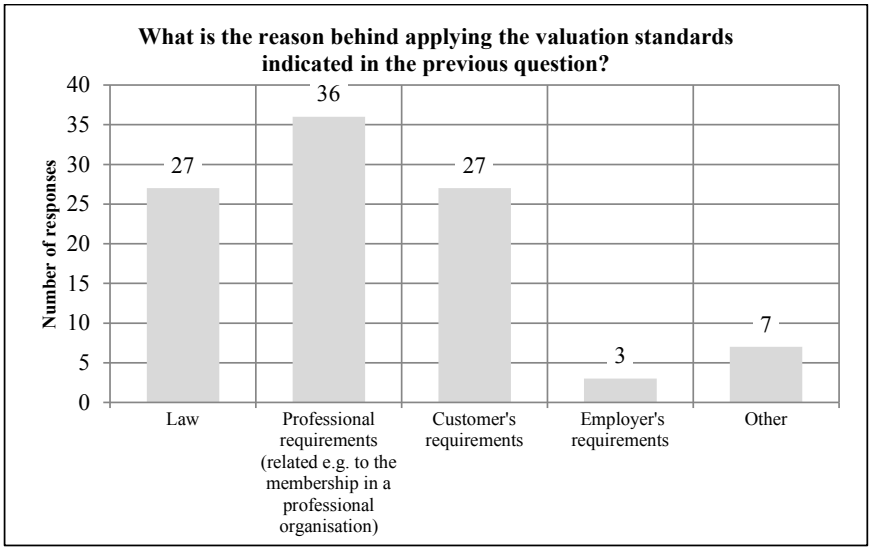
The next question aimed to identify the reasons for applying valuation standards. Only the respondents who admitted they used valuation standards in their practice were asked this question. The answers are summarised in Figure 10.

Figure 9. The distribution of respondents by the type of valuation standards applied in practice



Source: own study based on the questionnaire survey.

Figure 10. The number of respondents by reasons for applying valuation standards



Source: own study based on the questionnaire survey.

The most frequent reason for applying valuation standards, as indicated by the respondents, was the professional requirements related to the membership of a professional organisation. Such an answer was provided by approximately 63% of the respondents applying valuation standards. Approximately 47% of respondents mentioned legal requirements. A similar share of respondents pointed to "customer requirements" as the reason for applying valuation standards.

The results of the survey presented in this section were analysed from the viewpoint of the application of business valuation standards by business valuation professionals in the Polish market. The evidence from the survey reveals that the majority of respondents apply valuation standards in their practice. They represent mostly certified property valuators. A question arises, however, whether the standards applied by certified property valuators are appropriate in case of business valuation, and if so, whether they should become general principles to be adopted by all (or majority of) BV professionals in Poland.

Conclusion

The conclusions reached after thorough analysis of the evidence from the research may be summarised as follows:

1) More than 62% respondents apply standards of value in their business valuation practice. It should be mentioned that the standards were applied by all the respondents representing certified property valuators and all the respondents holding licenses of certified property valuators; professional organisations play an important part in the environment of certified property valuators. It provides certain evidence supporting the thesis that organisations associating professionals in a field impose application of certain professional standards,
2) Nearly 61% of respondents apply business valuation standards in their practice. Just as in the case of the standards of value, it is mostly certified property valuators who contribute to this figure. The largest group of respondents applying any BV standards refers to the International Valuation Standards. The thesis that organisations associating professionals in a field impose application of certain professional standards is further supported by the fact that the requirements related to the membership in an organisation were the most frequent reason for applying these standards, as indicated by the respondents. For the above–mentioned reason, it seems crucial to create in Poland strong professional organizations representing the interest of business valuation professionals.

The evidence from the research proves that a vast majority of business valuation professionals in Poland refers to both the standards of value and business valuation standards in their practice. They are mostly members of professional organisations, which proves that active organisations associating professionals in a field impose application of certain professional standards.

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INTERACTION OF INTERNAL AND EXTERNAL AUDITORS ACCORDING TO INTOSAI STANDARDS

Summary

Based on the principles of interaction between internal and external auditors contained in the similar documents of banking supervision, real economy auditing, the author has used provisions proposed for general use with the aim to adapt them to the specific mechanisms of general government institutions. Research of the international practice of internal auditors and representatives of external supervisory bodies interaction has showed that there are significant differences in supervisory practices in different countries at the level of the existing performance standards, also the considerably degree of supervisory functions of external public auditors varies during the cooperation with internal one.

