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Contents

Spis treści

Foreword

The editors of *The Małopolska School of Economics in Tarnów Research Papers Collection* are honoured to offer the Readers the opportunity of becoming acquainted with the second issue of the semi-annual collection prepared within the "Research Papers Collection Online" project. Following the premises of the project, all the works submitted with the publishing team have been released in two language versions: Polish (online) and English (printed and electronic). The project is a part of the "Index Plus" programme of the Ministry of Science and Higher Education, aimed at spreading the word about the work of Polish authors both in the country and abroad.

The semi-annual publication is a joint work of academic and didactic teachers and doctoral students of the Cracow University of Economics, University of Agriculture in Krakow, University School of Physical Education in Krakow, the Warsaw University of Technology and the employees of the Małopolska School of Economics in Tarnów. The fact is worth emphasising that it has been developed by professionals in business practice areas. The papers in this volume are the result of research work conducted within basic and implementation work on entrepreneurship and on innovative activities in companies and institutions, on shaping innovative attitudes in the youth and in students, and, last but not least, on the State policy in this respect. The authors have presented the models which allow making estimates of the effects of these activities on the economy, ecology, culture, higher education and business entities.

The works presented in this publication may prove to be interesting and useful for management theoreticians and researchers dealing with these issues in the industry aspects, as well as practicians and students.

It is also important that this volume continues our publishing tradition and has been released after reassessment by a team of specialists appointed by the Ministry of Science and Higher Education. Thus, we are deeply satisfied that "The Małopolska School of Economics in Tarnów Research Papers Collection" has found its way to the list of research magazines with increased scoring for the papers published in it.

Leszek Kozioł
Chief Editor

Bożena Alejziak*

Innovativeness of the museum offer in the cultural education of children and youth: The example of selected museum facilities in Krakow

K e y w o r d s: museums, cultural education of children and youth, innovativeness

S u m m a r y: The museum in the modern world meets many needs of the youth, such as the need of aesthetic experience, deepening knowledge, need of pleasant and quality spending of free time. For this reason, the objective of this paper was analysing the educational offer in the context of its attractiveness and innovativeness, proposed by several selected museum facilities in Krakow. The largest facility was selected for the analysis, that is the National Museum and the units that have specialised exhibition, like for example the Historical Museum, the Natural History Museum, the Salt Mine Museum in Wieliczka, and the "Manggha" Museum of Japanese Art and Technology. From the point of view of tourism and young visitors, the highest significance comes from making the collections available, as well as from their professional explanations and offering interesting educational enterprises based on own collections.

To enable museum facilities to change their image from the so-called sanctuaries of culture to modern facilities, attractive for a young tourist, changes in the way their collections are presented are necessary. Using computer technology and knowledge is most important here, which means offering the multimedia aspects of the museum exhibition, making the collections available online, offering museum meetings on the principle of active participation strategy, offering high degree of interactivity and the "hands-on" experience. The museums in question fully meet the above criteria and may be regarded as modern museum facilities which present their collections at a high European level. The characteristic feature of museum tourism is a high share of single-day trips in the specialised offer.

The activities of the museums suffer from poor promotion and advertising of their educational products and the resulting local reach and limited knowledge of the offer by tourists coming from outside of the region.

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1. Introduction

Museums have long been regarded as the "temples" of high culture, and the method of presentation of their collections did not encourage to visiting them frequently. Visiting museums was associated with boredom, especially for young people, and staying in them resulted from the necessity of executing the obligatory agenda of many school trips. The low number of young people visiting museums is confirmed with the research on tourist activities of the youth run for many years by the Institute of Tourism in Warsaw. They show that visiting museums and objects of historical value in the years 2002–2009 was practised by less than one fifth of the young tourists (1, p. 38, 47; 2, p. 38, 47; 3, p. 38, 47; 4, p. 38, 47; 5, p. 38, 47; 6, p. 38, 47; 7, p. 99–117).

Due to low interest of the youth in the cultural heritage, as well as awareness of the fact that this situation should be changed, this paper is aimed at the analysis of some aspects of the museum offer addressed to children and youth by the selected museums in Krakow. Children and youth constitute one of the more important segments of tourism, thus the habits of participation in culture should be developed from the early years. Change is thus necessary, or modification in the approach of the museums to presentation of their own collections by introducing modern, innovative and attractive educational offers and their presentation adjusted to the expectations of young visitors. Introduction of product and technological innovations will certainly improve low attendance of children and youth in museum tourism.

2. Definitions and terms

The first step in the analysis of attractiveness and innovativeness of educational programmes included in museum offers addressed to children and youth should consist in defining such terms as "museum", "museum tourism", innovations and innovations in tourism. According to the Polish act (8), "a museum is an organisational unit not dedicated to achieving profit, whose objective is taking care of the objects of historical value, informing about the values and content of the collections, popularisation of the basic values of the Polish and world history, science and culture, developing learning and aesthetical sensitivity and enabling contact with collections." Moreover, important objectives of museums come in the form of *managing educational activities, making the collections available for educational purposes, ensuring the appropriate conditions for touring and using the collections*, and managing publishing activities.

The heritage of culture and tourism are the factors which are mutually supportive. Tourism would have never evolve to such a scale without cultural heritage. The same is with the cultural heritage which could not reach wide circles of recipients without

tourist travels. Thus, according to Armin Mikos von Rohrscheidt (9, p. 61), "museum tourism is an undertaking of tourist nature, where the main reason for a travel and its objective is visiting one or several museum facilities." To enable museum facilities to change their image from the so-called sanctuaries of culture to modern facilities, attractive for a young tourist, changes in the way their collections are presented are necessary.

Innovation means introduction into the practice of a company of a new or significantly improved solution in reference to a product (goods or services), a process, marketing, as well as in the scope of organisation and management (10; 11, p. 25 et seqq.). Innovativeness in tourism as an area of services is defined very extensively and refers to products and the process of providing services, management over a company, logistics or creating relationships with the environment. The features which are specific for tourist services make the innovative process differ under many respects from that in production activities. The tourist product is an important subject of innovation in the intangible area, which allows facing the increasing requirements and expectations of tourists, and its high quality prevents loss in popularity in individual travel destinations. In tourism, contact of the client with the service provider is sometimes more important than the product (which is not always recognised), along with mutual relationships resulting from the time of providing the service (12, p. 469).

Technological innovations in tourist services are equally important as non-technological innovations (12, pp. 468–469). However, to achieve satisfactory results in this area of innovation, tourist companies should have the appropriate technological facilities, which facilitates application of new marketing and organisational strategies (e.g. multimedia support, interactivity, making the offer available online and the possibility of online booking, etc.). This applies also to the introduction of modern, innovative museum products, which is one of the conditions of a higher interest in museum tourism which constitutes an important area of cultural tourism, where the main objective is presentation of the material and intangible cultural and national heritage.

3. Museum education in current research

The report "Museums in Poland 1989–2008" is one of more important documents diagnosing the situation of museums in Poland. It follows from it, contrary to common belief, that educational activities in the Polish museum facilities is executed at the respectable level, and almost 717 museum institutions have active websites with information about the offered educational programmes (13, p. 30). Common access to the educational activities conducted by museums is also confirmed with the research conducted by the National Museum in Poznań. However, many inadequacies have been found out during this research, lowering quality of the activities of

the museums (e.g. lack of a separate space for educational activities, a workshop area, a computer room, a laboratory, a sound library or a media/ audio library).

4. Museums and tourism

The important strategic objective, as the Ministry of Culture emphasises, is including museums in the network of tourist services, that is the so-called cultural tourism. The execution of the above objective forces museums to initiate a series of changes related to making their collections available as well as to organisation of education for the region (13, p. 42). From the point of view of tourism and the youth visiting museums, the highest importance is assigned to attractive presentation of the collections, their professional explanations and offering educational enterprises based on own collections (9, p. 61). Unfortunately, only local reach and limited knowledge of the offer by tourists coming from outside of the region are a major shortcoming of the educational offers of the museums, although it results from the lack of organisational skills of effective promotion and advertising (9, p. 62; 14, p. 10).

The museum exhibition should be built not only on scientific premises, but should also take into account regularities which govern sightseeing and perception. In its organisation, the needs of the didactic process should be taken into consideration, and the presented contents should be set up according to a pre-defined order (chronological, historical, problem-related), should have a clear structure, should maintain the conditions of communicative presentation with various means (art, science, technology), should aim at creating interesting art forms and accurate information, and should evoke specific learning and emotional results in the group of young visitors.

An additional factor which increases interest in museum tourism in the group of young tourists may come in the form of, for example, application of the active participation strategy (15, p. 23 et seqq.) or use of the multimedia aspects of the museum exhibition. The "glass cabinet" museums are long gone. A modern museum is an interactive place which does not allow the young visitor to be a passive spectator only, draws him/ her into a dialogue, stimulates inquiry or individual search for the answers. The exhibition should affect all the senses of the young human being (hearing, vision, smell, touch). If the museum intends to be successful, it must take into account the expectations of the young human being of the 21st century, who lives in the civilisation of information and knowledge. It is noteworthy that the breakthrough moment in the presentation of the exhibition was the application of the computer technology in the Warsaw Uprising Museum, which is one of the most modern multimedia facilities in the country (16). Musée d'Orsay in Paris is also a good example of innovativeness, as it was the first facility to make its collections available online (17, p. 39). At present, virtual trips in museum collections are possible in many modern facilities.

5. The educational offer of the selected Krakow museum facilities

Krakow is perceived as a city unique both nationally and in Europe (it has been entered in the UNESCO World Heritage directory). Museums are an important element of its cultural heritage. For this reason, the authors have decided to analyse attractiveness of the museum offer addressed to young visitors in several selected museum facilities in the context of innovativeness and versatility of the educational programmes. There are 26 museums and 62 galleries and exhibition halls in Krakow, so several facilities characteristic of the city were selected for the analysis, such as the National Museum (which is the largest museum facility) and several museums with specialised activities: the Historical Museum, the Natural History Museum, the "Manggha" Museum of Japanese Art and Technology, and the Salt Mine Museum in Wieliczka.

The National Museum in Krakow

This is the largest museum facility in Krakow, established in 1879 as the first national museum institution of the Poles during the partitions period. At present, the Museum offers various forms of educational activities addressed to children of school and nursery school age and the disabled. The museum lessons are dedicated to the issues close to the school curricula, and it also supplements and expands their information resources. The proposed classes include creative workshops executed in the form of interactive classes with the associated art activities or museum lessons which stimulate creative thinking (18). The scope and variety of the offered subjects is very rich, adjusted to the age and interests of young participants. Some of the proposals are "The Legends of Krakow" (the programme prepared the stories of the history of Krakow, based on the sculpture by Wacław Szymanowski), "Shapes and geometric figures in art" (explaining the term "cubism"), "Adventure with art. The first visit in the museum". How did museums come into existence? Can every single artist paint? What is art? These are only a few proposals from among the very rich museum offer.

Aquarium and the Natural History Museum in Krakow

The museum stores live specimen of fauna and flora from the farthest corners of the world, thus forming the most exotic place in Krakow and the only facility of this type in Poland. The best advantage of the activities of the museum comes with its interactivity and openness to the individual needs of the visitor. It is a modern, multimedia-focused museum which enables the visitors to actively participate in the life of exotic animals, not seen in daily life here. The only zoo is located here where all the visitors may see the secrets of the exhibition (19). The museum has a rich educational programme dedicated for kindergartens, primary schools, gymnasia (junior

high schools), and secondary schools. The visitors will not find here dust-covered display cases, uninterested guides or boring and "school" approach to the classes. What makes the classes attractive is the possibility of direct interaction with some animals, running "hands on learning" activities, a network of multimedia information kiosks with touchscreens where additional information about the presented animals may be learned, and new enterprises executed in the scope of the educational offer, that is the virtual trip online around the museum.

The Salt Mine Museum in Wieliczka

The Salt Mine in Wieliczka is the only mining place in the world open and active uninterruptedly from the Middle Ages to this moment. Its original headings (drifts, ramps, mining chambers, lakes, shafts, and small shafts) with the total length of about 300 kilometres are located in 9 levels down to 327 metres, and illustrate all the stages of development in the mining technology in particular historical ages. Due to its historical value, the mine was entered in the UNESCO World Heritage List in 1978 (20).

With a view on little tourists, the mine has prepared unique touring programmes addressed to school and kindergarten groups. The extraordinary lesson in the salt underground gives the young explorers the possibility of active learning about one of the most known Polish historical objects. Participation in the offered classes develops imagination, sensitivity to the beauty of the surroundings and creativity by way of active participation in the offered plays and tasks. The offer for school groups includes the proposals within which the following aspects are covered: "Discover the Salt Land" (the offer dedicated for children of 5–10, was proclaimed to be the "best tourist product" in the 4th edition of the Polish Tourism Organisation competition), "Following the legends of the Wieliczka mine", "Become the explorer of the mine depths", where the programmes have been prepared with a view on supplementation of the curriculum executed in gymnasia and secondary schools in the field of geography and history of Poland (21).

The "Manggha" Museum of Japanese Art and Technology

The museum was established in 1994 as a branch of the National Museum in Krakow. With the status of independent unit, it has been the European centre of Far Eastern culture since 2007. In terms of forms and results, the activities of the museum are consistent with the understanding of the role of a modern institution of culture which introduces new, non-museum forms of activities, extending beyond the traditional activities related to collecting, preparing and making the collections available. In popularisation of the things Japanese since many years, it has been using varied methods, means and forms of work, including multimedia and modern audio-visual means. All this is done to help the recipient brought up in the European culture understand the specific nature of the Asian culture (22).

The educational offer for kindergartens, primary and other schools includes unconventional learning about the Japanese culture by children and youth. With a special programme "Japan then and now", the visitors may enjoy an attractive and interesting form of presentation of art and technology of the Cherry Blossom Country. The used forms of communication include a movie presenting Japan at the background of changing seasons of the year and a multimedia presentation adjusted to the age of viewers, presenting selected issues from the culture, art and daily life in Japan. Moreover, the museum offers to the youth interesting workshops such as origami (the Japanese art of paper folding), calligraphy (writing the basic Japanese characters with a brush), the tea ceremony (the Japanese-style ceremony of tea preparation), kimono (presentation of the traditional Japanese clothing and additions to it), ikebana (the Japanese art of arranging flowers), the Zen garden (learning the principles of establishing traditional Japanese gardens), furoshiki (tying a scarf traditionally used in Japan for packing and handling various objects) (23).

The Historical Museum of the City of Krakow

The Historical Museum of the City of Krakow was established in 1899. Nowadays, one of the more important actions which it has undertaken to execute is the jubilee project on the commemoration of 750 years passing from the location of Krakow with the Magdeburg law, completed in the years 2005–2007, including a series of exhibitions on *Legends and secrets of Krakow* (24). The museum manages broad education for children and youth, with its interesting "Spring with Museum-Mania" or "Academy of Little Explorers", "Krakow really for everyone", "Play Krakow", "The most beautiful building structures in Krakow", "Parchment and pen: The office of the city scribe", "Knights' tournaments", "The history of Nowa Huta" and many others (25). Within the Historical Museum, the PRL Museum (People's Republic of Poland Museum) is also active, established in 2008, and offering the project "Put your shoes on, come to Huta" (26). It is the first multimedia educational path with street game elements in Poland (27).

6. Conclusions

The museum in the modern world meets many needs of the youth, such as the need of aesthetic experience, satisfying curiosity, deepening knowledge, developing an outlook on life, finding life patterns and ideals, the need of pleasant and quality spending of free time (17, pp. 36–37). To develop their activities or maintain important position, museums have to actively respond to the challenges and needs of the modern youth. To enable museum facilities to change their image from the so-called sanctuaries of culture to modern facilities, attractive for a young tourist, changes in the way their collections are presented are necessary, which is possible with intro-

duction of innovative products, offering museum meetings on the principle of active participation strategy in the creative and learning process, offering "hands-on" activities, providing technological innovations or using computer-based techniques and IT knowledge (the multimedia nature of the museum exhibition, high interactivity, making the collections available online). The proposed changes should be, obviously, safe for the youngest visitors (28). The offer of the selected Krakow museum facilities, such as the National Museum, the Historical Museum, the Natural History Museum, the Salt Mine Museum in Wieliczka, where the exhibition concerns also health tourism (29), the "Manggha" Museum of Japanese Art and Technology, one may notice that these are modern museums offering many interesting, attractive and innovative solutions in presentation of the educational offer of the facility. These are:

- interesting museum classes and workshops with multimedia and interactive computer-based techniques (the National Museum, the Historical Museum, the Natural History Museum, the Salt Mine Museum in Wieliczka, the "Manggha" Museum of Japanese Art and Technology, the Natural History Museum);
- making the collections available online with the so-called e-museums (the National Museum, the Natural History Museum, the Historical Museum);
- offering "hands-on" activities (the National Museum, the Natural History Museum, the Salt Mine Museum in Wieliczka);
- offering museum meetings on the principle of active participation strategy (the National Museum, the Salt Mine Museum in Wieliczka, the Natural History Museum);
- offering to children and youth "active" classes with participation in the creative and learning process (the National Museum, the "Manggha" Museum of Japanese Art and Technology, the Salt Mine Museum in Wieliczka);
- the offer for the disabled children and youth (the National Museum, the "Manggha" Museum of Japanese Art and Technology).

This analysis has proved that despite a popular belief about museum facilities as units of low flexibility, where a rigid and unattractive touring programmes are offered, the museums described here feature a noticeable change in the approach to young visitors. The Krakow museums presented in this paper have introduced many interesting educational offers (creative workshops, museum classes, special events) and apply modern techniques of communication to encourage children and youth to frequent visiting.

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Innowacyjność oferty muzealnej w edukacji kulturowej dzieci i młodzieży. Na przykładzie wybranych obiektów muzealnych w Krakowie

S t r e s z c z e n i e: We współczesnym świecie muzeum spełnia wiele potrzeb młodzieży, takich jak: potrzeba doznań estetycznych, pogłębiania wiedzy, potrzeba przyjemnego i wartościowego spędzania wolnego czasu. Z tego względu celem niniejszego artykułu było przeanalizowanie oferty edukacyjnej w kontekście jej atrakcyjności i innowacyjności, proponowanej przez kilka wybranych placówek muzealnych w Krakowie. Do analizy wybrano największą jednostkę, jaką jest Muzeum Narodowe, oraz jednostki posiadające specjalistyczną ekspozycję, do których zaliczyć można Muzeum Historyczne, Muzeum Przyrodnicze, Kopalnię Soli „Wieliczka" Trasa Turystyczna, Muzeum Sztuki i Techniki Japońskiej „Manggha". Z punktu widzenia turystyki oraz młodych zwiedzających największe znaczenie ma atrakcyjne udostępnianie zbiorów, ich fachowe objaśnienie oraz oferowanie ciekawych przedsięwzięć edukacyjnych w oparciu o własną kolekcję.

Aby obiekty muzealne zmieniały swój wizerunek z tak zwanych sanktuariów kultury na obiekty nowoczesne i atrakcyjne dla młodego turysty, konieczne jest wprowadzanie zmian w sposobie prezentacji ekspozycji. Najważniejsze znaczenie ma tutaj wykorzystanie technik komputerowych oraz wiedzy informatycznej, czyli proponowanie multimedialnego charakteru ekspozycji muzealnej, udostępnianie zbiorów w sieci, proponowanie spotkań muzealnych na zasadzie strategii aktywnego uczestnictwa, proponowanie wysokiego stopnia interaktywności oraz zasady „hands-on". Analizowane muzea w pełni spełniają powyższe kryteria i można je uznać za nowoczesne placówki muzealne, prezentujące swoją ekspozycję na wysokim poziomie europejskim. Charakterystyczną cechą turystyki muzealnej jest duży udział w ofercie tematycznych wycieczek jednodniowych.

Dużym mankamentem działalności muzeów jest słaba promocja i reklama posiadanych produktów edukacyjnych i wynikający z tego ich lokalny zasięg oraz mała znajomość posiadanej oferty przez turystów spoza regionu.

S ł o w a k l u c z o w e: muzea, edukacja kulturowa dzieci i młodzieży, innowacyjność

Marzena Bac*

Tradition and innovations in managing flood risk in Poland

K e y w o r d s: flood risk, flood risk management, innovation, innovativeness

S u m m a r y: The paper presents traditional and innovative solutions in managing flood risk in Poland. A short report on the problem of flood losses and presence of this risk in the world is the introduction to the above discussion.

It constitutes one of the main dangers of catastrophic nature (right after earthquakes) which affect the modern humanity. The risk of earthquakes is at a relatively stable level, but the risk of floods causes more and more victims and losses in the economies of the world.

The term "flood risk" appears in many legal acts and source materials available, both Polish and international, among which special attention has been paid to the EU Floods Directive. It introduces major changes in flood risk management, also for the Polish standards.

The traditional attitude to managing the analysed risks most often comes down to the way of thinking and acting in the face of flood hazard. Expecting flood levees to perform as expected when living in the natural flood areas of rivers and mountain streams may result in increased hazard and worsening of the situation. Tradition manifests here in the way flood works are executed and in risk management (lack of active protection measures for the endangered entities/ areas, hoping that "technology will make it", shifting responsibility for execution of protection work on particular units managing water resources in the country). Innovative solutions are based on application of modern technologies and/ or materials, as well as other tools, such as the law (act which regulate the discussed emergencies, comprehensive flood protection programmes), early warning systems, education, insurance or ART financial instruments in the capital market. The paper analyses the most important of them.

The conclusion presents in brief the results of inspection of the Supreme Audit Office in the scope of flood protection in Poland and synthetically summaries the above discussion with attention paid to implementation problems for innovative solutions in the analysed scope.

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1. Introduction

Flood events and the resulting losses belong to the most common and turbulent manifestations of extreme natural disasters.

According to the *United Nations Development Programme* (UNDP) concerning consequences of natural disasters, with the example of the last two decades of the 20th century and the level of exposure and susceptibility to various disasters in particular countries of the world, on the average almost 196 m people in at least 90 countries are exposed to the flood risk every year. The number of casualties in floods per million of residents in the analysed period was highest in Asia and in the Pacific area (14.11), and lowest in Northern America (0.31). In Europe, this indicator was 1.68 (1, pp. 9, 14).

According to UNESCO, about 9 m people lost their lives in floods in the 20th century. At the end of the last century, ca 150–170 floods were recorded every year in the world (2).

According to the definition in Article 2 of Directive 2007/60/EC of the European Parliament and Council of 23 October 2007 on assessment of flood risk and flood risk management (referred to in the literature as the Floods Directive), "flood risk" is a combination of the probability of occurrence of flood and the related prospective negative consequences for human health, the environment, cultural heritage and business activities, whereas flood is a temporary covering with water of the area which is not covered with it under standard conditions (3, Article 2, p. 27). This definition includes events caused by rivers, mountain streams, as well as mediterranean periodical water streams, which applies only to the countries on the Mediterranean Sea in the belt of its specific climate, and storm floods, which may occur in sea coast areas, but it may not take into consideration floods caused by sewerage systems. The quoted act of the EU law applies to all member countries as of 26 November 2007.

Similar definitions of flood are used in Poland (in professional literature in this scope, in conference materials, in IMGW documents and in legal regulations in force). According to them, flood means freshet of river or sea waters, which causes measurable losses in property and social losses. Freshets are a natural phenomenon, necessary and ultimately useful for the environment, but floods constitute an example of disaster risk whose occurrence causes damages in the economy and in the society (more: see e.g. 4, p. 14).

Therefore, flood risk management aimed at limitation of its negative consequences becomes a priority, and in the all Europe context, not only for individual countries. In Poland, flood phenomena occur every year, the difference only consists in their intensity and reach (the area of inundated land), and, as a result, in the value of the losses incurred. The recent floods of 2010 and early 2011, apart from tragic experience, resulted in new acts regulating the issues related to flood protection and compensation of losses, thus there is quite large and current set of materials for the discussion.

The objective of this paper is indication of solutions in the area of flood risk management used in Poland, with special attention paid to their traditional and innovative nature.

2. Traditional flood risk management in Poland

The problem of flood disasters cannot be eliminated, as it is not within the realm of human activities (due to inevitability of this type of natural phenomena). According to scientific research in the field of hydrology, now and then the reach and consequences of floods exceed the forecasts. The most probable causes of extreme natural phenomena, apart from the popularised *global warming* as a derivative of pollution of the natural environment, are the Sun activity (which decides about the strength of the solar wind) and the volume of sun light reaching the Earth, thus causing formation of clouds. This activity is nowadays very strong, resulting in warmer climate, and high temperatures feed phenomena based on pressure, such as hurricanes and tornadoes, which in turn cause further disaster, like floods or fires.

Traditional methods of managing flood risk manifest mostly in the attitude to its essence. The basic objective of such management is liquidation of the consequences of floods and preventing their occurrence by controlling the flow and levels of water in river beds.

Liquidation of damages is an obvious activity resulting from the necessity of saving people and their property. The provision of the Constitution on the obligation of the state to protect citizens and their property should be understood in a broader way, as the task of the state to undertake actions to prevent actualisation of risk/ hazard. Protection against flood constitutes also, as indicated in the Water Law of 18 July 2001 (5), the task of government and local government administration. The point is to create legal standards, formal procedures and means for creating conditions for protection of citizens against phenomena threatening life and health and causing high losses in property. Most of waters and water devices, including used for flood protection, is managed by regional and voivodeship water management administrations, that is local government budget units reporting to voivodeship speakers.

The President of the National Water Management Administration (KZGW), reporting directly to the minister for water management, supervises regional ZGWs in Gdańsk, Gliwice, Krakow, Poznań, Szczecin, Warsaw and Wrocław, and units of the state hydrological, meteorological and hydrogeological services. Additionally, flood protection is also the duty of such departments as the Ministry of Agriculture and Rural Development; Infrastructure; Home Affairs; and Administration; and the Government Security Centre (6, p. 16).

Flood management is part of crisis management, pursuant to the Act of 26 April 2007 on crisis management (7). The crisis management system deals with occurrence of hazards which require undertaking special measures by public administration. The

centres for crisis activities included in the system deal with events which create hazard for integrity of the territory, life, health, property or infrastructure of strategic importance for the society, cultural heritage or environment (the so-called incident situation, that is protection of building structures, equipment, installations and services of key meaning for security of the state and its citizens and efficient functioning of bodies of public administration). However, this applies to such degree of hazard which does not require announcement of any extraordinary rules (martial law, state of emergency or natural disaster situation). Crisis management may thus be used in case of natural events such as floods, hurricanes, droughts or technical breakdowns, pursuant to the provisions of the Act of 18 April 2002 on natural disaster situations (8, Article 3).

The Voivodeship Drainage and Water Devices Management (WZMiUW) and the Regional Water Management Authority (RZGW) constitute the appropriate entities which deal with broadly understood water management, investments in this respect and managing the issues related to flood protection. Examination of the causes of building disasters and co-operation with the bodies of state inspection remain in the realm of the organs of construction supervision (voivodeship and county inspectorates of construction supervision and their managers, as well as the Chief Inspector for Construction Supervision). Additionally, apart from the said Water Law, the Building Law of 7 July 1994 (9) also specifies the scope of competencies of regional and voivodeship administrations of drainage and water devices.

The organisation of water management in the country is presented in Figure 1.

Unfortunately, there is no certain preventive measure against floods, and using the known and traditional technical solutions applied for this purpose is not, according to specialists in this field, unanimously positive. Traditional methods of flood risk management thus include technical measures and methods, such as:

- river bed embankments along the river flow;
- reservoirs which regulate retention (storage reservoirs, relief canals, dry canals);
- accumulation reservoirs and devices (which are used for management of water resources, control wave height: by opening and closing in the proper moments of the flow of water, they reduce wave height, thus minimising the risk of river bed overflow, additionally providing electricity), i.e. the gates in the ditches, locks, weirs, dams on rivers;
- river regulation (their banks and bottoms);
- polders (natural inundation areas beyond retention embankments);
- planting vegetation in inundation areas and wastelands (the so-called phytoimprovement).

Innovative solutions are also used, described in more detail in section 3 of this paper. However, these methods are more often related to the traditional approach to flood protection.

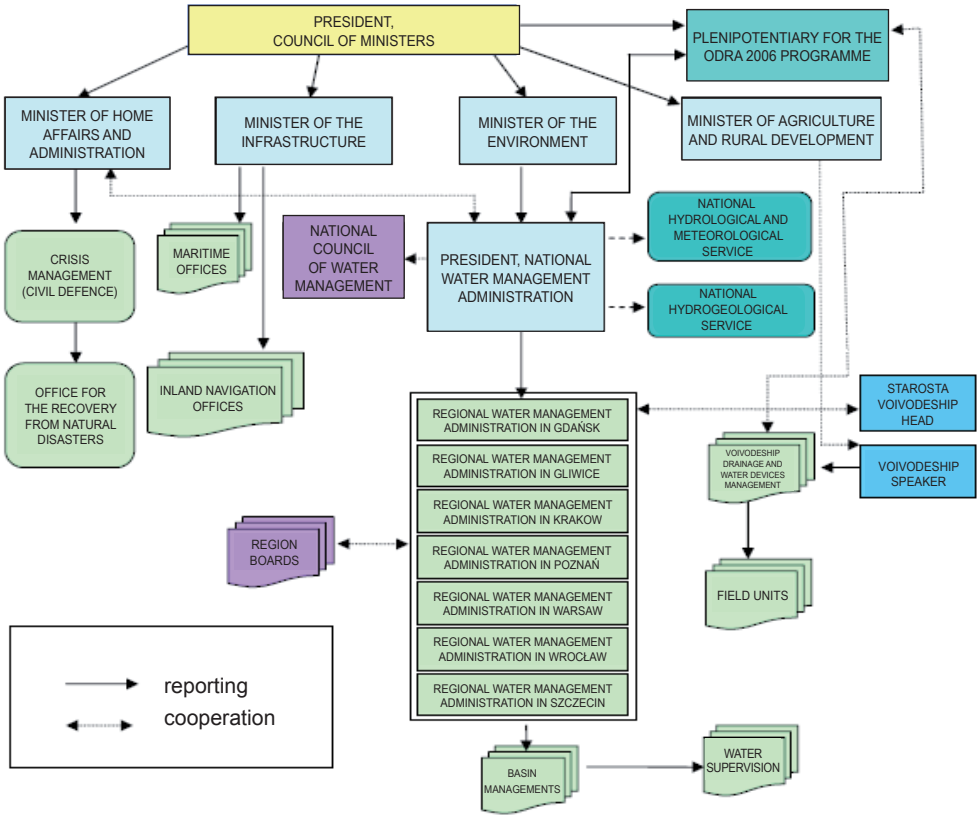

Figure 1. Organisation of water management in Poland

S o u r c e: (10, p. 14).

3. Innovativeness in flood risk management methods

Innovative solutions[1] in reference to actions commonly called by a collective term "flood prevention measures" boil down in Poland mostly to using new technologies in construction, rebuilding or expansion of flood protection measures. Modern methods include various types of shields and cores (e.g. made of cohesive soils, geomembranes, vinyl chloride, polyethylene, PEHD), vertical filtration barriers made of hardening suspended matter, leak-tight walls executed where there is no room for expansion of the levee or aprons sealing sub-floor on the draining side made of ma-

[1] In this article, new solutions/ actions regarding flood risk management, different from previously used, are being regarded as innovative solutions.

terials similar to those for shields and cores (mostly geosynthetic) (11). Direct examples of such solutions include mobile flood prevention systems in the form of flood barriers made of retention beams and walls with locking mechanisms built of them (12),[2] flood barriers and gates (13)[3] or the Beaver protection system, awarded in June 2011 during the EDURA 2011 fair in the category of "Measures of protection for people and property" (14).[4]

Innovativeness manifests also in activities of technical nature, contrary to these whose objective is river regulation. They consist in recovering the natural flow of rivers and are named renaturisation, as it was done with the river of Rhine in Germany.

Some innovative legal solutions may help in executing flood prevention investments. Their innovativeness consists in application of procedures not applied so far in such cases, which are to facilitate and accelerate execution of the activities used for flood protection, which is in fact improving and reforming the use of such solutions in practice. One of these solutions is the Act of 8 July 2010 on special principles of preparation for execution of investments in the scope of flood prevention building facilities (15), hereinafter referred to as a special act. It is based on a similar special road regulation (16), introducing extraordinary mechanisms of acquisition of private estate properties for this purpose to the process of flood prevention investments execution (the point is to take over the estate property for public objectives with the damages without the necessity of running the expropriation process).

Government programmes developed with a view on comprehensive protection of Poland against floods and mitigating their consequences may be also considered innovative. These programmes refer to the areas of river basins of the basic rivers in the country, that is Vistula and Odra, as well as Żuławy Wiślane. According to the premises, they allow effective, properly planned and included in planning documents execution of tasks and investments protecting against disastrous floods, as well as reforming the system of managing waters in the country. The scope of programmes and their main objectives are given in Table 1.

In the programmes given in Table 1, the draft State Water Policy is the superordinate and priority measure (the official abbreviation: Projekt PWP), and its time span shall be longest (it is longer than the average period, which results from international obligations, but mostly in the EU).

[2] The German technology of the company IBB, used in practice on a larger scale in the floods in 2002 and 2006, not only in Germany but in the UK, France, Switzerland, Austria, Belgium, the Netherlands, Luxembourg and the United States.

[3] Polish Technology of the Company Pierot Ltd, more commonly known for fire protection.

[4] Swiss technology representing pumped barrier consisting of two parallelly connected hoses filled with water.

Table 1

Characteristics of water management programmes in the scope of flood protection

Programme	Time (years)	Basic objectives	Tasks/ investments
1. State water policy up to 2030 (including stage 2016)—prepared by the National Water Management Administration based on the "Project of National Strategy of Management of Waters 2030 (including stage 2015)" PROEKO CDM Sp. z o.o.	2010–2016 2016–2030	a) common access of people to pure and healthy water, b) limitation of hazards caused by floods and droughts and reduction of risk of emergencies and their negative consequences, c) keeping good condition of waters and the related ecosystems, d) meeting justified water needs of the economy, e) the reform of the system of water management and financing (development by the end of 2013) of solutions in the field of organisation, financing and legal aspects and verification of the reformed system of waters management by the end of 2016), f) improvement of territory coherence as well as equalisation of regional disproportions	• the Upper Odra area: construction of the flood reservoir tank Racibórz Dolny, improvement of flood protection in Kotlina Kłodzka, modernisation of the water reservoir Nysa and increasing outflow of flood waters from this area, modernisation of Wrocławski Węzeł Wodny including hydrotechnical structures and flood embankments; • the area of Środkowa and Dolna Odra: liquidation of places difficult for ice breaking (rebuilding, modernisation and maintenance of regulation development), improvement of the outflow of flood waters; • the area of Upper Vistula: cleaning up water management for a set of tanks (Przeczyce, Kuźnica Warężyńska, Pogoria), modernisation of flood prevention structures in the valley of Przemsza, construction of the water reservoir Kąty-Myscowa on the River Wisłoka, completion of construction of the tank Świnna Poręba; • the area of Upper Vistula: ecological protection of the water step in Włocławek, improvement of flood safety reservoir in Wrocław, repair of side barriers, reinforcing banks and clearing away mud on the River Bug mouth to Zegrze Lake; • the area of Lower Vistula: protection of Żuławy Wiślane against floods
Program Żuławski 2030	1st stage by 2015, 2nd stage by 2030	• ensuring protection against flood	• 43 projects (modernisation of the flood protection infrastructure—reconstruction, rebuilding, expansion, non-technical activities: hazard recognition, prevention with natural protection methods, increasing awareness of local communities and representatives of the administration and institutions in the scope of flood risk management)

Programme	Time (years)	Basic objectives	Tasks/ investments
Program dla Wisły i jej Dorzecza 2020	opening in 2000, updating in 2006	• ensuring protection against flood: the goal will be achieved when risk of flood losses drops by 2020 to the level of 25% against 1997 (until 2006, this risk was to reach 60%)	• protection against flood: active (flood prevention reservoirs, small retention, polders, ice breaking), passive (flood embankments, regulation of rivers and mountain streams), non-investment (spatial planning, expropriation, tax and insurance systems), education, crisis action plans
Program dla Odry—2006	opening in 2001, updating in 2008	• modernisation of Odrzański System Wodny and radical improvement of flood safety in the basin of Odra (the concept of protection against flood in the "General strategy of protection against flood in the basin of upper and middle Odra after the high flood 1997")	• elimination of flood damages, developing preventive plans for spatial management and protection of water purity and the natural environment, modernisation and construction of flood embankments, organisation of polders, construction of retention reservoirs and small retention facilities, modernisation of the Odra river bed and the Opole water system node

S o u r c e: Author's own study on the basis of (6, p. 18; 17, p. 28; 10; 18; 19; 20).

Innovative solutions not only for Poland but also for all countries of the European Union have been introduced by the so-called EU Floods Directive. The obligations resulting from the Directive consist in preparation of the initial assessment of flood risk (by the end of 2011), flood hazard maps (by the end of 2013), flood risk maps (similarly to hazard maps, by the end of 2013) and plans for flood risk management (by the end of 2015). The order of publicising the above documents by public announcement is also important. Additional documentation on flood risk in the area of member countries will be made available by electronic means with the European Water Information System for Europe *WISE* (http://www.water.europa.eu/) and implementation activities for the guidelines of the Directive by particular members of the EU will be checked in this way as well. The implementation schedule for the Directive in Poland, prepared by the National Water Management Administration in 2008, is given in Figure 2.[5]

The solutions introduced by EU are mostly based on non-technical methods. Technical means are to extend duration of wave control (i.e. keeping it at the level which does not pose hazard to people and their property) and limit the reach and level of losses by construction, maintenance and rebuilding flood prevention structures and

[5] The novel to the Water Law (necessary to implement the Floods Directive in Poland), announced first in 2009, which should have been included in the Polish law by the end of November 2010, was passed as late as in January 2011, and became effective on 18 March 2011.

devices, while non-technical means emphasise prevention of floods and the resulting losses by education and legal actions (preparation of local communities to floods, increase in awareness of such hazards and possibilities of insurance coverage, the proper spatial management), protection of the areas exposed to flood risk (development of the section between the levee and the river bed, increasing the retention area in the form of polders) and development of risk management methods not only at the level of authorities, but for each citizen at risk. The non-technical solutions include highly innovative measures, like application of financial instruments in the capital market to transfer flood risk.[6] These are disaster bonds (*"Act of God" Bonds*), derivative instruments (*forwards*, *futures*, *options*, *swaps*), CatEPut (*Catastrophe Equity Put Option*) or securitisation products (e.g. ABS bonds: *Asset Backed Securities*, LBS: *Liability Backed Securities*). They determine access to cash from the moment of occurrence of the event agreed earlier (in this case: floods) which are the so-called *triggers*, i.e. events which "release" the capital. This is where their name came from: ART (instruments of Alternative Risk Transfer). They are used less commonly than insurance and reinsurance (which have become a practically traditional solution), and are often based on physical indexes or loss indexes, and for their effective sale or trading CATEX type exchanges are necessary (*Catastrophe Risk Exchange*) (21).

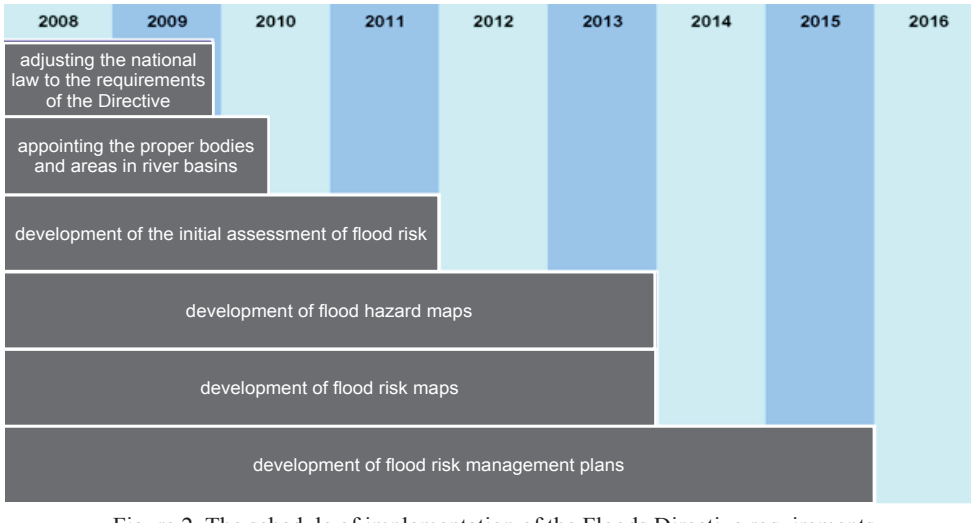

Figure 2. The schedule of implementation of the Floods Directive requirements

S o u r c e: (22).

