



CRACOW
UNIVERSITY
OF ECONOMICS



KNOWLEDGE ECONOMY SOCIETY

CHALLENGES AND DEVELOPMENT
TRENDS OF MODERN ECONOMY,
FINANCE AND INFORMATION
TECHNOLOGY



Edited by
Anna Malina, Renata Oczkowska, Jarosław Kaczmarek

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CHALLENGES AND DEVELOPMENT TRENDS OF MODERN ECONOMY, FINANCE AND INFORMATION TECHNOLOGY

CRACOW UNIVERSITY OF ECONOMICS
Faculty of Management
FOUNDATION OF THE CRACOW UNIVERSITY OF ECONOMICS

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Reviewer

Katarzyna Koziol-Nadolna

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Introduction

The new century has become an arena of extremely dynamic, turbulent, often unpredictable social, economic, demographic and technological changes. They are creating a climate of new challenges for the functioning, transformations and development of the global economic system, national economies, their integrative relationships and the entities of the real sphere – enterprises. The bases of the transformations were formed by the creation of the new order based on knowledge, intellectual capital, innovativeness and creativeness. The identified new resources – information and knowledge – are now perceived as indispensable for the functioning of the society, economy, enterprises and institutions, and equally with other tangible resources they co-decide about their development. In numerous views they are regarded as the most valuable resources. The progressing transformations are favoured and determined by information and communication technologies (ICT) which create broad opportunities to acquire, gather, make available and apply information and knowledge.

The observed information and technological transformation is becoming, according to A. Toffler's concept, the third wave (the post-industrial age) which, having initially interfered with the previous one (the industrial age), will cover it entirely. In the progressing transformations a regularity can be observed that subsequent achievements of the technosphere correspond with other spheres of human life, and, in effect, they evoke drastic changes in the sociosphere, infosphere and the sphere of power (ownership of means of production). Conversions within all those spheres are in fact subsequent major stages of the civilisation development of blurred in time character.

The new economy, according to D. Tapscott and A.D. Williams, is characterised by openness, peering, sharing and acting globally, and economics has become wkinomics. Openness of the new economy is manifested in using by enterprises not only their own intellectual capital, and within it human, structural and relational capital, but also capital raised from the outside. The remaining attributes of wkinomics are also based on openness: partnership, making resources available and globalisation. Partnership, as the contemporary production model, redefines the hitherto prevailing hierarchies in organisations, creating a new model of cooperation which organisational barriers and gradations do not concern. The cooperation is possible owing to resignation from the encapsulation of resources. Owing to ICT, the cooperation is far from any restrictions – it is global.

What has also become a special distinguishing feature of contemporary times are crisis phenomena, also progressing with huge speed and intensity, specific storms, only intensifying the state of permanent recession against short-term and weak economic recovery. The properties question the effectiveness of numerous theories and practical activities, they have ruined irreversibly, as it seems, the hitherto prevailing conditions and factors of development. Their considerable force have made economies and enterprises lose balance, numerous falling out from the outlined paths of development. What is more, strong economic, social and political turbulences destructively influence everything which was built on weak foundations, dubious strategies, improperly selected and used resources.

The development of information and communication technology (ICT), and the new view of information and knowledge with it, have evoked, as it was already indicated in the introduction, huge transformations, basically in all areas of life. The ways of the functioning of economies, enterprises, societies and people have been transformed, but it concerns mainly the countries which were prepared for such a technological metamorphosis civilisationally and were receptive. Information and communication technology (ICT), and the new view of information and knowledge connected with it, is reflected in the idea of a new society – the information society. The idea was initiated in the second half of the 20th century in Japan (T. Umesao, K. Koyama and Y. Masuda). Soon, it became popular in the United States and in Europe. Understanding the information society is a result of many previous and parallel attempts to describe reality. The nucleus were, among others, the ideas of “global village” by M. McLuhan (1964), “post-modern society” by A. Etzioni (1968), “prefigurative culture” by M. Mead (1970) or “telematic society” by S. Nora and A. Minc (1978), “third wave” by A. Toffler (1980) or “knowledge society” by P.F. Drucker (1993).

It is the knowledge-based economy model, which performs a decisive role in building competitive advantage, that has become, according to A.K. Koźmiński, a desired direction of the evolution of contemporary economies. As P.F. Drucker emphasised, the functioning of such an economy is based on generating, distributing and applying knowledge. The knowledge-based economy must be also supported in many dimensions. The pillars of this support are: education and training, information infrastructure, economic support and institutional system, as well as the innovation system. However, according to C.M. Olszak, deliberations about the knowledge-based economy arise from the truism that the vision of such an economy would be just a utopia, if not for the development of ICT, so intensive over the last several dozen years. Thus, a conclusion is often drawn that ICT has a significant impact on the picture of contemporary economy, yet, this impact is not one-sided – we deal with co-influence.