***

Introduction

The relationship of external supervision bodies, which are as the Accounting Chamber of Ukraine, and the State Financial Inspection of Ukraine and internal auditors' general government require consideration and thorough research. The internal control in the public sector entities should be complemented by an effective internal audit function that independently evaluates the control in institutions. On the other hand, its external auditors may provide important "feedback" with regard to the efficiency of this process. Public financial supervisors should ensure the implementation of effective methods and practices and improvement by the management of state agencies, departments the appropriate corrective actions to respond to weaknesses in internal control identified by internal auditors. Cooperation of state financial control and internal audit service departments and agencies contributes to such a control.

The regulation through the setting of standards is caused by a clear division of functions and the establishment of closer relations between the internal and external audit, acceptance and implementation of the necessary legal instruments that provide the organization of audit by internal auditors, and external control inspections concentrate the focus on the fight against corruption and serious irregularities.

In world practice, regulation of such relationships was rather actively carried out in the last twenty years in the field of banking supervision. Thus, the Basel Committee has developed and adopted for

implementation several documents that serve as a basis for establishing norms and standards of external auditing, banking inspection and internal audit. The relationships of internal and external auditors are considered in detail and International Standards on Auditing. It is worth mentioned, that adoption of the Government Act on the reorganization of departmental audits and implementation of internal audit of public sector management in September 2011[1] caused the necessity to determine the use of internal audit results by the external financial control authorities.

Nowadays, despite the high importance of this issue, research in this area is not carried out. Among the published results of existing norms and standards of internal audit practical implementation only a few publications of the State Financial Inspection of Ukraine highlight the certain aspects of the issue. The author studied the interaction of internal audit institutions of the general government, authorities, ministries and external financial controls based on an analysis of existing regulations, foreign experience in order to develop the effective approaches to the regulation of cooperation in this area.

Based on the principles of interaction between internal and external auditors contained in the similar documents of banking supervision, real economy auditing, the author has used provisions proposed for general use with the aim to adapt them to the specific mechanisms of general government institutions. Research of the international practice of internal auditors and representatives of external supervisory bodies interaction has showed that there are significant differences in supervisory practices in different countries at the level of the existing performance standards, also the considerably degree of supervisory functions of external public auditors varies during the cooperation with internal one.

The interaction of internal and external auditors

For example, in Croatia exterior inspection budget has the following main objectives – control of public finance management by assessing the effectiveness and efficiency of the use of public funds and adherence to fiscal discipline. Therefore, while constructing interaction with internal auditors' budgetary institutions these issues are seen as the main results of audit of internal auditors.

In Moldova, the relationship between internal audit budget institutions with external one is formed according to the influence of subjective factors. For example, in many countries, internal auditors are former financial controllers, because most countries face with a lack of staff institutional control. Therefore, the internal audit staff was created on the basis of financial regulators. These professional approaches require clear lines of authority and detail the functions separately for internal, external auditors separately. The situation is aggravated by the fact that managers are accustomed to departmental audit results, which showed a violation that's why the executives prefer the methods and results of the audit work rather than internal auditors. However, legal provisions, performance standards would help to convince them to get them to take adequate internal audit activity.

The conception of financial inspection building as external public audit body of Armenia needed to solve the problem of supervisory, control and audit powers duplication of resources in the public sector, as far they are implemented by several agencies: Supervisory Service of the President of Armenia, Supervisory Service of the Prime Minister of Armenia, Audit Inspection of the Ministry of Finance, Supervisory Chamber of Armenia, Armenian Prosecutor's Office. In this context, the transfer of certain control powers on the internal audit government agencies would help to eliminate one or two external control bodies.

The selection of approach in each country depends on these factors, and the author defined common characteristics of most of the principles of the relationship between internal auditors and representatives of external financial control bodies. The external audit bodies include the Accounting Chamber of

[1] *Government Act of Ukraine*, September 28, 2011 #1011, http://zakon2.rada.gov.ua/laws/show/1001–2011–п.

Ukraine and the State Financial Inspection of Ukraine. Exploring the practice of such control the author has realized that there are significant differences in legislative and regulatory mechanisms identified in the functional powers of a supervisory body in different countries. In some countries the supreme audit bodies provides basic, if not a solely function of the general government agencies control in order to enforce the latest goals and objectives in the most efficient manner.

These mean that there is no centralized internal control in this country, which is assigned to the State Financial Inspection in Ukraine. Actually it is not absent, and is realized directly by the well–developed internal audit institutions and agencies that have the decentralized nature. In contrast, in other countries external financial control is vested with a broad jurisdiction, in particular, regarding the organization of external parliamentary control by the Supreme Audit Institution and internal control by the structure, similar to internal control of the State Financial Inspection of the executive branch. Taking into account these differences, the concept of building relationships between internal auditors and representatives of external financial control bodies in this study are not considered in the context of determining the legal schemes, but rather to designate two members of the control process, providing management decisions of institutions of the general government and the state as a whole.