[6] The specific solution of a fiscal nature (thus falling among non-technical methods) has been suggested by Professor Grzegorz Kołodko. It is a solidarity tax levied on the wealthiest citizens as a single fiscal instrument. The aim would be to prevent the deepening of the financial deficit or an increase in public debt as a result of catastrophic flood losses. The idea came up in the face of losses that occurred in May, June and August of 2010, as well as at the beginning of 2011 (23). Examples of flood risk management proposals do not fall within the scope of this paper, but may be the subject of a separate research article.

4. Conclusions

Flood risk management is a difficult enterprise, the execution of which is with public authorities, and effectiveness of the used solutions which constitute investments of public use affects national economy and the whole society.

According to the Supreme Audit Office (NIK), which published the report "NIK on floods (1994–2010)" in the end of January 2011, the situation in the scope of flood protection in Poland is bad. None of the inspected communes and powiats was assessed positively, and major problems refer to maintenance of flood prevention structures/ devices. Deficiencies in coordination of actions in the flood protection scope was also indicated (for eight years, the national flood protection plan set forth in the Water Law has not been developed). Finally, it may be said that despite access to the EU sources of financing, flood risk management has not been reformed and a homogeneous system applicable in any place throughout Poland where flood risk occurs has not been developed (24).

The activities with signs of innovations which were undertaken in Poland in this area are mostly of technical nature. Thus, one could speak about technological innovations related to the process of limiting flood losses (prevention and liquidation). New solutions, different from the currently used, in reference to flood risk management methods appear in the Polish acts of the law and ordinances. These expand the scope of possibilities of the proceedings in case of disasters events such as floods, but due to various impediments (lack of financial means, traditional attitude to flood risk among decision makers, fear of the risk related to costs and critical social opinion, etc.) are not always applicable. Additionally, there are no solutions in the analysed scope to support innovativeness in managing disaster risks such as floods, which is related to the fact that the process of managing such risks is difficult due to tragic consequences of its execution and due to the fact that this risk most often results from forces of nature beyond human control and due to its special, public nature. Therefore, the level of innovativeness in managing flood risk in Poland may be regarded as low.

The most demanded innovative action from the point of view of flood risk management in Poland would be to reform/ improve the entire system of water management in the country, in which protection against flood and minimising flood losses is just one component. The beginning should be with organisational structure and division of competencies, which seem to be pretty complex and unclear, and then move on to financial, legal and technological possibilities, which are very important for successful implementation of new actions. High costs of implementation of innovative solutions (research, laboratory tests, tests of new technology, costs of changes in legal regulations, personal costs and the whole execution of the enterprises) constitute the basic difficulties for execution of innovative and repair actions, for both a company and local government or the state. Lack of coherence and continuity in

financing the flood prevention system in Poland may effectively inhibit all manifestations of innovativeness in this field.

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Tradycja i innowacje w zarządzaniu ryzykiem powodziowym w Polsce

S t r e s z c z e n i e: Artykuł przedstawia rozwiązania tradycyjne i innowacyjne w zarządzaniu ryzykiem powodziowym w Polsce. Wprowadzeniem do powyższych rozważań jest krótkie zobrazowanie problemu strat powodziowych i zagrożenia tym ryzykiem na świecie. Stanowi ono jedno z głównych zagrożeń o charakterze katastroficznym (zaraz po trzęsieniu ziemi) dotykających współczesną ludzkość. O ile ryzyko trzęsień ziemi utrzymuje się na względnie stałym poziomie, o tyle ryzyko powodzi zbiera wciąż większe żniwo wśród ofiar i dotkniętych stratami gospodarek świata.

Pojęcie ryzyka powodziowego przybliża wiele aktów prawnych oraz dostępnych materiałów źródłowych, zarówno polskich, jak i międzynarodowych, wśród których szczególną uwagę zwrócono na unijną Dyrektywę Powodziową. Wprowadza ona istotne zmiany także dla polskich standardów zarządzania ryzykiem powodzi.

Tradycyjne podejście do zarządzania analizowanym ryzykiem sprowadza się najczęściej do sposobu myślenia i działania w obliczu zagrożenia powodziowego. Oczekiwanie, że wały powodziowe spełnią rolę, jaką im przypisano, na zamieszkanych naturalnych terenach zalewowych rzek i potoków górskich, może doprowadzić do wzrostu zagrożenia i pogorszenia sytuacji. Tradycja przejawia się tutaj w sposobie wykonywania prac przeciwpowodziowych, jak i zarządzania ryzykiem (brak aktywnego zabezpieczenia zagrożonych podmiotów / obszarów, liczenie na to, że „technika wytrzyma", przerzucanie odpowiedzialności za wykonanie prac ochronnych na poszczególne jednostki gospodarujące zasobami wodnymi w kraju). Rozwiązania o charakterze innowacyjnym opierają się na zastosowaniu nowoczesnych technologii i/lub materiałów, a także innych narzędzi, takich jak: prawo (ustawy regulujące omawiane sytuacje kryzysowe, kompleksowe programy ochrony przeciwpowodziowej), system wczesnego ostrzegania, edukacja, ubezpieczenia czy instrumenty finansowe ART z rynku kapitałowego. W opracowaniu przeanalizowano najważniejsze z nich.

W zakończeniu przedstawiono krótko wyniki inspekcji Najwyższej Izby Kontroli w zakresie ochrony przeciwpowodziowej w Polsce oraz dokonano syntetycznego podsumowania powyższych rozważań, zwracając uwagę na problemy wdrożeniowe rozwiązań innowacyjnych z badanego zakresu.

S ł o w a k l u c z o w e: ryzyko powodziowe, zarządzanie ryzykiem powodzi, innowacja, innowacyjność

Piotr Fijałkowski*

Models of dependence in stock exchange quotations in the example of quotes of copper and stock of KGHM Polska Miedź SA

K e y w o r d s: raw materials prices, stock exchange, correlation, econometric modelling, prediction

S u m m a r y: This paper describes the structure and testing of econometric models of dependence in copper quotes and quotes of KGHM Polska Miedź SA stock on the basis of 6-month data from the London Metal Exchange (LME) and from the Warsaw Stock Exchange (WSE). The reasons for application of such models come from the high correlations between copper quotes in LME in US dollars (x) and KGHM quotes in Polish Zloty (s) in WSE (about 0.96), which confirms the natural hypothesis of the dependency of these values.

The linear, power and exponential models are tested in the paper. This choice came from the naturalness of the linear model, the possibility of reduction of the power model and of the exponential model to the linear with variable replacement, frequent practical verifiability and lack of theoretical grounds for application of other models. The obtained linear model comes in the form: $y = 0.0303x - 120.4991$, whereas the alternative power model is: $y = 8.1816 \cdot 10^{-6} x^{1.8378}$. The exponential model and the linear, power and exponential models which take into consideration "one day delay" proved to be worse.

Contrary to the expectations of the author, taking into consideration exchange rate fluctuations in Dollar against Zloty and conversion of copper prices into Zloty at the current rate did not improve the data for the model, as the corresponding correlation ratio (about 0.94) is slightly lower than in the original version. Therefore, the design of the corresponding models proved to be useless.

These types of models may be used in predicting one value on the basis of forecast quotes of another. In the described case, the model may be the basis for predicting the quotes of KGHM Polska Miedź SA on the basis of the predicted quotes of copper.

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1. Introduction

The objective of this paper is designing and testing three models of dependence between two variables: linear, power and exponential, for the actual data, in the form of stock exchange quotes of copper and stock of KGHM Polska Miedź SA taken from a 6-month period.

2. Quotes

The data for this paper come from the website (1). The following table summarises copper quotes in the London Metal Exchange (LME), with 3-month delivery periods, in USD/t (variable x) and the KGHM closing price in the Warsaw Stock Exchange (WSE) in PLN (variable y) within a 6-month period from mid-September 2010 to mid-March 2011. This summary has omitted Saturdays and Sundays, that is the days of the week during which both stock exchange facilities are off, with further days omitted: 01 Nov 2010, 11 Nov 2010, 24 Dec 2010 and 06 Jan 2011, the days on which the WSE was closed. For 15 Sep 2010, the table takes into account only copper quotes, due to the fact that this day is taken into account only in the time-shift model.

Further columns give average NBP exchange rates of Dollar against Zloty (variable x_1) and copper quotes translated into PLN (variable x_2).

Date	x (USD/t)	y (PLN)	x_1 (PLN/USD)	x_2 (PLN/t)
15.03.2011	8991.0	168.6	2.9284	26329.24
14.03.2011	9235.0	172.5	2.8825	26619.89
11.03.2011	9073.0	170.5	2.9212	26504.05
10.03.2011	9210.0	169.0	2.8849	26569.93
09.03.2011	9629.0	175.8	2.8644	27581.31
08.03.2011	9431.0	176.3	2.8549	26924.56
07.03.2011	9854.0	181.4	2.8372	27957.77
04.03.2011	9980.0	182.0	2.8646	28588.71
03.03.2011	9910.0	183.9	2.8704	28445.66
02.03.2011	9830.0	177.8	2.8843	28352.67
01.03.2011	9920.0	175.1	2.8643	28413.86
28.02.2011	9845.0	175.5	2.8765	28319.14
25.02.2011	9675.0	168.1	2.8770	27834.98
24.02.2011	9440.0	163.5	2.8941	27320.30
23.02.2011	9512.0	164.0	2.8868	27459.24
22.02.2011	9650.5	164.5	2.9198	28177.53
21.02.2011	9815.0	168.5	2.8755	28223.03
18.02.2011	9800.0	166.5	2.8803	28226.94

17.02.2011	9790.0	165.5	2.8790	28185.41
16.02.2011	9905.0	171.0	2.8864	28589.79
15.02.2011	10110.0	175.0	2.9159	29479.75
14.02.2011	10124.0	177.0	2.9219	29581.32
11.02.2011	9905.5	177.8	2.9116	28840.85
10.02.2011	9865.0	173.7	2.8795	28406.27
09.02.2011	9973.0	177.9	2.8581	28503.83
08.02.2011	9925.0	175.3	2.8471	28257.47
07.02.2011	10120.0	176.2	2.8438	28779.26
04.02.2011	9978.0	175.9	2.8666	28602.93
03.02.2011	9941.0	173.3	2.8424	28256.30
02.02.2011	9920.0	174.0	2.8230	28004.16
01.02.2011	9810.0	174.9	2.8468	27927.11
31.01.2011	9680.0	168.2	2.8845	27921.96
28.01.2011	9585.0	170.5	2.8501	27318.21
27.01.2011	9471.0	173.9	2.8508	26999.93
26.01.2011	9370.0	167.0	2.8280	26498.36
25.01.2011	9316.5	167.0	2.8558	26606.06
24.01.2011	9480.0	173.5	2.8561	27075.83
21.01.2011	9455.0	175.0	2.8779	27210.54
20.01.2011	9465.0	175.0	2.8856	27312.20
19.01.2011	9756.0	181.5	2.8879	28174.35
18.01.2011	9715.0	187.5	2.8848	28025.83
17.01.2011	9651.0	176.8	2.9181	28162.58
14.01.2011	9572.0	175.5	2.9048	27804.75
13.01.2011	9620.0	180.0	2.9353	28237.59
12.01.2011	9618.0	178.2	2.9466	28340.40
11.01.2011	9472.0	167.0	3.0065	28477.57
10.01.2011	9360.5	161.4	3.0268	28332.36
07.01.2011	9390.0	162.5	2.9818	27999.10
05.01.2011	9434.5	166.5	2.9476	27809.13
04.01.2011	9715.5	171.0	2.9415	28578.14
03.01.2011	9665.0	170.0	2.9822	28822.96
31.12.2010	9665.0	173.0	2.9641	28648.03
30.12.2010	9514.5	167.9	2.9979	28523.52
29.12.2010	9430.0	166.0	3.0383	28651.17
28.12.2010	9332.0	163.1	3.0112	28100.52
27.12.2010	9332.0	162.5	3.0215	28196.64
23.12.2010	9241.0	163.0	3.0323	28021.48
22.12.2010	9359.0	163.2	3.0322	28378.36
21.12.2010	9353.5	162.9	3.0370	28406.58
20.12.2010	9206.0	157.9	3.0396	27982.56
17.12.2010	9072.5	155.0	2.9840	27072.34

16.12.2010	9020.0	154.0	3.0125	27172.75
15.12.2010	9060.0	159.4	2.9978	27160.07
14.12.2010	9208.5	160.9	2.9708	27356.61
13.12.2010	9141.0	163.0	3.0445	27829.77
10.12.2010	9069.0	159.9	3.0458	27622.36
09.12.2010	9011.0	157.6	3.0508	27490.76
08.12.2010	8849.0	159.5	3.0558	27040.77
07.12.2010	8986.0	159.0	2.9955	26917.56
06.12.2010	8729.0	151.9	3.0057	26236.76
03.12.2010	8707.0	144.9	3.0172	26270.76
02.12.2010	8670.5	141.2	3.0282	26256.01
01.12.2010	8499.0	139.1	3.0753	26136.97
30.11.2010	8286.0	134.0	3.1308	25941.81
29.11.2010	8260.0	135.3	3.0441	25144.27
26.11.2010	8235.0	137.0	3.0363	25003.93
25.11.2010	8251.0	137.3	2.9881	24654.81
24.11.2010	8245.0	138.1	2.9808	24576.70
23.11.2010	8120.0	134.7	2.9020	23564.24
22.11.2010	8376.0	138.6	2.8591	23947.82
19.11.2010	8391.5	137.7	2.8749	24124.72
18.11.2010	8360.0	139.0	2.8871	24136.16
17.11.2010	8110.0	134.1	2.9217	23694.99
16.11.2010	8470.0	134.0	2.8937	24509.64
15.11.2010	8565.0	137.2	2.8915	24765.70
12.11.2010	8681.5	139.0	2.8865	25059.15
10.11.2010	8720.0	136.9	2.8220	24607.84
09.11.2010	8835.0	144.0	2.8278	24983.61
08.11.2010	8680.0	134.1	2.8178	24458.50
05.11.2010	8710.5	134.5	2.7648	24082.79
04.11.2010	8539.0	133.7	2.7449	23438.70
03.11.2010	8405.0	128.0	2.8010	23542.41
02.11.2010	8419.0	131.3	2.8297	23823.24
29.10.2010	8330.0	128.0	2.8873	24051.21
28.10.2010	8340.0	126.1	2.8728	23959.15
27.10.2010	8345.0	126.0	2.8567	23839.16
26.10.2010	8474.5	129.0	2.8207	23904.02
25.10.2010	8502.0	130.5	2.8119	23906.77
22.10.2010	8325.0	125.5	2.8616	23822.82
21.10.2010	8424.0	125.9	2.8193	23749.78
20.10.2010	8272.0	124.5	2.8714	23752.22
19.10.2010	8290.0	125.1	2.8268	23434.17
18.10.2010	8344.5	131.9	2.8297	23612.43
15.10.2010	8371.0	131.5	2.7717	23201.90

14.10.2010	8415.5	131.5	2.7697	23308.41
13.10.2010	8410.5	131.5	2.8327	23824.42
12.10.2010	8271.0	126.0	2.8802	23822.13
11.10.2010	8326.0	123.8	2.8525	23749.92
08.10.2010	8115.0	122.0	2.8660	23257.59
07.10.2010	8286.0	125.1	2.8401	23533.07
06.10.2010	8239.0	126.5	2.8422	23416.89
05.10.2010	8140.0	123.1	2.8838	23474.13
04.10.2010	8120.0	119.5	2.8922	23484.66
01.10.2010	8132.0	119.4	2.8772	23397.39
30.09.2010	8055.0	117.3	2.9250	23560.88
29.09.2010	8030.0	117.5	2.9227	23469.28
28.09.2010	7861.0	113.8	2.9645	23303.93
27.09.2010	7940.0	115.7	2.9425	23363.45
24.09.2010	7905.5	115.9	2.9704	23482.50
23.09.2010	7885.0	114.5	2.9853	23539.09
22.09.2010	7710.0	115.0	2.9636	22849.36
21.09.2010	7696.0	115.7	3.0053	23128.79
20.09.2010	7752.0	115.6	3.0156	23376.93
17.09.2010	7770.0	115.8	3.0079	23371.38
16.09.2010	7685.0	115.9	3.0131	23155.67
15.09.2010	7610.5	–	–	–

3. Models of dependence

The hypothesis of high correlation in copper quotes and quotes of KGHM stock is quite natural. Due to the fact that there are many other factors which may affect price of stock, and do not necessarily affect copper quotes (and vice versa), it is not obvious that the dependence between these two values should be very strong. It does not have to be of linear nature. The three models of this dependency are presented here: linear, power and exponential. Despite the naturalness of the linear model in this case, the situation of faster or slower increase/ decrease in optimism depending on the increase/ decrease in copper quotes is not easily excluded. The choice of the power and exponential models (not of the linear one) comes from the simplicity of these models, frequent practical verifiability, the possibility of reduction to the linear model with variable replacement and (obviously enough) lack of theoretical grounds for application of other models.

Due to the fact that the effect of delay in the reaction of the stock market to the quotes in the raw materials market may be expected in the described case of dependency, we will examine the linear, power and exponential models with the one-day delay taken into account.

All the calculations were done with Microsoft Excel. The detailed record of the calculations is omitted here, as they may be easily verified by the reader.

3.1. The linear model

The design of the linear model starts with determination of the coefficient of correlation between the variables x and y, described, for example, in (2):

$$r = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2 \sum_{i=1}^{n}(y_i - \bar{y})^2}},$$

which is the measure of the linear relationship between x and y.

For the given data, the result shall be:

$$r = 0.9604,$$

which is surprisingly high due to the fact that other factors should also affect the stock price, completely unrelated to copper quotes.

The linear model shall be designed as a model of linear regression described, for example, in (2), that is as an equation of linear relationship:

$$y = ax + b,$$

with the parameters a and b adjusted so that the sum of squares

$$\sum_{i=1}^{n}(y_i - \hat{y}_i)^2$$

of the differences between the actual values y_i and the theoretical values, that is

$$\hat{y}_i = ax_i + b,$$

was minimised. The following known formulae are obtained from the above condition, which allow calculation of the parameters of the equation:

$$a = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sum_{i=1}^{n}(x_i - \bar{x})^2},$$

$$b = \bar{y} - a\bar{x}.$$

With the above formulae, we shall determine the linear model for our data:

$$y = 0.0303x - 120.4991.$$

We shall select the convergence ratio as a measure of correspondence of the actual and theoretical values:

$$\phi^2 = \frac{\sum_{i=1}^{n}(y_i - \hat{y}_i)^2}{\sum_{i=1}^{n}(y_i - \bar{y})^2},$$

whose values close to 0 indicate good consistence of the actual and theoretical data.

The value is obtained for these data:

$$\phi^2 = 0.0777,$$

which indicates good consistence of the actual and theoretical data.

3.2. The power model

The power model means the hypothetical dependence in the form of:

$$y = bx^a.$$

Taking logarithms for both sides of the above equality, the power model may be converted to the linear model:

$$\ln y = a\ln x + \ln b.$$

With $b' = \ln b$, $x' = \ln x$, $y' = \ln y$, the equality results:

$$y' = ax' + b',$$

which may be regarded as conversion of the power model for the variables x and y to the linear model of the variables x' and y'. When values are defined for the new variables, the correlation ratio for them may be determined along with the linear regression equation and the convergence ratio:

$$r = 0.9614,$$
$$y' = 1.8378x' - 11.7136,$$
$$\phi^2 = 0.0757.$$

The comparison of the value of the correlation ratio and convergence with the corresponding coefficients for the previous model leads to the conclusion that the power model is slightly better for our values, at least theoretically. In practice, the linear model may be selected due to simplicity of calculations if (as is the case here) the parameters r and ϕ^2 are similar for both models.

After determination of $b = e^{b'}$, the form of the power model is to be determined:

$$y' = 8.1816 \cdot 10^{-6} x^{1.8378}.$$

3.3. The exponential model

The exponential model means the hypothetical dependence in the form of:

$$y = ba^x.$$

Taking logarithms for both sides of the above equality, the power model may be converted to the linear model:

$$\ln y = x\ln a + \ln b.$$

With $b' = \ln b$, $x' = \ln x$, $y' = \ln y$, the equality results:

$$y' = ax' + b',$$

which may be regarded as conversion of the exponential model for the variables x and y to the linear model of the variables x and y'. When values are defined for the new variables, the correlation ratio for them may be determined along with the linear regression equation and the convergence ratio:

$$r = 0.9580,$$

$$y' = 0.000206x - 3.163799,$$

$$\phi^2 = 0.0895.$$

The comparison of the values of the correlation ratio and convergence with the corresponding coefficients for the previous models leads to the conclusion that the exponential model is slightly worse for our values. After determination of $b = e^{b'}$, $a = e^{a'}$, the form of the exponential model may be determined:

$$y = 23.660322 \cdot 1.000206^{x}.$$

4. "Delay" models

In expectation of the delay effect in the reaction of the KGHM stock market to the quotes in the market copper, we are examining the linear, power and exponential models which take into account this delay. It would be difficult to expect any delay by more than one quote, thus we shall examine the dependence between the copper quote for the given day and the KGHM stock quote for the next day (or, in case of days off, for the first session after this time). We shall use the same variable markings for convenience.

In order to leave the calculations clear, the data for several days when the London LME was open and the Warsaw WSE was closed are not corrected here. It should not have any significance for the results. With these assumptions, the following models are obtained:

the linear model, the power model, the exponential model.

4.1. The linear model

The x and y correlation ratio, which takes into account the delay, is $r = 0.9540$, and the model comes in the form of the equation:

$$y = 0.0296x - 114.3115.$$

The convergence ratio is

$$\phi^2 = 0.0898.$$

4.2. The power model

The correlation ratio for the variables $x' = \ln x$, $y' = \ln y$ with the delay taken into account is $r = 0.9555$, and the model with the new variables comes in the form:

$$y' = 1.7959x' - 1.3303.$$

The convergence ratio is

$$\phi^2 = 0.0870.$$

The model for the variables x and y comes in the form:

$$y = 1.20039 \cdot 10^{-5} x^{1.7959}.$$

4.3. The exponential model

The correlation ratio for the variables x and $y' = \mathrm{h}\, y$ with the delay taken into account is $r = 0.9521$, and the model comes in the form of the equation:

$$y' = 0.000201x - 3.205105.$$

The convergence ratio is

$$\phi^2 = 0.0935.$$

The model for the variables x and y comes in the form:

$$y = 24.658097 \cdot 1.000201^{x}.$$

Comparing the coefficients of correlation and the coefficients of convergence for the models without delay and with delay, it may be found out that the models which take the delay into consideration are slightly less accurate than those without delay. This could prove fast reaction of the market to significant information.

It may seem that the linear, power and exponential models are mutually exclusive, which means that when one is good, the others are not. However, our case proved that all three models are practically good. This paradox may be explained with relatively small variability of the data; for data with higher variability the theoretical values determined from them would differ more significantly.

5. Exchange rate fluctuations

The above models do not take into consideration changes in the Dollar to Zloty exchange rates. It may seem that elimination of exchange rate fluctuations by translating LME copper quotes from SD/t into PLN/t should increase the correlation between the quotes of copper and KGHM. However, this is not true. x_1 in the above table stands for the average Dollar exchange rate in NBP for the given day, and

x_2 stands for copper quotes in LME calculated at this exchange rate into Polish Zloty. The correlation ratio for LME copper quotes expressed in PLN and KGHM quotes is 0.9405 and is unexpectedly slightly lower than the corresponding coefficient for copper quotes not converted into Polish Zloty (0.9604). The strange thing is that the Dollar exchange rate and the KGHM quotes are practically not correlated (the correlation ratio for x_1 and y is 0.0086).

6. Application

The models of the type presented here may be used to predict one value on the basis of predictions of another value. In the described case, due to the good quality of the model measured with the convergence coefficient, the predictions of KGHM quotes may be obtained whose accuracy depends on the accuracy of predictions of copper quotes.

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Modele zależności notowań giełdowych na przykładzie notowań miedzi i akcji KGHM Polska Miedź SA

S t r e s z c z e n i e: Niniejsza praca opisuje konstrukcję i testowanie ekonometrycznych modeli zależności notowań miedzi i akcji KGHM Polska Miedź SA na podstawie półrocznych danych z London Metal Exchange (LME) i Giełdy Papierów Wartościowych w Warszawie (GPW). Uzasadnieniem celowości takich modeli jest wyznaczony wysoki współczynnik korelacji notowań miedzi na LME w dolarach amerykańskich (x) i notowań KGHM w złotych polskich (y) na GPW (około 0,96), potwierdzający naturalną hipotezę o związku między tymi wielkościami.

W pracy testowany jest wariant liniowy, potęgowy i wykładniczy modelu. Uzasadnieniem takiego wyboru jest naturalność modelu liniowego, sprowadzalność modelu potęgowego i wykładniczego do liniowego przez zamianę zmiennych, częste sprawdzanie się w praktyce oraz brak teoretycznych podstaw do stosowania innych modeli. Wyznaczony model liniowy ma postać:

$y = 0{,}0303x - 120{,}4991$, natomiast alternatywny potęgowy: $y = 8{,}1816 \cdot 10^{-6} x^{1{,}8378}$. Model wykładniczy oraz modele liniowy, potęgowy i wykładniczy uwzględniające opóźnienie czasowe o jedno notowanie okazały się słabsze. Wbrew oczekiwaniom autora uwzględnienie zmian kursowych dolara względem złotego i przeliczenie cen miedzi na złote według aktualnego kursu nie poprawiło danych do modelu, gdyż odpowiedni współczynnik korelacji (około 0,94) jest nieco niższy niż w wersji pierwotnej. W związku z tym konstrukcja odpowiednich modeli okazała się niecelowa.

Zastosowaniem tego typu modeli może być prognozowanie wartości jednej wielkości na podstawie prognoz drugiej. W opisanym przypadku model może być punktem wyjścia do prognozowania notowań KGHM Polska Miedź SA na podstawie prognoz notowań miedzi.

S ł o w a k l u c z o w e: ceny surowców, giełda papierów wartościowych, korelacja, modelowanie ekonometryczne, prognozowanie

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Trychotomy of motivating factors in the workplace: Concept outline

K e y w o r d s: motivation for work, motivational factors, demotivation, motivational system

S u m m a r y: The paper presents the key substantial and methodological aspects of motivation for work, with special attention paid to the analysis of classification of motivating factors. The selected, more important of them, have been described. A new approach to them has been presented in the form of the concept of trychotomy of motivating factors at work (i.e. in the environment, in the situation of work), which constitutes the evolution of the two-factor theory by Frederick Herzberg. This concept lists three groups of factors: "motivators" give satisfaction when present, "factors of hygiene" cause dissatisfaction when not present, and "demotivators" cause dissatisfaction when present. Their vectors of effect on satisfaction with work differ radically, although they are present at the same time in the work environment. That is why this concept constitutes the methodological directive which suggests expansion of the field of analysis of the conducted research by the factors which reduce motivation in the workplace.

1. Introduction

Survival and growth of the organisation in a dynamic environment and under conditions of ever increasing competition require initiative and cooperation of all the employees of the organisation.[1] That is why motivation for work of the participants is so important in the production process. Many organisations face the necessity of improving motivation rules in terms of strengthening the motivational effect of salary and other motivation factors, with the simultaneous adjusting of these rules to the financial situation of the company. Improving the motivation system is a difficult

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[1] The control mechanism is changed, as well. Standard procedures based mostly on financial indicators and on authoritarian management do not ensure these days full assessment of the activities of the company (1, p. 17).

process, as it requires comprehensive and in-depth analysis of the current solutions and assessment of effectiveness of their functioning so as to propose a new, more effective system to support execution of the strategic objectives of the company and to facilitate achieving the level of high competitiveness with rationalisation of labour costs, "attracting" the best specialists to the company, developing the appropriate attitudes of the executive personnel and employees about the objectives set and the tasks assigned.

Motivating employees to work constitutes the basic component of the management process, and the manager should have knowledge in this respect. Motivation is the power under the effect of which the individual initiates work, and performs it in the hope of achieving the intended result. The motifs of undertaking specific activities differ, depending on the needs of the person, the situation in the workplace, the conditions of the cultural environment from which he/ she comes, as well as the possibilities of their execution. Motivation means willingness, intention, desire of something. Motivation is thus a psychological process present in each and every employee in the work process, and is the basic element of his/ her work potential, and the obtained results are a significant factor of his/ her competencies. Motivating means stimulating and having the organism continuously ready for action.

With the research of our forerunners taken into account, certain premises may be assumed related to human behaviour: it is caused with specific factors (and does not arise all by itself), it is always related to some objective, and it may be subject to some external action.

These components have been used in designing many models of human behaviour. The main assumption of the model is the thesis that human being has many needs, desires and expectations of varied intensity. Effectiveness of motivation means in turn the result of the accurate selection of principles, tools and factors of motivation (2, p. 26). In other words, the process of motivation consists in connecting requirements and expectations of the organisation towards the employees with the needs, values and expectations of these employees, and satisfaction of the employee—achieved as a result of meeting his/ her needs by the work environment—stimulates him/ her to increase performance of work.

This relatively broad subject matter and scope of research on motivation is limited in the paper to the analysis of classification of motivating factors in the workplace and the characteristics of some of them. A new approach to them has been presented in the form of the concept of trychotomy of motivating factors at work, which constitutes the evolution of the two-factor theory by Frederick Herzberg. Special attention has been paid to the factors which have been called demotivators. These are less known to the general group of readers, and are often omitted in research and discussions. The objective of the paper is thus presentation of the new approach to the typology of motivating factors at work (i.e. in the environment, in the situation of work), and stating directions and methods of their examination, as well as practical use of the results of this analysis.

2. Characteristics of the selected classifications of factors of motivation for work

In the diagnosis of the factors of motivation for work, at least some definitions of motivation are worth quoting, often repeated in the already voluminous and broad literature, as they are important from the point of view of the planned research. Michael Armstrong states that motivation deals with factors which affect people to behave in a specific way (3, p. 210). A definition similar to some extent is given by Falko Rheinberg, writing that it is "activating direction of the current act of life on a positively assessed target situation" (4, p. 18). This concise definition requires additional explanations. The term "activating direction" or "positively assessed target situation" has to be considered in many meanings. For example, motivation may be regarded as various conditions and behaviour, such as wanting, attempting, desiring, pursuing something; it may also mean avoiding, hesitating, aversion, fear of unwanted events, experiences. Thus, according to the author, avoiding motivation differs in many respects from achievement motivation. From among other definitions of this phenomenon which emphasise significance of motivating factors, the one by Ferdynand Michoń is worth quoting. According to him, motivation is a set of forces and factors which stimulate to and keep a person in the behaviours aimed at achieving specific objectives. The said forces are needs, drives, instincts, aspirations, as well as tensions, called the mechanism of the human organism (5, p. 18). This definition presents attributes or features of motivation.

Depending on economic and social conditions or individual differences (resulting from personality and experience), people are governed in their personal activities by varied motivations, i.e. factors of motivation, stimuli.[2]

The literature gives many classifications of the types of motivation, which are supported by psychological and other theories. One of them is differentiating motivation into internal (intrinsic) and external (extrinsic). The term of internal motivation, also called autotelic or endogenous is used to such forms of activities which are carried out for the same of the activity alone. The term of external motivation (exogenous, instrumental) refers to the activities focused on a stimulus included in the objectives or consequences (6, p. 331 et seqq.).

The subject matter of the discussion is limited mostly to external factors, instrumental, in particular the ones which form the motivational system of the employees of the organisation. The motivational system, which is a set of motivation factors selected by the company, is the tool used by the managers to increase effectiveness of work.

[2] Motivations, that is factors of motivation, stimuli of the need, tasks, may be understood as any change in the human environment (e.g. change in the situation of an employee), which causes or changes a motif for action.

3. Tri-factor concept of motivating factors

The theory of F. Herzberg highly contributed to the development of knowledge about motivation for work, especially in the research of motivating factors. He stipulated a thesis that satisfaction and dissatisfaction are caused by basically different factors present in the work environment.[3] He called the factors which give satisfaction when present "motivators", and the ones which cause dissatisfaction with work when absent—"factors of hygiene" (higienes). The following have been accepted as motivators: achievements, recognition, promotion, the contents of work, the possibility of personal development, responsibility. The factors of hygiene include: the policy of the company and management, technical supervision, interpersonal relationships, remuneration, safety of work, working conditions, welfare benefits, position occupied.

Pursuant to this theory, increasing satisfaction with work is possible even when dissatisfaction is not reduced, and the case is true in the opposite situation. Numerous charges are put against the Herzberg's theory,[4] yet researchers who deal with these issues admit that this theory has contributed to enhancing research methods in motivation for work (there are two independent continuums: satisfaction and dissatisfaction with work), moreover, this theory has provided additional arguments related to connecting satisfaction with work with effectiveness of the employee. The latest research shows that there are other factors of motivation for work (other than motivators and factors of hygiene), namely demotivators, whose vector of action basically differs from that in the other factors. So far, research documents on demotivation are scarce. Waldemar Stelmach attempted to systematise this issue with the definition of demotivation as the total sum of factors which affect aversion or increase in aversion to the performed work (7, p. 90).

The authors indicate various and numerous factors which demotivate people for work.[5] Stelmach, on the basis of the conducted empirical research, proposed such

[3] Earlier research used the concept of satisfaction with work, included in the single-dimension space model. Satisfaction and dissatisfaction in the workplace were regarded as opposite values of the same continuum, i.e. it was assumed that the given factor has positive value for the employee, and its lack has negative value, and the other way round.

[4] The two sets of motivating factors introduced by Herzberg are differently regarded by different categories of employees. Some factors of hygiene may be regarded as motivators, and an opposite view may also appear.

[5] For example, a list of harmful behaviours may be given, as stated by Peter Honey, which may be also viewed as a list of demotivating factors. These are examples of behaviours resulting from interpersonal communication, such as picking out errors in the statements of the speaker, refusing to understand the feelings or views of the speaker, expressing objection before explanation or keeping defensive attitude or inconsistency in verbal and non-verbal behaviours (8, p. 245); Stanisław Smoleński presents somewhat ironically the premises often found in practice, the "premises" of demotivation, such as, for example, breaking promises, dilettantism of the superiors, pursuing career at the expense of colleagues or, in short, amoral behaviour of the superiors or colleagues (9, p. 214). The authors: Anna Kozińska, Joanna Szybisz, defined the condition of demotivation and provided its five dimensions. They have described the demotivation condition as "usually passive behaviour, frozen still, heaviness and aversion.

demotivation causes as: unclear regulations, exerting pressure on employees for performing work not fully consistent with regulations and professional ethics, work beyond capacity, sham, unequal distribution of duties, lack of additional training, failure to recognise employees with long-term history of employment and practical experience, pressure and fear of losing employment. These relationships were grouped into four areas according to the recurring problems (7, p. 96):

1. Emotional situations: lack of the possibility of self-actualisation, lack of information on own future in the given company, breaking the promises made during the interview, unjust penalties or prizes, promotion. The effect of personal culture of the management on demotivation, stress as a result of improper, amoral behaviour of the superiors towards the subordinates.
2. Situations of work organisation: improper management, lack of the possibility of co-deciding, disapproving work environment, bad effects of work, not observing the regulations of the Labour Code, unfriendly employee relationships and contacts with clients, ignorance of responsibility, material deficiencies.
3. Economic situations resulting from defective method of remuneration, "wrong efficiency" of assigning equivalent for effort, for work time, lack of "justice" in defining salaries, boni and additional awards for employees.
4. External situations: wrong policy of the management and other main authorities of the organisation, long-term objectives of the organisation not taking into account the interests of the employees, unfavourable national regulations and administrative orders of the management determining solving of problems, activities of local governments, that is (according to the Author) objective factors, independent on the responders.

As one can see, the said motivational factors, i.e. demotivators, give human activities a specific direction, strongly affect meeting visceral needs, the need of safety, the needs of recognition (respect). In the known and recognised Abraham Maslow's hierarchy of needs, most of them are of the lower range: the needs which, when not met, dominate other needs, determine the behaviour of the individual (employee). Due to their significance, first attention should be paid to these factors. They result mostly from alienation of work, errors in the organisation and management system, as well as weaknesses of the human nature.

However, referring to the quoted classification of demotivation causes, one has to emphasise that it is not quite precise, as it consists of four too generally aggregated measures, including both demotivation factors and, first of all, factors of hygiene, e.g. conditions of work or interpersonal relationships. Other authors present these factors

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It turns out that employers create events for the employed which weaken their natural level of energy and result in behaviours with demotivation signs (10, p. 8 et seqq.). John Adair states the following premises and manifestations of demotivation: disseminating information about lack of perspectives in the development of the company, spreading the atmosphere of disasters, near bankruptcy, suggesting lack of reasons for the work provided, etc. (11, p. 158 et seqq.).

in a similar way, not excluding F. Herzberg. Thus, both identification and clear, disjuncting classification of motivating factors in the work environment are lacking.

The summary of the presented theoretical comments gave reasons to the statement that almost all the said factors are important and should not be omitted in research on motivation in the workplace. The effect of the set of motivating factors on satisfaction with work are presented in Table 1. The directions (vectors) of interactions of the said factors are basically divergent, although they may be present at the same time in the given work environment.

Table 1

The effect of motivating factors on satisfaction with work

Factors	When present, cause:	When absent, cause:
Motivators	Satisfaction	Lack of satisfaction
Factors of hygiene	Lack of satisfaction	Dissatisfaction
Demotivators	Dissatisfaction	Lack of dissatisfaction

Source: Author's own study.

For the purposes of preparation of the classification of motivating factors in the workplace, the method of linear ordering of objects in multidimensional space of features called comparative analysis has been used.[6] With this method, the set of the adopted variables should be divided into: stimulants (the variables whose increasing value proves increase in the level of the researched phenomenon), nominants (the variables for which the values proving high value of the researched phenomenon are included within a certain range) and destimulants (the variables whose decreasing value proves increase in the level of the researched phenomenon) (13, p. 17). Assuming that factors of motivation in the workplace will be in this case the diagnostic variable, factors of motivation were considered to be the stimulant (referred to as motivators). The nominant will be the factors of hygiene, and the denominant will be the obstacles present in the work process, that is factors of demotivation in the workplace. In the light of the quoted comments, improving, rationalisation of the system of motivation, should include not only identification of the factors, but first of all the activities aimed at elimination of demotivators (denominants), optimisation of the factors of hygiene (nominants) and maximisation of motivators (stimulants), in line with the financial possibilities and legal and organisational conditions, that is the strategy of the company.

Based on the research described in literature, the Mason Haire's concept may be also quoted which emphasises significance of not only factors motivating for work,

[6] The original method of linear ordering of objects in a multidimensional space of features, called the multidimensional comparative analysis, was proposed by Professor Zdzisław Hellwig, head of the Chair of Statistics in Wyższa Szkoła Ekonomiczna in Wrocław. This method allows defining the ranking of objects described in a multidimensional space of features, with some criteria of order taken into consideration. Professor Hellwig defined the necessary terms, such as stimulants and destimulants (12).

but also significance of demotivating factors. This concept is based on the assumption that the effectiveness curve of work of the team of employees features the trend to achieve the condition of relative balance. The company management may achieve higher effectiveness of work by reinforcement of forces under the curve of work effectiveness, that is forces of negative nature, inciting negative personnel relationships along with it. With the appropriate actions reducing the effect of the hindering forces, a similar result may be achieved, i.e. higher effectiveness of work. The difference between these two solutions consists in the fact that the latter actions may bring about the same result with lower tension in the personnel (5, pp. 110–115). The conclusion comes from the M. Haire's concept that the role of both stimulating and hindering factors is equally important in the analytical research aimed at determining factors of effectiveness of work. That is why this concept constitutes the methodological directive which suggests expansion of the field of analysis of the conducted research by the factors which hinder effectiveness of work.

The overview of factors which affect satisfaction with work, constituting at the same time the subject matter of numerous research on motivation for work in employees, allowed isolation of these which repeated most often. A list of almost 50 factors was made, which, as it seems, are of quite common nature, almost universal. The research employed the expert method. Line managers of organisational units and specialists in personnel management played the role of experts. Table 2 presents selected, more important of them.