Enterprises take a special place in economy due to manufacturing products and distribution of goods. It is in them that owing to human work added value is created. Their activities in the purposeful approach must be effective – to serve the creation of this value. Moreover, the function of enterprises has been now redefined – from the function of manufacturing to a form of investment, thus, multiplying the capital invested in them. The activities of enterprises are more precisely defined by their universal features and principles – an ability to achieve benefits, functioning in the conditions of risk, the principle of economical production, and the financial balance and autonomy. In general terms, an enterprise is described by the triad of related notions: rationality, efficiency, entrepreneurship. Economic efficiency expresses the results of the rationality of economical production, and entrepreneurship is an effective way of achieving efficiency. Considering the hitherto deliberations about the knowledge-based economy and the information society, when outlining the picture of a contemporary enterprise, it is difficult not to mention the aspects of knowledge management, intellectual capital and communication. The necessity to act on the global scale is also an unquestionable issue. Contemporary firms already have a changed organisation and structure, and they are managed differently. As W.M. Grudzewski and I.K. Hejduk indicate, their evolution is going towards knowledge-based organisations, defined as organisations whose structures are subject to and focused on creating added value based on the efficient use of knowledge. Such metamorphosis of organisations is greatly influenced by ICT.

The progressing globalisation and integration as the signs of internationalisation set new conditions and ways of development of economies and enterprises. Entering the third stage of trans-

formations in the form of the information society brings a permanent and fast-spreading access to information and enables the transfer of data, and knowledge and information become the critical factors in achieving success and key strategic resources. In the process of searching for and using factors of development, new opinions and assessments, concepts, theories and economic models, as well as directions and strategies of changes are formulated. It takes place in symbiosis with planning, designing and applying information technologies for the needs of the new economy and creating theories and paradigms which are reflected in practice.

These are the issues which create the centre of interest and the structural axis of the book entitled *Knowledge – Economy – Society. Challenges and Development Trends of Modern Economy, Finance and Information Technology*. What emerges from it is the structure filled with contents which logically and precisely reveal the quality of the discussed problems. As the editors we expect and hope that the book given to the Readers will be one of many important publications, extending the offer of the resource of knowledge about transformations in the functioning of contemporary economies, enterprise management and creating new information technologies.

The entirety of the Authors' deliberations has been divided into five thematic parts, related to each other logically and precisely:

- I. Economy and enterprises on the way to an increase in efficiency.
- II. The role of banks, finance and insurance in the development of economic activity.
- III. Intellectual capital in the creation of wealth resulting from knowledge.
- IV. Developmental challenges in the world of information technology.
- V. Evaluation of experiences and changes in law, business activity and management.

The first part of the book is devoted to economic issues in the macro and micro approach, focused around the problem of development, structural changes and efficiency. It is opened by an interesting paper by Katarzyna Cymbranowicz, discussing the employment model consisting in the combination of flexibility and social security – flexicurity, as well as the issues of labour productivity in the context of economic unions by Jurij Renkas. The deliberations on the micro-economic basis begin with a broad and multi-dimensional analysis of long-term trends and changes in the area of productivity and recoverability of fixed assets in production firms by Stanisław Młynarski and Jarosław Kaczmarek. The continuation are presentations related to the R&D area, the functioning of the SME sector, open innovations, clusters and syndicalisation.

The layer of deliberations connected with the functioning and the role of banks, insurers, as well as detailed issues of the area of enterprises finance management, makes the second part of the book. Attention should be paid to the study by Czesław Mesjasz and Lidia Mesjasz, devoted to negotiation patterns of debt, as well as the text by Jacel Pera devoted to the role of the central bank in reducing risk in the private sector. More detailed problems discussed by the authors are also the issues of shaping the results of mutual funds, the influence of debt on the profitability of equity, creative accounting or insurance in limiting financial losses – the last ones are presented in an interesting way by Ryszard Pukała.

The third part of the book is devoted to the issues of intellectual capital in creating wealth resulting from knowledge. It includes a closer discussion of the problems of current changes in the human capital theory, managing it in industrial networks, investing in its expansion or an interesting presentation of the problem of the role of mnemonics (the art of memory) in the development of the organisation's intellectual capital in Marzena Wójcik's paper. The problem of the influence of knowledge economy on the development of network relationships is presented interestingly in the paper by Karolina Orzeł.