Development of the relationships standardization of internal auditors and representatives of external financial control bodies in the form of the final document can serve as a basic guide for bodies of state financial control. It outlines the views of the internal audit institutions, departments, ministries, public authorities and the relationship of control and internal audit. Similar standards are able to support efforts regarding the harmonization and improvement of the standards of internal auditing public sector both internationally and at the level of a country.

Modernization of the Financial Inspection of Ukraine was carried out by the reorientation of the inspection tool for detecting significant irregularities and evidence of financial fraud. This area is implemented through organizational and structural changes in building financial inspection, the transition to risk–oriented planning and conducting inspections aimed at identifying the major violations and abuses. In Ukraine a new regulatory framework was carried out, the powers of the State Financial Inspection of Ukraine were changed.

The Internal Audit of ministries, organized according to the principles set in the Internal Audit Standards, approved by the Government facilitates the work of state financial control.

The stable internal controls, including the internal audit, external and competent public financial control is part of the efficient management of public finances, which in turn can contribute to effective and close working relationship between the management of public institutions and bodies of state financial control.

An effective internal audit of public institutions is a valuable source for the latest information on the quality of internal control.

As defined by the Board of Directors of the Institute of Internal Auditors, Internal audit is a dynamic profession involved in helping organizations achieve their objectives. It is concerned with evaluating and improving the effectiveness of risk management, control and governance processes in an organization. To do this, internal auditors work with management to systematically review systems and operations. These reviews (audits) are aimed at identifying how well risks are managed including whether the right processes are in place, and whether agreed procedures are being adhered to. Audits can also identify areas where efficiencies or innovations might be made. Internal audits are organized under an ongoing program of review and advisory activity this is based on the strategic needs of an organization[2].

This idea of internal audit was laid in the approved Internal Audit Standards for the general government, under which the department was reorganized and revision. It changed not only the name of the internal control. The need for objectivity and impartiality, particularly important for the department of internal

[2] *The Institute of Internal Auditors*, http://www.theiia.org.

audit institutions of public administration in the operation of departmental audit rule out the possibility of involvement of this unit to provide recommendation or counseling services. Recommendations of the management of public institutions, public authorities on the development of internal control are often an economical way to ensure an informed decision on the need for the introduction of control.

This internal control in the form of internal audit is able to implement such recommendation or advice. Moreover, they must make a fundamental duty of internal audit, not only complement conventional control measures for the independent evaluation and control of the institution.

An internal audit of state agencies is also intended to make inspection and assessment of its internal controls, including controls over financial reporting. Internal auditors should not eliminate from the analysis and criticism of the state of internal control, which was organized by senior management or direct guidance unit office, even if they gave management advice on the need to build a particular level of internal control. Some institutions are preferable to introduce self–assessment of control without the intervention of internal auditors. They can be taken as a result of internal controls, if they have been registered as official and documented procedures in which the management and staff analyze the activity or function and evaluate the effectiveness of related internal controls and return them. These self–assessments are the useful methods for evaluating the effectiveness of internal control and out of it, but in any case they do not replace the internal audit.

According on the above named nature of internal audit goals and objectives of internal audit are based on the implementation of certain principles and can be included in the construction of the relationship of the state financial control and internal audit of public authorities, institutions and general government.

Management is ultimately responsible for ensuring the establishment and management support to senior management of adequate and effective internal control system of measurement to assess the various risks in the public service system to identify risks relating to the level of budget funding agencies, and appropriate methods for monitoring compliance with laws, regulations and supervisory and internal policies. At least once in a year, the head should examine the internal controls and procedures for assessment of funding. The leadership of the institution should regularly check whether it is installed in an adequate system of internal controls to ensure the orderly and careful delivery of public services linking to defined objectives functioning government agency or program budget.

Guidance should also regularly check that the system developed in the institution identify risks relating to external and internal threats. Finally, management needs advice on the implementation of adequate procedures for identifying and controlling the risks faced by a government agency (or public authority) upon reaching his goals, testing the integrity, reliability and timeliness of financial and management information, monitoring compliance with laws and regulations, supervisory policies and internal plans, methods and procedures. Public sector entities are responsible for developing procedures to identify measure, monitor and control risks faced by the institution. At least once a year, management should report to the parent organization – Ministry about the scope and effectiveness of internal controls and procedures for implementation of program– target method of forming funding.