Qualification of factors of motivation for work in the organisation to these categories is not easy. Analysing the research of earlier authors on this issue, many unsolved issues may be found which concern the proper distribution of factors such as the division into factors of hygiene and motivators. The same factors are differently qualified in different research documents, with different scopes and directions of effect assigned. Factors which demotivate in the workplace, as an issue relatively new in the literature and causing many controversies, have not been sufficiently identified and categorised in terms of their strength and vector of interaction. Designing the appropriate and at the same time practical solutions in the scope of diagnosis of factors of motivation for work turns out to be a task of even more complexity and difficulty.[7]

[7] The known and commonly used methods of studying factors of motivation for work limit their object of analysis to the factors which are named motivators. This applies, in particular, to such methods as the method of Lawler and Porter, which is commonly used as a method diagnosing effectiveness of a motivation system in a company (14). The method of Blum and Russ is used for determining the hierarchy of values of the selected motifs motivating for work, which are followed by the employee when undertaking and executing work (15, p. 85). The method of J. Richard Hackman and G. Oldham, with the use of the authors' questionnaire with five criteria which specify the motivational contents of a task assigned to an employee for execution, in terms of its adjusting to the expectations of the employee (16, pp. 159–170). In the scope of mobbing, the methods of its measuring are developed to determine its effect as one of the factors which may cause demotivation. One of such methods is the NAQ (Negative Acts Questionnaire) dedicated for identifying and assessment of the degree of exposure of employees to mobbing in specific work environments, as well as for comparing indicators obtained in different countries, professional groups or organisations (17, p. 16 et seqq.). For the purposes of learning factors

If one would try to translate this concept into the language of psychology, it appears as a de-individualised and largely unconscious regulation. The observation that the motivation process is not controlled cognitively is already a form of cognitive control. Thus one should believe that becoming aware of one's own situation of interaction in the demotivation factors is just the beginning of the process of elimination of this phenomenon. This comment may be referred to the other factors of satisfaction with work (motivation), i.e. factors of hygiene and factors positively motivating the employees.

Table 2

Examples of factors affecting satisfaction with work

Motivating factors	Factors of hygiene	Demotivating factors
– Financial awards – Possibility of promotion – Possibility of personal development – Flexible working hours – A cafč (additional services, prizes) – Appraisal and expression of recognition – Training paid by the employer	– Salary – Work time – Load with work – Organisational commitment – Interpersonal relationships, good atmosphere in the workplace – Safety of work – Contents of work – Policy of the company – Responsibility – Social and welfare activities – Supervision of the employer	– Mobbing on part of superiors, colleagues – Stress in the workplace caused with amoral behaviour of superiors, colleagues – Work exceeding psychological and physical capacity of the employee, his/ her qualifications – Signing contracts for short periods of time – Negative behaviour necessary to achieve the objectives of the organisation – Inability to change the actual condition, making improvements (feeling powerless)

Source: Author's own study.

4. Conclusions

To complete the presentation of the concept of trychotomy of motivating factors in the workplace, it is important to state that instead of identification and measuring the selected motivating factors, important from the point of view of the theory, in practice research and reconstruction should cover the whole motivational process as much as it is possible. Moreover, or first of all, if the concepts in the area of motivation for work are to be not only defined with scientific precision, but also used in practice, a diagnostic system should be ready at hand to capture the significant com-

motivating employees for work and specifying their priorities, i.e. defining importance of each motivating factor by assigning it a specific weight in numbers, the AHP method (Analytic Hierarchy Process) may also be used (18).

ponents (factors) of the motivational process on the one hand, and which should be clear and understandable, on the other hand.

With the above findings taken into account, one may assume a thesis that development of a method of diagnosing a system of motivating employees for work in a company is necessary and possible, in which the subject matter and scope of the research would include motivators, factors of hygiene and factors of demotivation. The practical results of this research should constitute a premise for improving the motivational system and the basis for the proper business pragmatics. The identified motivators may be useful in building a system of motivation within the company's collective employment rules system; the factors of hygiene may be used in developing the work regulations, and demotivators may constitute the basis for preparation of the code of ethics of the organisation. As one can see, the results of the research designed in this way may prove to be useful in developing a theory of motivation and, what is more significant, may be used in the practical operation of companies and institutions for improving their systems of motivation, or even systems of work.

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Trychotomia czynników motywacji w pracy – zarys koncepcji

S t r e s z c z e n i e: W artykule przedstawiono węzłowe kwestie merytoryczne i metodyczne motywacji do pracy, ze szczególnym zwróceniem uwagi na analizę klasyfikacji czynników motywacji. Scharakteryzowano wybrane, ważniejsze z nich. Zaprezentowano nowe ich ujęcie w postaci koncepcji trychotomii czynników motywacji w pracy (tj. w środowisku, w sytuacji pracy), która stanowi rozwinięcie dwuczynnikowej teorii Fredericka Herzberga. W tej koncepcji wyróżniono trzy grupy czynników: „motywatory", które gdy występują, powodują zadowolenie; „czynniki higieny" – gdy nie występują, wywołują niezadowolenie; oraz „demotywatory" – gdy pojawiają się, powodują niezadowolenie. Ich wektory oddziaływania na zadowolenie z pracy różnią się diametralnie, chociaż występują one w środowisku pracy równocześnie. Dlatego też koncepcja ta stanowi dyrektywę metodologiczną sugerującą rozszerzenie pola analizy prowadzonych badań na czynniki zmniejszające motywację w pracy.

S ł o w a k l u c z o w e: motywacja do pracy, czynniki motywacyjne, demotywacja, system motywacyjny

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Social and ethical aspects of entrepreneurship

K e y w o r d s: entrepreneurship, optimisation of decisions and actions, risk, responsibility

S u m m a r y: Entrepreneurship and innovativeness constitute the fundamental premises of economic development and growth. Entrepreneurship as a personal feature of the unit improved in the education process may be effectively manifested under the appropriate legal and economic conditions. These conditions are shaped by the socially established decision system. The entrepreneur-innovator executes his/ her projects within a changing tangible environment, including organisational and legal conditions. To optimise the expected added value which constitutes the objective of his/ her activities, also for the environment, the entrepreneur, while making decisions and undertaking actions, formulates the mechanism of internal protection measures by activating, among others, the appropriate system of reserves in the controlled production complex (or services) and insures it externally in the network of insurance systems. These activities refer also to macrosystems and are aimed at minimisation of risk, maximisation of the expected value, and also limit multi-plane responsibility and shape timeless ethical rules in the human relationships (international), thus affecting the development of the modern civilisation.

1. Introduction

Etymologically, entrepreneurship means a set of features and behaviours mostly typical of entrepreneurs. In the theory of economics, entrepreneurship is understood as a form of work or as the fourth (apart from labour, land and capital) factor of production.

Entrepreneurship refers also to various areas of business life. Its main features include the skill of perceiving needs, perfecting ideas, readiness to undertake risk, the combined effectiveness of cognitive activities and creative use of the acquired knowledge, efficient behaviour in new situations and with new tasks, as well as effective use of the results of the undertaken enterprises.

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The activities of a person in the initial phases of economy practically did not face any limitations (apart from natural ones) resulting from the standards of the law. With time, rituals of behaviour were developed which constituted the basis for assessment of the unit and which defined the type and scope of responsibility when violated. The overwhelming passivity of human activities resulting from limited needs did not result in excess conflict situations which required special regulations. However, as early as in the 18th century BC, the Babylonian ruler, Hammurabi, published the code (regarded as one of the oldest codes in the world, published about 1792–1750 BC) in which he unified and systematised the then applicable rules of common law, mostly in terms of penal and material law. Liability and a system of penalties included in the code were based on the talion principle (from Latin *talis*: the same) which consisted in retaliation equal to the inflicted harm. (This principle is also described in the Old Testament as "eye for eye, tooth for tooth.") The inflicted damages in property demanded repair or compensation.

The objective of liability and penalties applied was to prevent returning to crime by depriving freedom of the person violating the law, as well as restoring social balance caused with crime. Not observing the principles resulting from the standards of the law in force resulted to ostracism which consisted in alienation of the unit from the family community or expelling from the given place or country.

Along with development of forms of social coexistence in the group, the belief originated and consolidated that actions of one person should not harm another. This thought was best expressed by Hippocrates (ca 460–377 BC), a Greek physician referred to as the father of medicine, who is known to say *primum non nocere* (in Latin, first, do not cause harm). Hippocrates addressed this obligation mostly to people dealing with protection of human life and health. Many modern legal regulations make references to this rule. If this standard was commonly accepted as a sacred principle in human relationships, the problem of responsibility would not need to be analysed in terms of guilt and penalty. If we could remember about and use the second part of the Hippocrates' vow, which made reference to "supporting the healing powers of nature" in exercising care of a human being, life would follow along less conflictual and more friendly conditions.

2. Social aspects of entrepreneurship

Business decisions and actions are undertaken to achieve specific objectives. They may be formulated in a number of ways, depending on funds and nature of the enterprise. The ultimate objective of business activities is to achieve the benefits which are the driving force for units, companies, thus deciding about the financial affluence of people, and about the wealth of the nation.

Satisfaction with successful business undertakings has determined and will determine the intention of repeating the success. This axiom is logical and socially justi-

fied. It is grounded in many directions of philosophical and economic thought. It is referred to in, among others, the Biblical parable of multiplying talents. Some of the ways and methods which are supposed to help manifest the desired objective called "success" have been controversial or even reprehensible in the past and continue to be perceived in this way.

At the turn of the 17th century, the English social thinker (of Dutch origin), writer, physician and economist, Bernard de Mandeville (1670–1733) based his ethical, social and economic concepts on the controversial thesis according to which private egoism may be profitable for the society. Mandeville is considered to be the author of the term "division of labour". He prepared the soil for Adam Smith (1723–1790) and his economic *laissez faire* (free action), which constitutes the principle of classic liberalism. Mandeville is also seen as a co-creator of utilitarianism (along with David Hume and Jeremy Bentham), which promoted the primacy of usability over other motives in human actions. Egoism, human passions, according to Mandeville, constitute the source of development of the civilisation and social welfare (1). The legitimacy of this concept has been discussed by economists since the times of Adam Smith. More and more often, its theses are challenged. It is confirmed with more and more often repeating financial and economic crises. The detailed analysis and undertaking of the appropriate counter-measures is still expected.

In reference to the premises of the Mandeville's concepts, two and a half century later, the eminent American specialist in modern management, Peter F. Drucker, stated that no community can be permanently built on the thesis that private sins may help public benefits (2).

The fact is that "capitalism", as it was understood in the 19th century, actually referred to the Mandevill's theses, which largely explains its financial success. This concept, however, irrespective of its controversiality or benefits resulting from it, could not survive to define the principles of modern entrepreneurship. However, it has to be noticed that wherever economy is reborn based on the principles of free play of market forces, in a more or less mature form, it refers to its 19th-century flavours, along with the full range of deficiencies of this period.

In 1918, the American tycoon of railways, William Vanderbilt, stated that his only responsibility in the balance of actions is "winning profit", claiming directly that "The public be damned. I'm working for the shareholders" (3, p. 81 et seqq.).

During this time, similar views could be publicly presented without social and moral responsibility. The financial needs of employees, the degree of their intellectual development, were relatively low, and the possibility of articulating one's opinion or challenging these principles on their ethical aspects were limited, and even if they were appearing, they were of little effect.

A major change in the views of the social issue in entrepreneurship and the issue of responsibility for the undertaken actions and their consequences brought about both the great economic crisis in the years 1929–1933, and, most of all, the achievements of science and technique in the first half of the 20th century. The conviction

that a company should be managed so that public good becomes its (the company's) private good is a new phenomenon, called the "revolution of the 20th century."

The conviction is slowly appearing in economic circles about the necessity of combining individual benefits with social interest. The feeling of responsibility for the undertaken activities and their consequences is increasing, and the conviction is becoming grounded that every action is related to some consequences which should be foreseen and accounted for (4, p. 27).

This conviction did not come into existence out of the blue. Misunderstood freedom in activities results in devastation of the natural environment, thus threatening also the devastating entities, and paying lockout (reduced) salary for work contradicts the feeling of social standards of justice.

Apart from the detailed discussion of justice (as it constitutes and will constitute embers of discussion for many generations), one should remember that, e.g. Aristotelian differentiation of *exchangeable* justice (commutative) and *distributory* justice became the foundation of many modern economic concepts in the scope of social and economic development.

"Exchangeable" justice is close to liberal concepts. The distribution of goods is then done horizontally between particular entities (e.g. employee—employer, that is labour—salary). The problems arise here, e.g. how to relate labour to salary? What are the conditions and relationships between these values, objective and subjective? What is the salary called "fair"? The determination with good or bad will of the employer or with a set of factors which constitute the functional dependence resulting from work performance, determined with the organisational level, qualifications of employees, technical support for work, customs and a number of external factors.

Similar questions come with formulation of the principle of distributive justice. It assumes allocation of the produced values with the obligatory provision of its part for social purposes (in the form of, among others, taxes). The problems arise here as well, related to the legitimacy, scope and planned use of the collected funds. Various views are stated, yet almost universally the principle is adopted which determines the necessity of providing allowances for general social use. It is expressed with the formula *pay − as – you − earn*. With the assumption of proportional allocation and purposefulness of these allowances, there is a rational conviction that the volume of charges for social objectives should be correlated with the second significant principle: *save − as − you − earn.* This principles constitutes the basic condition of economic growth, where increasing welfare of people should be the tangible objective. It has to be noticed here that representatives of the dogmatic liberalism (including Friedrich von Hayek, a Nobel laureate in economics, 1974) claim that the idea of social justice is disjunctive with the idea of the market economy. Hayek rejects not only the idea of social justice due to criticism of socialism, but also any concepts of distributory justice executed by social and government organisations (5, p. 64).

State institutions are provided from the income generated by the community. The state basically does not produce any tangible values, thus it does not have its own

income, thus it is foreign to the rules of their rational, optimum use. Irrationality in managing income is the cause of domestic and international financial turbulence caused with, among others, not observing the equivalence principles in the balances of incomes and expenses. This problem requires effective domestic and international legal regulations and a strict financial supervision which does not allow accumulation of bank credits which generate crises resulting from the risk of investing in the so-called derivative instruments based on debt securities. This principle applies also to national finances. Continuing lack of balancing of incomes and expenses may lead to bankruptcy threatened with unknown consequences. The debt crisis of the state refers directly or indirectly to the entire community, as it will have to bear its consequences. The recipe for preventing crises is observing the elementary principles of economy balancing incomes with expenditures.

The cyclic nature of crisis phenomena negatively affects all segments of the economic life. They require a detailed analysis and application of effective preventive measures. Crises are usually consequence of human actions, thus the area of human actions has to include some possibilities of their limitation or elimination.

The signalled problem of justice remains correlated with responsibility, and it intuitively assumes constructive peace. This feeling is related to the universally existing *equality* on which building both microelements of matter as well as global financial systems is based. Balance constitutes the basic factor which ensures the required course of both numerous physical processes as well as social life. It affects many of the basic interdependencies in business life, including, e.g., the market law of balancing of supply and demand.

Balance is a perfect state to which rationally managed communities aspire. This state should be perceived in a dynamic sense, i.e. ensuring growth of the programmed objectives, positive for individuals and for the society. The execution of these premises requires creation of such a decision system which would ensure balance of charges and benefits, thus allowing manifestation of correlative rights and obligations, which constitute immanent features of human nature determined with customs (rights) of the environment, which intrinsically assume pursuit of cultural growth of the individual and personal and social welfare. There are no other objectives for modern communities. Perceiving them and efficient execution with decisive factors constitute the necessary item of the internal order and of the international peace, thus contributing to the growth of human entrepreneurship and financial affluence.

Entrepreneurship should be protected against unfavourable events, whose carriers come in the form of internal, endogenous (dependent on people) phenomena as well as exogenous (external) events which constitute a set of institutional, human factors (e.g. irrationally functioning decision centres) and phenomena independent of humans (e.g. meteorological phenomena). The possibility of their existence requires creation of the appropriate system of *security reserves* (the interior of the system, e.g. a company), as well as external *insurance* (in insurance companies). Practical expe-

rience confirms reasonability of these enterprises, as they ensure stabilisation and growth to business entities, minimising their temporary dysfunction.

3. Responsibility in business activities

Entrepreneurship is executed in practice by undertaking business activities aimed at producing goods or providing services. These activities come into interactions with the environment, which is the provider of the necessary production factors, both tangible (raw materials, materials, water) as well as personal (human potential). These enterprises may lead to violation of balance in various areas of activities (the market, financial, ecological aspects, etc.), producing unwanted effects in the environment.

Business activities may give contradictions which are apparent, e.g., between a human being as a producer and a human being as a consumer. Keeping the balance between unlimited human needs and limited resources provided by the nature is determined with the state of development of science, technology and the scope of legal regulations. Winning balance is dependent on the state of cultural and educational development of the community and on the decision optimising skills and actions undertaken by its representatives.

To maintain continuity of development, rationalisation of decisions is necessary which is conducive to execution of the required social and economic processes. The perceptions of the standards which decide about decisions and activities of the entrepreneur make him/ her co-responsible for development of the environment and ensures maintenance of economic and biological balance of the environment.

Nowadays, the activities of entrepreneurs (consortia) are determined by 4 basic areas of responsibility; they define the relationship to:

- the community: deciding about the necessity of observing the principles concerning protection of the natural environment;
- consumers: by securing the rights in the scope of quality of the provided goods and services and elimination of defects, if any;
- employees: executed by, among others, timely salaries specified with a contract, and ensuring safe and properly organised conditions of its execution;
- investors: by participation in income proportionally to the shares.

The details and the scope of the stated areas of responsibility are determined with economic and cultural development of the country.

Fear of responsibility deepens the area of uncertainty with the entrepreneur, creates a multi-level safeguarding system, extends the process of execution of the task and evokes and cultivates a passive attitude to the unclear reality, which in consequence may become a drag for development of entrepreneurship, and, under specific circumstances, may result in discontinuing it.

Responsibility may be analysed in various planes. It may refer to moral, disciplinary, civil and legal, as well as penal liability areas. Each of the above types of responsibility refers to various areas of human activities and the scale and the scope of violation of the principles or standards viewed as obligatory. These areas of responsibility may occur in mutual interaction. The process of the undertaken tasks may result in moral, civil and legal consequences, and, with consciously negative actions, penal consequences as well. The awareness of the scale of responsibility is necessary. It is a limitation of undertaking gambling actions or actions morally and legally reprehensible, which may expose the company (the shareholders) to numerous losses.

A separate area in which the problem of responsibility in the activities of the entrepreneur may arise refers to cooperation with other business entities or institutions. The timely and reliable behaviour in execution of the undertaken obligations, elimination of non-lawful actions, including tax-related, investment tender proceedings, quality of execution of the undertaken tasks, also constitutes a broadly understood area of responsibility of the individual in the realm of business activities.

4. Ethical aspects of entrepreneurship

Ethical issues of entrepreneurship include under a seemingly clear simplicity numerous and complex factors. Ethics in business, as specialists in this field declare, is one of the most significant problems of the present-day world. The literature emphasises the axiom which is expressed as follows: "honesty pays, you do not need cheat to win" (6).

A justified question may be asked about the purpose of discussing the issue of ethics in entrepreneurship if human activities related to business processes (that is manufacturing goods, providing services and their distribution) are regulated with many legal acts which standardise this area of business life. Acceptance of the *non nocere* rule quoted above might be sufficient: not only avoiding harmful actions undertaken by the participants of business processes (passive behaviour: no harm), but also providing help if needed (active behaviour: help). These rules should constitute a sacred ground for behaviour in business.

Codification of ethical standards of behaviour in entrepreneurship may pose doubts related to the scope, details, methods of settlements used in conflictual situations or fears of improper use of standard arrangements for the purposes servient to a specific ideology or doctrine.

Arguments prevail in discussions for reasonability of codifying ethical standards related to business activities. Such codification would become verbalisation of principles of behaviour in the given profession or would be a set of values recognised by it and a catalogue of morally impeccable behaviours. The code of business ethics would constitute supplementation of legal provisions and professional regulations, would shape the feeling of responsibility for social consequences of professional actions,

would promote honest activities, would reveal and negatively qualify non-ethical activities. It has to be stated that many professions have their own codes of professional ethics, e.g. physicians, barristers; also, a set of principles and guidelines *Decency in science* has been prepared for scientific circles and published by the Committee of Ethics in Science at the Presidium of the Polish Academy of Science (7).

The modern leading economic doctrines are based on three different ethical concepts:

- u t i l i t a r i a n i s m, the ethical theory originated in the 19th century (called the principle of usability), according to which an act is good when and only when it contributes to the common happiness understood as increase of pleasures and reduction of sufferings in the world (the main representatives of utilitarianism are John Stuart Mill and Jeremy Bentham). The modern utilitarianism is especially active in the area of particular ethics, such as bioethics or ecological ethics. In Poland, an approach similar to utilitarianism was presented by a philosopher and praxeologician, professor Tadeusz Kotarbiński, in his theory of "independent ethics";
- l i b e r a l i s m, expressed in the saying *laissez faire, laissez passer*, that is freedom of earning and trade without interference of the state, with sacredness of the principle of the ownership right. In the social areas, liberalism aims at complete freedom of the individual in the scope of deciding about one's fate, and it allows only voluntary system of connections of individuals into groups of activities (corporations);
- r e l a t i v i s m, according to which logical and cognitive values (true—false), ethical values (good—wrong) and aesthetic values and the related standards and judgments are of relative nature. Relativistic concepts assume subjective nature of both human knowledge and moral standards. In economics, they accept the rule of profit maximisation as a leading axiom in business activities and stipulate separation of "ethics of business" from "general ethics".

The stated main currents in ethics concepts have advantages and shortcomings, which is confirmed with the ongoing discussions. Their leading motif has come to be the statement that "morality and ethics constitute the heart of practice in business" (8). The reasonability of preparation of a set of principles of a reliable human being dealing with business activities is also emphasised, not because there is a special fashion for code-based disciplining of particular areas of life, but because, as many economists prove, the ethical code of the entrepreneur will constitute a written summary of the basic principles of behaviour which a person undertaking business operations should follow, as he/ she will be an animator of decency in business and a moral protection against attempts of contemptible behaviour. Its violation could result in moral anathema (like, e.g. the so-called black list for debtors) (9).

As a consequence, the code of ethics will contribute to harmonious, agreeable cooperation of people in economy processes, as well as harmonious social coexistence with the natural environment which in itself cannot protect, and a person responsible

for shaping modern civilisation should become its protector, because this civilisation allows discovering fascinating natural resources and unrecognised possibilities of the human intellect.

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Społeczne i etyczne aspekty przedsiębiorczości

Streszczenie: Przedsiębiorczość oraz innowacyjność stanowią fundamentalne przesłanki wzrostu i rozwoju gospodarczego. Przedsiębiorczość, jako cecha osobowa jednostki doskonalona w procesie edukacyjnym, może być efektywnie realizowana w odpowiednich warunkach prawno-ekonomicznych. Warunki te kształtowane są przez społecznie stanowiony system decyzyjny. Przedsiębiorca innowator realizuje przedsięwzięcia w zmieniającym się otoczeniu materialnym, organizacyjnym i prawnym. Aby oczekiwana wartość dodana stanowiąca cel jego działalności była optymalna, również dla otoczenia, przedsiębiorca, podejmując decyzje i działania, formułuje mechanizm zabezpieczeń wewnętrznych, poprzez uruchomienie między innymi odpowiedniego systemu rezerw w sterowanym zespole wytwórczym (usługowym), a jednocześnie ubezpiecza go zewnętrznie w sieci systemów ubezpieczeniowych. Działania te dotyczą również makroukładów i mają na celu minimalizację ryzyka, maksymalizację oczekiwanych wartości, ponadto ograniczają wielopłaszczyznową odpowiedzialność oraz kształtują ponadczasowe zasady etyczne w stosunkach międzyludzkich (międzynarodowych) i wpływają na rozwój nowoczesnej cywilizacji.

Słowa kluczowe: przedsiębiorczość, optymalizacja decyzji i działań, ryzyko, odpowiedzialność

Edward Michalik*

Effect of deregulation on changes in the local market of postal services (with the example of the former Tarnów Voivodeship)

K e y w o r d s: deregulation of the market of postal services, liberalisation of the market of postal services, postal services, postal services market, Poczta Polska (Polish public postal services), delivery services, delivery companies, postal companies

S u m m a r y: The paper presents the effect of the processes of liberalisation and deregulation of the postal services market on the local market of postal services of the former Tarnów Voivodeship (now the city of Tarnów, the Counties: Tarnów, Bochnia, Brzesko, Dąbrowa Tarnowska, Dębica). In particular, the terms of postal services and of the postal services market have been discussed, and then the further stages of the processes of liberalisation and deregulation of this market within the European Union and in Poland and their effect on the local market of these services in the former Tarnów Voivodeship.

1. Introduction

The activities undertaken by the European Union and related to unification of particular sectors of the internal market include also postal services. This applies to gradual liberalisation, but at the same time, in reference to common services, takes into account certain regulatory processes whose objective is ensuring a specific level of performance. It follows from the fact that, despite development of alternative services, postal services are important for both the state and the society.

This document discusses the most significant issues related to the process of deregulation of the postal services market and their effect on the local market, including the former Tarnów Voivodeship (now the city of Tarnów, the Counties: Tarnów,

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Bochnia, Brzesko, Dąbrowa Tarnowska, Dębica). The summary includes conclusions of general nature as well as proposals of the directions of further research in this issue.

2. Postal services

Pursuant to the provisions of the Polish legal regulations, in particular to Article 2 of the Postal Law (1), a postal service means profit-driven reception, transporting and delivery of letters, parcels, parcels for the blind, postal orders executed in domestic or international trading. Within the postal services, the common postal services are named. These include services (Article 3 Para 25 of the said Law) which consist in receiving, transporting and delivery of letters (up to 2000 g, including registered parcels and parcels with stated value), parcels (up to 10,000 g, including with stated value), parcels for the blind. Moreover, the common services include delivery of parcels sent from abroad (up to 20,000 g) and processing postal orders. These are provided in the domestic and international trading in the territory of the Republic of Poland, in a unified way under comparable conditions and at affordable prices, maintaining the quality required by the law and with ensuring at least one emptying of the sending mailbox and delivery of parcels at least on each business day and not less frequently than five days a week.

3. The postal services market

The above services are provided within the market of postal services defined as an "entirety of exchange relations between the suppliers, that is the units which provide postal services, and the buyers of these services. This market thus includes all the postal facilities and all the service beneficiaries and the total set of purchase and sale transactions in the scope of postal services throughout the country" (2). Its structure is multi-segmental and it may be broken down into the segment of postal services (within which common services are also present), delivery services, no name prints and direct mail (addressed promotional parcels), and services related to performing the intermediation function by the postal operator (e.g. banking and insurance) (3). The basic entities in the postal services market are individual buyers, companies, institutions, national and private organisations which provide postal services, companies and market firms in various industries, regulatory institutions, the state, and the objects of the exchange in the postal services market include information, tangible goods, and nominal goods (4).

The postal market has traditionally been functioning as a monopolistic one. The progressing globalisation of the economy and the liberalisation processes have also significantly affected the postal sector. These come in transformations of the market

structure (leaving monopoly and introducing competition), ownership transformations (undertaking activities in the market by private companies, changing the principles of functioning of traditional postal operators, that is departing the functioning according to the rules of the state administration and undertaking activities according to the rules characteristic of the private sector) as well as changing the method of controlling the postal market (departing from the direct control over the market by the state and implementation of the intermediate control with the use, at the widest scope possible, of general solutions characteristic of the whole economy, supported with industry regulations, the observation of which is supervised by specialised regulatory organs) (5).

4. Liberalisation of the postal services market within the European Union

In reference to the European Union, within the discussion on the processes of liberalisation and deregulation, as Grażyna Wolska stated (4; 6), two positions were presented. The first referred to state intervention and the feeling of social and military role of postal services was its basic assumption, thus the necessity of maintaining state monopoly in the postal services market. Moreover, effectiveness of the market was emphasised as a controller of the economy and the fears were presented resulting from uncertainty as regards behaviours of private entities providing postal services, from which disproportions in access to postal services may arise.

The second position referred to the necessity of liberalisation of the postal services market, within the framework of which arguments were used about imperfection of the state as an entity of allocation and control decisions, natural monopoly was covered, and better effectiveness of private against public institutions was emphasised. Finally, it was assumed that liberalisation of the postal services market was necessary. The prevailing arguments, justifying introduction of self-regulation in the postal services market, are broadly understood aspects of imperfection of the state as an entity of allocation and control decisions, as well as shortcomings, in many cases simply immanent, of public against private institutions. At the same time, it was proven that there are two main disturbances in the postal services market, which manifest in the fact that domestic markets are still mostly dominated by monopolies of the public sector and that many countries still feature too strong control, often limiting development of competition.

Despite the stated disturbances, the plan of liberalisation of the postal services market in the countries of the European Union has been prepared and is being implemented, which consists in gradual opening of the letters market in the years 2000–2011/2013. Within its framework, the area reserved for parcels up to 350 g and for the five times the basic tariff was limited as of 01.01.2000 (7). Then, further reduction of

the area reserved for postal parcels was specified as of 2002 (up to 100 g) and from 2006 (up to 50 g) (8). As of 1.01.2011 (9), full opening of the market was assumed, with the transition period up to 2013 for 11 European Union member countries (the Czech Republic, Greece, Cyprus, Lithuania, Latvia, Luxembourg, Hungary, Malta, Poland, Romania, Slovakia).

5. The postal services market

Within the implementation of the regulations of the European Union, the Polish postal services market is also subject to changes. At present, it is a market in which the dominant entity is present on part of the supply of the common postal services, which is the public operator "Poczta Polska" (a joint stock company since 2009), which results from Article 46 of the Postal Law (1). It also has a legally sanctioned monopolistic position in the area of reserved services, resulting from Article 47 of the said Law. At the same time, this market has been functioning for several years under the conditions of gradual liberalisation determined with significant dates. These include the year 1996 (when the Communication Law of 23 November 1990 introduced licences for delivery services, defined the common service term, the reserved area, the parcel services market was opened, within which postal operators appeared such as DHL, TNT, UPS), 1997 (introduction of the Act on PPUP Poczta Polska, regulating the issues of functioning of this company). Further important dates are 2001 (introduction of the Postal Law of 12 June 2003 along with executive acts defining the definition of common service, introduction of the obligation of providing common services, the reserved area up to 500 g was defined, changed to 350 g after joining the EU, the controller unit for the postal services market and its competencies were defined), 2006 (reduction of the reserved area to 50 g, which translates into the development of alternative postal operators, including InPost, PAF). The years 2008–2009 were the period of adjusting Directive 2008/6/EC of 20 February 2008 (amending Directive 97/67/EC) to the national regulations, and the year 2013 signifies the full opening of the postal services market, which will allow selection of the operator and will translate into reduction of prices and higher quality of services (10; 11; 12).

The above changes affect the market in a definite way. As the *Report of UKE President on the condition of the postal services market in Poland in 2009* (13) shows, the years 1996–2009 saw almost 14-fold increase in the number of non-public operators (from 15 to 209). It is significant that non-public operators, unlike Poczta Polska, which is obliged to provide services in the domestic and international trading, may provide their services within the country, abroad (or both domestically and abroad) or only locally (in the territory of a voivodeship, county, one place or even its part). These operators may be broken down into three groups, i.e. the so-called delivery companies (including Opek, UPS Polska, GLS Poland, Siódemka, DPD Polska, DHL Express, TNT Express Worldwide), a group of operators who provide services in the

domestic trading with the nature similar to common postal services (InPost, Polska Grupa Pocztowa), a group of other operators who predominantly provide services locally, following the procedure similar to common services or featuring added value (delivery services).

The postal sector shows a slow but steady increase in employment. The rate of increase in employment is maintained due to the presence of non-public operators, where employment is significantly increasing every year (2006: employment 17,964; 2007: 21,246; 2007: 25,484; 2009: 28,696). With Poczta Polska, the trend is just the opposite (2006: employment 101,146; 2007: 100,423; 2008: 100,994; 2009: 98,769). Throughout the country, as at the end of 2009, there were 10,776 facilities (of both non-public operators and the public operator), majority of which were located in city areas (6156). Rural areas are supported with postal services by Poczta Polska, and the number of facilities of non-public operators is negligible there (84). The latter focus their activities in the cities, where demand for postal services is considerably higher, and the costs of their providing are considerably lower than in rural areas. Transformations and changes in the global scale are also translated into the local market, which will be discussed further on.

6. The local postal services market of the former Tarnów Voivodeship: Changes within Poczta Polska

Poczta Polska in the form of a state-owned company of public use was established in 1992 from breaking down a state-owned organisational unit Polska Poczta Telegraf Telefon into two business entities, Poczta Polska and Telekomunikacja Polska Spółka Akcyjna. In 2009, Poczta Polska was transformed into a joint stock company with 100% shares owned by the State Treasury. In 2005, Poczta Polska initiated the process of changes. The main objectives included introduction of new elements into the functioning of this company, such as strengthening the market orientation (with the ultimate establishing of business units), increasing competitiveness and improvement in service quality, optimising costs (introduction of market-driven mechanisms in mutual relationships inside the company), implementation of uniform organisational structures in individual levels of the organisation, improving internal communication, implementation of modern systems of management.

The changes also covered Poczta Polska in Tarnów. In the place of the Regional Postal Office (one employer) covering the area of the former Tarnów Voivodeship (now the city of Tarnów, the Counties: Tarnów, Bochnia, Brzesko, Dąbrowa Tarnowska, Dębica), autonomous specialised units were established as the so-called business units: Oddział Rejonowy Centrum Sieci Pocztowej (District Branch of the Postal Network Centre—management over the network of Postal Offices and retail customer services), Oddział Rejonowy Centrum Usług Pocztowych (District Branch

of the Postal Services Centre—services for the so-called "contractual" customers, i.e. those with whom contracts for provision of postal services were concluded, processing and dispatching parcels, delivery of parcels), field auxiliary units (including Wydział Zamiejscowy Centrum Rachunkowości [Department of Accounting Campus Centre], Dział Terenowy Administracji i Zaopatrzenia [Department of Regional Administration and Procurement], Dział Terenowy Zarządzania Nieruchomościami [Regional Department of Real Estate Management], Centrum Obsługi Finansowej—Dział Kadr i Płac [Financial Service Center—Human Resources and Payroll], Centrum Informatyki—Rejonowy Dział Wsparcia Użytkowników [Computer Centre—District Unit of Members Support], Centrum Pocztex—Oddział Terenowy [Pocztex Centre—Local Branch], Centrum Usług Koncesjonowanych—Oddział Terenowy [Licensed Service Centre—Local Branch]). Later years saw a number of changes which translated into the organisational structure of organisational units in Tarnów. At 1 January 2011, the organisational structure of Poczta Polska in Tarnów was as follows:

- Oddział Rejonowy Centrum Poczty (a regional branch established from merging Centrum Sieci Pocztowej and Centrum Usług Pocztowych, responsible for organisation of a network of postal facilities, support for customers, both individual and "contractual", delivery of parcels, banking and insurance services, retail services);
- Centrum Poczty—Przedstawicielstwo Handlowe (Postal Services Centre—Sales Representation; sales services for the customers with whom contracts were signed, concluding new contracts);
- field auxiliary units supporting the activities of Oddział Rejonowy Centrum Poczty (including Centrum Infrastruktury—Wydział Operacyjny Infrastruktury [Center for Infrastructure—Infrastructure Operations Division] for administrative and economic services, management estate properties, Centrum Zarządzania Kadrami—Dział Kadr i Płac for HR services, Centrum Rachunkowości—Wydział Zamiejscowy for accounting services, Centrum Logistyki—Oddział Terenowy [Logistics Centre—Local Branch] for transport and logistics, Centrum Usług Koncesjonowanych for security services).

7. The network of Poczta Polska postal facilities

From the point of view of the customer, the network of support facilities which guarantee availability of services is most important. Within the Poczta Polska network, there are postal offices (Urząd Pocztowy), affiliated postal offices (Filie Urzędów Pocztowych), postal agencies (Agencje Pocztowe). The basic tasks of Postal Offices include provision of services in the appointed area. These services include postal services, including common ones (receiving letters, parcels, money orders), delivery services, retail services (sale of a specific range of merchandise), financial and insur-

ance services (sale of credits, opening bank deposits, arranging insurance). Affiliated Postal Offices (Filie Urzędów Pocztowych) are selected parts of Postal Offices with which they make settlements under condition of operation outside of its area. These are most often service points in shopping centres (cities) and in rural areas (in the places without commune offices). Postal Agencies operate in the places where running Postal Offices or Affiliated Postal Offices is economically unjustified. They ensure access to common postal services and are managed by the Agents operating in accordance with the regulations of the Civil Code. A civil law agreement is signed for managing a Postal Agency.

In the years 2005–2009, Poczta Polska in Tarnów made a number of changes in the network of facilities, which mostly consisted in transforming Postal Offices into Affiliated Postal Offices and Postal Agencies. In particular (12):

- in 2005 there were 127 Postal Offices, 12 Affiliated Postal Offices, 9 Postal Agencies;
- in 2006 there were 106 Postal Offices, 30 Affiliated Postal Offices, 10 Postal Agencies;
- in 2007 there were 104 Postal Offices, 30 Affiliated Postal Offices, 12 Postal Agencies;
- in 2008 there were 80 Postal Offices, 52 Affiliated Postal Offices, 15 Postal Agencies;
- in 2009 there were 80 Postal Offices, 46 Affiliated Postal Offices, 20 Postal Agencies.

8. Alternative operators

Independently of Poczta Polska, other non-public operators operate in the area of the former Tarnów Voivodeship. These include delivery companies (DHL, Siódemka, Opek, UPS, DPD) and companies which provide services with the nature similar to postal services (InPost), as well as other, mostly local, delivery and postal companies. In particular, InPost, according to the data as at 28 April 2011 (15) has seven customer service points in Tarnów (including three automated parcel machines), five points in Dębica (including four automated parcel machines), three points in Brzesko (including one automated parcel machine), and one point in Bochnia. The DHL delivery company opened in May 2010 in Tarnów (in Czysta Street), a modern reloading terminal with the capacity of processing about 8,000 parcels per day in warehouse halls with the area of 1,500 sq.m. Customers also have the possibility of collecting and sending parcels there. Proprietary customer service points in Tarnów and nearby are also operated by, among others, the following delivery companies: Siódemka, Opek, Masterlink Express, UPS Polska, DPD Polska (16; 17). Moreover, the register of postal operators of the Electronic Control Office reports, as at 28 April 2011 (18), three local companies from Tarnów and one in Dębica, Bochnia, Żabno near Tarnów each.

9. Final remarks

Postal services form a special type of services. The regulations of the law, both in Poland and in the European Union, generally define them as profit-driven reception, transporting and delivery of letters, parcels, parcels for the blind, and postal orders. Within these services, a separate category includes common postal services which, in accordance with the regulations of the law, are the services which consist in receiving, transporting and delivery of letters, parcels, and parcels for the blind, within specified weight ranges and with the specific requirements met in the scope of time, quality and accessibility of service. Common postal services are different in that they are subject to intense state control, which is also justified in their special legal protection, and the characteristic thing is that it is assumed that they are conducive to social integration and facilitate effective functioning of the economy. Common postal services are executed within the postal services market understood as the entirety of exchange relations between the suppliers, that is the units which provide postal services, and the buyers of these services. This market thus includes all the postal facilities and all the service beneficiaries and the total set of purchase and sale transactions in the scope of postal services throughout the country. For many years, this market was supervised in high detail as well as limited by the state, with the justification of, among others, the special social and military role of postal services, thus requiring a strong control on part of the state administration. Moreover, operation of private operators was feared, and there was a strong belief in limited effectiveness of the market as a controller of the economy. However, the market situation, as well as views of the economists finally prevailed (including the arguments related to imperfection of the state as an entity of location, as well as regulatory decisions, or the shortcomings of public institutions against private ones) and this market is being subjected to gradual liberalisation and deregulation.

In Poland, the dominant entity in the postal services market is Poczta Polska. With the rights of a public operator and acting in the reserved area, this company takes advantage of its dominant position with, among others, defining and applying price list for common services which not always correspond with the costs incurred on this account. The implementation of further Directives in the field of deregulation of the services market contributes to development of competition in this field. It is apparent in the global analysis of the entire market of services and in the changes in the local market. In case of the former Tarnów Voivodeship, these include the transformations of Poczta Polska (passing from a territorial structure into selected business centres) and changes in the structure of the network (transformation of unprofitable Postal Offices and Affiliated Postal Offices into Postal Agencies). In case of other postal and delivery operators it means expansion of the own network of customer service points, including modern forms of parcel delivery (InPost automated parcel machines) or terminals in which parcels are processed, received and collected (the DHL delivery company is the example here).

The analysis of the trends related to the market which result from its liberalisation shows development of companies competitive to Poczta Polska. This process, along with further stages of liberalisation andderegulation, will continue, with introduction of real and measurable benefit for the customer in the form of competition, which translates into prices of services. At the same time, one of the current limitations is the lack of the decision by the state in the scope of principles and modes of providing common postal services after the complete liberalisation of the market in 2013 (administrative-based selection of the operator, contest, tender proceedings, etc., as well as lack of rules for compensations for providing unprofitable common services). This decision will result in further changes and transformations in this market, which may constitute another area of research and analyses.

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Wpływ deregulacji na zmiany lokalnego rynku usług pocztowych (na przykładzie byłego województwa tarnowskiego)

S t r e s z c z e n i e: W pracy przedstawiono wpływ procesów liberalizacji i deregulacji rynku usług pocztowych na lokalny rynek usług pocztowych byłego województwa tarnowskiego (obecnie miasto Tarnów, powiaty: tarnowski, bocheński, brzeski, dąbrowski, dębicki). W szczególności omówiono pojęcie usług pocztowych, rynku usług pocztowych. Następnie analizie poddano kolejne etapy procesu liberalizacji i deregulacji tego rynku w ramach Unii Europejskiej i Polski oraz ich wpływ na lokalny rynek tych usług w byłym województwie tarnowskim.

S ł o w a k l u c z o w e: deregulacja rynku usług pocztowych, liberalizacja rynku usług pocztowych, usługi pocztowe, rynek usług pocztowych, Poczta Polska, usługi kurierskie, firmy kurierskie, firmy pocztowe

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Selected issues in innovativeness in forestry processes management

K e y w o r d s: forests, forestry, work environment, innovativeness, work processes, hazards, accidents, safety and ergonomics, machines

S u m m a r y: With the background of general characteristics of forests in Poland, the objective and scope of innovativeness has been discussed in economy, including forest economy, and in work safety management. Special attention has been paid to the specific nature of noxiousness of work in a highly varied work environment, which often times extremely unfavourably increases health risk, or even poses hazard to life of the employees in the forestry process. Implementing the issues of innovativeness in forestry should be related to the current achievements in science and to technical progress, with a view on the necessity of eliminating or effective reducing accidents in the works related to acquiring raw timber.

1. Introduction

The area of forests in Poland is 9,088 thou. ha, which means that the afforestation rate is 29.1%. It has to be noticed that the percentage ratio of the area of forests to the general geographical area of voivodeships is highly varied (Table 1):

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Table 1

Afforestation rate by voivodeships in 2009

Voivodeship	Afforestation rate (in %)
Lubusz	48.9
Subcarpathian	37.2
Pomeranian	36.1
West Pomeranian	35.1
Silesian	31.7
Podlaskie	30.4
Warmian-Masurian	30.4
Lower Silesian	29.5
Lesser Poland	28.5
Świętokrzyskie	27.8
Opolskie	26.5
Greater Poland	25.6
Kuyavian-Pomeranian	23.3
Lublin	22.8
Masovian	22.6
Łódź	21.0

Source: (1).

The structure of ownership shows dominance of public forests at 81.8% of forest areas, with 18.2% of private forests, which are additionally broken down into multiple small areas, i.e. resulting in about 1 ha per a single owner. In State Forests (Lasy Państwowe), the basic organisational units are forestry commissions with the average area of 17.5 thou. ha. Coniferous species prevail in 72.2% of forest areas (including pine in 62.2%), with deciduous species in 27.8% (including, among others, oak in 7.3%, birch in 7.0%, beech in 5.3%). In 2009, 32,702 thou. m^3 of large timber was acquired in Poland (the national forestry for the several dozen recent years refers to about 50% of log volume of timber.

It is noteworthy that, pursuant to the Forests Law of 1991, as amended, based on proven solutions in the system of organisation and management, State Forests manage a modern economy following the principles of continuous and expanded maintenance, emphasising continuity and further sustained multi-functional increase in resources.

The forests mostly meet the following functions:

- ecological, related to, among others, positive effect on the landscape and global and local climate, regulation of water circulation in the nature, protection of soil against erosion;
- production, which specifically consists in the capacity to produce renewable biomass, including industrial and power wood;

– s o c i a l, in the scope of modelling favourable health and recreation conditions, and related to the enrichment of the labour market (1). Since times immemorial, forests have been the places of rest and recreation (1).

2. General premises of innovativeness

The intense development of technique and technology has contributed to numerous objective difficulties, in their full adaptation in specifically varied innovations not ready for implementation under local work environment conditions. According to *Nowa encyklopedia powszechna PWN* (New common encyclopaedia) of 1996, innovations in the economy in the scope of new technologies and organisation and in products are classified by:

– releasing new goods and services for production,
– process application of new methods of obtaining these goods.

Process innovations result from scientific and technical progress, while organisational and institutional innovations are closely related to entrepreneurship and constitute its necessary item.

According to Ewa Okoń-Horodyńska (2), innovativeness of the economy means the capacity and motivation of business entities to operate with continuous conducting of scientific research and looking for new results, research and development work, new concepts and ideas, preparation and starting up manufacturing new or improved materials, goods, equipment, services, processes or methods dedicated for the market or for another practical application.

Joanna Wiśniewska (3, pp. 183–195) remarks that the most competitive and innovative economies in the world feature a perfectly developed sector of services, in particular services based on advanced know-how. The specific nature of services causes the companies functioning in this area implement organisational or marketing innovations considerably more often than innovations in products or processes. Indicating positive achievements in innovations, one cannot neglect the difficulties of the companies which introduce and execute innovations in services. Also, high costs of innovations and lack of capital are regarded the largest limitation factor in innovative activities in the sector of services. According to the Main Statistical Office research, economic obstacles are considered the strongest barriers for innovative activities in the services, especially those related to the costs.

Generating behaviours which allow maintenance of balance between cooperation and competition is the characteristic feature of the innovative environment. In the view of progressing globalisation and strengthening international competitiveness, efficient binding of companies with the R&D area determines innovativeness and competitiveness in companies (4, p. 34).

Technical progress according to Władysław Janasz (5, pp. 239–241) is one of the elements of broadly understood innovative process, as well as one of the factors of

increase in production of tangible items. It follows from the nature of this factor that it affects the production process indirectly, that is by the appropriate developing of work means and objects and stimulating to their effective use. It is significant for reduction of the unit costs of production, decrease of the share of material factors and live labour, improvement in the level of production quality, working conditions, work safety and hygiene conditions, protection of the natural environment and organisation, know-how and general technical culture of direct manufacturers.

It follows from the current discussion that innovativeness should be the main creative force in any organisation. Innovative are the companies which can create, absorb and win new products (services) and these which have the capacity of continuous adaptation to the changes in the economy (4, pp. 75–76).

The strategy of the European Union related to continuous, sustained development and the Lisbon strategy for the benefit of economic growth and employment are mutually supporting, thus giving the synergy effect due to their complementarity. In both strategies, the economic, social and environmental protection objectives are regarded as having mutually stimulating effect and that is why they should be executed jointly. Implementation of the necessary changes should contribute to creating conditions equal for all member countries, conducive to dynamic, innovative economic growth, social justice and continuous and sustained development of the natural environment (6, p. 46).

The theory of eco-innovations, just like that of the ecological economy, has recently become a new paradigm in the science. Its importance among many other types of theories of innovation is special due to the area of interest, that is environment and ecology. Ecological innovativeness means innovativeness which consciously strives to reduce load on the environment, and with its introduction intends mostly to achieve specific environmental effectiveness (6, p. 21).

According to Małgorzata Golińska-Pieszyńska (6, p. 176), business accepting, within the common sense limits, the principle that safety is more important than profit, has not only generated the market of products and services, but also gave the impulse to developing a new, broad area of knowledge of safety management.

3. Characteristics of work environment

Both national regulations and the guidelines of the European Union directives oblige employers to continuous improvement in the executed work process based on the latest achievements in science and in technological progress, including elimination or major reduction of the hazards for health and, under extremely dangerous employment conditions, life of the employees. The above activities should not be subjected to factors of economic nature only (7, pp. 5–9).

Employees should not be exposed in individual work stations to the effect of harmful health factors whose impact may be the cause of accidents, loss of health,

as well as chronic and incurable occupational illnesses or even permanent disability (Tables 2 and 3).

Table 2

Incidence of occupational diseases by type

Description		Total	Of which		
			Hearing loss	Infectious and parasitic diseases	Vibration syndrome
Forestry, logging and related service activities	2005	245	8	214	19
	2006	247	1	219	23
	2007	303	4	285	12
	2008	526	2	508	15
	2009	473	–	457	15

Source: (8).

Table 3

Persons working in forestry in hazardous conditions, exposed to agents harmful and hazardous to health, by groups of conditions, per 1000 paid employees

Hazard connected	2005	2006	2007	2008	2009
Work environment, including:	108.1	117	112.5	129.7	105.2
a) chemical substances	0.7	0.7	1.2	0.5	0.5
b) carcinogenic	0.4	0.2	0.6	0.0	–
c) hazardous industrial dusts	3.3	–	2.1	1.8	0.6
d) noise	38.4	40.3	39.5	41.6	31.1
e) vibrations	33.2	37.2	35.1	35.3	26.4
f) hot microclimates	4.9	7.3	6.5	6.3	3.4
g) cold microclimates	12.7	9.8	7.1	5.9	3.9
h) ionizing radiation	0.1	0.1	0.1	0.1	–
i) electromagnetic fields	4.6	3.8	3.6	2.1	1.5
Strenuous conditions, including:	52.6	51.5	51.2	61.2	55.8
a) excessive physical effort	29.5	34.8	30.9	34.2	33.0
b) hazards from insufficient light	1.6	4.5	2.4	3.4	2.0
Mechanical factors related to highly dangerous machinery	29.9	28.5	30.5	39.7	33.1

Source: (8).

Observing recommendations of ergonomics is intended to maximise harmony in human activities with the executed work, not only in the scope of ensuring work safety and hygiene, but also in order to minimise strenuous working conditions, as well as achieving the best possible comfort and stress-free employment. It is commonly known that providing hard and strenuous physical work with high level of effort constitutes a factor enhancing the degree of occupational hazard exposure. Direct hazard to life or health is always present in the environment which exceeds the

highest allowed concentrations (Polish abbr. NDS) or intensities (Polish abbr. NDN). Despite perceivable improvement in working conditions with each year, in forestry only, in 2009, among 1000 persons employed under hazardous conditions and environmental factors harmful for health and strenuous working conditions, 92 were employed in the public sector and 370 in the private sector (Tables 4 and 5).

Table 4

Persons working in forestry in hazardous conditions by groups and intensity of danger in the surveyed community, per 1000 paid employees of the total surveyed

Hazard	2005	2007	2008	2009		
				Total	Public sector	Private sector
Work environment	57.7	65.8	77.8	65.6	50.6	177.9
a) impact of agents from one group	28.3	34.9	47.1	38.6	36.0	57.8
b) two and more groups	29.4	30.9	30.7	27.0	14.6	120.1
Strenuous conditions	35.9	34.5	38.0	35.1	31.8	59.6
a) impact of agents from one group	25.5	23.3	26.0	25.8	26.0	24.3
b) two and more groups	10.4	11.2	12.0	9.3	5.8	35.3
Mechanical factors	22.7	21.9	30.1	24.4	9.9	133.1
a) impact of agents from one group	7.5	7.4	11.0	7.9	1.8	53.5
b) two and more groups	15.2	14.5	19.1	16.5	8.1	79.6
TOTAL	116.4	122.2	145.9	125.1	92.3	370.6

Source: (8).

Table 5

Accidents at work and accident absence in forestry by ownership sectors

Years	Occupational accidents		Fatal accidents		Accident absence in thou. days	
	Public sector	Private sector	Public sector	Private sector	Public sector	Private sector
2005	260	109	6	6	11 954	6823
2008	330	150	4	8	15 304	8650
2009	226	142	–	5	9695	8157

Source: (8).

Mechanisation of work, implemented in forestry for long years, gradually and effectively eliminates heavy physical effort. However, mechanisation of work is not always based on machines and equipment developed in accordance with criteria of ergonomics. Work is particularly harmful for health in the environment where physical effort and expenditure of energy are high, and emitted noise and mechanical vibrations exceed the allowed values, particularly in operation of sawing machines, cutting machines, barking machines, harvesters, processors, as well as tractors or cable railways.

Relatively high accident rate in forestry comes also from highly varied conditions of work environment. Significant fluctuations, not only seasonal, but also over the twenty-four-hour periods, are the feature of atmospheric conditions, and their variation affects the health of the employees and the number and scale of accident rates. It is noteworthy that climatic conditions, mostly during the late-autumn, winter and early-spring periods, also expose the fellers to the combined effect of chill, humidity and wind. These factors in many cases hinder the course of thermal regulation processes and may lead to cold-related ailments, which means increased accident rates.

Preliminary analyses proved that some correlation may be drawn between accident rates in forestry and biological and meteorological factors, especially with variables atmospheric conditions and when mental and physical abilities are reduced (which may be seen in reaction time variations and attention deficits).

It has to be noticed that, especially in the State Forests, the goal is to limit and eliminate hazards present during execution of strenuous and dangerous work in forestry (Table 6). Even though new, less hazardous and innovative machines, techniques and technologies of acquisition of raw timber are introduced on the ongoing basis, the group of persons forced to perform dangerous work is still numerous, especially when related to the work environment in mountain forest stands.

Table 6

Elimination or limitation of hazards in forestry (per person)

Hazards	Year	Persons working under hazardous conditions				
		In relation to which hazards were over the year				As at 31 Dec
		Eliminated or limited			Reported (including new hazards)	
		Total	Eliminated or limited up to acceptable norms	Limited		
working environment-related hazardous factors	2005	1523	733	790	360	3015
	2007	1743	842	901	586	3128
	2008	1995	972	1023	526	3692
	2009	1435	619	816	381	2901
hazards caused by strenuousness	2005	520	203	317	126	1466
	2007	498	235	263	184	1423
	2008	680	314	366	227	1743
	2009	590	226	364	218	1538
hazards caused by mechanical factors related to highly dangerous devices	2005	334	156	178	81	835
	2007	471	216	255	132	847
	2008	553	233	320	157	1130
	2009	**386**	**167**	**219**	**177**	**914**

Source: (8).

It has to be noticed that the employer is legally obliged to ensure safe and ergonomic conditions of work for all employees, however, due to highly complex situations, fellers undertake works which are hazardous to their health, or even life.

These days, not only in Poland, the degree of hazard from the work environment is enhanced. The above problem in forestry is related to, among others, unprecedented for many years damages in forests due to natural disasters. Significant damages to forest stands, in the form of windfalling, breaking, as well as other hurricane disasters, definitely make working conditions more difficult in the given area. The strength of these factors depends on both size and type of the affected forest.

The data given in Tables 7 and 8 show that more fatal accidents occur in the private sector. Inappropriate behaviour of the employee is definitely the most frequent cause of accidents. At the same time, accidents at work, although classified as resulting in one event, most often are caused by several simultaneous causes (Tables 7 and 8).

Table 7

Accidents at work in forestry: persons injured

Accidents		Year						
		2005	2006	2007	2008	2009		
						Total	Public sector	Private sector
Fatal accidents		12	4	9	12	5	–	5
including men		11	4	9	11	5	–	5
Serious accidents		7	15	9	10	6	3	3
including men		7	12	8	9	6	3	3
Light accidents		350	405	388	458	357	223	134
including men		318	374	355	424	335	208	127
TOTAL		369	424	406	480	368	226	142
including men		336	390	372	444	346	211	135
including the resulting inability to work	1–3 days	2	5	5	6	6	2	4
	4–20 days	94	95	107	125	113	80	33
	>20 days	251	311	271	313	223	126	97

Source: (8).

Table 8

Accidents at work in forestry by cause of accident

Cause of accidents		Year						
		2005	2006	2007	2008	2009		
						Total	Public sector	Private sector
Improper condition of material objects/ agents		56	54	54	75	55	26	29
Improper organisation of	work	24	26	20	36	24	7	17
	work post	22	42	22	36	33	20	13

Lack or wrong use of material objects/ agents	41	31	35	45	28	11	17
Protective equipment not used	12	11	7	13	11	7	4
Inappropriate deliberate behaviour of employees	34	71	63	57	53	29	24
Inappropriate mental and/ or physical condition of employees	27	23	39	44	25	22	3
Incorrect action of employees	339	454	406	506	386	205	181
Other	66	76	74	82	80	63	17
TOTAL	621	788	720	894	695	390	305

S o u r c e: (8).

4. Selected issues in innovative work

A number of processes has been undertaken in recent years to adjust the Polish law to, among others, the Geneva conventions of the International Labour Organisation and to the currently recommended European Union directives, especially in the scope of:

- Introducing measures to increase safety, improve health and limit accident hazards;
- Define the minimum requirements for work safety in operation of machines used in forestry;
- Use new generations of means of personal protection, including head, hearing, arms, hands, feet, legs, etc. protection;
- Avoid or reduce hazards, particularly those which cause spine injuries with the employees performing manual handling operations;
- Define the basic requirements and recommendations in the scope of ergonomics during designing and production of machines used in forestry.

In the scope of adjusting the environment to human psychological and physical needs and possibilities, in the process of work under conditions of special hazard to health or even life of the employees, there are many issues which require further examination and solution.

During development of the technological and organisational progress, it is necessary to adjust all the efforts, in particular in reference to the actions related to optimisation of mental and physical comfort, in all work stations, specifically those which feature conditions harmful for health of the employees.

For example, new-generation combustion engine sawing machines feature not only high performance but also proper comfort of operation. The optimum shape of the universal grip allows control over all functions of the sawing machine with one hand. The proper location of the centre of gravity facilitates control, and the employed shock-absorbing system ensures easy, relatively light, less fatiguing and safer

work, in many cases meeting the recommendations of ergonomics. Lower volume of emitted exhaust gases makes them more friendly for the environment with catalysts. Chain sawing machines are fitted with the appropriate braking devices activated automatically, stopping the chain saw in a wink of the eye with too strong rebound of the sawing machine, irrespective of its location. Fitting the sawing machines with systems of trouble-free start-up and electronic ignition modules guarantees easy operation of the sawing machines.

One of the basic tasks of ergonomics is systematic improvement in working conditions with implementation and application of the principles of optimum adjustment to the average anthropomorphic features (somatic and functional) of the employee.

The appropriate decisions resulting from interdisciplinary recommendations are helpful and, in most cases, simply absolutely necessary, not only during work management processes, but also during modification of work places.

5. Conclusions

With the background of the analysis of introducing innovativeness and its impact on safety of work in forestry, the following conclusions may be drawn:

1. A relatively numerous group of employees is still employed under conditions of hazard to health or even life, under extremely dangerous conditions, e.g. in removing trees after natural disasters.
2. Strenuous and hazardous work executed manually should be, wherever possible, effectively eliminated or limited in the maximum scope by introduction of modern technologies of machine work.
3. Machine acquisition of timber with universal machines provided forestry with a new, innovative system of safer work. Operator's work stations in these machines are loaded with unknown (as yet) ailments, mostly in the muscular and bone system, which may be effectively prevented with the proper technique and organisation of the work process.
4. Introduction of new innovative techniques and technologies and further mechanisation of chipping work should not be dependent solely on the achieved temporary economic effects, but should take into consideration safety of work which, in the long run, contributes to achieving better economic results with, among others, higher quality of work done under good conditions.
5. The chain saws used should be modernised from the point of view of ergonomics and HS&E premises, including special work on reducing mechanical vibrations and noise.
6. In effecting technological and organisational progress, it is necessary to adjust all efforts to the psychological and physical human needs in all work stations, specifically those which feature conditions harmful for health of the employees.

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Wybrane zagadnienia innowacyjności w zarządzaniu procesami użytkowania lasu

S t r e s z c z e n i e: Na tle ogólnej charakterystyki lasów w Polsce omówione zostały cel i zakres innowacyjności w gospodarce, w tym w gospodarce leśnej i zarządzaniu bezpieczeństwem pracy. Szczególną uwagę zwrócono na specyfikę uciążliwości wykonywanych zajęć ze strony zróżnicowanego środowiska pracy, które niejednokrotnie w sposób szczególnie niekorzystny wpływają na wzrost zagrożenia zdrowia, a nawet życia pracowników w procesie użytkowania lasu. Wdrażanie problematyki innowacyjności w leśnictwie powinno nawiązywać do bieżących osiągnięć nauki i postępu technicznego, zwracając przy tym uwagę na konieczność eliminowania względnie znacznego ograniczania wypadkowości w pracach związanych z pozyskiwaniem surowca drzewnego.

S ł o w a k l u c z o w e: lasy, użytkowanie lasów, środowisko pracy, innowacyjność, procesy pracy, zagrożenia, wypadkowość, bezpieczeństwo i ergonomia, maszyny

Marlena Piekut*

Innovativeness of companies in Poland and other European countries

K e y w o r d s: innovations, innovativeness of companies, business surroundings

S u m m a r y: The objective of this paper was the analysis of the statistical data related to innovativeness of entrepreneurs from Poland and other European countries. The data from the GUS and the Eurostat have been used in the paper. The analysis showed that more centres of innovativeness are being established in the territory of Poland and these are more and more specialised units. Polish entrepreneurs rather unwillingly undertake cooperation in the scope of innovative activities with other units. It was also noticed that expenditures for innovative activities in companies and the number of innovations made are on the increase. Major regional differentiation has also been noticed. The Masovia and Silesia areas have the dominant role in innovative activities. The leaders in introducing innovations among European countries are entrepreneurs from Germany, Italy, the United Kingdom, France and Spain.

1. Introduction

Development of any innovations requires comprehensive knowledge, experience and skills from many areas. innovations require mental and physical expenditures as well as financial and material means. The publications of the Organization for Economic Co-operation and Development and the Eurostat define innovation as Implementation of a new or significantly improved product, a new or significantly improved process, a new method of marketing or a new method of organisation in the scope of business practices, workplace organisation or relationships with the external environment (1).

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Innovations originate within innovative activities which include research activities (scientific), financial, organisational and trade. Innovativeness is thus the result of a complex, multi-level innovative process. Edyta Pawlak (2) finds the following stages in most of the models: concept incubation, implementation and dissemination of the concept. Moreover, this process features mutual dependency of individual stages, high risk, use of various sources of information, high costs, and it is the result of a specific level of knowledge.

Innovation may thus be perceived as a result of partnership of the participants in the innovative process: entrepreneurs, R&D units, advisory and intermediation units, units which financially support introduction of a new scientific and technical solution, units of local government. All these parties should establish a common network of partnership which may, over time, be joined by other entities (3).

Innovativeness is a feature of business entities, a special resource which enables entrepreneurial activity for effective allocation of arrangable and owned financial, material and organisational resources, as well as developing the optimum configuration of competitive edges (4).

The objective of the paper is presentation of the analysis of selected results of statistical research concerning the level of innovativeness in Polish companies and comparison of these data with the indicators for the European Union. The GUS (Central Statistical Office) and the Eurostat data constitute the source material.

2. Milieu of innovative business

The institutional background plays a significant role in developing innovations, as well as the structural, regional and industrial background of the state, supporting innovative activities of business entities. Władysława Jastrzębska (5) indicates that the system of innovations should be understood as a network of public and private institutions whose activities and cooperation contribute to developing, modifying, adapting and disseminating innovations as well as new technologies in the region. The institutions which create the surroundings for innovative companies include local government authorities, college facilities, research and development units, credit and financial institutions, specialised units supporting innovativeness, as well as network-based support systems.

According to the GUS data (6), the number of units managing research and development activities in Poland are continuously increasing. There were 738 of them in 1995, rising to 1157 in 2008. Development units constituted the largest group in the research and development pool, amounting to over 55% in 2008. The second largest group was formed of scientific and research and development units, with university-level facilities ranking third.

Innovations are expensive, therefore the presence of credit and financial institutions in the surroundings of the innovative company is necessary. Entrepreneurs may

also receive support with the European Union funds to enhance the potential of research and development departments, support for purchase of technology or support for protection of intellectual property in companies.

Specialised units supporting innovativeness form another element in the surroundings of the innovative company. The data given in the Report on Centres of Innovations and Entrepreneurship in Poland (7) show that there were about 717 centres of innovations and entrepreneurship active in mid-2009, 28% of which were entities which offer help for innovative entrepreneurship. The highest density of Centres of Innovations and Entrepreneurship was in the Voivodeships: Silesian (87 units), Masovian (65) and Greater Poland (64), with the lowest number of these units active in the Opole Voivodeship (17). 6 centres were recorded in rural areas.

Network-based support systems also constitute an important element of the surroundings of innovative business, such as the National Innovations Center, the National SME Services Network or regional information centres.

3. Cooperation in the scope of innovative activities

Research and development activities in companies and implementing innovations help gain advantageous position in international markets. Experience of many countries which are leaders in innovations and in economy based on knowledge indicate that strengthening the relations between the research and development area and the business and creating cooperation-based relations is the factor which significantly enhances innovative nature of companies and that of the economy (8).

According to the GUS data (6), active cooperation with other units in innovative projects in the years 2006–2008 covered over 8% of industrial companies and about 7% of service companies. These data are lower than in the 2004–2006 period, when this type of cooperation was declared by 11% of both industrial and service companies. Interest in cooperation increased with the size of the company: the industrial companies reported cooperation of about 4% of small companies (employing 10 to 49 persons), about 15% of medium-size companies (with 50–249 employees) and almost 41% of large companies (more than 249 employees). This cooperation was undertaken in the sector of services by about 5% of small companies, 12% of medium-size companies and 34% large companies. The GUS data indicate also that companies take advantage of external sources in the innovative process in a limited degree. If companies already cooperate with external partners, these are most often their direct suppliers, recipients or other companies, and not external research and development units.

The Eurostat data show that the largest number of cooperation-based relations are developed by companies from the United Kingdom, with almost 21,000 (2008) various types of cooperation-based relations (Figure 1). The second place was taken by German companies, with French companies ranked third.

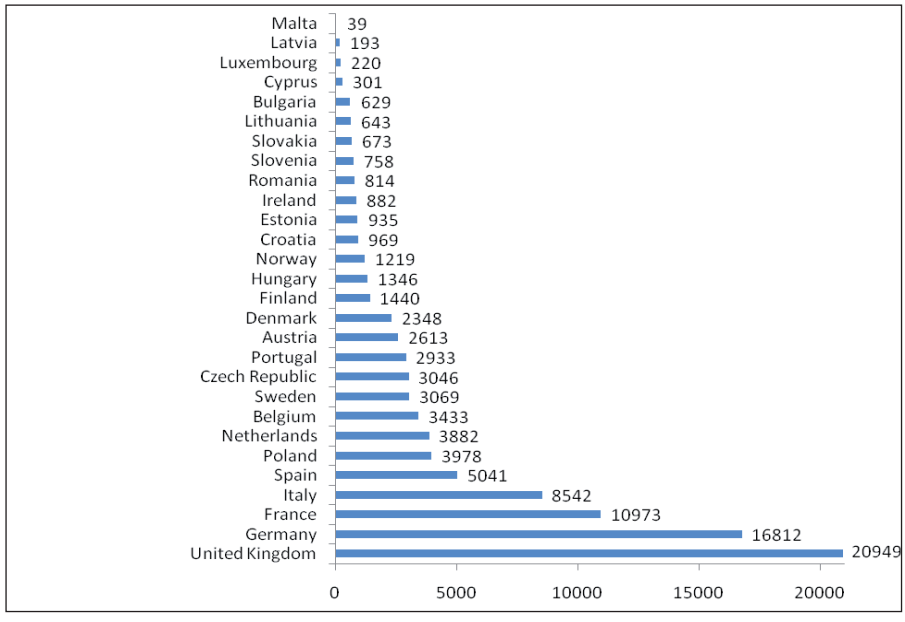

Figure 1. The number of all types of cooperation with participation of companies in European countries in 2008

S o u r c e: Author's own study on the basis of the Eurostat data.

To stimulate business to business cooperation and cooperation between entrepreneurs and business surroundings institutions, PARP (9) recommends, among others, improving quality of functioning of the legal surroundings of business, improving quality of functioning of research and development centres, stimulating cooperation with international investors and representatives of the administration.

4. Types of innovations

Innovations may be broken down into groups by the type of change applied: innovations in products, processes, organisation, marketing, and eco-innovations. Product innovation means all types of changes which consists in improving products (goods and services) already in production in the company. Process innovations refer to changes in the methods of providing services or in the methods of manufacturing products applied by the company, as well as in the methods of reaching the recipients with the product (6).

On the basis of the GUS research (10) on innovative activities, it was found out that in the years 2006–2008 the share of companies which made product or process innovations dropped against the previous research period. In the sector of services it was about

16% as compared with 21% in the years 2002–2004, with 21% in the industry as compared with 23% in the previous period. Both in the industry and in the sector of services, innovations were made mostly in large companies. Small companies often cannot afford funding research and development works aimed at innovations.

The Eurostat data show that companies from Germany, Italy and the United Kingdom are most active in making process innovations (in processes and products) (Figure 2). In Poland, over 4200 companies made process innovations, thus giving Poland the 7th place among 27 analysed countries.

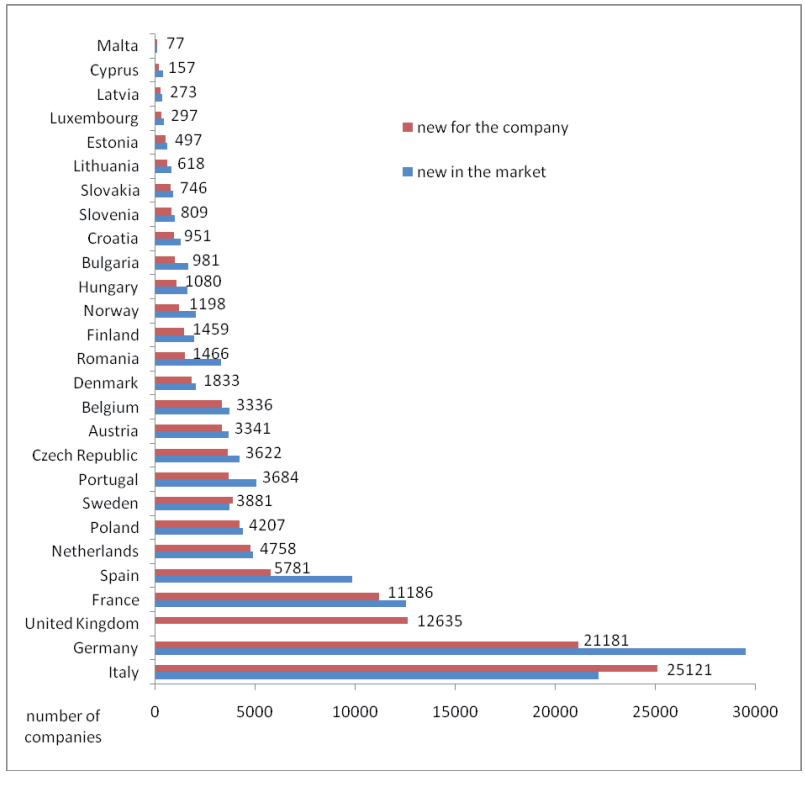

Figure 2. The number of companies with technological innovativeness (in process or product, current or discontinued) new only for the company and new in the market in European countries in 2008; the chart presents the number of companies with new innovations in the scale of the market

S o u r c e: Author's own study on the basis of the Eurostat data.

According to the PKPP LEWIATAN, BRE Bank and Dun&Bradstreet research, the most innovative companies in the scope of process innovations were IBM Polska, Jotkel Krzywonos Jan, Jagiellonian University, "Damel", Belma Accessories Systems, Gdańska Stocznia "Remontowa" im. Józefa Piłsudskiego [Gdańsk Shiprepair Yard "Remontowa" SA named after Józef Piłsudski] (11).

Another type of innovations is organisational innovativeness, which results from introducing a new method of organisation in the business practices of the company, workplace organisation or external relations. The GUS data for the period 2006–2008 (6) show that organisational innovations were made by about 44% of large companies in the industry and 43% in the sector of services. In medium-size companies, this type of innovations was made by 20% of companies active in the industry and 24% in the sector of services. Small companies which introduced organisational innovations constituted 9% in the industry and 12% in the sector of services. The most often made organisational innovations were new methods of allocation of task and decision rights.

The Eurostat data show that organisational innovations were most actively made by entrepreneurs from Germany, Italy and France (Figure 3). Polish entrepreneurs were ranked 8th among 28 European countries.

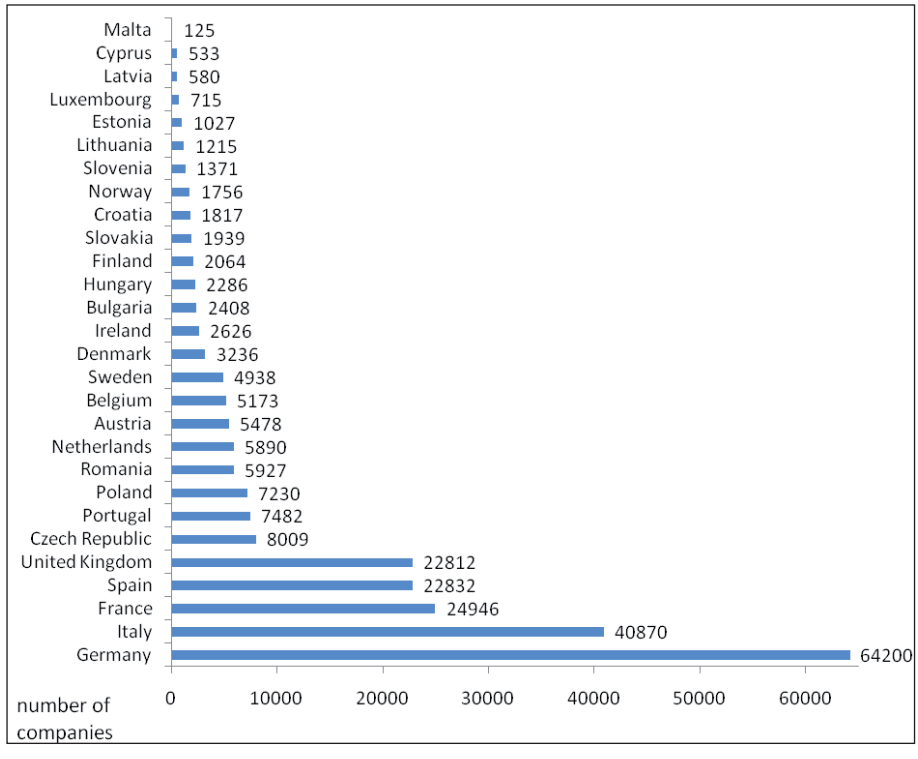

Figure 3. The number of companies making organisational innovations in European countries in 2008

S o u r c e: Author's own study on the basis of the Eurostat data.

The leaders among the most innovative companies in Poland (11) in terms of organisational innovations were ICN Polfa Rzeszów, Istrial and Zakład Produkcji Automatyki Sieciowej (Factory of Network Automatics).

Marketing innovativeness refers to design and packages, methods of sale of goods and services, promotion and advertising of goods and services, as well as methods (strategies) of defining prices for goods and services (6). According to the GUS data (6), marketing innovations in the years 2006–2008 were introduced in the industry by 33% of large companies, 17% of medium-size companies and 11% of small companies. In the sector of services, the share of companies introducing marketing innovations were as follows: 36%, 20%, 12%. The most frequent marketing innovations in the industry included new methods of defining prices for goods and services, and new media or techniques of product promotion in the sector of services.

The Eurostat data show that the largest number of companies introducing marketing innovations in 2008 were located in Germany and Italy (almost 36,000) (Figure 4). Poland, with its 7099 companies introducing marketing innovations, was ranked 7th among 26 European countries.

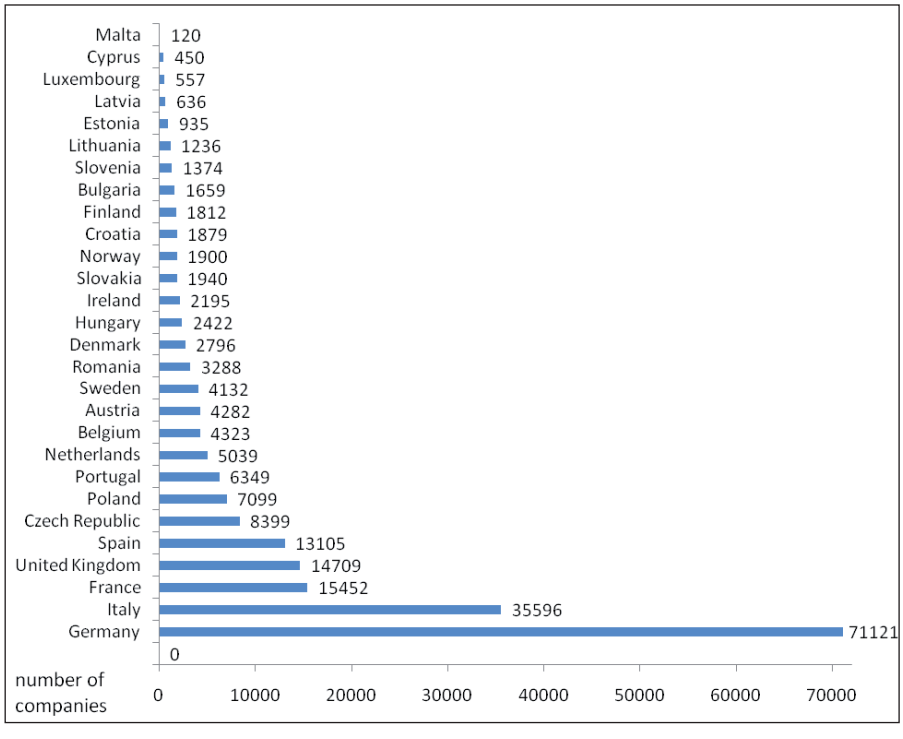

Figure 4. The number of companies introducing marketing innovations in European countries in 2008

S o u r c e: Author's own study on the basis of the Eurostat data.

The leaders in the scope of marketing innovations, according to the "Kamerton Innowacyjności" research, are Gdańska Stocznia "Remontowa", Fiat Auto Poland (Zakład Tychy) and Zakład Produkcji Automatyki Sieciowej (11).

The GUS research in the years 2006–2008 (6) showed a new category of innovations, the so-called eco-innovations, that is innovations which are beneficial for the environment, both during the period of product manufacturing, and during its use or application. Eco-innovations were introduced in over 26% of industrial companies and about 16% of companies functioning in the sector of services (6).

The largest share of innovative industrial companies was recorded in the Voivodeships: Masovian, Warmian-Masurian and Silesian (Figure 5). The lowest number of industrial companies introducing innovations was recorded in the area of the Voivodeships: Lubusz and Pomeranian.

Teresa Taranko (12) states that companies operating in Poland in the process of creating innovations mostly have their own R&D departments and employees who work on new solutions. She also noticed that innovative company show interest in cooperation with consulting companies but are close to cooperation with external surroundings.

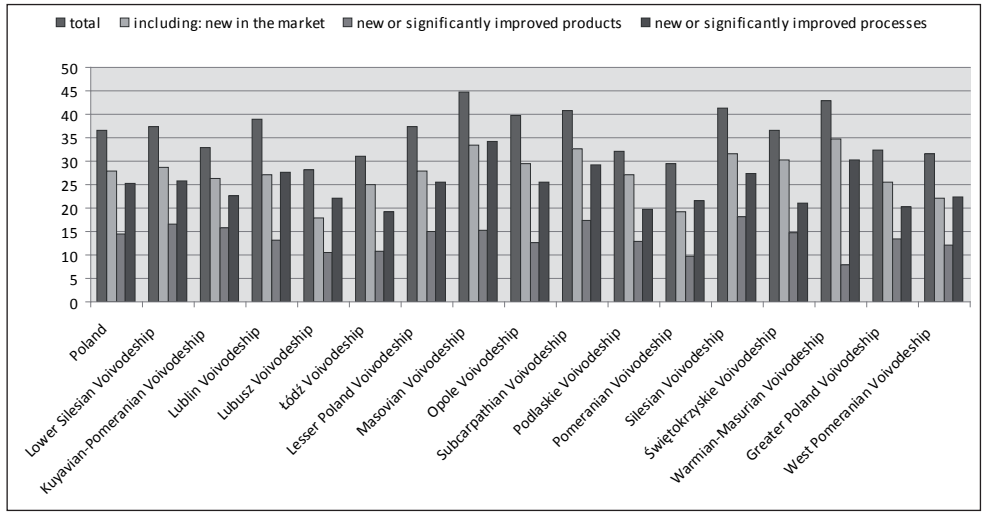

Figure 5. The structure of innovative companies in the industry by the types of innovations introduced and by voivodeships in the years 2005–2007, the companies which introduced innovations in % of the total number of companies

S o u r c e: Author's own study on the basis of (13).