Management of state institutions should maintain an organizational structure with a clear division of responsibility, authority and reporting the relationships and ensuring the effective exercise of delegated powers. Management is also responsible for developing risk management procedures that are identified, measured, monitored and controlled by the identified threats. Finally, the management of public institutions establishes appropriate methods of internal controls and monitors the adequacy and effectiveness of internal controls.

Internal audits of state agencies, despite its organizational independence is part of the continuous monitoring of the internal control of the Bank and its internal procedures for assessing the legality of the use of budget funds because internal audit provides an independent assessment of the adequacy of and compliance with established methods and procedures of budgetary institutions. As such, the internal audit function assists management in the effective and efficient discharge of their duties as described above.

According to the accepted Standards of Internal Audit their objectives include:

- Inspection and assessment of the adequacy and effectiveness of internal controls,
- Inspecting the use and effectiveness of risk management procedures and risk assessment methodologies,
- Inspecting of management and financial information, including the electronic media,
- Inspection the accuracy and reliability of the accounting records of budget accounting and financial statements,
- Inspection of condition and preservation of assets,
- Assessment of effectiveness and efficiency of operations with public funds,
- Testing of transactions and functioning of specific internal control procedures,
- Inspection of systems established to ensure compliance with legal and regulatory requirements, codes of conduct and implement methods and procedures,
- Testing the reliability and timeliness of regulatory reporting,
- Conducting special investigations, such as non–admission of corruption.

Management should assure continued and complete awareness of the internal audit department of the new developments, initiatives, products and operational changes to ensure the detection of associated risks at an early stage. To determine the foundations of the relationship between internal audit and external financial control appropriate to consider the principle of internal audit is to realize its constant function – ensuring the continuity of operations. Each public agency must have a permanent internal audit service. In carrying out its responsibilities management should take all necessary steps to ensure that the institution could always rely on an adequate internal audit service, appropriate to its size and nature of operations. These include formation of estimates and providing adequate resources and internal audit staff to achieve their goals.

In larger public institutions, government bodies with complex operations under normal conditions of organizational internal audits should be conducted through internal audit department that has a sufficient number of staff. In smaller institutions internal audit can be assigned to a single auditor. In some countries, smaller establishments permitted as an alternative, to apply a system of independent review of key aspects of internal control.

Internal audits of state agencies must be independent in the activities that exposed the audit, and the daily internal control procedures. This means that the internal audit function is given appropriate status within the institution and its mission it has an objective and impartial manner. The same status should be followed during construction of the interaction of internal and external audit of state financial control.

The Internal Audit Department should be able to carry out its mission on its own initiative in all departments, divisions and services of the bank. It must have the unfettered right to report his findings and assess and disclose this information to the institution's management. During the interaction of internal and external state controller also disclosed the results of the internal auditors. The independence principle also means that the internal audit department operates under the direct supervision of top management institutions. Head of Internal Audit Department should form their duties in a way that directly and on its own initiative contact with top management, external public auditors.

The principle of independence also implies that external auditors should not have a conflict of interest with the public institution. The system of remuneration of internal auditors must meet the challenge of internal audit. Internal audits of state agencies should be the subject to independent scrutiny. This inspection can be carried authority of the state financial control, third–party – The Accounting Chamber of Ukraine. To assess the independence may be involved and the internal financial control of the State Financial Inspection of Ukraine. The relationship of public financial control and internal audit service should be viewed as a whole, as the interaction of internal audit with external regulatory agencies and in particular with the control body representing public external audit.

Authority of internal financial control, which provides centralized control of the executive branch the State Financial Inspection of Ukraine should be to assess the work of the Internal Audit and, if he

finds it satisfactory to rely on it in determining areas of potential risks of budgetary institutions. State Financial Inspection issued by various regulatory provisions relating to the control of public institutions. Although in different countries the scope of this regulation are not the same, it usually includes a number of fundamental principles which were intended to promote an adequate system of control and regulation of matters relating to the legality and effectiveness of public spending. Most oversight bodies also developed methods, practices and procedures in various fields, such as inspecting of public procurement, public financial audits, and more.

The quality assessment of internal control budgetary institutions of public financial control can follow different approaches. One approach is that supervisors evaluate the work of the Internal Audit establishments, including test management procedures for the detection, measurement, risk monitoring and control. If the supervisory authorities are satisfied with the quality of work of the internal audit department, they can use the results of the internal auditors as a primary mechanism for the problem of control in a public institution or to determine areas of potential risk has not been verified by auditors in the recent past.

According to the practice of constructing interaction of external audit with internal auditors, the supervisory authorities should periodically consult with the internal auditors of ministries and agencies to discuss identified areas of risk and the measures taken. It may also be discussed in the degree of cooperation between internal audit institutions of the general government and public external controllers.