The Eurostat data show that in the countries where the largest number of companies introduce innovations, the percentage of the companies discontinuing or suspending this activity is also highest. In 2008, 1424 companies in Italy dropped or halted their activities, and in Germany this applied to 1251 companies (Figure 6). 34 cases of companies discontinuing or suspending innovative activities were reported in Poland. The main problems with introduction of innovations in Poland, apart from legal and tax barriers, come from a small number of specialists implementing innova-

tive processes, financial limitations, and poor integration of scientific and economic circles. Another barrier is (14) low motivation of some entrepreneurs who in advance discredit the innovations in their companies.

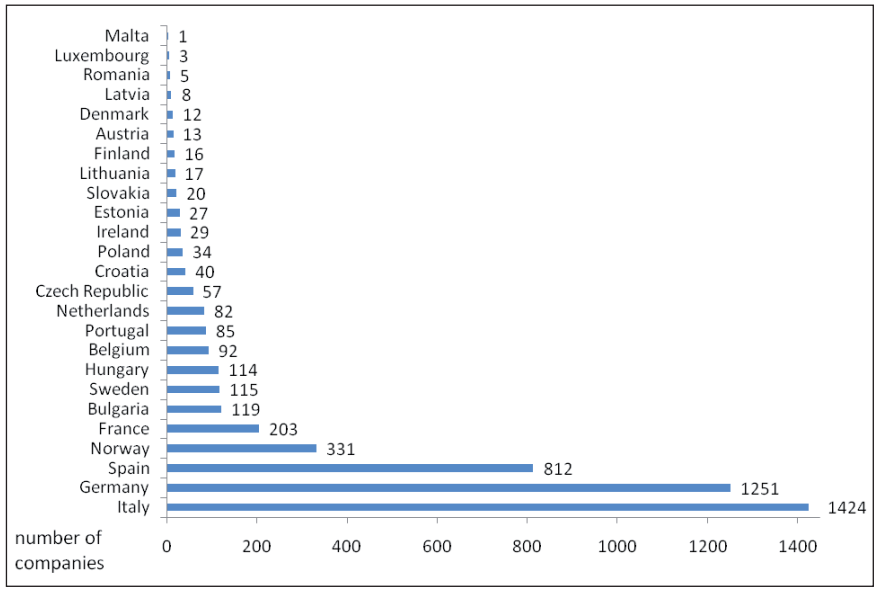

Figure 6. The number of companies discontinuing or suspending innovative activities before completion in 2008

S o u r c e: Author's own study on the basis of the Eurostat data.

5. Expenditures for innovative activities

The GUS data indicate that expenditures for innovative activities in the industry in the years 1999–2008 increased from PLN 15,250 m to PLN 24,652 m. In 2009, expenses for innovative activities dropped by about 8 per cent points against the previous year, i.e. PLN 22,652 m.

Polish entrepreneurs manage innovative activities mostly based on modernisation of their machine resources (Figure 7). In 2000, expenditures for investments in machines, technical devices and tools and means of transport constituted 64% of the total expenses for innovative activities in industrial companies. The next category in terms of the amounts constituted buildings and building structures, with over 28% of the total expenses allocated for them in 2009. Over 8% of the total expenses was spent on research and development activities in industrial companies in 2009.

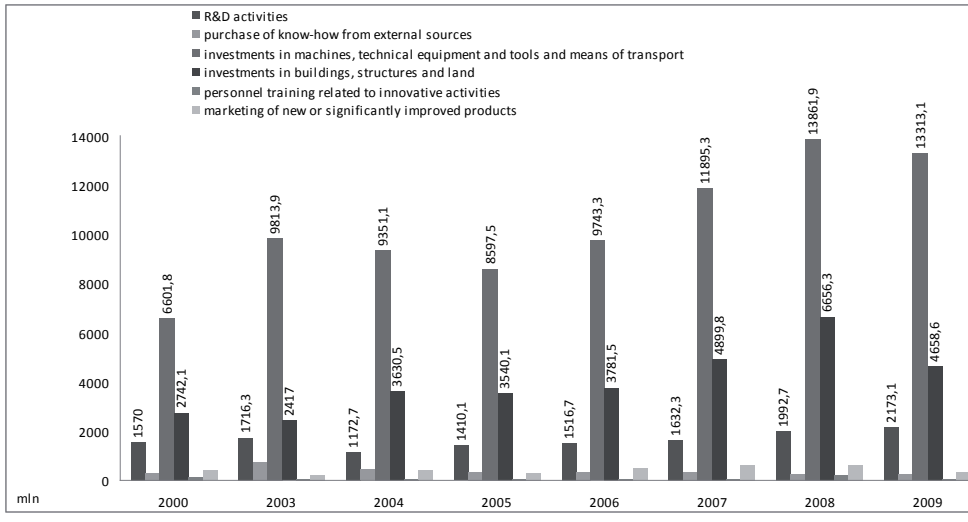

Figure 7. Expenditures for innovative activities in the scope of product and process innovations in industrial companies in selected years 2000–2009

S o u r c e: Author's own study on the basis of (15; 13).

6. Final remarks

Year by year, more and more innovative centres are coming into existence in the territory of Poland, along with their increasing specialisation. Expenditures for innovative activities in companies and the number of innovations made are also on the increase. Major regional differentiation has also been noticed. The Masovia and Silesia areas have the dominant role in innovative activities. Polish entrepreneurs have also been found rather unwilling to undertake cooperation in the scope of innovative activities with other units.

The leaders in introducing innovations are entrepreneurs from Germany, Italy, the United Kingdom, France and Spain. Polish entrepreneurs are ranked in the first ten European countries in terms of the number of innovations introduced.

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Innowacyjność przedsiębiorstw w Polsce i w innych krajach europejskich

Streszczenie: Celem artykułu była analiza danych statystycznych dotyczących innowacyjności przedsiębiorców z Polski i z innych krajów europejskich. Do opracowania wykorzystano dane GUS-u i Eurostatu. Przeprowadzona analiza wykazała, że na terenie Polski przybywa ośrodków innowacyjności i są to jednostki coraz bardziej wyspecjalizowane. Polscy przedsiębiorcy stosunkowo rzadko podejmują współpracę w zakresie działalności innowacyjnej z innymi jednostkami. Zaobserwowano także, iż zwiększają się nakłady na działalność innowacyjną w przedsiębiorstwach; zwiększa się też ilość wprowadzanych innowacji. Dostrzega się jednak duże zróżnicowanie regionalne. Dominującą rolę w działalności innowacyjnej pełnią Mazowsze i Śląsk. Liderami we wprowadzaniu innowacji wśród krajów europejskich są przedsiębiorcy z Niemiec, Włoch, Wielkiej Brytanii, Francji i Hiszpanii.

Słowa kluczowe: innowacje, innowacyjność przedsiębiorstw, otoczenie biznesu

Matej Polák, Dušan Blaško, Ľubomír Petro*

Innovations in the area of research and education at universities in Slovakia

K e y w o r d s: innovations, research and development, education, modernisation, renewable energy sources

S u m m a r y: The European Commission pays great attention to the need of innovations in the area of research, development and education since this area remains behind in comparison with the advanced countries such as the USA and Japan. The upgrading of education in the way it is stressed by the resolutions of the Bologna Process points up the necessity of increasing the quality by emphasising the linking of science and practice as well as gaining of skills and knowledge for their better application in practice. Therefore it will be necessary, even in the conditions of Slovakia which remains behind significantly as to the support of science and education, to direct the structural funds of the European Union towards modernisation of the universities and other institutions of higher education so that it could be possible to assure the qualities of research and improve the conditions in students' preparation for their better performance in practice. In their paper the authors point to the possibilities of implementing the innovations in the area of research and development by presenting an example of the Research & Development and Information Centre of Bioenergy (VVICB) at Kapušany, and they also demonstrate the practical solutions of these activities.

1. Introduction

The European Commission pays great attention to the need of innovations in education as well as to upgrading the research and development at the universities in Europe. The goal is to approach the level of outcomes in research to the advanced

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The origin of this paper resulted from the observations and research carried out within the project "New Technologies for Environmentally and Economically Effective Improvement of Biomass for Energy Uses", ITMS, the project code: 26220220063, in the framework of the Operational Programme: Research and Development.

countries such as the USA and Japan which have far more patents in the number of a million inhabitants when compared with the countries of the European Union. The necessity of increasing the quality of undergraduates' preparation is also emphasised within the Bologna Process with the aim to prepare the graduates for their better performance in practice. Interconnection of practice with science and research carried out at the universities and other institutions of higher education appears to be one of the possibilities. Therefore it is necessary to break the psychological barrier in enterprise activities at the universities.

Enterprise should be the culmination of educational and research activities and should retrospectively support and finance them. The linking of education and science belongs among the priorities of the University of Economics in Bratislava and is reflected in numerous research projects. One of the projects which will serve as a training scheme for the students and educators of the Faculty of Business Economy in Košice, the Technical University in Košice and the Technical University in Zvolen, has been designed by the workers of the Research & Development and Information Centre of Bioenergy (VVICB) at Kapušany, the educational and research facility which is an inseparable part of the University of Economics in Bratislava.

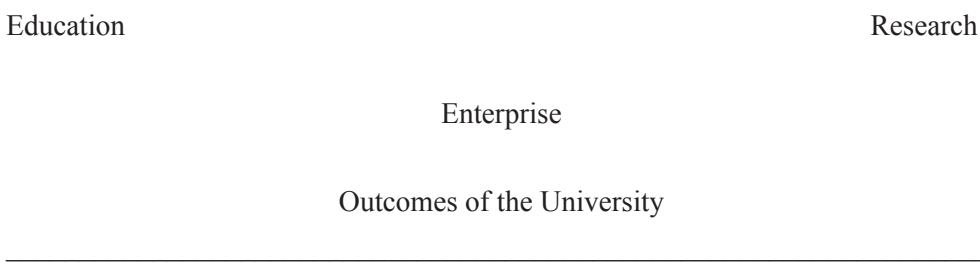

Figure 1

The aim of enterprise and business activities is closely connected with creation of further opportunities for funding the universities and other institutions of higher education from multiple sources. The year 2009 was declared in the European Union as a year of innovations in the area of education towards enterprise activities. The educational establishments, such as the universities and other institutions of higher education, had and still have enough opportunities to prepare adequately in order to update their institutes within the programme Erasmus Mundus as well as in the framework of the Operational Programme Research and Development. Individual challenges are currently going on within the above operational programme.

Modernisation of the universities should be directed towards the following areas:

- management of the universities and responsibility;
- content and quality of education;
- funding of the universities.

2. Management of the universities and responsibility

In the area of management of the universities and other institutions of higher education it is necessary to focus more extensively on the areas of science and research and their linking with practice. To carry out this linking it will be necessary in educational and research process to apply the activities that will be aimed at the needs and requirements of practice. It will be necessary to strengthen higher education and give this sector greater dynamics. It is also necessary to come to terms with the debt cumulated from the past in the area of facility equipment (deficit in the quality of university equipment causes low level of skills and creativity of students and educators). The directing managements of universities and faculties should support and motivate outstanding scientists and educators, who apply the latest scientific knowledge in their work and have active and very good contact with practice, in a more appropriate manner than they have done so far. The Slovak institutions of higher education remain behind similar institutions in the world, and this is closely connected with certain insufficiencies in their managements. Such managements are not able to offer a flexible response to the needs and requirements of practice and keep to traditional principles and attitudes. It often happens that such managements declare a support for innovations in science and research in their wording, nevertheless, the reality is rather different. The appreciation of those scientific workers who are behind the achievements in the area of science and research, is in most cases negligible either from moral or financial points of view. Such workers frequently appear to be a burden for a conservative management of the university, they are not motivated and supported adequately because they might cause some problems and additional work for the management. It is conservatism in particular, being the first and most important cause of the fact that no Slovak university is ranking among the best 500 world universities. The dynamics of development should be the priority of every university or institution of higher education, and it should stimulate and develop duality of mutual collaboration of school and practice.

3. Content and quality of education

The world financial crisis offers perhaps the best laboratory and research environment for seeking the new solutions of old as well as new problems. It is necessary to distract from the grooved ways and get rid of the used cliché as far as the content and quality are concerned. It is necessary to direct in a flexible way towards the needs of business companies in individual branches and regions at keeping to certain principles. It is undesirable to continue in old rules and dogmas the validity of which is groundless. Due to rather low activities of professors and associate professor at the universities these institutions of higher education are not prepared to respond adequately to the current needs and trends. A change in the content of

education in the area of training and instruction of managers means to educate and respond in a flexible way to the necessities of contemporary business environment and solve the problems of business companies. However, the present practice shows that the future managers lack skills and habits as well as resistance to helplessness and stress. Business companies and people lack time and money to train the graduates, at least for some period (6 months, a year) after their leaving the academic institution, how to apply, e.g., the marketing principles in practice, how to manage a firm or how to sell the company's products in the market. Our graduates consider this to be a big deficiency as they do not have the possibility of testing and verifying their theoretical knowledge. From the side of universities and other institutions of higher education it is necessary to convince the business companies of the fact that collaboration with academic institutions is inevitable and it can bring progress in the graduates´ preparation, and at the same time it can save the company costs for the training of its employees. Our knowledge in this direction is unambiguous and convincing.

3.1. Universities and the Bologna Process

The universities in Slovakia should respond to the challenges resulting from the Bologna Process and should begin applying the "3T" System aimed at:

- talent;
- technology;
- tolerance.

This system was discussed at the meeting of the EU delegates and the representatives of institutions of higher education on 25 January 2007 in Bratislava within the newly originated innovation centre. If the 3T System is applied at our universities, together with the sense and heart, the system of innovations within the European Union will develop further on. That is simply to say that such interdisciplinary collaboration of technical and economic universities is required which will simultaneously deal with technical as well as economic and social issues.

3.2. Funding of the universities and other institutions of higher education

Funding of the universities and other institutions of higher education is as important as management of the universities and the quality and content of education. The reason for this follows from the fact that science cannot be carried out without funding. This is accounted for by the results in the area of the evaluation qualification framework. According to this criterion 53 patents fall on a million of inhabitants in the European Union, 179 patents in the USA, and even 219 patents in Japan. The difference in funding the academic institutions in the advanced countries and in Slovakia is enormous. The last presentation of the Minister of Education of the Slovak Republic brings no better predictions. On the contrary, out of the funds al-

located from the EU structural funds for science and research, the Government intends to use certain financial amount for the construction of highways in Slovakia. At the present time the expenses for the development of science and education in Slovakia constitute only 0.67% of GNP, whilst in the USA it is 2.3%, and 2.7% of GNP in Japan. The European Union gives 1.6% on average, whilst some countries reach higher average that the EU one. Lack of funding for science and research brings about insufficient equipment of the universities and a low level of innovations. This produces insufficiencies in the students' preparation for the new challenges of global economy.

4. Support of the European Union for development of science and research

Despite these problems the European Union has offered generous funding to support research and development at the universities and other institutions of higher education not only in Slovakia but also in the entire European Union within the Operational Programme OPaV 2008/5, 1/02—SORO (Research and Development) as well as within the Operational Programme OPvaV 2.1/02—SORO (Research and Development). It is a great chance for the universities in Slovakia to update the equipment of their laboratories and research facilities.

4.1. Why to build up and develop the Research & Development and Information Centre of Bioenergy at Kapušany as the EU facility?

The high rate of unemployment and significant disproportions in the development of disadvantaged regions of North-East Slovakia and a part of Southern Slovakia particularly cause immigration of top university graduates from these regions. It is necessary to maintain the inhabitation of these regions according to the examples of Austria, Germany and Poland and prevent from their depopulation by developing new activities and upgrading the access to innovations in the area of information and communication technologies which will bring new opportunities for the development of small and medium-sized enterprises. These activities also include the exploitation of renewable energy sources that has become the main task to be accomplished by the above Research & Development Centre.

At present there is a deficit in new impulses and themes for the enterprise development. Therefore this subject appears to be a challenging issue for our efforts to deal with. Who is to establish successful business companies, particularly with high sophisticated production, if not professors, researchers, postgraduate and undergraduate students? This fact may increase the university prestige and will contribute to the higher quality of graduates' preparation and their managerial capabilities.

4.2. Collaboration of the university with practice

Current collaboration of the university with practice and its development lacks:

- *legislation*—clear rules and limits of collaboration have to be established for bilaterally advantageous collaboration for both universities and business companies;
- *marketing*, i.e. mutual communication—business companies and universities do not use much marketing in their activities. More communication could significantly contribute to the better approach and gaining the trust between partners;
- *interlinking element*—there is a lack as to the interlinking element in carrying out the innovative steps;
- *orders*—business companies consider orders and effective activity to be an important fact what is a frequent problem of collaboration. On the other hand the companies have to trust more in universities and their potential. The VVICB Kapušany will mainly direct its activities towards this kind of problems, that is to say, to solve the technical and economic problems at the level of research and to offer ready solutions for practice;
- *official possibility to be in business*—until now there is no official possibility for the university workers in Slovakia to be in business at the university within science and research. Therefore these workers usually have a small business licence or form business companies outside the terms of the university. It requires making the necessary steps in this direction and to legalise enterprise activities;
- *adequate services concerned with taxes, audits, economic and administration activities*. Doing business at the institutions of higher education in the area of science and research requires solving the above legislative steps and procedures to carry out enterprise activities within the law.

4.3. A Proposal of VVICB philosophy and current activities

PROFIL—the Centre of Bioenergy Research is coming into existence in connection with solving the project "New Technologies for Environmentally and Economically Effective Improvement of Biomass for Energy Uses", ITMS code: 26220220063, within the Operational Programme Research and Development in the years 2007–2013.

VVICB will be directed towards the following tasks and issues:

1. Solving the scientific and technical projects, grants and research tasks in the area of exploitation of alternative energy carriers, with the emphasis on solar radiation and biomass;
2. Projecting the new progressive energy equipment and systems;
3. Updating of already existing energy equipment with an emphasis on the increase of their effectiveness, operation and the optimum use of the energy content of fuels;

4. Projecting the synergic technologies in the area of exploitation of renewable energy sources;
5. Developing the progressive energy systems for the use of secondary fuels and non-traditional energy raw materials;
6. Monitoring the environment in connection with the operation of energy systems and equipment, e.g. the Biogas Station at Kapušany;
7. Economy of the exploitation of natural resources;
8. Creative support for the education of university student;
9. Research and verification of the results achieved in research and practice within the projects of the universities in Eastern Slovakia;
10. Demonstrations of individual energy carriers.

The Operational Facilities of the Centre are as follows:

1. The biogas station with a cogeneration unit of 180 KW/h output;
2. The solar energy laboratory—photovoltaics and water heating by solar collectors;
3. The laboratory and workplace of dry matter improvement and its processing into formed fossil fuels (briquettes, pellets);
4. The laboratory and workplace of liquid fuels for biooil and bioetanol production;
5. The physical and chemical laboratory of biomass testing.

5. Conclusions

The Bologna Process, which all the countries of the EU refer to, and accordingly the Slovak Republic as well, makes high demands on innovations of research and education at the universities. It will not be possible to assure the effective processes of learning without high quality research as this could have unfavourable results for the EU in remaining behind the advanced world in research and development for this and next centuries. These two activities are crucial from the view of the fact that progress is impossible without them as well as the assurance of high standard of living. Therefore all those who take part in these processes at the universities and other institutions of higher education must not allow the failure in this area so that it could become a stigma, on the contrary, the innovation processes must become a challenge for further development.

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Inovácie v oblasti výskumu a vzdelávania na univerzitách na Slovensku

Abstrakt: Európska komisia venuje veľkú pozornosť potrebe inovácií v oblasti výskumu, vývoja a vzdelávania. Pretože v tejto oblasti je Slovensko stále pozadu v porovnaní s vyspelými krajinami, ako sú USA a Japonsko. Modernizácia vzdelávania, ako sa zdôrazňuje v uznesení bolonského procesu je nutnosť zvyšovania kvality s dôrazom na prepojenie vedy a praxe, ako aj získavanie zručností a znalostí pre ich lepšie uplatnenie v praxi. Preto bude nutné, a to aj v podmienkach, Slovenska prispieť významnou mierou k podpore vedy a vzdelania. Mala by k tomu prispieť podpora štrukturálnych fondov Európskej únie na modernizáciu vysokých škôl a ďalších inštitúcií vyššieho vzdelávania, aby bolo možné zabezpečiť kvalitný výskum a zlepšiť podmienky v príprave študentov na ich lepšie uplatnenie v praxi. Autori vo svojej práci poukazujú na možnosti realizácie inovácií v oblasti výskumu a vývoja tým, že představuju príklad Výskumno – vývojového a informačního centra bioenergie (VVICB) na Ekonomickej univerzite v Bratislave pracovisko Kapušany. To centrum výskumu a vzdelávania ma prispieť k prenosu idey využitia obnoviteľných zdrojov energie do praxe a tiež ukázať praktické riešenia týchto aktivít.

Táto vedecká práca bola vytvorená realizáciou projektu „Nové technológie pre ekologicky a ekonomicky efektívneho zlepšenia biomasy na energetické využitie", ITMS, kód projektu 26220220063 na základe podpory Operačného programu veda a výskum, financovaného z Európskeho fondu regionálneho rozvoja.

Kľúčové slová: inovácia, výskum a vývoj, vzdelávanie, modernizácia, obnoviteľné zdroje energie

Łukasz Popławski, Matej Polák*

Innovativeness in regional development: Selected problems

K e y w o r d s: regional development, factors of regional development, innovativeness

S u m m a r y: The objective of the paper is presentation of innovativeness in regional development in the aspect of the regional development concept. Under current conditions, the development conditions of individual regions on the basis of which the directions of development of particular voivodeships should be based become significant. Moreover, the development concepts are important for individual regions, on the basis of which the directions of development of particular voivodeships should be based. This paper presents development factors found in the literature of the subject matter in the context of innovativeness. At the same time, special attention has been paid to the development concepts related to innovativeness. Innovativeness as a factor of regional development is differently analysed in the given concepts and theories. It is commonly believed that its role will increase due to the fact that this factor is perceived as the centre of competitive edge of the region.

1. Introduction

Fast progress in the growth of economy causes continuous changes in the competitive environment of modern business entities, in particular companies. For each of them, the position in the market and the capacity to quickly and flexibly react to the changes are of significance. To ensure the economic growth of the country, region or company, increasing, or at least stable demand for manufactured products or services in question should be provided. Competitiveness of the offer is decisive for the economic success or failure. Competitiveness is not a purely technical issue. Modern technologies imported from the West by foreign capital will not be sufficient. Com-

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petitiveness means that the society is organised in a certain way, that it can not only absorb, accept all novelties, but also produce them within a certain scope. Therefore, the issue is not only in imitating foreign solutions, but in innovations as well: technological, organisational, and cultural, created by own entities.

Competitiveness depends not only on the absolute value of the product or service, but also on attractiveness of the offer and on the method of its promotion. Assigning and exhibiting those features of the product which competitive bids do not have is important. Competitiveness is thus a function of innovative actions which decide about both success of individual entrepreneurs and economic development of the country. That is why in the countries actively supporting competitiveness of their economy, innovative policy is becoming part of the area of state administration operation.

Innovative activities include the works related to preparation and starting manufacturing new or improved materials, products, equipment, services, processes or methods, planned for introduction into the market or for another practical use. Innovative activities means also enhancing the level of organisation and management, improving effectiveness of business undertakings and quality of their results. Innovative activities or activities supporting innovativeness stand for improving the level of education, the development of the infrastructure, especially in IT-related areas, standardisation, establishing norms, and activities for protection of industrial and intellectual rights, improving performance and quality of activities of public services, in particular those established for protection of health and natural environment, to prevent the consequences of phenomena and events which pose hazard to life and property. In a different approach, this is a view of innovations as creative changes in the social system, in the economic structure, in technology and in the nature.

Innovations are exceptional tools in entrepreneurship, the activities which give new economic possibilities to the resources. In this respect, they are related to new products, services or knowledge. Thus, innovations create new resources**.** This new resource is not taken into consideration until practical application for execution or meeting of needs are found. In this way, the new resource gains economic value in the market.

Innovative activities are at present viewed as the basic condition or maintaining and strengthening the position of the entity in the market (most often a company, but also a region).

The objective of this paper is presentation of innovativeness in regional development in the aspect of selected theoretical problems.

2. Innovativeness in theoretical concepts and as a factor of regional development

Every project that is executed affects first of all the changes in theory and in practice in the economic development, as well as in the territorial status and institutional conditions of regional policy.

The literature defines regional development in a number of ways. Ryszard Brol (1) emphasises that the most synthetic are the three definitions by Jacek Szlachta, Tadeusz Kudłacz and Andrzej Klasik. They define regional development in the following way:

- "regional development" is a continuous improvement in competitiveness of business entities and in the quality of life of residents and increase in the economic potential of the regions, contributing to social and economic growth of the country (2);
- permanent increase in the quality of life of residents and in the economic potential in the scale of a specific territorial unit (3);
- this definition has been expanded for the task force for elements of regional development in Poland as "permanent increase in three elements: economic potential of regions, their competitive strength and the level and quality of life of residents" in the context of permanent growth which contributes to the development of the whole national community (4).

The society should have a positive attitude to effective adaptation to changes, continuous striving to improve quality, performance of activities, as well as satisfaction with the achieved objectives, which consciously employs development processes at the individual, group and system level. Table 1 presents the classification of the factors of regional development proposed by the author. It takes into account the view of the regional development, and in this case it may also be used in a local scale from the point of view of the development of economy in which innovativeness of the economy is included.

Table 1

Factors of regional development with innovativeness included

Development factor	Traditional view	Modern view	Economy based on knowledge
Employment	more companies = more work places	companies which create new work places adjust them to the qualifications of residents	intellect growth with training events and learning for the needs of the labour market and for the development of the company
Development facilities	development of the existing sectors of economy	creating new economic institutions	development of new sectors and introducing innovativeness in the existing ones
Benefits from place	comparative benefits based on tangible assets	comparative benefits based on quality of the environment	comparative benefits based on quality of the environment and intellectual capital
Resources of knowledge	knowledge of the existing personnel	knowledge as a generator of social and economic development	knowledge, information, innovativeness and mobility as the base for development

Source: (5).

It has to be emphasised that the policy of innovativeness is the instrument which, owing to new technologies, promotes increase in quality of the provided services.

As a result of the increased development and global interactions, openness to changes and new technologies and various global conditions as well as international factors increases rapidly. All individuals, social groups, companies and public institutions must faster adjust to the global market of exchange of knowledge, information, services, products and technologies. It may even be the case that quality of Internet communication will be more valuable for some entrepreneurs than quality of any other type of infrastructure. In this case, that commune will win a new investor which is more competitive in these terms, even if its location is worse. Innovativeness means implementation of novelties in business practice. However, this definition must be more detailed. Thus, the innovative activity stands for introduction of a new or significantly improved solution (in reference to a product, goods, services, a marketing process or an organisation (6).

The definition of innovativeness refers directly to the definition of the new investment included in the Ordinance (EC) of 24 October, no. 1628/2006, on application of Articles 87 and 88 of the treaty in reference to regional economic and investment aid.

Within innovativeness, those investments will thus be mostly supported as a result of which new or significantly improved products arise. Innovativeness should feature novelty and degree of spreading or diffusion. The factors of regional development and the related theoretical concepts in the scope of education and innovativeness are presented in Table 2.

Table 2

Factors of regional development and related theoretical concepts in the scope of education and innovativeness

Education	– human capital as a factor of production in the new theory of growth, E. Lucas (1988, 1990); R. Baro, X. Sala-i-Martin (1991); – the result of learning by doing in the new theory of growth, E. Lucas (1988, 1990); – promotion of general education, professional skills, organisational and management skills for creating a sector of high technology in the concepts of policy of endogenous regional development, R. Camagni (1992)
Process innovations	– process innovations as an exogenous factor in the neoclassical development model, G.H. Borts, J.L. Stein (1964); H.W. Richardson (1973); – the result of information spreading *(spillover*) in the new cumulative causality concept, N. Kaldor (1970); – innovations as the basic development factor, with support from scientific and technology parks, the concept of policy of endogenous regional development, E.J. Malecki, P. Nijkamp (1988); – the theory of endogenous increase: the technological progress from development of research and development activities, B&R, P. Romer (1990); – the concept of learning regions in the concept of the policy of endogenous regional development, B. Asheim (1995); – the process of spreading knowledge and skills *(knowledge spillover)* in the new theory of growth, G. Tondl (2001)

Source: (7).

Innovativeness results from cooperation of persons and institutions with various possibilities and classifications, that is why it is successful when introduced into the market.

The mechanism of stimulation for innovation results in the following classification (8):

- supply innovations: discoveries, inventions, the ideas of creators of new techniques resulting from own inquisitiveness.

Supply innovations are very expensive, thus only large corporations or companies can afford financing research or patenting inventions.

- demand innovations: stimulated by the needs of the market, that is finding solutions which respond to the demand for the given product or service.

Demand innovations are more valuable in business practice, as they more positively affect business growth.

Innovativeness results from cooperation of persons and institutions with various possibilities and classifications, that is why it is successful when introduced into the market, but it also creates specific economic values. Classification of the sets of the innovativeness system is presented in Figure 1.

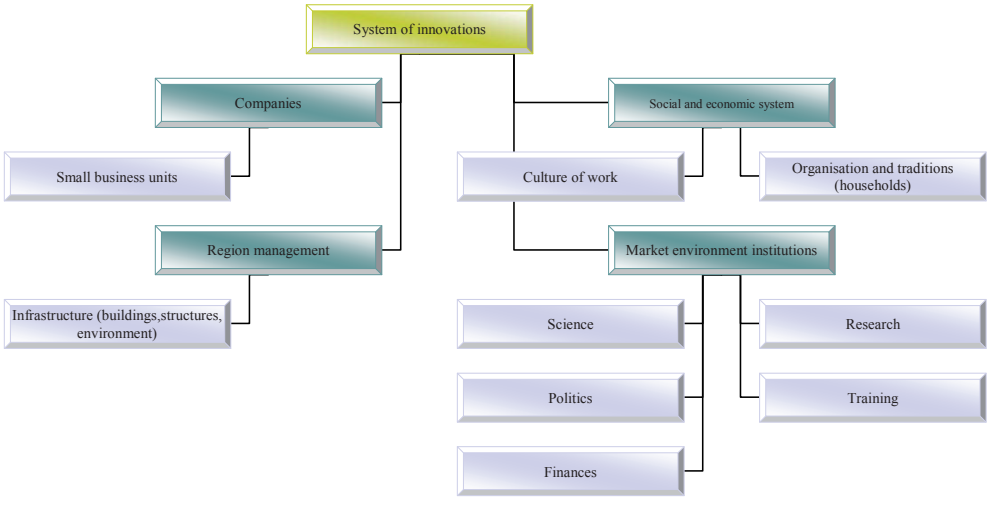

Figure 1. Classification of the sets of the innovativeness system

Source: (8).

Classification of innovations and development is based on the functioning of the market economy. The system of innovations has significant effect on development of a company and the level of the technical and economical infrastructure in the region. On the other hand, the system of innovations supports social and economic activi-

ties and requires the interest on part of the institution to have support in the region. Institutions are not always willing to incur expenditures for this support, in particular companies. In the last 10 years, the best situation in this respect in Slovakia is for small and medium business units. In the companies which promote and are open to innovativeness, its various forms are implemented. It is done by employing new, creative and educated persons in the companies which do not have development problems even in crisis times, unlike in the companies where they are not implemented. It is also important for the political authorities, including regional, and financial institutions to support innovations with aid for execution of investments conducive to progress in science and technology.

Development of innovativeness is considered to be the basic condition of development of the given region. Owing to relevance and application possibilities, the following concepts of regional development are interesting in this respect (1):

- the basic product (*stale theory*);
- the production cycle (*product-cycle theory*);
- the learning region;
- flexible production.

The basic product theory (by Harold Innes) constitutes an evolution from the economic base theory. It finds the source of regional development in export activities. The road to regional development is through gradual specialisation in production, aiming at "developing *the basic product* for the economy of the region, i.e. a product which may be most competitive in external markets. The benefit from specialisation in production are: reduction of transaction costs, improving the production process and quality of the produced *basic products*, which makes these products very competitive. The example of this comes in the success of Nokia in Finland.

The discussed concept assumes commitment of public authorities aimed at supporting the specialisation process and reducing transaction costs in production. This support comes in the form of infrastructural institutions, development of business environment services, co-financing research and innovative activities, as well as commitment of financial institutions in financing production specialisation (9).

The production cycle concept combines economic development of the region with the three-stage cycle: origination of a new product—its improving—standardisation. The first stage (origination of a new product) is done in highly developed regions which have the appropriate potential for creating innovativeness, i.e. the scientific facilities, the best market information, marketing instruments, and have demanding and affluent market of consumers, capable of absorption of innovative, expensive products. In the second stage of the cycle, the product is improved, it is cheaper (produced in larger series) and exported into external markets. In the third stage of the cycle, a standard product is created whose production may be transferred to peripheral regions of weak development, with less affluent consumers in the market, but with cheaper work force, thus affecting development of less developed regions.

Pursuant to this concept, public authorities should support both innovative activities in rich regions and the capacity of taking over standard production by poorer regions (9).

The learning region concept is one of several theoretical and application structures which recognise the dominant role of process, organisational and marketing innovativeness as the key factor in regional development. On this basis, Richard Florida (9) spread the *learning region* term, where the main inspiration and stimulation of development comes from permanent innovativeness and the ability to accept changing market conditions. Under these conditions, the task of entities in regional policy is to stimulate all factors responsible for development of science, research, improvement of personnel and application of high technology in the companies of the learning region. The public method of supporting the private innovative sector comes from creating a regional system of innovations which includes public and private institutions operating in a shared network of cooperation between the centres of science, expert institutions and business entities. Regional centres of innovations and science parks are used for this purpose.

The flexible production concepts make references to the transformation of development, as they were established in 1980s, during the crisis period of the mass production system. The creators of this concept, Michael Piore and Charles Sabel, on the basis of research in dynamically developing Italian regions (especially Emilia-Romagna) focused their attention on the regional system of flexible production and specialisation. It is based on a numerous group of small and medium companies, capable of quick changes in production consistent with the requirements of the market. The system is based on the territorial cooperation with the source in social relationships resulting from mutual trust. The source of this cooperation is the historically developed integration of regional community and entrepreneurship traditions. The system of flexible production in small companies and the tradition of social cooperation are the source of reducing transaction costs and increasing effectiveness of the whole production group (9).

Other important concepts and theories of regional development which take innovativeness into consideration are:

1. The theory of Joseph Schumpeter, where the source of the historical change comes from technical inventions, and economic development is similar to the process of creative destruction. Entrepreneurs are the most important factor of changes, as they develop a new combination of the system, open new markets, cooperate with new business partners and test new raw materials and methods of transport. That is why it is immensely important on part of public authorities to create social and institutional climate for innovative activities of companies. Agriculture in Slovakia provides an example of such processes. Innovative modernisation processes and improvement in many actions in the scope of management and organisation of companies have been recently initiated, especially in agricultural cooperatives, in Slovakia. These transformations come

in the forms of: returning farms to the cooperative, commitment of additional stockholders and capital, participation of land owners and other entities in innovative technologies which will allow farmers to differentiate their activities and many new products, as well as introduce effective activities in the area of technical and organisational progress (production of bioenergy, food processing and trading, etc.). It has to be noticed here that the process of creative destruction caused many failures in companies, which were replaced with new ones, more flexible, and adjusted to the conditions of the market economy;

2. The new growth theory of Romer: this theory assumes the possibility of accumulation of the factors of growth, which means:
   – the possibility of gaining permanent growth and
   – maintaining or even increasing differences between regions.

   Moreover, long and stable growth is based on endogenous development, and growth is based on human and material capital and process innovativeness. National and regional authorities should build internal potential of the given region instead of investing in the export base. Poor regions may catch up with the delays by investing in human resources and enhancing the technological level;
3. The theory of institutional economic growth of North, where human being is the author of social institutions, but they evolve in a long historical process. A certain level of contradiction is interesting, as two groups of causes decide about growth. On the one hand, economic factors, such as technological change, have effect on reduction of production costs. On the other hand, growth is dependent on reduction of transaction costs, which comes from more effective political and economic institutions, and the current institutions stand for the rules of the game which limit the activities of the individual.
4. The concept of sector polarisation by François Perroux, based on the theory of growth poles. The theory of growth poles states that a region does not grow economically in the same degree over its entire area. Growth is fastest in one or many points (called the "poles), with relatively smaller changes in other areas. Cities are these fast-growing points, especially large and medium-size ones. Their growth affects the changes in the rest of the area. The theory of growth poles explains why growth is not balanced geographically. A special role in the growth process is played by the so-called drive industry (motoric). It should be represented by a large plant (plants), important for the economy, well-prospering and branched to other industries. The drive industry stimulates growth of the entire region by increasing employment and buying capacity of people and attracting new activities. The drive industry is related to other industries, called stimulated industries. Stimulation affects also other types of activities in the region, e.g. sale of goods and services, education of employees (10; 11; 12; 13).

3. Conclusions

The presented selected concepts of regional development take into consideration the innovativeness factor as a source of regional development, but do not fully explain many problems in regional development, including the mechanism of differentiation of regions due to social and economic growth. They are only examples of the search for an answer to the question: what is the driving force of regional development with varied level of development, under varied conditions of macroenvironment, with varied resources and possibilities of development? Regional development is a multi-aspect process. A region exports goods and services, expands infrastructure, benefits from rich and varied resources: human, environmental, business, knowledge and technology, provides the market with new, technically advanced products and services, when innovative entrepreneurs and competent and active institutions of public authorities act who support these processes. All this is happening even at the local level, and that is why local government and local initiatives are of such importance, being the basic factors of development, especially with the existing entrepreneurship and institutional support under conditions of the economy based on knowledge. As a consequence, the process of concentration and specialisation of this production in the regions with the most favourable natural, social and economic conditions is deepening, with a view on the needs of often distant international markets. Concentration of expenditures in the areas which give the best results is also increasing, and problem areas are pushed to the periphery where more and more often less attractive areas are left by their residents (depopulation of the countryside), with harm to the environment and to the residents. Innovativeness in a natural way is related to the centres of growth, and not to peripheral areas, due to human and social or intellectual capital.

All in all, the largest hazard for the proper regional development comes from the weaker part of the region, losing the competition for the markets with a more efficient and better organised centre (the core, the centre of growth). The synergy effect comes into play, where faster development of the industry (sector) concentrated in a regional centre (most often with advanced innovative activities) is associated by outflow of the best qualified personnel and capital resources from the peripheries to this centre, which is not beneficial for the development of the region. The innovative processes should be present not only in the centres of growth, but also in the peripheries, e.g. in the scope of a broadly understood agricultural business.

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Innowacyjność w rozwoju regionalnym – wybrane problemy

Streszczenie: Celem artykułu jest przedstawienie innowacyjności w rozwoju regionalnym w aspekcie koncepcji rozwoju regionalnego. W obecnych warunkach istotnego znaczenia nabierają uwarunkowania rozwojowe poszczególnych regionów, na podstawie których powinny opierać się kierunki rozwoju danych województw. Ponadto istotne są koncepcje rozwojowe dla poszczególnych regionów. W niniejszej pracy zaprezentowano czynniki rozwojowe spotykane w literaturze przedmiotu na tle innowacyjności. Równocześnie szczególną uwagę zwrócono na koncepcje rozwojowe związane z innowacyjnością. Innowacyjność jako czynnik rozwoju regionalnego jest różnie rozpatrywana w danych koncepcjach i teoriach. Powszechnie uważa się, iż jej rola będzie wzrastać ze względu na to, że w tym czynniku upatruje się przewagi konkurencyjnej regionu.

Słowa kluczowe: rozwój regionalny, czynniki rozwoju regionalnego, innowacyjność

Małgorzata Ramocka*

Catholics and Protestants: The analysis of differences in declared values as prospective determinants of economic growth

K e y w o r d s: Catholicism, Protestantism, values, economic development

S u m m a r y: This paper analyses the values held by Protestants and Catholics residing in the countries of modern Europe. The objective was to find out whether there are significant differences in the values subscribed to by these two groups and whether there are any areas relevant to economic development. The study showed the existence of differences and the areas in which they are present have been classified into five major groups: the values associated with perception of problems in occupational life, life in the public area, life in the private area, and personal well-being, as well as values related to trust and religion. The further part of the paper analyses the values in each selected area by placing them in the context of their importance for economic development. The last part of the paper proposes a model of culture as either conducive to development or inhibiting it, the model based on the values characteristic of the representatives of both religions.

1. Introduction

Religions have always decided about the moral standards. Even in the lay world, their significance cannot be neglected as, in the words of Mircea Eliade, "a lay person, whether he wants it or not, shows the features of behaviour of a religious person, although they are devoid of religious significance. Whatever that person does, he is the heir, anyway. He cannot destroy his past completely, as he is himself its product" (1, p. 169).

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The thesis of this paper is the assumption that in Europe there are differences dependent on religion between the cultural Catholics and Protestants,[1] within the values held by them, which may have effect on economic development of the countries inhabited by them.

The thesis makes a reference to the theory by Max Weber presented in 1905 in the book which causes vivid discussions until these days: *Protestant ethics and the spirit of capitalism*.[2] However, the objective of this paper is not proving that this theory is true or false, and only an attempt at finding differences in the perception of oneself and of the world by persons brought up in the Catholic and Protestant traditions. The attempt at finding the values which may affect development of the economy and creating on their basis model features of the pro-development society and that which inhibits development.

The paper uses research results from *World Value Survey*.[3] Attention has only been paid to selected European countries now within EU,[4] with the data from the years 1981–2008. The values were differentiated from the point of view of the religion of the inquired person. No current religious commitment of the responders was taken into account, and in the statement of religion they only indicated their cultural origin.[5]

The values within which the highest level of differentiation was recorded have been grouped for simplicity reasons into five fields:

- The values related to perception of education and problems in professional work;
- The values related to the area of public life;
- The values related to private life and physical and mental condition;
- The values related to trust;
- The values of religious nature.

Further sections of the paper will include more detailed descriptions of the stated issues and conclusions.

[1] I.e. from the given culture, not necessarily practising or believers.

[2] Its essence is in the conviction of the author about the effect of Protestant virtues (e.g. ethics of work, attitude to time, thriftiness, belief in predestination, individual reading of the Holy Bible) on development of capitalism (see 2).

[3] The research programme running since early 1980s, whose objective is observation of the condition of social, cultural, moral, religious and political values and differences between cultures all over the world. The data obtained in the research and the tools used may be found at www.worldvaluessurvey.org (3).

[4] The countries included in the research: Austria, Belgium, the Czech Republic, Estonia, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, the Netherlands, Poland, Portugal, Spain, Sweden, the United Kingdom, Slovakia and Slovenia.

[5] The research showed differences in numerous phenomena, yet for the needs of this paper only these values have been presented among which differences in the declared values achieved the level of at least 10% and which, at the same time, seemed to be most strongly related to economic development.

2. Analysis of the values related to perception of education and problems in professional work

The first significant area within which differences have been noticed between broadly understood Protestants[6] and Catholics was the place of education in their life, especially perception of university-level education in the gender context,[7] but also the duration and the level of education. These differences are given in Table 1.

Table 1

Differences in attitude to education

Protestants	Catholics
1. In the years 1981–2000, the average of 12.5% Protestants believed that education at the university level is more important for men than for women.	1. In the years 1981–2000, the average of 24.8% Catholics believed that education at the university level is more important for men than for women.
2. Definite disagreement with this attitude reported 64.8% of the inquired persons.	2. Definite disagreement with this attitude reported 28.3% of the inquired persons.
3. In the years 2005–2008, this statement was supported by the average of 9.3% Protestants.	3. In the years 2005–2008, this statement was supported by the average of 12.5% Catholics.
4. In the years 1981–2000, the average of 30.9% of the inquired persons continue their education after the 21st year of life.	4. In the years 1981–2000, the average of 15.9% of the inquired persons continue their education after the 21st year of life.
5. In the years 1981–2000, the average of 16.8% of the inquired completed their education at the 14th year of life.	5. In the years 1981–2000, the average of 35.5% Catholics completed their education in the 14th year of life.
6. In the years 2005–2008, the average of 57.9% of the inquired completed their education before the 20th year of life.	6. 6. In the years 2005–2008, the average of 74.9% of the inquired completed their education before the 20th year of life.

S o u r c e: Author's own study on the basis of (3).

Apart from the differences in perceiving the role of education and its duration, a different attitude to participation in organisations dealing with educational, artistic and cultural activities was also apparent. In all the research series, belonging to such organisations was reported by more Protestants than Catholics.

All in all, it may be noticed that the percentage of persons successfully completing studies was increasing irrespective of the denomination. However, the dynamics of increase was not identical. Protestants more often than Catholics represented a higher level of education. At the same time, the higher percentage of Catholics than Protestants resigned of education after the 20th year of life.

[6] The term "Protestants" in the descriptions refers to all the stated reformed churches: declaring themselves as Protestants, representatives of free churches, representatives of the Church of Sweden, Evangelical churches.

[7] The term for social and cultural gender.

Education[8] constitutes the basis for building human capital, whose importance for economic development is unquestioned. At the same time, the type of the education obtained does not remain indifferent to the hierarchy of values, religious practices patterns and professional work, whose value was also understood differently by representatives of different religions.

The differences in viewing work by Catholics and Protestants could be found as early as in the upbringing model, and then in the attitude to work and motivation, which is presented in Table 2.

Table 2

Differences in attitude to work

Protestants	Catholics
1. Among the values important in upbringing children, the inquired persons less frequently quoted the virtue of "hard work".[9]	1. Among the values important in upbringing children, the inquired persons more frequently quoted the virtue of "hard work".
2. In the period 1981–2000, the average of 18% reported hard work as a value which should be taught to children.	2. In the period 1981–2000, the average of 45.5% reported hard work as a value which should be taught to children.
3. In the period 2005–2007, the average of 22% reported hard work as a value which should be taught to children.	3. In the period 2005–2007, the average of 42% reported hard work as a value which should be taught to children.
4. During the period 1981–2000, salary was reported as most important in choosing work by the average of 15% Protestants.	4. During the period 1981–2000, salary was reported as most important in choosing work by the average of 35.8% Catholics.
5. During the period 2005–2008, salary was reported as most important in choosing work by the average of 18.3% Protestants.	5. During the period 1981–2000, salary was reported as most important in choosing work by the average of 28.1% Catholics.
6. On the average, the inquired persons were looking in their work rather than the possibilities of meeting other people, executing interesting, important jobs, the possibility of achieving something exceptional.	6. On the average, the inquired persons desired work without high pressure, with comfortable working hours and good possibilities of promotion.
7. A higher degree of acceptance of responsibility.	7. Higher success desire.
8. Lower tendency to admit the right to work for the stronger.	8. Higher tendency to admit the right to work for the stronger.
9. They were more often signed up with trade unions.	9. They were less often signed up with trade unions.

[8] It is worth noting that the study showed the difference in the use of media. In a series from the early 1980s, 25% less Catholics than Protestants reported reading daily newspapers. In the last series of 2005–2008, 22.5% more Protestants than Catholics declared the daily reading of newspapers, magazines or books taken as a source of information. 27.5% more of Protestants reported use of e-mail, the Internet or talking with colleagues, whose aim was to gain information.

[9] It is interesting to note that, according to Weber, ethics of work was the element determining economic success of Protestants. At the same time, however, work for Protestants was a calling, while in Catholicism the "pray and work" model was historically more popular, but work was named after prayer, and additionally it was associated with the Biblical curse: "… By the sweat of your brow you will eat your food…" (Genesis 3:19; New International Version, 1984).

10. In the years 1981–2000, the average of 52.6% of the inquired persons did not agree with the view that older persons should be forced to retire if their workplaces are necessary for the younger. 81.2% did not agree with the opinion that providing work for the disabled is not fair when fully healthy people need it. 76.5% did not agree with the opinion that men should have priority over women in access to employment. 45.2% did not agree with the opinion that employers should first offer work to the local people and later only to immigrants. 11. In the years 2005–2008, the average of 80% did not agree with the opinion that men should have priority over women in access to employment. 48.8% did not agree with the opinion that employers should first offer work to the local people and later only to immigrants.	10. In the years 1981–2000, the average of 28.4% of the inquired persons did not agree with the view that older persons should be forced to retire if their workplaces are necessary for the younger. 64.1% did not agree with the opinion that providing work for the disabled is not fair when fully healthy people need it. 52% did not agree with the opinion that men should have priority over women in access to employment. 15.9% did not agree with the opinion that employers should first offer work to the local people and later only to immigrants. 11. In the years 2005–2008, the average of 63.2% did not agree with the opinion that men should have priority over women in access to employment. 24.3% did not agree with the opinion that employers should first offer work to the local people and later only to immigrants.

S o u r c e: Author's own study on the basis of (3).

From the summary of the table it seems that a larger number of Catholics than Protestants perceived work as a source of (good) income and a way to personal success. At the same time, work was important due to its community dimension and the possibility of self-actualisation for a larger number of Protestants. Catholics could perceive work as a burden to a higher degree.

Not recognising by them of the social dimension of work seems to be a negative phenomenon, although it is a very important issue in the social teaching of the church. One has to add that all the research series proved also that contacts with friends were considerably more important for Protestants than for Catholics.[10] It is worrying in the context of the role of social capital in economic development.

Social capital is a "set of informal values and ethical standards common for members of a specific group and allowing them to cooperate effectively" (4, p. 169); it is expressed with interpersonal binds and the skill of cooperation, and its level depends on the number of friends, informal network connections, degree of corruption, belonging to various organisations (5), and here Catholics also fared worse than Protestants. These issues are translated into increase in transaction costs, lesser openness to new ideas and reduced creativity.

The tendency to give right for employment to the stronger which is more often found with Catholics may not be without significance for the economy. Aversion

[10] On the average, in the series 1981–2000, friends were considered very important by 56.2% Protestants and 37.4% Catholics. In the series 2005–2007, friends were considered very important by a larger percentage of Catholics (45.7%), but also by the average of 64.6% Protestants.

to cooperation within various social groups may not be translated into the boom of the society, which is proven with the conclusions from the iterated "prisoner's dilemma",[11] which shows that friendliness and willingness to forgive is the best strategy for achieving joint success.

The last issue was lower popularity of trade unions among Catholics. It may have positive effect on the economic development with fewer demurrage in the workplace caused with, for example, strikes. The lower effect of trade unions also means less funds from the budget dedicated for meeting the needs of occupational groups, and more for, e.g. investments. However, in the context of the fact that Catholics less willingly joined not only trade unions, but also organisations of educational, artistic, social and cultural nature, it looks like the case of trade unions confirms some problems related to social capital, lack of the need of cooperation and lack of the feeling of being the prime mover in social and economic life.

3. Analysis of values related to public life

Differences in perceiving the values related to public life referred mostly to the attitude to politics and politicians. On the average, Catholics were definitely less interested in politics,[12] less willingly participated in political activities and less frequently talked about politics. It may have been due to the fact that many Catholic countries may be characterised as having high distance to authority.[13] However, it seems that lower scale of commitment to public issues translates into lower degree of action for their purpose. It was noticeable even in the opinions which the inquired persons provided on responsibility of the state for pollution of the environment and independent care about the environment. Catholics to a larger degree than Protes-

[11] The "prisoner dilemma" is a problem in the theory of games. In the basic version, it is a two-person game with non-zero sum where players may win by cheating on the opponent but when both players are cheating at the same time, both will lose. The iterated dilemma is a multiple repetition of this game in which players create their strategies with the moves of the opponents taken into account. It was proven that the choice of egoistic strategies results, on the average, with very small wins as compared with more altruistic.

[12] The average of about 20% less Catholics expressed interest in this area of life.

[13] Apart from Austria and Ireland, which are the countries with very low distance to authority, the other Catholic countries feature high distance to authority. Distance to authority is one of the four dimensions of culture described by Geert Hofstede (6). Cultures with high distance to authority feature, among others, acceptance for lack of balance to authority, which has absolutistic features here, is aloof from the individual, and the individual has limited or no feeling in reference to the possibility of having effect on the authorities. It is manifested in hierarchic structures in organisations and in the model of the family, which reflects inequalities between people. The tendency to centralise power is typical, as are major differences in salaries between high and low positions. Subordinates expect instructions from superiors. Cultures with low distance to authority feature the tendency to reduce inequalities between people, decentralisation. Hierarchy in execution of tasks results from the roles which employees have to play. Differences in salaries are small, superiors expect employees to participate in the decision process.

tants showed the tendency to shift responsibility for reduction of pollution of the environment to politicians. At the same time, however, when asked about the attitude to recycling or consumption of goods produced in accordance with ecological standards, less frequently than Protestants admitted that they were applying these rules in their life. This confirms the earlier thesis about lesser commitment of Catholics in the activities for the benefit of the community. They expect, to a higher degree, that the activities of the authorities should be the driving force for changes, and not individual moves. It may be important that in the cultures dominated by Catholics the impulse should be originated by the person endowed with particular authority, as, at the same time, Catholics to a larger degree than Protestants believed that authorities are important and necessary for the society.

4. Analysis of values related to private life and physical and mental condition

The private area and physical and mental condition of the responders were the area where probably the largest number of differences in the subscribed values occurred. Even the attitude to upbringing children and the important characteristics required by the inquired persons from various denominations in their children is an interesting issue in the research. Starting with the 1980s up to the first decade of the 21st century, the average of 15% more Protestants than Catholics listed honesty, tolerance and respect for others, independence and imagination as the values which should be taught to children. Catholics on the average 15% more often put in the first place religious faith, obedience and, as stated earlier, hard work.

An obedient, hard-working and religious person is almost as good as the Weber's archetype. However, can this model nowadays still ensure commercial successes? Or, does productivity depend on creativity, autonomy in making decisions and social skills these days?

The differences in perceiving family were also not without significance. Catholics valued the traditional model of family more than Protestants. They were more ready than Protestants to offer their parents respect resulting from the fact of being a parent alone. They were more caring towards own children and more often showed the trend to impose behaviour patterns on women. It was apparent in, among others, lower acceptance of single mothers, lower acceptance of going out to work by women, more often supported with care about the child. It was also showed in significantly lower degree of acceptance for abortion. It looks like the issue of the position of women may be of significance for economic development and avoiding gender discrimination basically increases work performance. However, the strength of the social family capital does not remain without positive impact on the economy, as it was shown by, for example, Jan Jacek Sztaudynger (7).

Major differences were also recorded in the attitude of representatives of different religions to the media. Reading the press[14] and using Internet and e-mail[15] was higher in case of Protestants. Lower popularity of the press may prove the said trend to staying aloof from public issues. The lower degree of using Internet and e-mail could be related to lower financial resources, education, distance from public issues or discomfort related to technological progress. The lower degree of access to computer equipment and the Internet constitute, however, the element hindering economic development, extending the flow of information and blocking transfer of knowledge.

In reference to subjective physical and mental condition, in the first two research series, Catholics on the average 25% less frequently than Protestants stated the feeling of being on "the roof of the world",[16] were more easily irritable at home, less frequently felt safe at home. Catholics less frequently felt proud with compliments, less frequently were excited and less frequently felt that things were in line with their expectations. At the same time, however, less frequently than Protestants they felt alone, unhappy or depressed, criticism was much less painful for them than for Protestants, and the feeling of boredom was less known to them. Despite this, the declared feeling of happiness[17] was higher in case of Protestants than Catholics, just like with the feeling of meaning of life.[18] What is interesting, the feeling of being healthy was at a higher level in case of Protestants. In other words, Catholics less frequently reported the perfect condition of their own health, which could have directly translated to the economic results of their countries, depending on the frequency of using medical leaves[19], and could also be demotivating in occupational situations and other social circumstances.

It looks like the Protestant model featured a higher degree of sensitivity and reacting to the changing situations and circumstances, thus the more often felt boredom, sadness, higher sensitivity to criticism and complements.

Most of the differences were related to the differences in nature. It is difficult to study individuals and look for the effect of this type of differences on economic in-

[14] In the early 1980s about 25% less Catholics than Protestants were regularly reading the press. In the series of the research from the years 2005–2007, the advantage of the Protestants was maintained at the level of 15–30%, depending on the type of the reformed Church.

[15] In the series of the research from the years 2005–2007, on the average 27.5% more Protestants than Catholics reported using Internet and e-mail.

[16] This term means feeling of satisfaction, achievement of a goal.

[17] In the last research series, Protestants on the average 15% more often reported to be happy.

[18] These features seem also to affect differentiation in economic successes. Lack of the skill of experiencing and enjoying success does not seem to affect well motivation, just like lack of passion may limit effectiveness in activities. It may also be the fact that Catholics show higher tolerance for moderate mental discomfort, thus they do not feel a deep need to make changes. Negative feelings, such as loneliness, sadness or boredom, are more mobilising in case of Protestants, which ultimately translates into, for example, a higher level of happiness. At the same time, the feeling of happiness in itself may also have bearing on economic results.

[19] In the last research series, Protestants 5–15% more often assessed their health as perfect.

dicators. The theoretical question remains to be asked: which of the perfect types is closer to a modern successful person:

1. Obedient, with low level of passion, not enjoying words of praise and not caring about criticism, or:
2. Creative, imaginative, independent, sensitive to praise and reprisal, with higher level of motivation.[20]

It looks like none of these types will feel fulfilled in a perfect way in all types of work. The first type may be better in work which requires routine and is more patterned. The second may be good for work with higher level of risk, innovative. However, it seems that all the countries of the European Union have already reached the level of development in which risk and innovativeness are necessary.

5. Analysis of values related to trust

The differences between Catholics and Protestants were also disclosed in the issue of trust. The general conclusion is that Catholics had definitely lower level of trust to both institutions and other people. The Church was the only institution whom Catholics trusted more than Protestants. All the research series proved that the average of 20% less Catholics than Protestants trusted the police and the justice institutions. In the research series at the end of 1990s, questions were asked "Can most of people be trusted?" and "Do most people try to take advantage of you?" As much as 37.5% more persons of Catholic denomination believed, in the end of 1990s, that most of people try to take advantage of them. At the same time 17.5% more Protestants believed that most people may be trusted. In the research series 2005–2007, 28.5% more Protestants than Catholics stated that most people may be trusted and 25.5% more Catholics believed that most of people try to take advantage of them. In a more detailed research in trust in the 2005–2007 series, it was also proven that 10% less Catholics than Protestants trusted their friends, 22.5% less Catholics trusted strangers, 32.5% less Catholics trusted persons of a religion different from theirs, and 30% less Catholics than Protestants trusted persons of other nationalities.

No doubt, the level of trust is key issue for economic development. As Francis Fukuyama stated: "If representatives of the given group have grounds to believe that other members will be honest and reliable to them, they will start having mutual trust. Trust is like grease which increases capacity for activities in any group or institution" (4, p. 169). He believed that degree of mutual trust and trust to institutions depend

[20] It has to be emphasised here that these are perfect types and they characterised only with reported values. The author does not state that the above perfect types represent the type of personality typical of all Catholics and Protestants. It is only a summary of averaged research results in which certain features were favoured or more often apparent in the group of Catholics, and others—in the group of Protestants.

on the culture and is apparent, among others, in spontaneous forms of organisation of the society.

The human capacity to create groups is dependent on the degree of sharing common standards and values by the members of the given community: the closer ethically they are, the easier and more natural is their willingness to form groups, including these whose objective is achieving profit. Additionally, a higher degree of social trust affects quality and performance in work: in communities with a high level of social trust, work is more flexible, and there is tendency to entrust lower organisational levels with responsibility, which may positively affect motivation and morale of the employees, unlike with hierarchy-based, bureaucratic principles which rule in the world of low level of social trust. Some trust is the basis in any community. Some encourage a higher degree of honesty, good will actions and sympathy, trust in institutions and other members of the community. Others insist on trusting only the members of the closest environment, for example a family. In this context, Fukuyama analysed selected economies, indicating that economic successes of the economies based on trust in the family circle[21] were possible with intervention of the state, supporting establishment of companies of global reach. In the other extreme there were countries like Germany or Japan, where the level of social trust was extremely high, and large companies were established without family bonds, spontaneously, only based on national bonds (8, pp. 43–49.)

Trust is the building material for social capital, and distrust harms cooperation, leading to formation of the so-called negative social capital, which in turn contributes to material losses. The selection of partners from the circle of friends or people recommended by friends, limitations in cooperation or arming the conditions of cooperation with additional contracts and detailed arrangements reduce effectiveness of social interactions[22] (9, pp. 246–247).

6. Analysis of values with religious nature

The last group within which differences were found between Catholics and Protestants were values with religious nature. In this respect, Catholics turned out to be much more active. They declared their religiousness more often than Protestants[23] along with practising their religion. More often they were brought up in a religious atmosphere. The level of believing in life after death, the Satan, God, Hell and Heaven was higher among Catholics than Protestants. Catholics also showed higher tendency to imagine God as a personal entity than some unspecified life force. Faith gave them

[21] That is with the example of China, France, Italy or South Korea.

[22] The problem of trust is confirmed to have impact on economic issues also in the context of the transaction costs economics, where a higher level of trust reduces these costs.

[23] The division into Catholics and Protestants adopted by the author specifies cultural belonging and not the degree of commitment to religious life and belief in metaphysical phenomena.

more strength and comfort than Protestants and, finally, the church institution helped them to a higher degree in solving moral or family problems. All in all, Catholics were more attached to religious traditions and showed higher degree of religiousness.[24]

Although strictly religious values seem to not have many connections with the economy, they affect it by the attitudes of their followers. Robert Putnam presented the example of positive interaction of religiousness with social capital. His area of interest covered the United States, which are different culturally from Europe, but the results of his research led to the conclusions that the places of cult can generate more social capital than other institutions in the USA. They are also used as the bastion and training field for all types of social initiatives. According to Putnam, almost half of all the resources of social capital of the United States is related to religion, has purely religious nature or is related to religion in the context of membership in associations or charity organisation (10, p. 54.).

The above conclusions were only partially confirmed in the research by Robert J. Barro and Rachel M. McCleary. They analysed the effect of phenomena of religious nature on economic development, showing, among others, that with the given level of going to the church, increase in belief in Heaven and Hell positively affects economic development. In turn, with the given level of belief in Hell and Heaven, increased frequency of going to the church may act to the contrary (11, p. 36). However, it does not mean a clearly negative impact on the increase, as at the same time presence in the church increases the level of belief in Hell and Heaven, and additionally is an important factor building social capital.

7. Conclusions

The analysis of values declared by Catholics and Protestants during the period of almost 30 years showed variety in their views. It is difficult to unanimously state that either group be clearly pro-development, yet more features conducive to development seem to be present with Protestants. However, it does not mean that Catholics show no features to qualify for faster development, for example higher attachment to the family institution. Also, is does not look like any religious group executed nowadays the Weber's model from the work *Protestant ethics and the spirit of capitalism*.

Catholics are more willing to report religiousness and desire to teach their children the virtues of hard work and obedience, but they regard their profession as a call-

[24] For example, up to 30% more Catholics than Protestants perceived God as a personal entity, and not as an undefined life force, up to 25% more Catholics reported in the research periods religion giving them the feeling of comfort, and the Church helping them in finding answers to difficult questions. Up to 20% more Catholics reported themselves to be religious persons. Also, the average of about 15% more Catholics than Protestants believed in Hell, Heaven, life after death, etc. Catholics 25% more often participated regularly in the mass and more often dedicated time for prayer. The average of about 15% more Catholics than Protestants stated that good and evil are clearly separated.

ing more rarely. Protestants do not mention the calling issue, either, but it seems that their attitude to work may be an echo of this way of thinking. Also, the higher tendency to form groups may be the residue after the conviction that wasting time is sin and that time should be filled with activities for important issues. However, the modern Europe lacks a society referred to by Weber, which is not surprising in the context of the changed understanding of social relationships and development.

On the basis of the five areas of the selected differences, perfect cultural models may be named with religious determinants, in which the subscribed values will be conducive to or will hinder economic development. These characteristic features in both models are given in Table 3.

Table 3

Features of cultures conducive to and hindering economic development

Culture conducive to economic development	Culture hindering economic development
– Interest in the world – Education as an element present throughout life – Work regarded as a means for self-development – Non-discrimination in the labour market applies (for gender, age, origin, health) – Friends are very important in life – Members of the society are the source of ideas and the driving force for transformations in the community, those who are not afraid of taking over initiative – Initiative of individuals is important – The community has the feeling of common purpose – High degree of participation of women in the labour market and in public life – High intensity of using media, especially Internet – Individuals well assess their health – Fast reaction to discomfort in life[25] – The level of trust to other people and institutions is high – The appropriate level of participation in religious life[26]	– Lack of the need of gaining information about the rest of the world – Education as an element of the early stage in life – Work perceived as burden – The labour market governed by the stronger – Friends have little importance – Initiatives for changes come from the authorities, the authorities are the driving force for social changes – Opinions of authorities are important – Lack of the feeling of common purpose in the community – Low degree of participation of women in the labour market and in public life – Low use of media, especially Internet – Low subjective self-assessment of health in individuals – Individuals with high tolerance for certain discomfort in life – Low level of trust to other persons and institutions – Insufficient participation in religious life

Source: Author's own study.

[25] The author's view is that of a broadly understood comfort of living, in the meaning of satisfaction with work, a relationship, a family and self-actualisation. This does not refer to impatience in eliminating current problems, e.g. traffic jams, speed limits, etc.

[26] Putnam perceives direct positive effect of participation in religious rituals on social capital. Barro and McCleary do not state such a direct translation of these factors, or even frequent presence in the church has negative impact on economic growth. Thus, an addition research is necessary to determine the relationship between participation in the mass and economic growth in Europe.

None of the presented models may be completely identified with a specific religion. As stated above, pro-development values and values inhibiting economic development are present with the representatives of both religions, but among the values closer to Protestants those conducive to development seem to prevail.

This research constitutes only one cause for further considerations. It has to be emphasised that the issues included in the above model certainly do not form the full spectrum of social and cultural factors responsible for economic development. All in all, it has been found out that the thesis was confirmed in the scope of proving differences in the values subscribed to by Catholics and Protestants. These differences are present in many areas significant for the economy, thus indirectly the values dependent on the type of religion affect economic development.

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Katolicy i protestanci – analiza zróżnicowania deklarowanych wartości jako potencjalnych determinantów rozwoju gospodarczego

Streszczenie: W artykule analizie poddano wartości reprezentowane przez protestantów i katolików, mieszkańców współczesnej Europy. Celem było zbadanie, czy w wartościach wyznawanych przez te dwie grupy obecne są istotne różnice i czy występują one w obszarach istot-

nych z punktu widzenia rozwoju gospodarczego. Badanie wykazało istnienie różnic, natomiast obszary ich występowania sklasyfikowane zostały w pięciu najistotniejszych grupach: wartości związanych z postrzeganiem problemów pracy zawodowej, ze sferą życia publicznego, ze sferą prywatną oraz własnym samopoczuciem, związanych z zaufaniem i o charakterze religijnym. W dalszej części artykułu poddano analizie wartości z zakresu każdego zaznaczonego obszaru, poprzez umieszczenie ich w kontekście znaczenia dla rozwoju gospodarczego. Ostatnia część artykułu zawiera natomiast modele: kultury prorozwojowej oraz hamującej rozwój, zbudowane w oparciu o wartości charakteryzujące przedstawicieli obu religii.

S ł o w a k l u c z o w e: katolicyzm, protestantyzm, wartości, rozwój gospodarczy

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Health care policy in Poland and in selected European Union countries: Attempts at reducing fast increasing medical care costs

A thing that would be good in every respect does not exist
Horace

K e y w o r d s: public health care services, deficit, saving cuts, services provided

S u m m a r y: The objective of the paper is the discussion of the health care systems in selected countries. The paper presents the four basic models of health service, i.e. the Bismarck's model, the Beveridge's model, the residual model and the Siemaszko's model. In the following part, the paper presents information on the deficit in the health care service in Poland, as well as the deficit in selected European countries, that is in Germany, in the United Kingdom, in France, Italy or the Netherlands It has been emphasised that a battle is currently waged throughout Europe about reducing expenses for health care services without any radical limitation in the scope of the public health care benefits. The shortage of financial funds and ever increasing expenditures for medical care put in a difficult situation not only physicians, but also patients. The subject matter of the analysis is indication of the possibilities of reducing excessive costs of the public health care services, but without severe reducing of the scope of public health care benefits. It has been emphasised that real changes may occur from development of privatisation in the competitors. The summary presents expenditures for health care in the years 1999–2008 in selected European countries as % of GDP.

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1. Introduction

The social care systems in the European Union countries are related to the history, tradition and culture of the given country. There are four basic models in the health care systems at present (8):

– the Bismarck's model;
– the Beveridge's model;
– the residual model, called the X model;
– the Siemaszko's model.

The Bismarck's model was introduced by prince Otto Eduard Leopold von Bismarck in 1883. This model has become the template for creating insurance for almost all European countries in the early 20th century. Health care services are financed from premiums (paid by the employee and the employer), which are most often obligatory. The process of making decisions is decentralised, and the State creates precise legal frames of functioning of the entire system. The important thing is that refunding medical care costs may be provided in full or may include some share of the insured in financing.

After World War II, the master system of the English national health care services was introduced in the United Kingdom in 1948, based on the project by Lord William Beveridge. This model is called the Beveridge's model. It excludes medical care from the social insurance system and calls for a special fund for it, financed from general taxes. The leading idea of this model is guaranteeing social security to all citizens, the so-called principle of equality of citizens. The state controls execution of health care services by health care facilities. Access to health care services is free. Hospitals are financed mostly by the central budget or are assigned limits of financial funds. The above model includes also voluntary supplementary insurance facilities which are dedicated to increasing the standard of medical care and expanding its scope.

The residual model, called the X model, rejects or seriously limits public responsibility for allowing citizen access to health care. Health care services are financed with voluntary individual premiums, thus the private sector has the dominant role. The area of public health is thus separated from individual health care, and the health care sector is regarded as an open field for economic activity. Financing of services is based on private insurance or on individual direct financing. The residual model includes the public sector which covers only persons in special need, including very poor or old people.

In the Central and Eastern Europe, the Siemaszko's model (or the budget model) has been functioning since early 20th century.[1] The principles of its functioning were developed by Mikołaj Siemaszko (the health care commissar in the Soviet Union in 1930s). The basic premises of this model are: financing health care services from

[1] After the collapse of the communist system this model is practically not present in any European country.

taxes through the budget, free complete range of services, except for some medicines, equal access to services for everyone and the monopoly of the state health care service. This model proved to be fiction, pure theory. It is now regarded as a historical form, and the states in which this model was functioning are restoring their insurance systems.

2. Methodology

The paper uses the descriptive, statistical and analytical methods. The descriptive method has been used as a primary tool. It consisted in isolating and describing a specific phenomenon of the effect of water quality on health. The comparative analysis was used in the following part of the paper, which indicated all changes and abnormalities and deviations from the accepted standards.

The results have been provided in the tabular form.

3. Results and discussion

The social and economic transformation in Poland at the end of the 20th century forced the health care system reform. The condition of the health care system, the dispreference of expenses for health care, as well as the reality of the free-market economy determined the replacement of the previous supply system for health care services financed from the state budget with the insurance system based on premiums paid into health care funds, which is at present the National Health Fund.

On 6 February 1997, the act on common health care insurance was passed and approved, which became effective on 1 January 1999 (the act on common health care insurance of 1997, Dz. U. no. 28, Items 153 and 75, Item 468, as amended). The change in the system of financing health care service means in practice that the costs of its maintenance will be borne in the most part by the insured. The premium, initially in the amount of 7.5% and its increase in the following years up to the level of 9%, which is paid by all citizens for health care insurance, has not basically improved the underfinanced and indebted industry, as it was not sufficient for the financing of the system. Under these circumstances, some amount should be guaranteed with the budget act for the disposal of the health department for the activities related to health care, but increasing the premium would be a better way.

The creator of the common health insurance assumed that it would bring benefits to both the insured and the provider of medical services. The insured expected from the new system improvement in the health care system condition and respecting the rights of the patient. The health care services expected from the reform quick rise in salaries. However, until now nothing has changed. The reason was that it was forgotten that the act created only some organisational and financial premises for introduc-

tion of competition in the medical services market. Only creating such competitiveness should, among others, contribute to enhancing quality of medical services, as well as improving the attitude of health care employees to patients. Thus, any visible improvement in the condition of health care services is still to be seen.

Problems with health care services appear not only in Poland. Even the countries where the health insurance system is well developed have been touched with crisis. A battle is waged throughout Europe about reducing expenses for health care services without any radical limitation in the scope of the public health care benefits. The governments of many countries consider the plans for:

1. Imposition of limits on expenditures;
2. Withdrawal from very expensive therapeutic methods, as well as
3. Closing down some medical facilities.

Implementing the savings concepts, however, faces major resistance on part of medical circles. Physicians believe that "a clerk is not capable of assessing whether some treatment is justified for a specific patient, as these are matters purely medical. However, despite objection of some professional groups (pharmacists, physicians), many persons demand "general overhaul" and "efficient medicine" for the public health care service.

The preliminary reform steps have already been undertaken, among others, in Germany, in the United Kingdom, France, Italy or the Netherlands.

A characteristic feature of the German health care system is interference of the state in the health care policy, thus health insurance funds apply the policy of expenses focused on income of the insured. The insured, benefitting from the state, obligatory health care insurance, pays EUR 10 for the first visit with a physician per quarter. If the beneficiary enjoys private insurance, he/ she will pay for the visit from his/ her own funds, and then the insurer will refund the incurred costs. The insured under the state insurance will always pay for hospital treatment for the first 14 days of hospital stay. The fee is settled on a day-to-day basis. Since 1993, hospitals, chemist's facilities, beneficiaries of refunding of patients' medical care costs (through 571 non-commercial health insurance funds) had to observe the authorities-agreed upper limits of remuneration and fees for the services. As the system was proficient in the years 1992–1994, the deficit of the funds was eliminated in the amount of USD 5.7 bn, and they won the surplus of USD 6 bn. At present, however, debts have reappeared and amount to USD 3 bn (3; 7). A broadly understood health care takes 11% of the gross domestic product of Germany, i.e. EUR 230 m. The statutory health insurance funds which insure 90% of residents of Germany spent almost EUR 144 bn in 2002 for medical services. Their deficit was EUR 3.3 bn, and in 2003, despite permanently increasing premiums for health care, got even bigger. In 1990, the premium was 12.6% of gross salary, and increased in 2003 to 14.4% (11). The crisis in the German health care system is caused, most of all, by:

– the society getting older (life expectancy in men is 74.8 years, in women: 80.8 years);

– bad economic situation of the country (increase in unemployment);
– technical and technological progress (new methods of treating and new medicines are developed).

The United Kingdom's NHS (National Health Service) is under the crisis. Lack of finances may lead to hospitals suspending reception of patients, except for sudden cases. The demand for ambulance services is on the increase, and administrative expenses are abruptly increasing, which in turn leads to limitation of the services provided by hospitals, delaying planned operations and purchases of equipment. The United Kingdom is starting to stand apart from other Western countries in the area of modern medical equipment, e.g. magnetic resonance scanners (USD 1.7 bn per unit) are still something rare in most of NHS hospitals. In 1993, the "private financing initiative" for health care services was started by the government, within which private companies could appeal for the right to build and manage public hospitals. Not very many contracts of this type were concluded. In terms of health care, the United Kingdom is close to a developing country (the necessity of creating waiting lists of people set up for treatments, more strict criteria for directing to operations, e.g. most of the NHS regional management offices refuse covering the costs of in vitro sessions). Physicians generally do not direct +75 patients and those seriously ill for expensive operations like inserting a hip joint endoprosthesis or dialysis. This is why about 14% households in the United Kingdom bought health care insurance policies in private companies, making them independent of NHS services. Under these circumstances, the government must highly increase the NHS budget or apply major saving cuts. Either of these solutions will be a "bitter medicine". So far, only queues of patients waiting for operations got reduced, which is the consequence of the government introducing permits for the hospitals to pay boni to the most efficient surgeons. With this decision, salaries of surgeons in NHS increased by 100%. The fact is, however, that public health care services in the United Kingdom are closer to financial breakdown than ever before. Clearly, no-one thinks about liquidation of the National Health Service which has been active for 50 years. With the basic services, such as obstetrics and ambulance services, NHS acquits itself very well. In recent years, certain fees have been introduced in the United Kingdom for some medical services, such as writing out prescriptions (the fee for each one is £6.20), optical and dentist services, the fees are collected for the benefit of NHS, but it is very difficult to find a dentist willing to work for NHS, thus more and more people take private dentist services. Patients receiving state-funded benefits and OAPs and pensioners are exempt from these fees (1; 2; 7; 11).

In France, where the 1996 deficit of the public health care service was ca USD 10 bn, the government wanted to set up a no-pass limit for health care. The difference between the limit and the actual expenditures would have to be covered by physicians from their income. The objective of this solution is reduction in the number of visits to physicians and the treatment recommended by them. Thousands of physicians went on strike against such decisions in November 1996, cancelling all visits

for the coming four days. This resulted in the government starting mitigation of its initial plans. On 16 June 2004, the French government adopted a package of changes in the health care system. The reform was aimed at reduction of the deficit in public funds for health care, estimated at present at ca EUR 13 bn. One of the elements of the reform was introduction of EUR 1 lump-sum fees for each visit to a physician. Moreover, the whole medical documentation was converted into IT systems and the principles of drug refunding were changed to promote cheaper generics. The changes, which directly affected the patients, are the necessity of acquiring referrals from a family physician before visiting a specialist and the obligation of paying EUR 1 for each visit to a physician (11).

In Italy, prices were reduced (by 12%) for the medicines whose purchases are in part regulated by the state budget. Additionally, it was proposed that physicians hired in the public health care could earn additionally with receiving private patients if they agree to 15% reduction in salaries.

In the Netherlands, the health care services could not be left "in the hands of the market", as it would cause high increase in costs. However, at present the Netherlands cannot afford to maintain social care centres. Reorganisation of the structure of health care services is also planned. The objectives is, among others, to make old-age people stay at their homes as long as possible with the help of a nurse coming for 20 hours per week. The group with no medical indications, which would need care as they cannot take care of themselves, will be directed to the intermediate health care sector and will be obliged to partial participation in costs. It means forcing the patient to make payments so that he is aware of the cost of his/ her care. Health care insurance does not apply to cosmetic treatment, as it is paid by the interested persons themselves. In the Netherlands, each region has its own system of medical services which creates the so-called net, i.e. clinic hospitals, daytime care facilities, psychiatry, paediatrics, etc. It is the patients who decide how many physicians are necessary in the given area (region). However, this is experience of many years. The most important in this system is the family physician (the central figure). The patient is referred to specialists only and solely by the family physician. The information about writing out a referral is entered into the patient's file (10).

It follows from the above that the problem throughout Europe comes in permanently increasing treatment costs. Health care needs an injection of cash to cover the expenditures which are not covered in the budget, otherwise it will have to limit the services provided. This situation of shortage of financial funds makes the situation of physicians and patients a difficult one. Therefore, almost each country ponders about plans of reorganisation of the system or imposition of limits on expenditures related to medical care, withdrawing from very expensive therapeutic methods, as well as closing down some medical facilities. However, real changes may occur as a result of development of privatisation in the competition. The United Kingdom has gone farthest in this direction. Germany and the Netherlands have also made their first attempts. France and Italy, as well as Poland, are at the stage of preliminary reform steps.

Table 1 presents the data related to health care expenses in selected European countries in the years 1999–2003.