Although the internal audit doing a great task, its does not criticize the policy of the state institutions and, with the exception of the internal control policy usually can not doubt it, or appropriateness of individual management decisions. This issue is important from the supervisory point of view, as a unstable policy could harm the interests of potential users of public services, create a negative image of public institutions, and ultimately harm the public interest and the proper functioning of the state system of providing certain types of socially important services such as medical, educational, social. However, this does not exclude the possibility for the internal audit report and respond to senior management of a government agency or ministry, ministry of leadership adopted a decision contrary to legal or regulatory provisions or the written methods and procedures of the institution. When the head of internal audit institution ceases to act as such, a good practice is to timely inform the authorities of the state institutions of the state financial control of the circumstances of this fact. In case of resignation from the head of internal audit for any reason, the period when he is released from its duties, authority external state control should consider meeting with him. The purpose of this communication is to establish facts that could lead to negative consequences of such a release.

In this case, under any circumstances, the organization of regular external oversight bodies on policy discussions of the institution encouraged together with the head of internal audit under the control of institutions. But to guide the internal audit departments of ministries and agencies is good practice to combine efforts in conducting sectoral consultations between them and the bodies of state financial control on matters of mutual interest. To build effective relationships between the internal auditors of public institutions and external bodies of state financial control should be encouraged in recent consultation between internal and external auditors for the purpose of improving the efficiency of effective cooperation.

By activities of control external auditors provide a significant impact on the quality of internal control, including through discussions with management of agencies recommendations to improve internal controls.

It is well known that the internal audit, including and government agencies can be useful in determining the nature and extent of the temporary schedule of external audit procedures. However, the public external auditor has sole responsibility for the preparation of an act of validation. The external auditor that performs authority inspections of state financial control wants to be consulted and have access to relevant internal audit findings and to be informed of any important thing that attracts the attention of

the internal auditor and can affect the performance of the external auditor. Similarly, the public external auditor should inform the internal auditor of any significant matter that may affect the internal audit.

The management should ensure that internal audit plan in a way that made the internal auditor's work is not duplicated the work of the state financial controllers. Coordination of efforts in the audit is, including holding meetings to discuss issues of mutual interest to share the results of audits, develop a common understanding of the control procedures and terminology.

Conclusion

In general, proposals for "correct model" behavior, the distribution of roles, responsibilities of Internal Audit, Financial Inspection (internal centralized state financial control) and external audit (parliamentary control of the Accounting Chamber of Ukraine) in public administration, identify the ways of interaction, coordination of planning according to the level standards would achieve interaction as minimize duplication of audit trail and mutual use of the results. The standards should include the basic structural characteristics of reporting the results of monitoring system in the interaction of internal audit, financial inspection and external audit.

At the same time it should be noted that standardization of interaction with internal auditors' budgetary institutions will affect the development of public internal financial control and for inspection activities in the specification of the responsibilities, powers and tasks.

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The book "Development, Innovation and Business Potential in View of Economic Changes" handed over to the Readers, by collecting and organizing the developed knowledge, findings and new search, inscribes into the presentation of interesting investigations, detailed analysis and resulting evaluations conducted by the Authors, describing complex and multidimensional issues of development and economic policies, innovation in the behavior of enterprises, their competitiveness and optimization of operations, as well as the financial aspects of their functioning and control. The entirety of the Authors' deliberations is divided into four thematic parts creating one coherent whole:

- Creation of Development, Competitiveness and Business Potential,
- Macroeconomic and Sectoral Policy Problems in Terms of Economic Analysis,
- Decision-Making Factors of Optimization, Reliability and Innovation Processes in Enterprises,
- Financial Aspects of the Functioning and Control of Firms and Public Institutions.

The publication came into existence on the basis of many years' cooperation of Department of Economics and Organization of Enterprises at Cracow University of Economics with representatives of various Polish and foreign scientific centres and individuals coming from economic practice. Within the framework of this cooperation are organized, among others, conferences, seminars and symposiums, which are a platform for exchanging ideas and views. Results of such cooperation are the following English-language books published by the Foundation of the Cracow University of Economics:

- Borowiecki R., Jaki A. (eds.) (2008), *Enterprises in the Face of 21st Century Challenges. Development – Management – Entrepreneurship,*
- Borowiecki R., Jaki A. (eds.) (2009), *Global and Regional Challenges for the 21st Century Economies,*
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- Kaczmarek J., Rojek T. (eds.) (2012), *Dilemmas of the Contemporary Economy Facing Global Changes,*
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