Table 1

Expenditures for health care in the years 1999–2005 in selected European countries as % GDP

Country	1999	2000	2001	2002	2003	2004	2005	2008
Austria	8.1	8.0	7.7	7.5	7.5	9.6	10.2	10.5
Belgium	8.7	8.7	9.0	9.1	9.6	10.1	10.3	10.2
The Czech Republic	7.2	7.2	7.3	7.2	7.5	7.3	7.2	7.1
Denmark	8.5	8.3	8.6	8.8	9.0	8.9	9.1	9.7
Finland	6.9	6.6	7.0	7.2	7.4	7.5	7.5	8.4
France	9.4	9.5	9.5	9.7	10.1	10.5	11.1	11.2
Germany	10.7	10.6	10.7	10.9	11.1	10.9	10.7	10.5
Greece	8.7	8.3	9.4	9.8	9.9	10.0	10.1	9.7
Hungary	6.8	6.8	6.8	7.8	8.4	8.3	8.1	7.3
Ireland	6.8	6.7	6.5	7.3	7.4	7.1	7.5	8.7
Italy	7.8	8.1	8.4	8.4	8.4	8.4	8.9	9.1
Luxembourg	6.0	n/a	5.6	7.2	6.9	8.0	8.3	7.2
The Netherlands	8.2	8.1	8.9	9.3	9.8	9.2	9.2	9.9
Norway	8.8	7.8	8.3	9.9	10.3	9.7	9.1	8.5
Poland	**6.2**	**6.1**	**6.3**	**6.6**	**6.5**	**6.5**	**6.2**	**7.0**
Portugal	8.4	8.2	9.2	9.3	9.6	10.0	10.2	9.9
Slovakia	5.8	5.9	5.7	5.7	5.9	5.9	7.1	7.8
Spain	7.7	7.7	7.5	7.6	7.7	8.1	8.2	9.0
Sweden	n/a	n/a	8.7	9.2	9.4	9.1	9.1	9.4
The United Kingdom	7.1	7.3	7.6	7.7	n/a	8.3	8.3	8.7

Source: (4; 6; 5).

The data in Table 1 show that the largest share of the total expenses for health care, calculated as GDP interest, is in Germany (in 2005 and 2008 in France), with the smallest share of these expenses in Slovakia, but as early as in 2005 a noticeable increase up to the level of 7.1% GDP was apparent, and in 2008: up to the level of 7.8% of GDP. The share of expenses for health care was systematically increasing in Norway up to 2003, with the following decrease; and the share of expenses for health care has been at a fixed level since 2001 in Italy and, with slight increase, in Hungary and in the United Kingdom. In Poland, the total expenditures are almost unchanging, e.g. in 2003 and 2004 they constituted 6.5% GDP, in 2005: 6.2% GDP; increasing in 2008 up to 7.0% of GDP. The above analysis of shows that Poland is one of these EU countries which spend the least amounts for health care (these are Luxembourg, Poland and Slovakia, although the situation in 2005 changed). Thus, Poland stands quite weak among the selected EU countries, and its competitiveness against other countries is negligible and in 2005, simply none (Poland ranks last this year). Poland,

among the EU countries, is one of these countries which allocate the least amount of funds for health care.

4. Conclusions

With the above analysis, the following conclusions come:

1. At present, ever increasing costs of treatment are the problem in all European countries.
2. Throughout Europe, changes are made on protection of health. The objective of the reforms is to reduce the deficit of public funds for health care.
3. The market in the health care systems is a non-reliable mechanism, which leads to worsening of its effectiveness and quality. That is why intervention is necessary in it, as it is done in many countries, e.g. Germany, the Netherlands or France.
4. The private sector in all the countries has been developing. Moreover, it is expected that European health care systems may be fully privatised.

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Polityka zdrowotna w Polsce i w wybranych krajach Unii Europejskiej. Próby zredukowania szybko rosnących kosztów leczenia

S t r e s z c z e n i e: Celem opracowania jest omówienie systemów opieki zdrowotnej w wybranych krajach. W artykule zaprezentowano cztery podstawowe modele służby zdrowia, to jest

model Bismarcka, model Beveridge'a, model rezydualny oraz model Siemaszki. W dalszej części przedstawiono informacje dotyczące deficytu służby zdrowia w Polsce, a także deficytu pojawiającego się w wybranych krajach europejskich, to jest w Niemczech, w Wielkiej Brytanii, we Francji, we Włoszech czy w Holandii. Podkreślono, że obecnie w całej Europie toczy się batalia o zredukowanie wydatków na służbę zdrowia bez drastycznego ograniczenia zakresu publicznych świadczeń zdrowotnych. Niedostatek środków finansowych i wciąż rosnące wydatki na opiekę medyczną stawiają w trudnej sytuacji nie tylko lekarzy, ale również pacjentów. Przedmiotem analizy jest wskazanie możliwości redukowania nadmiernych kosztów publicznej służby zdrowia, jednak bez drastycznego ograniczania zakresu publicznych świadczeń zdrowotnych. Podkreślono, iż rzeczywiste zmiany mogą jednak nastąpić na skutek rozwoju prywatyzacji konkurencji. W końcowej części pracy pokazano wydatki na ochronę zdrowia w latach 1999–2008 w wybranych państwach europejskich jako % PKB.

S ł o w a k l u c z o w e: publiczna służba zdrowia, deficyt, cięcia oszczędnościowe, świadczone usługi

Adam Stabryła*

Universal research approaches in designing development projects

K e y w o r d s: functional approach, value analysis, expert approach, benchmarking, improvement and base designing, scenario method, foresight concept

S u m m a r y: The objective of the paper is presentation of the basic research approaches which significantly enhance designing the development of an organisation (activities of companies, institutions, larger systems). They constitute concepts of attitudes to problems in designing and, at the same time, express a specific research angle for creating future economic, organisational, technical and others solutions.

The structure of the paper follows a specific chronology of changes in universal research approaches, that is the ones that were relatively most commonly applied. It has to be emphasised that research approaches only give directions to studies and implementations, and the developed formula of analytical instruments is represented by detailed methodologies and their methods, techniques, and algorithms (which corresponds with methodology understood pragmatically).

The research approaches highlighted in the paper are: the functional approach, the methodology of the functional analysis of the product, the value analysis, the expert approach, benchmarking, improvement and base designing, the scenario method and foresight. These approaches are based to a higher or lesser degree on diagnostic research (assessment of the actual situation), relating them then with development of template models. The latter form the basis for preparation of functional solutions, that is various types of designs, products, strategies, plans, scenarios, systems of management and other.

The paper consists of eight sections.

Preliminary notes define the review function of text and the reference of the selected research approaches.

Functional approach discusses the scope of applications of this concept and the essence of the technique of function study. Then, *Methodology of functional product analysis* presents the characteristics of its individual stages, with special attention paid to determination of the degree of meeting the function. This section is supplemented with presentation of the scope of applications of the *Method of value analysis* and the stages of the research proceedings in this method.

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The next section is dedicated to the *Expert approach*, which presents the Delphic method and the cycle of organisation of expert research. The next section, *Benchmarking*, highlights the template issue and presents types of benchmarking and its methodology (according to R. C. Camp). *Improvement and base designing* discusses the scope of these concepts and explains the essence of the system-based approach, pattern modelling and idealisation.

The last section of the paper deals with the *Scenario method* and the *Foresight concept.* It presents different research attitudes towards the future, the specific nature of the scenario method and its close relation to the foresight concept. As regards the last issue, its features, the scope of applications and methodology are discussed.

1. Preliminary notes

The objective of the paper is presentation of the basic research approaches which significantly enhance designing the development of an organisation (activities of companies, institutions, larger systems). They constitute concepts of attitudes to problems in designing and, at the same time, express a specific research angle for creating future economic, organisational, technical and others solutions.

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2. Functional approach

The essence of the *functional approach* is the thesis that operational standards and effective behaviour of the system have superior significance in practical use. They are referred to, e.g., the properties of the product, technological operations, function met in the process of management and in administrative work, and the activities which constitute any type of service, including stages of creative work, etc. The functional approach, even though it accepts the structural aspect, which is substantial (behavioural), economic, and ethical in the assessment of systems, yet it gives the priority meaning to the "function".

The functional approach is mostly visible in the *function study technique*, which is an analytical procedure, is used for diagnosis and perfection of activities and properties of all types of systems. The application of the function study technique is highly varied. It may be used in diagnostics, modelling and designing technical objects, for example machines, equipment, daily use products, and it also may be used in organisation of a working post, in examining procedures and all kinds of processes.

The functional approach has key meaning in the value analysis method, which deals with "adjusting systems to the function and minimisation of costs of meeting the function" (1, p. 9). This approach also plays a significant role in the quality assessment of products, and it has also been fully expressed in the system-based analysis, where, in particular, mutual interaction of the elements of the given entirety are examined, which, in consequence, is to allow finding efficient *functional systems* (system-based solutions) of a specific entirety.

3. Methodology of the functional analysis of the product

The simplified procedure in the functional analysis of the product may be described in the following stages (Figure 1):

1. Selection of the subject matter of the examination and collecting the basic information;
2. Application of the function study technique;
3. Finding new solutions and modelling;
4. Development of the project of the solution and its implementation.

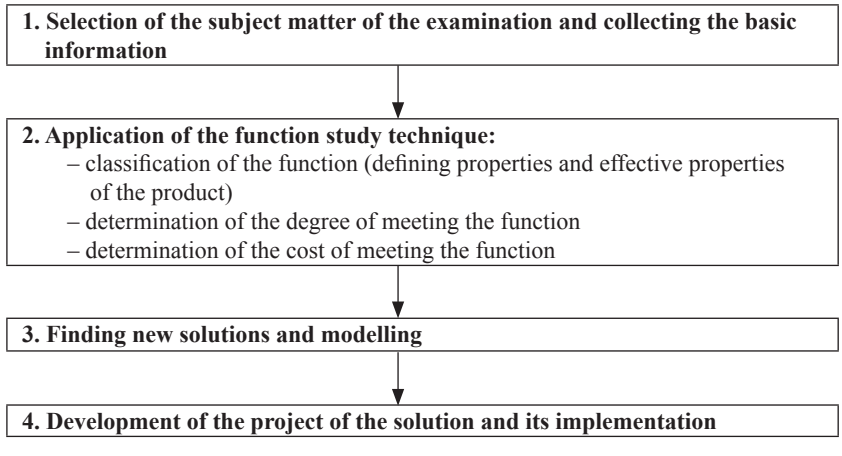

Figure 1. Methodology of the functional analysis of the product

S o u r c e: Author's own study.

4. Value analysis method (VA)

The value analysis method (VA) is one of the examination concepts of wide use, and its origin dates back to World War II. An American engineer, Lawrence D. Miles, is considered to be its creator, as he was the first to use the name *Value analysis* (in 1947). The applications of the VA method were wide: it covered with its scope industrial examinations (*value engineering*), as well as functioning of organisations and administrative work processes (*value organisation* and *value administration*).[1]

The idea of the VA method, referred to technical, organisational and other systems, may be summarised as follows: *In examining and designing any systems, execution of the required functions should be pursued, with the possibly lowest cost of meeting them*. The methodology of examination is structured in the value analysis into the following stages:

1. Preparation of the human factor;
2. Selection of the subject matter of examination;
3. Recognising the system;
4. Collecting information;
5. Analysis of the function and finding new solutions;
6. Development of the detailed project;
7. Implementation of the project (2, p. 147).

In examination of an industrial product, the more functional solutions in terms of construction or use are searched for, at the same time striving to achieve the lowest social cost of meeting the function. This "lowest potentially achievable social cost of meeting the function" is the *value* in the meaning of the VA method. The pursuit to achieve this value of the cost (thus equalling actual costs with the value as the potentially lowest social cost), is thus, along with functionality, the ultimate objective of VA.

Even though the basic direction of practical applications of VA are industrial products (objects of daily use, as well as machines, devices and their elements), VA may be also used in examining operation procedures (e.g. of the client) in administrative and office work, in technological processes. In general, the value analysis may be applied (with appropriate modifications) in examining any systems and their elements. Thus, value analysis may be called the "system-based" method, as it assumes examining *internal and external* relations between elements of the given system and analyses these relationships in multiple layers.

5. Expert approach

In the scope of economic and organisational designing, forecasting methodologies have an important place, with heuristic methods among them. However, they differ in a very basic way from the methodologies of research based strictly on analytical

[1] The general discussion of the VA method is presented by Z. Martyniak (2, p. 144 et seqq.).

materials and quantity methods, as they are based on quality assessment of facts, intuition, and, most of all, on individual association patterns of the researchers, which is a certain type of algorithm of learning and forecasting.

Typical quantity approaches, e.g. forecasting based on time series, econometric and analogue models, mostly use the formula of theoretical functions and empirical characteristics, whose objective is to verify and prove credibility of the research. Heuristic learning is based on flexibility of the search and allowing an assumption in the thinking process about subjective probability of occurrence of specific phenomena and cause-effect relationships between them.

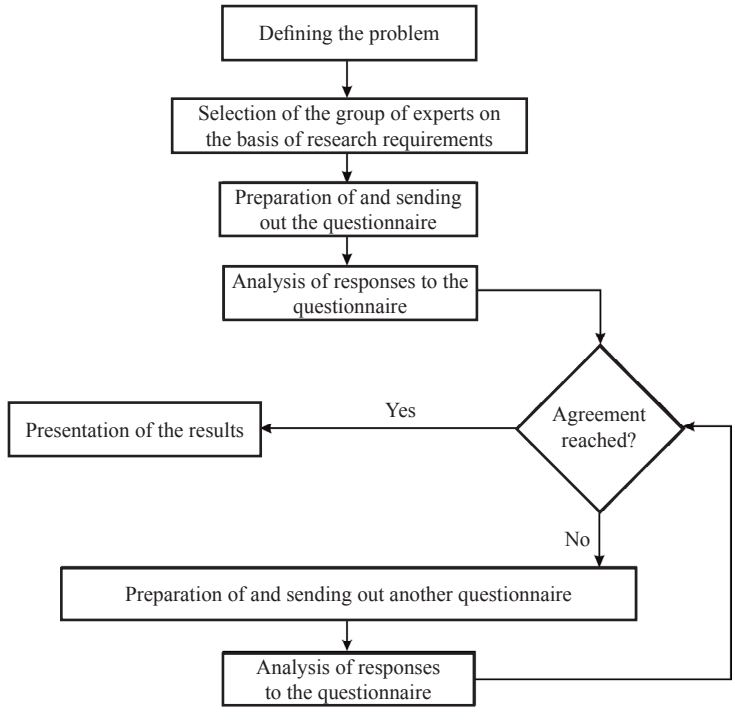

Figure 2. The stages of the procedure in the Delphic method

S o u r c e: (4, p. 209).

One of the presented heuristic methods is the *Delphic method*, prepared and applied by Olaf Helmer and his colleagues in 1963 in reference to the research in RAND Corporation (*Research and Development Corporation*). The idea of this approach is formulation of long-term forecasts on the basis of opinions of independent experts. They prepare their own opinions in correspondence discussion (with questionnaires) on economic or political and military forecasts, create perspective projections on technical and organisational solutions (in general concerning changes in various walks of life). The example of applications of the Delphic method may be the search of the answer to the questions: when will the space be conquered, when and

where will natural languages disappear and is it practically possible to replace them with digital communication (including direct contacts), what will be the type of fuel for vehicle motors under the situation of major reduction in the volume of oil and gas, what factors will definitely affect the development of the agricultural and food industry, what model of company management will be dominant in the era of common globalisation, what organisational form will the system of sale assume due to development in computers, what niches will come into existence in the area of services.

The Delphic method has the following features:

- Examination and analysis based on competent opinions of experts in the given field;
- A representative selection of experts;
- Collecting opinions in writing;
- Verification of opinions (expert opinions) with repeated examination (3, p. 29).

The stages of the procedure in the Delphic method are shown in Figure 2.

6. Benchmarking

The idea of benchmarking comes down to finding the best organisational, economic, technical and other solutions which constitute patterned models for own activities. With the use of the experience of distinguished entities, learning from leaders constitute a universal guideline for improvement.

The most characteristic function of the discussed approach is focusing on finding "benchmarks", that is points of reference, for assessment of the results of own activities (e.g. in the scope of competitiveness, sale, level of technology, quality and reliability of products, economic and organisational effectiveness of processes, productivity, costs of labour). Benchmarks are thus standards, optimum indicators which constitute a measuring tool for the outstanding activity.

Benchmarking may be broken down into the following types (5, p. 58):

- Internal benchmarking: which refers to comparisons between organisational units of a company (and also between work stations) and consists in developing one's own, autonomous formula of master patterns;
- Competitive benchmarking: which uses the available model solutions taken from its rivals (cooperation of competitive entities is also possible);
- Functional benchmarking: which refers to master patterns in execution of specific functions (e.g. technical, logistic, organisational), developed outside of one's own sector, thus in other areas of business operations.

The above determining factors of benchmarking justify the statement that it is a universal approach with multiple applications. The methodology of benchmarking features relatively high difference from other methodological concepts. The following Table 1 presents one of the distinctive methodologies of benchmarking by Robert C. Camp.

Table 1

Methodology of benchmarking by R. C. Camp

Description
1. Planning
1.1. Identification of the subject matter of the examination
1.2. Identification of companies (partners) for comparisons
1.3. Selection of the method for data acquisition
2. Analysis
2.1. Determination of deviations in the scope of parameters of effectiveness
2.2. Determination of the level of the future results
3. Integration
3.1. Communication of the results of benchmarking and having them accepted
3.2. Determination of functional objectives (in individual levels of the organisational structure)
4. Implementation
4.1. Development of the implementation plan
4.2. Initiation of implementation activities and securing their execution
4.3. Defining new "benchmarks"

Source: (5, p. 62).

7. Improvement and base designing

Improvement designing applies to the existing systems and is focused on elimination of the found defects or shortcomings in the solutions applied, it may also be aimed at their improvement. The specific nature of this type of designing is expressed in, among others, the basic significance of identification, diagnosis and programming of changes. These three specific processes combine into analytical and research works which define the area of finding effective design solutions.

Base designing refers to newly created systems, and its basic characteristics are as follows:

1. It is based on its own, specific principles and a model concept;
2. It is represented by the system-based approach (comprehensive);
3. It employs the methodology of building patterned models.

● *Own, specific principles of base designing* are the general construction rules according to which the creator (designer, planner, analyst) creates the model concept. These, they are standards which are the guidelines to take in finding a solution for the specific design task. An example of such a set of principles comes in the form of guidelines for designing economic and organisational systems: specialisation of production, diversification of the sale programme, economisation of the scale of production, globalisation of production and market, concentration of production and capital, economic division of labour, outsourcing auxiliary functions, creating flexible net-

work structures, economic optimisation of organisational structures, decentralisation of management, functional integration of the systems of management, algorithmisation of decision and control processes.

The principles constitute the superior directives for rational designing and express both the methodological and practical orientation of the creator which may differ from case to case. These differences are the more clear, the higher degrees of presence of antinomies between particular principles. For example, such opposing principles are: specialisation and diversification, concentration and distribution, production and organisational globalisation and creating flexible network structures, decentralisation and centralisation, designing system uniform in terms of functionality and designing integrated systems (multi-functional).

However, the above opposition of the principles cannot be regarded strictly as an alternative, but should be understood facultatively, that is as connecting specific principles with external situations and internal conditions of the system. It means that the context will be the criterion decisive about the selection of a particular principle due to the need of formulation of the model concept.

● *The model concept* is a vision of the solution for the design task which is expressed with a forecast of reality in a shorter or longer time perspective on the one hand, and the idea and the general view of the result of designing on the other hand. It is assumed that the model concept (in short: the model) is a master pattern, irrespective of the level of idealisation or detail.

● *The system-based approach* is regarded as an immanent feature of base designing and in popular understanding constitutes the strategy of comprehensive research proceedings. The system-based approach applies in entirety the directive of integration, that is synthesis of functions (activities, properties). Tadeusz Kotarbiński, referring integration to synthesis of activities, defines this term as "merging constituent activities into *an entirety* (emphasised by A. S.) as the most useful for the objective" (6, p. 202).

This merging should take into consideration two general stipulations: including in the entirety whatever is necessary, and not including in the entirety or removing from it whatever is unwanted (6, p. 202 et seqq.). However, the comprehensive meaning of the system-based approach cannot be limited only to activities (processes, procedures), it has to be related to all objects analysed statically. Integration will then be the universal principle for base designing (as well as improvement designing).

● *The patterned models construction methodology* is the necessary determinant of base designing. Unlike with reproduction models, creating and using patterned models is mostly related to finding innovative scientific and technical solutions. Models, whether specific or abstract, have to perform the role of standards or stipulations. They are created for comparison in diagnostic research and for the needs of broadly understood planning and design works. In the latter case, models are originals for plans or designs, as they express some sort of a primary solution. Models are subject to verification and detailing during execution of an assumed enterprise.

8. Scenario method and *foresight* concept

The concept of scenarios was first popularised by Herman Kahn and Anthony J. Wiener in *The Year 2000* (1967). The essence of this concept comes down to finding that the scenario presents a set of images (projections) of any system or situation expected in the future. Michel Godet regards a scenario as a description of the possible future events and directions of development in the reality (7, p. 19). A more elaborate interpretation of the scenario approach is given by Lucien Gerardin, defining four attitudes towards the future:

- *The passive attitude (opportunist),* completely subordinate to the flow of events, in a sense being an expression of fatalistic philosophy;
- *The adaptive approach*, which consists in optimisation of present-day activities so as to better adjust its results to the forecast future;
- *The forecast approach*, whose essence is estimation of the possible state of things at the given future time, with the assumption of continuation of present-day trends;
- *The approach creative to the future* (8, p. 328 et seqq.).

The above summary of approaches to the future features the following opposition comparisons:

1. The adaptive approach in long-term planning vs the creative approach in the so-called *the futures creative planning*. The essence of this differences is in the gap between adaptation (with some necessary delay) to an external change and causing (with an obvious advance) of a demanded change. Long-term planning is an activity at the strategic level, while the futures creative planning evolves in a political level. Long-term planning proposes focusing on the most probable development of events. The futures creative planning (*future conditions* or *changes*: A. S.) is aimed at referring each *futurible* (projection: A. S.) to a point of reference in the future, and not to the past projected into the future.

2. The forecast approach vs the creative approach. The classical view that value of forecasts is measured with the accuracy of evolution of the forecast future is in some contradiction to the statement that the value of the forecast is measured with the degrees of the effect it has on the current situation when a decision is made. It is so because *typical forecasts* as regards closer or farther future should not be confused with the futures creative planning. The latter form of planning may be called *creative forecasting*. Creative planning is a new philosophy of making decisions which assumes shared participation in formulation of common objectives and agreeing on views (8, pp. 330–333).

Here are some views of other authors. According to Krystyna Fabiańska and Jerzy Rokita, the scenario concept consists in preparation of many different versions of scenarios which describe the situation of a business organisation and the condition of the environment in which it will function in the future, as well as in building a development plan for each version. The centre of gravity of this planning concept is in *identification and prospective* examining executed in the initial stage of the planning process.

With simple extrapolations of the current trends in changes in a business organisation, its future situation may be determined. In constructing alternative descriptions of the future, certain features of a perfect situation and negative consequences of continuation of the current strategy are the factors which justify the choice of development objectives as a perfect situation and the corresponding strategies. The scope of strategies in the scenario concept depends on meeting the following conditions:

– The business organisation must have an accurate scenario of a real situation (many scenarios do not correspond with the existing reality);
– The undertakings included in the development plan must correspond with the existing situation;
– The time of initiation of the strategic activities included in the development plan must be properly selected (9, pp. 113–114).

The meaning of creativity in scenario planning is also emphasised by Andrzej Klasik. He writes that prospective studies leading to formulation of strategic objectives and problems form a creative reflection about the future of the organisation. He then adds that this approach is used by the management of the organisation to create comprehensive and varied visions of the future, that is scenarios (10, p. 85).

To take a position on the above views and interpretations, especially those of Lucien Gerardin, one should take notice that repeatedly emphasised attitudes towards the future, although clearly different, create in total (probably with the exception of the passive attitude) a certain mutually supplementary entirety. Creative planning, while performing its creative and exploratory function, cannot be devoid of the features of a typical forecast, and cannot be separate from the necessity of adaptation to the existing or changing external and internal conditions.

Foresight

The *foresight* concept is closely related to the scenario method. This term is interpreted as "prediction", "caution", "far-sightedness". In a more developed way, *foresight* is proposed to be defined as a type of programming development of social, business and technical systems whose main features are:

1. The objective of the research procedure is designing the development strategy at the level of the national, regional and company economy;

2. The subject of the *foresight methodology* is, among others: the level of social and cultural development, the power industry, protection of the environment, information and telecommunication technologies, safety, innovativeness of companies;

3. The research procedure combines forecasting with long- and short-term planning;

4. Management over the process of execution of undertakings uses algorithms for planning experience and control over implementation processes;

5. The applied research methods include, among others, system-based analysis, heuristic methods, optimisation calculus, artificial intelligence, business forecasting (including scenarios), project management, managing security and risk, analysis of

development capacity, economic and financial analysis, SWOT analysis, feasibility study.

The following Table 2 presents the *foresight* methodology.

Table 2

Foresight methodology

Description
1. Development of the strategic directive
1.1. Objectives (expectations of the owners and the management)
1.2. Areas of activities (functions and types of resources)
1.3. Critical points
1.4. Decision rights
1.5. Co-operation of experts
1.6. Operational guidelines
2. Analysis of external situations
2.1. Structure of the environment
2.2. Identification of the effect of the environment
2.3. Diagnosis of external situations
2.4. Forecast of external situations
3. Diagnosis of the internal organisation and of the functioning of the system
3.1. Assessment of the actual situation
3.2. Threshold analysis
3.3. Categorisation of the assessment of the actual situation
3.4. Analysis of causes
3.5. Comparative examination (dynamic, spatial)
4. Forecasting and planning activities
4.1. Vision
4.2. Balances of the production potential
4.3. Performance balance
4.4. Scenarios and selection of the optimum scenario variant
4.5. Chances (risk) of achieving the strategic objectives
4.6. Making the plans of activities probable
5. Implementation of the plans activities
5.1. Assessment of feasibility and risk
5.2. Safety
5.3. The logistic project
5.4. Control over the implementation process

Source: Author's own study.

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Uniwersalne podejścia badawcze w projektowaniu przedsięwzięć rozwojowych

Streszczenie: Celem artykułu jest przedstawienie podstawowych podejść badawczych, jakie w istotny sposób wspomagają projektowanie rozwoju organizacji (działalności przedsiębiorstw, instytucji, większych systemów). Stanowią one koncepcje ujęcia problemów projektowania, a zarazem wyrażają określoną postawę badawczą względem kreowania przyszłych rozwiązań gospodarczych, organizacyjnych, technicznych i innych.

Struktura artykułu zachowuje określoną chronologię kształtowania się uniwersalnych podejść badawczych, a więc tych, które miały stosunkowo najbardziej powszechne zastosowania. Należy przy tym podkreślić, iż podejścia badawcze ukierunkowują jedynie prace studialne i wdrożenia, natomiast rozwinięta formuła instrumentarium analitycznego jest reprezentowana przez szczegółowe metodyki i właściwe dla nich metody, techniki, algorytmy (czemu odpowiada metodologia rozumiana w sensie pragmatycznym).

Wyróżnione w prezentowanym opracowaniu podejścia badawcze to: podejście funkcjonalne, metodyka analizy funkcjonalnej wyrobu, analiza wartości, podejście eksperckie, benchmarking, projektowanie usprawniające i bazowe, metoda scenariuszowa i foresight. Podejścia te w większym lub mniejszym stopniu opierają się na badaniach diagnostycznych (ocenie stanu faktycznego), wiążąc je następnie z tworzeniem modeli-wzorców. Te ostatnie są podstawą przygotowania rozwiązań użytkowych, a więc różnego rodzaju projektów, wyrobów, strategii, planów, scenariuszy, systemów zarządzania i innych.

Charakterystyka artykułu dotyczy ośmiu punktów.

W *Uwagach wstępnych* sformułowano funkcję przeglądową tekstu oraz przedmiotowe odniesienie wyróżnionych podejść badawczych.

W punkcie *Podejście funkcjonalne* omówiono zakres zastosowań tej koncepcji oraz istotę techniki badania funkcji. W kolejnym punkcie *Metodyka analizy funkcjonalnej wyrobu* przedstawiono charakterystykę poszczególnych jej etapów, zwracając szczególną uwagę na określenie stopnia spełniania funkcji. Dopełnieniem niniejszego punktu jest prezentacja zakresu zastosowań *metody analizy wartości* oraz etapy postępowania badawczego w tej metodzie.

Dalszy punkt artykułu to *Podejście eksperckie*. Tu zaprezentowano metodę delficką oraz cykl organizacji badań eksperckich. W następnym punkcie *Benchmarking* wyeksponowano problem wzorca, a także przedstawiono rodzaje benchmarkingu i jego metodykę (według R.C. Campa). W punkcie *Projektowanie usprawniające i bazowe* omówiono zakres tych koncepcji, jak również wyjaśniono sens podejścia systemowego, modelowania wzorcującego oraz idealizacji.

Ostatni punkt artykułu to *Metoda scenariuszowa* i *koncepcja foresight.* Tu przedstawiono różne postawy badawcze wobec przyszłości, specyfikę metody scenariuszowej i jej ścisłe powiązanie z koncepcją foresight. W odniesieniu do tej ostatniej scharakteryzowano jego wyróżniki, zakres zastosowań oraz metodykę.

S ł o w a k l u c z o w e: podejście funkcjonalne, analiza wartości, podejście eksperckie, benchmarking, projektowanie usprawniające i bazowe, metoda scenariuszowa, koncepcja foresight

Jolanta Stanienda*

Clusters in the system of region innovations

K e y w o r d s: regional system of innovations, cluster

S u m m a r y: Transformations in the world economy towards the economy based on know-how result in the situation where innovations are listed among the most important elements which give momentum to growth, especially in the age of sudden process changes and globalisation of competition which are noticeable. However, certain conducive conditions have to be present for innovations to come into existence. One of them is the region, its resources, including know-how and internal potential. The important role of the region in production of innovation and its spreading to other regions causes the need of strengthening its significance, as regions may faster and more effectively build mechanisms supporting growth, creating and diffusion and absorption of innovations. Effective implementation of innovative solutions is determined with fruitful cooperation of the entities operating in the region: producers of innovation (science, R&D), recipients of innovation (business) and institutions which determine the policy in the region (public administration). These entities and the system of interdependencies and connections between them are referred to as the Regional System of Innovations (RSI). The activities and interdependencies of the RSI entities should be developed in such a way that its functioning could affect the effective, long-term growth of the region.

The entities within RSI include a cluster structure in which transfer of know-how and technology is fastest and is achieved with geographical closeness of the entities representing both industry and science (networking and interpersonal contacts).

1. Introduction

The objective of the paper is presentation of the activities of the clusters in the regional system of innovations as factors highly affecting innovativeness in the region, at the same time ensuring the growth of the region. Apart from this, the benefits have been indicated which are related to functioning of companies in cluster structures, both for the region and for the companies operating there. The thesis of the article has

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been formulated as follows: clusters have major significance in building an efficiently functioning regional system of innovations and affect increasing competitiveness of the region by strengthening innovative activities in the region. Expanding the issues of general nature, special attention has been paid to the cluster operating in Tarnów.

Innovations are one of the significant objectives of business policy in the countries of the European Union, expressed in the Strategy Europe 2020. The proposed model of the European social market economy is to be based, to a degree higher than at present, on three interdependent and mutually supportive priorities (1, p. 3): intelligent growth, sustained growth and growth conducive to social inclusion.

Innovativeness of economy also means innovativeness of the regions. The regional dimension turns out to be important, as diffusion of information and know-how is accelerated when the networks of cooperating units are concentrated geographically. Innovativeness of the economy depends on innovativeness of its companies. The institutional infrastructure plays an important role in this respect, with the task of promoting and supporting innovative activities and transfer of technology to companies.

Clusters are one of the elements of the institutional infrastructure. They are perceived as the source of potential for effective increase of the level of competitiveness of economies in individual regions of the European Union. Clusters are often defined as innovative systems based on transfer of know-how, and they have certain features which ensure creation and transfer of innovations. These include: geographical closeness, relationships, interactions and a sufficiently large number of entities.

2. The essence of the term of innovations

One of the main features of modern economies, both developed and developing, is the increase of significance of innovations and innovativeness. Innovation constitutes the key factor of social and economic development (2, p. 3). Innovativeness is the basic factor which determines international competitiveness of the economy. Innovations constitute the heart of permanent competitiveness of modern companies. They are regarded as the critical factor of their development (3, p. 35). The company which does not introduce innovations inevitably ages and withers (4, p. 162).

The literature of the subject includes numerous definitions of innovation. However, there is no unanimity in understanding both the term and the scope of its application. As a result, there is a large number of interpretations of innovation. According to the dictionary of foreign phrases, "innovation" comes from the Latin word *innovare*, which means renewing. The term "innovativeness" was entered in the world economy literature by Joseph Schumpeter, paraphrasing it as "creative destruction" of the existing economic balance which constitutes the basis for economic progress.

The Central Statistical Office uses the definition proposed by the Oslo Manual (5), where innovativeness is understood as capacity of companies to develop and imple-

ment new or significantly improved products (goods, services) and processes, where these products and processes are new at least from the point of view of the company which introduces them. It includes a number of research (scientific), technical, organisational, financial and business activities. Innovativeness of the economy means capacity of business entities to continuously search for and use in practice new results of scientific research, of research and development work, new concepts, ideas and inventions. One could generalise that innovativeness of the economy is the combined result of innovativeness of individual business entities in the form of companies (6, p. 242).

3. Clusters in the regional system of innovations

Innovative processes are a significant factor affecting the strength of the economies. These appear within a specific system of connections, as they are less frequently closed within a single company, and require common internal and external actions. It follows from the fact that companies are innovative owing to their own organisational capacity, but also to external contacts with their suppliers and partners in business. Communication, cooperation and coordination between particular entities is thus the necessary condition for creating and diffusion of new products. Therefore, networks are developed which create Regional Systems of Innovations that are the manifestation of development of technological intervention. It features diversification of the tasks between local, regional and national structures. The tasks executed on individual levels are mutually supportive. The new attitude to innovative policy in a special way exhibits local effects which affect improvement of the general situation in the scale of the city, commune or region. The observation that regional factors may affect innovative capacity of companies has contributed to the increased interest in the analysis of innovations at the regional level (5, p. 41). Creating systems focused on finding safe and permanent grounds for growth inside the regions, with a broad use of commitment of local circles, constitutes support for such policy of economic growth.

The Regional System of Innovations is defined as a network of cooperation between organisations and institutions operating in the region, whose objective is growth of innovativeness of this region, by way of supporting the innovative potential of the companies. One could say that RSI is a flexible, creative and regional social and economic system with the broadest possible relationships, which uses local attributes and resources that determine production and product in the way corresponding with the specific nature of the local market (7). The innovative system consists of a number of mutually complementary and inter-dependent subsystems. The element common for the operation of individual subsystems comes in the form of regional and local authorities and their innovative policy. The well-organised and effective Regional System of Innovations constitutes at present the basis for building cooperation of science, business, and public authorities, which in turn is to lead to

building competitiveness of the region in the globalising economy, where innovativeness, know-how and the learning process are the key factors of economic success (8, pp. 302–303).

It is noteworthy that relationships between particular RSI participants are based on the principle of exchange and not subordination (RSI is a typical example of the network system). Therefore, the method of RSI management must be different from traditional methods. Solutions are necessary which support cooperation, openness and flexibility of relationships between different institutions, as, most often, none of the RSI participants has competencies or resources sufficient for individual and strategic management and coordination of the system. The conclusion is that building and functioning of RSI requires long, comprehensive and consistent actions on part of many regional and national institutions.

There are many challenges related to creating efficiently functioning RSIs. These may be met by cluster structures which are being developed in Poland, where the relationships between the company and the field of science and research and public institutions of technology transfer have the basic importance.

The most important argument in favour of supporting clusters comes in the form of prospective benefits from their functioning. Participation in a cluster allows gaining benefits in a regional economy. An effectively functioning cluster may result in increases productivity of local companies due to access to relatively cheap, specialised production factors and various expenditures used in production activities. Geographical closeness of business entities stimulates and supports their innovativeness. The developing cluster features a dynamic creation of new companies and translates into creating new work places (9, pp. 3–12).

The benefits from an effectively functioning cluster are not limited to its participants. A cluster generates also a number of positive external effects for the region where it is settled (10, p. 9), thus it may become a driving force for the regional growth (Austin, Cambridge, Penang) (11, p. 7). In the local cluster economy, it is not the concept of cluster alone that affects the internal and external growth, but dynamics of inter-connected objectives, cooperating people and co-participation. The cluster concept becomes an instrument supporting growth of individual groups of entrepreneurs, producer groups, and service groups, translating over an extended period of time into the growth of the local economy and improvement in quality of life of its residents (12, pp. 90–93).

An effectively functioning cluster results in, among others, increase of availability of specialised business-related services, infrastructural institutions, increasing income for the population, increase in export and profit, and, as a result, faster economic growth (9, pp. 3–12). The social results of functioning of clusters is reduction of unemployment and stimulation of local democracy.

As a result, a well-functioning cluster should contribute to increasing the rate of increase in employment and creating new work places, thus improving situation of the local (regional) labour market and increase in the degree of specialisation.

4. Clusters in the Tarnów system of innovation

The Tarnów region is building the Regional System of Innovations based on "The Regional Strategy of Innovations in the Lesser Poland Voivodeship 2008–2013". It is a system-based project executed by the Department of Economic Growth of the Speaker's Office in the Lesser Poland Voivodeship within the Human Resources Development Operational Programme. The superior objective of the project is supporting the implementation of "The Regional Strategy of Innovations in the Lesser Poland Voivodeship 2008–2013" by creating a system of monitoring and evaluating strategy, which would allow assessment of the activities undertaken in the region which are related to implementation of a broadly understood innovativeness and indicating new activities. The project has the task of creating a "platform" for cooperation between various institutions in the voivodeship area: companies, college facilities, research and development units, institutions of the business environment and regional authorities.

The final result is to be increasing awareness and making entrepreneurs more open to the idea of innovation by showing that innovations mean not only expensive, modern technologies, but also other changes and improvements, e.g. in management, flow of information, etc., with which a company may be more competitive.

Implementation of the regional strategies of innovations may provide an opportunity for developing a system capable of effective supporting companies in the innovative activities undertaken by them. For the system of innovations to come into existence, creating strong, continued connections between particular actors in the process of innovations is of key importance.

Clusters constitute an important factor which contributes to the proper development of the regional system of innovations, as their characteristic feature is that the companies in them are mutually competitive, but at the same time cooperate in these areas where triggering synergy effects from shared activities is possible (joint research and development works, diffusion of know-how, rotation of personnel within the cluster, concentration of resources, openness to innovations and capacity of their absorption, attracting new resources and companies, reduction of risk). Competition does not exclude mutual, positive interactions with other companies, and it may become a driving force in their development. This situation is called by the name of *coopetition* (from *cooperation* and *competition*) (13).

Industrial Cluster SA is functioning in the Tarnów region, for the establishment of which the basis came in the form of specific local resources from the raw material base (Zakłady Azotowe SA [Nitrogen Plants]) and local entrepreneurs. The local tools and mechanical facilities was also used from Zakłady Mechaniczne SA (Mechanical Plants) in Tarnów.

Apart from the raw materials base and machine facilities, the resources of local know-how and skills in the form of specialised knowledge in the field of heavy chemistry was used. This combination of all local resources, as well as close co-operation

with authorities and institutions, contributed to the concept of the innovative environment.

Table 1 shows that companies in various industries located their activities in the Cluster and most of them already manage commercial operations. The policy of the units of local government and organs of government administration have immense significance for strengthening the position of the Cluster and its growth. In June 2004, an agreement was signed between the Commune of the City of Tarnów, Zakłady Azotowe SA, Tarnowska Grupowa Oczyszczalnia Ścieków (Tarnów Group Water Waste Treatment Plant) and the Tarnów Industrial Cluster SA on establishing the industrial park (Tarnowski Regionalny Park Przemysłowy [Tarnów Regional Industrial Park]). Thus, the formula of the Cluster's activities was expanded with the optimum use of the area and infrastructure in the area of the city.

Table 1

The companies which purchased undeveloped estate properties and/or obtained permits for managing business operations in the area of the Special Economic Zone in Krakow, the sub-zone in Tarnów, Industrial Park "Czysta I" and "Czysta II" (as at 10 June 2011)

Investor	Activities conducted	Investment progress	Investment volume (m)	Employment
Becker Farby Przemysłowe sp. z o.o.	Production of industrial paints and lacquers, including specialised paints dedicated for use on plastics	Production activities opened: September 2006	20	42
ELMARK–TARNÓW	Processing of plastics	Production activities opened: November 2006	2	8
Becker Farby Proszkowe sp. z o.o.	Production of high-durability powdered paints and innovative decoration effects, such as very realistic WoodGrain finishing (with wood fibre structure)	Assignment of ownership rights for the estate properties—Becker Farby Przemysłowe sp. z o.o.: 29 October 2008	Permit expired	–
Cestor sp. z o.o.	Production of building elements of broad use	Investment in progress	0.75	8
ABM Solid SA	Activities in the building industry, R&D and implementation	The investor has not initiated execution of the investment project	Permit expired	–
Fabryka Styropianu "ARBET" Bartosik, Czernicki, Funke, Kuncer, Muzyczuk sp.j.	Production of foamed polystyrene	Investment not started	Permit expired	–
UNIPRESS Mariusz Dobrzański, Marcin Węgrzynek s.c.	Printing facility, printing	Production activities opened: December 2006	4.2	15

Investor	Activities conducted	Investment progress	Investment volume (m)	Employment
Zakład Elementów Konstrukcyjnych sp. z o.o.	Production of structural elements of steel (rim shapes) for use in the building industry	Investment in progress	15	54
Summit Packaging Polska sp. z o.o.	Production of valves for aerosol packages, processing of plastics	Production activities opened: January 2007	15	11
PPH MOSKITO Marek Jeleń	Production of elements for mosquito screens for window and door frame assembly	Production activities opened: March 2010	2.5	20
"ZEGAR" Wojciech Dzikowski i Alicja Zyder sp.j.	Precision engineering: production of curtain rods of stainless steel and brass	Investment in progress: preparation of the project documentation, obtaining the required decisions and permits	3	50
DHL Express Poland sp. z o.o.	The reloading and warehouse centre for support for road transport of goods	Activities opened: April 2010	5	51
BERENDSEN Textile Service sp. z o.o.	Services for working clothing, door mats and hygiene equipment	Investment in progress: preparation of the project documentation, obtaining the required decisions and permits	12.5	33
KON-INS-BUD MONTAŻ sp. z o.o.	Production of steel structures	Investment in progress	4	40
UNI-TARPIN sp. z o.o.	Production of chemical products	Investment in progress: preparation of the project documentation, obtaining the required decisions and permits	5.5	77

S o u r c e: Author's own study on the basis of the data made available by Tarnów Industrial Cluster SA.

In 2011, the offer of Tarnów Industrial Cluster SA, including attractive production and warehousing areas at preferential rates, located in Industrial Park "Mechaniczne" serves 21 entrepreneurs (Table 2).

T a b l e 2

The companies which conduct business operations in the area of Park Przemysłowy "Mechaniczne" in Tarnów (as at 10 June 2011)

Item	Company	Type of contract	Industry	Employment (persons)
1.	FHUP "POINTS" Grzegorz Mazur	lease	Printing facility	3
2.	ELBO Projekty sp. z o.o.	lease	Furniture design	1
3.	KRESKA sp. z o.o.	lease	Tailoring	74
4.	GPL PROJEKTY sp. z o.o.	lease	Furniture production	61

Item	Company	Type of contract	Industry	Employment (persons)
5.	GLOBUS sp. z o.o.	lease	Steel structures	5
6.	Alien Inspired Technologies "AIT" sp. z o.o.	lease	Production of photovoltaic modules	21
7.	Firma Usługowo-Remontowa "ALEX" Przemysław Bazia	lease	Repair services	4
8.	GALECO sp. z o.o.	lease	Production of gutter systems and a logistic centre	4
9.	FHUP "BLACHODACH" Janusz i Bartosz Bochnak sp.j.	lease	Production of gutter systems and sheet plate accessories	22
10.	Autoryzowany Serwis Wózków Widłowych REM-WÓZ	lease	Servicing fork lifts	5
11.	Green House sp. z o.o.	lease	Production of arbours	18
12.	Ośrodek Szkolenia Kierowców "KRAMEX"	lease	A maneouvering yard	46
13.	Firma Usługowa Remontowo Budowlana "REMCAT" Adam Rymanowski	lease	Repair and construction services	5
14.	HUT Technika Środowiska sp. z o.o.	lease	Process units for utilisation	8
15.	Pośrednictwo Ubezpieczeniowe "GAMBIT" Monika Kucajda	lease	Insurance intermediation services	2
16.	Usługi Remontowo-Budowlane Dziedzic Grzegorz	lease	Repair and construction services	15
17.	FHU "FLOMARK" Import Eksport	lease	Wholesale and retail trading	2
18.	Zakład Usługowo-Handlowy "PASADYN"	lease	Jet-stream and abrasive cleaning: equipment, services	5
19.	Przedsiębiorstwo Budowlane "EKO-BUD" Janusz Koziara	lease	Construction services	20
20.	Firma Handlowa Wiesław Hebda	lease	Chemicals for the building industry	3
21.	Ośrodek Szkolenia Kierowców MX Bartłomiej Mitera	lease	A maneouvering yard	4

S o u r c e: Author's own study on the basis of the data made available by Tarnów Industrial Cluster SA.

The offer of Zielony Park Przemysłowy "Kryształowy" within the Cluster was accepted in 2011 by the company Polski Asfalt Technic sp. z o.o., which initiated the investment with the value of PLN 6.5 m and created new work places for 50 employees.

It follows from the information presented in the paper that the cluster concept constitutes a new way of thinking about creating international competitiveness and innovativeness of economy. Clusters are a specific spatial form of organisation of industry sectors and services which is regarded as the most mature form of organisation of production (under conditions of post-industrial economy) from the point of view

of the capacity to maintain growth. At the same time, their characteristic feature is the capacity to generate and keep competitive edge (14; 15).

Clusters also find a significant place in the concept of the innovative system, which perceives economy as a network of mutually connected business entities and institutions which determine obtaining the synergy effects in cooperation. Therefore, apart from the institutions which generate know-how and innovations (companies, the R&D area or institutions intermediating in transfer of innovations), it recognises the significance of various interactions between them. The innovative system should be thus understood as a complex of institutions and their connections, with which the given economy constitutes an effective mechanism of generation and diffusion of know-how.

5. Conclusions

The paper presents the issues of efficient functioning of systems of innovations in the region. The provided information allowed the conclusion that effective origination and implementation of innovative solutions in the region is determined with fruitful cooperation of the entities operating in it. This may be secured with cooperation within the Regional System of Innovations, which is a significant factor to support the process of building an innovative, competitive region. Innovations in the global economy are the very factor which is decisive for growth. It is important to create them and implement in the areas crucial for the region, the ones which offer rich own resources which may form competitive edge. Co-operation of entities in the Regional System of Innovations allows continuous and stable growth of the region, which translates into the growth of the country.

Clusters are one of the RSI entities for which innovativeness has crucial significance and determines their international competitiveness. Unlike other regional or national structures, they feature the fastest transfer of know-how and technology, which is achieved due to geographical closeness of the entities representing both industry and science (networking and interpersonal contacts). Innovative clusters differ from traditional local production systems in that partnership and cooperation are of significance there. Research institutes and universities are major entities in clusters that fall within the network of connections and interactions with the cooperating companies of the given production system. Such clusters are often referred to as local innovative systems.

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Klastry w systemie innowacji regionu

Streszczenie: Przemiany w gospodarce światowej zmierzające w kierunku gospodarki opartej na wiedzy powodują, że innowacje wymienia się wśród najważniejszych elementów napędzających wzrost, szczególnie w epoce gwałtownych zmian technologicznych i globalizacji konkurencji, które obserwujemy. Niemniej aby innowacje powstały, muszą zaistnieć pewne sprzyjające warunki. Jednym z nich jest region, jego zasoby, w tym wiedza i wewnętrzny potencjał. Istotna rola regionu w wytwarzaniu innowacji i transmisji jej do innych regionów powoduje potrzebę wzmocnienia jego znaczenia, gdyż regiony mogą w sposób szybszy, bardziej efektywny budować mechanizmy wspierające rozwój, tworzenie i dyfuzję oraz absorpcję innowacji. Skuteczne wdrażanie innowacyjnych rozwiązań determinowane jest efektywną współpracą podmiotów działających w regionie – wytwórców innowacji (sfera nauki, B+R), odbiorców innowacji (biznes) oraz instytucji kształtujących politykę w regionie (administracja publiczna). Podmioty te – system współzależności i powiązań zachodzących między nimi – określane są jako Regionalny

System Innowacji (RSI). Ważne jest takie ukształtowanie działań i współzależności podmiotów RSI, aby jego funkcjonowanie wpływało na efektywny, długotrwały rozwój regionu.

Wśród podmiotów znajdujących się w RSI jest struktura klastrowa, w której ma miejsce najszybszy transfer wiedzy i technologii, osiągany dzięki geograficznej bliskości podmiotów reprezentujących zarówno przemysł, jak i naukę (sieciowanie i kontakty międzyludzkie).

S ł o w a k l u c z o w e: regionalny system innowacji, klaster

Renata Śliwa*

Corporate governance in new institutional economics

K e y w o r d s: asymmetry of information, selected schools of new institutional economics, enterprise management

S u m m a r y: The theoretical outline of the issues which constitute the essence of corporate governance research is settled in the theories of the new institutional economics. The theory of contracts, the theory of agency, economy of transaction costs and the theory of rights of ownership are presented with the phenomenon of asymmetry of information which appears in various aspects of functioning of a company. The conclusion from the analysis within this paper is the statement that corporate supervision in any company is strongly determined with the specific nature of the activities of all its parties: the hierarchy of their objectives, expectations, competencies, willingness to undertake risk, thus including also stimulation of the level of asymmetry of information, using mechanisms of compensation or motivations used for drawing benefits from using private information.

1. Introduction

In a world with perfect information, there would be no need for existence of a specific social and economic entity that a company is. The company is an institution arising in response to the problem of lack of the complete information which business entities face.

This paper is an attempt at presentation of multi-aspect relationships arising with the origin and evolution of a company. Enhancing neoclassical analyses related to companies was to open a road for scientific exploration of the consequences of asymmetry of information existing in management. The theoretical outline of the issues which constitute the essence of corporate governance research is viewed in the light

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of such theories developed within the new institutional economics as: the theory of contracts, the theory of agency, economy of transaction costs and the theory of rights of ownership. Such approach to the issues of corporate governance deviates from two theoretical perspectives of the analysis of corporate supervision: institutional and strategic choices, although it brings additional cognitive valour into it. The institutional and strategic choices approaches constitute the ground for six theories of corporate governance: the theory of resources, the stakeholder theory, the theory of agency, the theory of steward, the institutional theory and the theory of managerial hegemony (1).

2. New institutional economics

The premises of the new institutional economics, such as: perceiving a company as a managing unit (non-producing), thus focusing on the organisational aspect (non--technological); perceiving an institution, along with economic effectiveness, as a result of human actions; introduction of transaction as a unit of analysis and recognising the costs resulting from conclusion of agreements; including costs of information and accepting the existence of unbalanced access to information, make the undertook research basically different from those undertaken within the neoclassical approach (2). Additionally, the research conducted within the new institutional economics are based on the assumption of a limited rationality and opportunism of behaviour of the observed entities. Opportunistic and not fully rational behaviour of business entities result from the phenomena of complexity and uncertainty which are related to business processes.[1]

The schools arising on the ground of the new institutional economics share the attitude to the issue of social coordination addressing solution of the problem of rare resources as the departure issue in the research. These issues are reflected in the analysis of the institutional basis of the economy as a determinant of transaction costs. Transaction costs and institutions are the two dimensions of the issues related to coordination of activities of business entities. The element which is common to all the trends in the new institutional economics is the presence of the phenomenon of scarcity of information, in the form of asymmetry or incompleteness (3).

[1] Omitting the institutional aspect of the process of exchange in the neoclassical analyses was its source in keeping the assumption about instrumental rationality. The analysis of transactional costs expands studies in economy on functioning of companies which were earlier focused on technology and on the costs of production or distribution.

3. The economic theory of contracts[2]

The theory of contracts analyses stimuli and their structure as elements which determine the structure and results of a contract. The contract is an institution aimed at preventing opportunistic behaviour and limitation of rationality. The absence of inclinations in business entities to behave in an opportunistic way would make a contract a useless institution (a promise or a general clause would be sufficient). Under conditions of the combined existence of limited rationality, opportunism and specific nature of assets, planning turns out to be incomplete, promises are broken and the identity resulting from the specific nature of assets gains in significance. Despite existence of tools used for court settlement of problems resulting from a contract, a large part of activities in enforcement of contracts remains with the private sector institutions. The proper shape of the institutions functioning within the private sector is determined with the organisation of the transaction which makes savings on limited rationality and provides protection against opportunism (2, pp. 80–94).

The economic theory of contract is focused on the process of structuring the contract so as to reflect the structure of the stimuli aimed at achieving the objectives expected by the parties (the theory of agency, the *ex-ante* stage) and in the general process of contractual management (the economy of transaction costs, the *ex-post* stage). The simple division into *ex-ante* and *ex-post* is not always justified. One could try to consider all the possible obstacles or only these obstacles which are really in existence, and deal with them as they appear (2).

The theory of contracts constitutes part of the economics of information and it focuses its research on the possibilities of application of individual contractual mechanisms to cope with asymmetry of information.

4. The theory of agency[3]

The theory of agency emphasises the stimuli resulting from delegating rights and obligations within organisations (e.g. the principal—agent relation). The following are the three dimensions of asymmetry of information present in the relations between the principal and the plenipotentiary: the temptation of abuse, negative selection and non-verifiability. The temptation of abuse arises under the conditions of lack of supervision of the behaviour of the manager by the owner of the capital, so that the managers may direct the resources under their custody to the areas where personal objectives of the managers may be pursued (different from the objectives of the principal). Negative selection (hidden information) is a significant element in the relations between the principal and the plenipotentiary due to existence of uncer-

[2] Creator: K. Arrow, developed in 1960s.
[3] Creator: K. Arrow, developed in 1960s and 1970s.

tainty and high complexity of the surroundings and the lack of the possibility of full assessment of competencies of the manager and differentiating his/ her bad and good decisions.

The relation of agency consists in entrusting by the principal caring of his/ her interests with a plenipotentiary, as only the latter has the resource of information necessary for maximising the useful functions of the former. The principal offers the plenipotentiary a remuneration system whose objective is encouraging the plenipotentiary to such using of his/ her information that he could act as best as possible in order to maximise the benefits for the principal. The lack of the possibility of observing the activities of the plenipotentiary for control purposes makes the economic stimuli the central element of the agency relationships, and their role seems to be the key one (4).

The essence of the contract between the principal and the plenipotentiary is determination by the principal of the remuneration scheme which will develop the stimuli for the plenipotentiary for acting in line with the interest of the principal as much as it is possible. The reasonable use of the agent's efforts in the activities compliant with the objectives of the principal not worse than the reasonable use of his/ her effort in any other variant (the condition of motivational correctness) and the reasonable use of the work for the principal at least identical with the reasonable use from work in any other place (the condition of participation) are the necessary elements of such a contract (5).

In general, the relation of agency induces an optimisation problem whose subject matter is developing stimuli for action of the plenipotentiary in line with the expectations of the principal. Aversion of risk by the agent is perceived as a normal attitude, principals are understood as entities with neutral attitude to risk, and any deviations from this are ignored in theories. This approach makes analyses of agency relationships static. Taking into consideration alternative motivations of the agent and a broader range of his/ her possible activities (determined with sociological and psychological factors) brings more dynamism into the agency relationships.[4]

5. The economy of transaction costs[5]

The economy of transaction costs focuses its analyses on the *ex-ante* costs of acquiring information before conclusion and execution of the contract and on the *ex--post* risk. Existence of asymmetrically distributed information and assigning meaning to the costs incurred on its reception constitute the core of the transaction costs economics (6, p. 668).

[4] The assumptions about the difference of objectives of the agent and of the principal and about a strong asymmetry of information give the theory of agency a static nature.

[5] Creators: R. Coase, 1937; O. Williamson.

The phenomenon of scarcity of information implies the costs of permanent lack, acquiring and processing information. Costs of this type, referred to in the theory of economics as "transaction costs", are most often present in the form of costs of information search, costs of negotiations, costs of formulation, recording and authentication of the contract (*ex-ante* costs), costs of monitoring, costs of implementation and enforcement of execution of the contract, costs of amicable settlement of disputes, costs of demanding the terms and conditions of the contract in court, costs resulting from impossibility of meeting the requirements of the contract by the parties, costs of contract renegotiation, and costs of protection of rights of ownership (*ex-post* costs).

Transaction costs are understood as a friction present in management processes[6]. *Ex-ante* (costs of information) and *ex-post* (costs of ignorance) transaction costs are mutually dependent and their analysis should cover their entirety. Higher *ex-ante* transaction costs imply lower *ex-post* risk. Despite perceiving the existence of transaction costs mostly as an unfavourable phenomenon, leading to sub-optimal solutions, they are also viewed as a factor reducing risk and encouraging to obtain results close to the optimum (3). The correct analysis of transaction costs requires specification of the nature of exchange, consideration of the possible alternative organisational structures and their assigned stimuli structures (the method of comparative analysis of institution), assessment of the type of relationship between the type of the transaction and the existing institutional solution (in-depth examination of the structure of the stimuli), and attempts at empirical verification of the theses.

Apart from the analytical condition of the transaction costs economics, which is in the form of bilateral dependency (the specific nature of assets),[7] the central approach to the analysis of transaction costs, specifically the one that emphasises *ex-post* management, is suitable for examining hazards from concluding agreements in general. These dangers may result from weakening of the rights of ownership, complexity of projects which require acquisition of numerous information and which have varied principals, intermediate activities management, reaction in time, strategic abuse, extended hiding, weak institutional environment related to the economic development, weak feeling of honesty in the community. Except for limitations on rationality and opportunism, all these hazards may be eliminated. Aside from the premises of limited rationality of the human factor and its susceptibility to opportunism, the economy of transaction costs indicates the specific nature of assets, uncertainty and frequency as significant elements of the description of the transaction.

[6] This kind of friction was included in the category of costs by R. Coase (7; 8; 9) and clearly named the transaction costs by Marschak and popularised by Williamson.

[7] The problem covered specific investments, different from those whose execution demanded classic market agreements where the parties of the agreement pursued the objectives in generation minimum costs. The difference of the investment resulted from the specific nature of the assets which constituted the subject matter of the executed transactions. This specific nature developed the relation of dependency between the parties of the transaction which forced the necessity of developing the mechanisms of cooperation, thus leading to friction (opportunism slowing down or paralysing changes), and additionally executed under conditions of incomplete information.

6. The theory of rights of ownership[8]

The theory of rights of ownership combines various methods of allocating rights of ownership with the structure of the stimuli. The analyses within the theory of rights of ownership refer to various forms of economic ownership which determine various systems of economic stimuli and motivations, thus affecting various levels of effectiveness of business activities.

Ownership refers to a set of rights to which the business entity is entitled for the purpose of using the assets/ managing business activities with the owned assets. The arrangements in the issues of ownership evolve so as to meet the needs of the production sector, while in financial services this refers to undertaking risk and making decisions. They also include the issues of preferences in the degree of risk of those who provide production expenditures, as well as refer to the needs of coping with the problems of agency which arise in the process of balancing the said needs and preferences. Isolation of ownership and labour in the company constitutes the basic cause of the problem of agency between the employer and the employee. Incurring risk, providing funds and making decisions are potentially separable functions, but they are usually executed jointly in market economy companies. Incurring risk and control over making decisions tend to be connected with the same persons, as the temptation of abuse means that the cost of incurring risk is inversely proportional to the degree of control over the actions of the entity incurring the given risk (10, p. 246).

The issues of the structure of the optimum contract, maximising usability within the principal—plenipotentiary relationships, activities aimed at reduction of transaction costs, and softening the owner—manager dependency all boil down to the crucial issue discussed in the chapters of this paper, that is functioning of a company under conditions of incomplete information. Asymmetry of information in a company is best reflected in the problem of separation of ownership, management and control in the company.

Increasing transparency of activities, including decision processes, optimising the number of plenipotentiaries, and the qualification requirements as the planned consequences of the implementation of corporate supervision systems will reduce the possibility of using asymmetry of information to generate allowance, thus balancing the share of individual stakeholders in the generated income.

The main objective of corporate governance is ensuring the condition in which the managers of the company pursue the objectives set forth by the shareholders and by the board of directors. The problems arising along with separation of the ownership and management functions refer mostly to the differences in motivating, differentiation of the objectives of the owners and of the management of the company, and developing the attitudes towards risk and asymmetry of information in them, as different attitudes to risk lead to achieving different objectives.

[8] Creators: A. Alchian, H. Demsetz, developed in 1970s.

Perceiving the issues of corporate governance on the basis of management dynamics, the activities in a specific social, local or historical environment is indicated as a necessary alternative to the approach which exhibits the objectives and activities or stakeholders or stockholders, where the forms of behaviour are already defined and agreed, i.e. the stockholders model, the stakeholders model, the market and the hierarchy, egoism and altruism, self-regulation and state intervention, etc.: which is called the *processual approach* (11). Thus, the strategic necessity seems to be introduction of the individual approach to examining "own" corporate supervision system in the company. None of the systems of management and supervision (be it dualistic or monistic) will bring about full effectiveness and performance. The case of each company subjected to the corporate supervision is strongly settled in such elements of the process of functioning of the company as: defining and understanding the ultimate objective of the company, expectations and coherence of objectives of the stakeholders, competencies of the members of the company bodies (supervisory boards, boards of directors), tendency to cooperate, and knowledge of proven and modern methods of management, and the results of the actions undertaken within exercising the corporate supervision depend on them (12; 13).

7. Conclusions

Stimulating intensity of asymmetry of information and using the mechanisms of compensation or motivations used for drawing benefits from using private information may determine the development of the company. High costs of multi-level relationships mostly in the areas such as: allocation of free funds, strategy on crisis conditions, capital structure, assigning a degree of independence to objectives and instruments used in managing a company make research in corporate governance an important area of the science of company, whose effective exploration may determine a strongly rooted increase in competitiveness of regions or entire economies.

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Ład korporacyjny w nowej ekonomii instytucjonalnej

S t r e s z c z e n i e: Teoretyczny zarys problematyki stanowiącej sedno badań ładu korporacyjnego zostaje osadzony na teoriach nowej ekonomii instytucjonalnej. Teoria kontraktów, teoria agencji, ekonomia kosztów transakcyjnych i teoria praw własności zostają zaprezentowane poprzez ekspozycję zjawiska asymetrii informacji wyłaniającego się w różnorodnych aspektach funkcjonowania przedsiębiorstwa. Wnioskiem płynącym z rozważań prowadzonych w ramach niniejszego artykułu jest stwierdzenie, że nadzór korporacyjny każdego przedsiębiorstwa jest silnie warunkowany specyfiką działania wszystkich jego interesariuszy – hierarchią ich celów, oczekiwaniami, kompetencjami, skłonnościami do ryzyka – a za tym również stymulowaniem poziomu asymetrii informacji, wykorzystaniem mechanizmów kompensacji czy motywacji służących czerpaniu korzyści z wykorzystywania informacji prywatnych.

S ł o w a k l u c z o w e: asymetria informacji, wybrane szkoły nowej ekonomii instytucjonalnej, zarządzanie w przedsiębiorstwie

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Eco-innovativeness as source of competitive edge in companies in the example of selected power plants

K e y w o r d s: eco-innovativeness, eco-investments, competitive edge, competitiveness, company

S u m m a r y: Eco-innovativeness as a process of providing activities in companies which produce electricity is one of the elements allowing gaining competitive edge. The expenditures incurred for ecological innovations and the created conditions are translated into the produced added value. The crucial significance of eco-innovativeness is more and more often appreciated by the management. Optimisation of the management process in the area of eco-innovativeness activities is becoming an element necessary to obtain competitive edge. For the companies which produce electricity, eco--innovative activities are necessary for further functioning of these companies.

The necessary condition for executing eco-investments is their cost-effectiveness, guaranteed by the appropriate prices. In a power plant, expenditures incurred for eco-innovative of the solution should affect prices of energy. The market price defined by the power plant should cover costs of production, environmental costs and administration costs, and should bring about specific unit margin on top of that, thus allowing multiplication of the capital invested in eco-investments.

1. Introduction

Eco-innovativeness is the response to the requirements of the market surroundings in the combination of innovative solutions with the care about natural environment. Supporting eco-innovative solutions forms the execution of the assumptions of the Lisbon Strategy and the Plan of Action for Environmental Technologies. Eco-innovations within the Framework Programme for Entrepreneurship and Innovations is the priority issue. In the years 2007–2013, EUR 200 m is planned for financing projects

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related to eco-innovations. The objective of this paper is to find out whether and how the activities in the scope of eco-innovativeness contribute to enhancing competitive edge of companies. It is planned that the necessary adjustments in the scope of protection of the environment will affect eco-innovative activities of companies, thus, in the long range, enhancing their competitiveness.

2. Ecological innovations

Eco-innovativeness means new production processes, technologies, services and products, which premise is reduction of the negative impact on the natural environment. Ecological innovations offer a chance for implementation of sustained solutions which will allow more effective use of the natural resources and reduction of harmful effect on the environment, with simultaneous maintenance of high level of innovativeness. Eco-innovations include building pro-ecological consumer attitudes, supporting environment-friendly products and expanding markets for them. Eco-development in the economy assumes optimisation of production processes so as the products manufactured with the lowest possible consumption of energy and raw materials and low pressure on the environment were really necessary, durable and of high quality (1, p. 44).

Ecological effectiveness of the company may enhance its competitive potential. Taking into account ecological conditions of functioning of a company and implementing pro-environmental activities in each stage of its functioning (from planning and preparation of the production process to acquiring economic resources, the production process, to sale and management of consumer waste) may bring about specific results. These effects may be regarded as a prospective source of economic benefits which enable gaining competitive edge. Enhanced competitive strength of a company may be the result of exceeding the competition in the scope of meeting the requirements set forth for the protection of the environment.

Due to changes in social awareness which consist in common acceptance of clean environment as an element of social and individual welfare, a company may build its competitive edge by differentiating products and respecting ecological preferences of specific groups of consumers. This meeting of ecological tastes of consumers may be translated into competitiveness of the company's products and may lead to increased demand for the offered products, which is equivalent with increased proceeds and strengthening of the position in the market. Such products may be, for example, clean energy, renewable energy, meeting environmental standards, etc. Competitive edge achieved from implementation of pro-ecological actions and behaviours in a company is significant as an item of competitiveness only when (2, p. 56):

- Specific conditions and methods of external costs calculation and internalisation are created;
- Conditions for common and effective enforcement of obligations for using the environment are created;

– Ecological awareness of the society is increased combined with changes in consumer preferences and patterns.

The following may be included in prospective benefits from ecological activities (3, p. 203):

– Gaining cost advantage in the market, resulting from increased economical effectiveness of a company after reduction of environmental costs;
– Gaining product advantage which results from improving quality and attractiveness of products and increasing satisfaction and trust of the clients.

Eco-innovations constitute one of the basic capacities which may help the company stand apart from the competition and be a source of continuous advantage in the market. However, due to complexity and high costs of the implementation process of eco-innovations, only some companies manage to build competitive edge with this capacity. Making decisions in the scope of execution of eco-innovations, the managers take into consideration changes in the surroundings, the necessity of improving the condition of the company, increasing competitiveness, the need of diversification of activities or changes in the scope of technology and manufacturing methods, which are all translated into the generated costs.

These factors determine not only existence of and balance between business entities, but also ensure obtaining competitive edge, which refers to perceiving the company by its owners in the context of generation of future financial surplus which is translated into the value of the company.

In conclusion, companies which intend to maintain continuous competitive edge are forced to improve their activities and undertake actions aimed at its perfection. It may be achieved with eco-innovative activities which leads to achievement of development objectives of the company.

3. Competitive edge of companies

Competitive edge is the necessary item in long-term successes, that is survival and growth of the company (4, p. 57). The company is the more competitive, the higher its capacity to achieve objectives under competition existing in the markets where it operates or intends to operate (4, p. 57), has the possibility of achieving higher added value than other companies acting in the same market, creates and maintains better results than those of the competition (5, p. 67).

Competitive edge is the essence of activities of the company in a competitive market (6, p. 17). In all the theories and models concerning company competitiveness, competitive edge plays the key role. It is the soul of the results of companies in a competitive market. Researchers are unanimous about the scale of this phenomenon, but there are difficulties in its defining. Competitive edge is a set of advantages perceived by the market and appreciated by the clients, which positively and perma-

nently differentiate the company from its competition and bring about better measurable financial results (7). The term of competitive edge is not interpreted clearly. The views of various authors on the term of competitive edge are presented in Table 1.

Table 1

Definitions of competitive edge in the literature

Definition	Author
Using skills and competencies of a company as well as opportunities occurring in the market.	S. Bandopadhyay
Having a strategy which may not be used by the existing and prospective rivals.	J. Barney
Advantage resulting from perceiving the product of the company by the clients as better from competitive products in at least one category and gaps in the skills of the competition to the given company.	K. P. Coyne
Broadly understood benefits for the company originated as a result of competition.	G. D. Flint
Differences between two competitors in a cross-section of but one variable, which allows creation of value for the client better than when compared with the rival. It is the soul of results of the companies operating in competitive markets.	H. Ma
The value delivered to the clients which may refer to price or non-price components of the offer. This value exceeds the costs of its manufacture.	M. E. Porter
The skills of the company in the scope of creating key competencies, which will allow adaptation to fast-changing conditions of the surroundings.	C. K. Prahalad G. Hamel
A higher level of achievements against the competition, which meets the following conditions: the given achievement must be of significance for the client, must be perceived by him and must be durable.	H. Simon
The capacity for effective use of the competitive potential, allowing generation of an attractive market offer and effective instruments of competition, to ensure generation of added value.	M. J. Stankiewicz
More advantageous location of the company in the market against the competition, which allows enhancing of the results of its operation (without increasing expenditures) or reducing expenditures (without minimising effects).	W. Wrzosek
Strengths and weaknesses of the organisation and the author draws the conclusion that competitive advantages and shortcomings are the strengths and weaknesses of the organisation against the strengths and weaknesses of its current, probable and future competition.	J. A. F. Stoner
Whatever positively differentiates the products of the company or the company itself from among the competition in the eyes of the clients or end-users.	L. Fahey
Its visible sign is the superiority of the company over the competition, perceived as lower costs and the resulting lower prices, originality of the product, good customer service, improvement in organisation of sale, precise following of the requirements of the market segment, specialised offer, the offer of products or services of modern quality, etc.	J. Famielec
The capacity of the company to act so that the competition cannot or will not imitate its ways.	Ph. Kotler

S o u r c e: Prepared on the basis of (8; 6, p. 17; 9, p. 137; 10, p. 172; 7; 11, p. 156).

The definitions presented in Table 1 prove that a variety of views refer to the essence of competitive edge as well as its types, sources, conditions of achieving and maintaining. Achieving superiority by a company above other companies is the result of specific development and use of its resources and skills. Pursuing competitive edge must thus assume having better resources and/ or skills. However, these are only sources of competitive edge. In themselves, they do not turn automatically into competitive edge. To make it happen, resources and skills of a company must be developed and used in a distinct and efficient way leading to achievement of development objectives. It is significant for the sources of competition to be permanent and to feature advantages difficult to imitate by the competition, especially at the times when dynamics of economy development causes immediate spreading of all innovative, individualised solutions (12, p. 22).

Competitive edge of the company may be regarded as a market game between the client, the company and the competition, which refers to a specific place, time, and is present only in specific situations (7). Its basic dimensions may include: the type, the size in reference to the competition, durability (13, p. 2), and the reasons to win it may be: lower costs of manufacture or differentiation of products, resources owned, skills, capacities, creating new solutions in the product and organisational realms, compression of time of manufacturing and delivering the product to the recipients. Source of competitive edge are integrated inside the company, and its appearance is happening in the external relations. The size (scale) is related to the disproportion between the company and its competition in the cross-section of a specific feature (instrument of competition), partial competitive edge. It is determined by effort and external factors, related to the type of the achieved advantage, whose larger size determines better competition possibilities.

4. Expenses, costs and proceeds related to implementing ecological requirements

Ecological standards in selected power plants may be achieved by such groups of investment and organisational enterprises as liquidation of the existing sources, abandoning or reducing energy production, modernisation of the existing sources with various applicable technologies, building new sources of energy production with various technologies limiting emission of pollution into air (eco-innovative solutions in this respect), application of new types of raw materials for energy production, emission trading.

The identified methods and enterprises of implementation of ecological standards in the electrical power engineering sector have been grouped into 6 blocks and all of them result in financial consequences typical of operational, financial and investment activities. The consequences of protection activities are not directly isolated and apparent in the accounting and financial reporting of companies. Work is still in

progress on creating the so-called ecological accounting, initiated, among others, by the Ministry of Environment and the Ministry of Economy (14, p. 52). They allow naming and measuring financial consequences of protection activities, including implementation of ecological standards. Typical financial categories related to ecological enterprises include: investment expenditures (expenses) and the resulting assets, current costs (expenses), proceeds from sales, equity, obligations (as a source of financing).

Expenditures for eco-investments in power plants are the sum of expenditures for investments eliminating pollution (pipe end) and investments preventing pollution (integrated) (15, p. 109). Expenditures on integrated eco-investments include expenditures for introduction of new or adaptation of the existing technologies, processes, equipment (or its parts), aimed at prevention or reduction of pollution at the source, thus reducing the impact on the environment, related to emission of pollutants resulting from production of electricity.

The protection of the environment and restoring it to the required condition are related to incurring costs (16, p. 9). Environmental costs mean costs of activities undertaken or required, used for elimination of negative impact of the operation of the power plant on the natural environment and other costs resulting from the power plant—environment relationships. These costs may include prevention of air pollution. The costs of protection of the environment with eco-investment and current nature incurred by the power plant should contribute, over an extended period of time, to reduction in fees and penalties on account of using the environment (or eliminate payment of penalties and damages on this account). Moreover, along with increase in these costs and the number of represented pro-ecological actions, the image of the power plant will be improved as a company friendly to the environment.

The necessity of the power plant incurring the costs of functioning in the given environment results from the requirements of the law which executes (with legal acts) the premises of the ecological policy of the state, e.g. emission fees.

A specific source of own capitals, with ecological nature, comes in subsidies and subventions, as well as allowances, tax exemptions and deductions which (through proceeds and extraordinary profits or reduced tax charges) affect the net financial result and the withheld financial result enhancing the equity in the form of the supplementary and reserve capitals.

The obligations which constitute the value equivalent of these items of property which were made available to the power plant with the obligation of returning within a specific deadline are the supplementation of own sources of financing. The ecological obligations are the obligations resulting from past events which consist in providing benefits of reliably defined value, related to the negative impact of the operation of the power plant on the environment, which result in using the already owned or future assets of this unit.

In the context of the market, the decisions related to introducing eco-innovative solutions are made on economic grounds such as costs and prices. The participants

of the market are committed to continuous comparative assessment of prices, product quality, available supplies, prospective markets and option of services for the consumer, and what is often most important, that is whether at all to take part in the market (to produce or to consume, to buy or to sell). The accounting period for calculation of costs of producing electricity in power plants is calendar year. The main groups of costs may be defined in their functioning, i.e. fixed and variable costs, as well as the related costs of protection of the environment which affect the prices of energy.

There are two main types of prices: those based on costs of the produced goods and market prices, determined by the market, which the company has to accept. One can assume that the profit and loss account and the calculation of costs constitute the information used in managing the company, and the relationships between prices and costs may be regarded as a determinant of the financial situation of the company.

In Polish power plants, prices of energy should be also effected by the necessary expenditures incurred for eco-innovative solutions. The market price obtained by the power plant should cover the costs of production, the environmental costs and the administration costs, and should bring about specific unit margin on top of that, thus allowing multiplication of the capital invested in eco-investments.

The necessary condition for executing eco-investments is their cost-effectiveness, which is guaranteed by the appropriate prices. Obtaining new commercial credits from banks, not based on long-term contracts, is difficult. Power plants have few items of property which banks could recognise as attractive collateral.

Lack of funds for own contribution of the credit beneficiary (which may be from 30 to 60% of the eco-investment value) is another limiting factor. In obtaining investment credits, power plants cannot count on support of the state. Financing investments with debt in the form of emission of bonds or Euro-bonds requires the statutory defined emission procedure and subjecting to the assessment of credit capacity. It looks like financing based on a contract of leasing or lease with the use of assets is the possibility adjusted to the current structure and needs of power plants. The most important advantage comes in the form of the period of repayment which determines the realistic charge on the power plant, resulting from the costs of the entire investment process. Emission of debt securities allows its extending owing to the possibility of rolling specific series of issue of debt securities and adjusting maturity of individual series to the requirements of the buyers.

About one billion Polish Zlotys is to be allocated for the power engineering sector within the execution of the "Infrastructure and Environment" Operational Programme. The "Infrastructure and Environment" Programme also means obtaining funds for promotion of renewable sources of energy. 20% of the funds should be provided for cofinanced projects from public funds, which is about EUR 780 m. The Ministry of Regional Development, however, proposed to allocate for the power engineering sector EUR 397.2 m, including almost 60 m from national funds. Stimulation activities will be initiated for power engineering companies which are the prop-

erty of the State Treasury, to undertake new investments in the scope of increasing production capacity, as well as for construction of exhibition structures for the technology of CO_2 capture and storing, and, after 2015, for the possible adjustment of the new blocks to assembling such installations. New production units should make use of the modern, low-emission technologies of incineration.

The research conducted provided the grounds for the finding that the defined environmental standards and their rules of functioning in selected power plants have and will have in the future serious negative impact on the competitive position of power plants, and this results from the necessity of introducing eco-innovative solutions. It will be specifically reflected in the decreased share in the market, in the increase in costs of energy production and in the increase of electricity prices.

5. Conclusions

Companies commit to the eco-innovative activities for a number of reasons. Their objectives may refer to products, markets, effectiveness, quality, capacity to learn and implement changes. Determining motivation of companies for undertaking innovative activities and the role of these motifs facilitates examination of the factors stimulating innovative activities such as competition or chances of entering new markets.

Eco-innovativeness of companies is in part dependent also on external factors whose stimulation is the task of the bodies of government administration on both central and local levels. Due to the necessity of adjusting to the requirements of ecological standards, the companies functioning in the market of energy in Poland had to undertake a number of eco-innovative activities. A number of factors may make eco-innovative activities difficult. There may be reasons for not undertaking any innovative activities, as well as reasons for slowing down such activities or effecting negative impact on it. These include economic factors, such as high costs or lack of demand, factors related to the given company, for example lack of qualified personnel or lack of knowledge, as well as factors of legal nature, like legal or tax regulations. The eco-innovative company is one which has introduced eco-innovation within the given period.

The effect of eco-innovations on effectiveness of activities of companies may vary from affecting sale and share in the market to changes in effectiveness and performance. At the level of the type of operations and at the level of the country, important results include changes in international competitive position and increase in the total productivity of production factors, transferring know-how resulting from eco-innovations at the level of companies, as well as increase in the volume of know-how shared in the network of relations. Effects of product eco-innovations may be measured with the percentage of sale on account of new or improved products. A similar approach may be used in measuring effects of other types of innovations.

Viewing eco-innovativeness as a process of introducing activities in companies which produce electricity allows measuring the conversion of the expenditures incurred and conditions created into the created values, and allows its optimisation. The crucial significance of eco-innovativeness is more and more often appreciated by the management in companies. Effective management over the process of eco-innovativeness becomes the condition necessary to win and maintain competitive edge for a company and increase the value of the company over an extended period of time. For companies producing electricity, eco-innovative activities are necessary for their proper functioning in the market.

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Ekoinnowacyjność źródłem przewagi konkurencyjnej przedsiębiorstw na przykładzie wybranych elektrowni

S t r e s z c z e n i e: Ekoinnowacyjność jako na proces wprowadzania działań w przedsiębiorstwach wytwarzających energie elektryczną jest jednym z elementów pozwalających na uzyskanie przewagi konkurencyjnej przedsiębiorstwa. Ponoszone nakłady na innowacje ekologiczne i stworzone warunki przekładają się na tworzenie wartości dodanej. Kluczowe znaczenie ekoinnowacyjności jest coraz częściej dostrzegane przez zarządzających. Optymalizacja procesu zarządzania w obszarze działań ekoinnowacyjnych staje się elementem niezbędnym do uzyskania przewagi konkurencyjnej. Dla przedsiębiorstw wytwarzających energię elektryczną działania ekoinnowacyjne są niezbędne do dalszego funkcjonowania tych instytucji.

Niezbędnym warunkiem realizacji ekoinwestycji jest ich opłacalność, co gwarantują odpowiednie ceny. W elektrowni na ceny energii powinny mieć wpływ nakłady poniesione na ekoinnowacyjne rozwiązania. Cena rynkowa, którą uzyskuje elektrownia, powinna pokrywać koszty produkcji, koszty środowiskowe i koszty administracji, a ponadto przynosić określoną marżę jednostkową, umożliwiającą pomnożenie kapitału zainwestowanego w ekoinwestycje.

S ł o w a k l u c z o w e: ekoinnowacyjność, ekoinwestycje, przewaga konkurencyjna, konkurencyjność, przedsiębiorstwo

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