Following the deliberations concerning the knowledge based economy, in the fourth part of the book, deliberations focus on the issues of the development of information and communication technology serving the development of the information society. What can be found here are extensively discussed problems of the optimisation of Internet websites, the use of web resources, evaluation measures in IT project management, the procedures of neuron classification (Janusz Morajda), the issues of automated discriminant analysis, data visualisation (Paweł Wołoszyn and others), or overcoming difficulties in using ICT by the elderly by Ewa Soja and Piotr Soja.

The last part of the book tackles the problem of the evaluation of experiences and changes in law, business activity and management. In the first layer there are deliberations devoted to legal risk (Filip Grzegorzczak and Grzegorz Miś), and the reform of judiciary, and then monitoring in reporting information for the purposes of management, the regional innovation system in the process of regional management restructuring (Zbigniew Makiela and Paweł Mucha), safety management, transactional costs or the economic problems of the sphere of physical activeness.

This publication came into being as an effect of the cooperation between the academic environment of the Faculty of Management at the Cracow University of Economics and employees and doctoral students of other faculties of the University, with representatives of different Polish academic circles, as well as representatives of foreign academic circles from The Czech Republic, Lithuania, Russia, Serbia, Spain and Ukraine. This work inscribes into the series of publications under the common title *Knowledge – Economy – Society*, which constitute one of the effects of this many years' cooperation¹. As scientific editors we would like to thank all the Authors for accepting our invitation to co-create this publication and for their commitment and contribution towards its creation.

Anna Malina, Renata Oczkowska, Jarosław Kaczmarek

¹ See: *Knowledge – Economy – Society. Challenges of the Contemporary World*, Edited by R. Oczkowska, B. Mikula, Faculty of Management of the Cracow University of Economics – Foundation of the Cracow University of Economics, Cracow 2011; *Knowledge – Economy – Society. Dilemmas of the Contemporary Management*, Edited by A. Malina, R. Oczkowska, T. Rojek, Faculty of Management of the Cracow University of Economics – Foundation of the Cracow University of Economics, Cracow 2012; *Knowledge – Economy – Society. Transfer of Knowledge in the Contemporary Economy*, Edited by P. Lula, B. Mikula, A. Jaki, Faculty of Management of the Cracow University of Economics – Foundation of the Cracow University of Economics, Cracow 2012; *Knowledge – Economy – Society. Global and Regional Challenges of the 21st Century Economy*, Edited by P. Lula, B. Mikula, A. Jaki, Faculty of Management of the Cracow University of Economics – Foundation of the Cracow University of Economics, Cracow 2013; *Knowledge – Economy – Society. Challenges of the Contemporary Management*, Edited by A. Malina, R. Oczkowska, T. Rojek, Faculty of Management of the Cracow University of Economics – Foundation of the Cracow University of Economics, Cracow 2013; *Knowledge – Economy – Society. Dilemmas of the Economic Resources Management*, Edited by R. Oczkowska, G. Śmigielska, Faculty of Management of the Cracow University of Economics – Foundation of the Cracow University of Economics, Cracow 2014; *Knowledge – Economy – Society. Contemporary Tools of Organizational Resources Management*, Edited by P. Lula, T. Rojek, Faculty of Management of the Cracow University of Economics – Foundation of the Cracow University of Economics, Cracow 2014; *Knowledge – Economy – Society. Contemporary Organizations in the Process of Institutional Transformations*, Edited by A. Malina, R. Oczkowska, J. Plichta, Faculty of Management of the Cracow University of Economics – Foundation of the Cracow University of Economics, Cracow 2014; *Knowledge – Economy – Society. Managing Organizations: Concepts and Their Applications*, Edited by A. Jaki, B. Mikula, Faculty of Management of the Cracow University of Economics – Foundation of the Cracow University of Economics, Cracow 2014 and *Knowledge – Economy – Society. Problems of Management and Financing Economic Activity*, Edited by R. Oczkowska, G. Śmigielska, Faculty of Management of the Cracow University of Economics – Foundation of the Cracow University of Economics, Cracow 2014.

PART I

ECONOMY AND ENTERPRISES ON THE WAY TO AN INCREASE IN EFFICIENCY



Chapter 1

The Impact of *Flexicurity* on the Functioning of the Labor Market in the European Union

Katarzyna Cymbranowicz

1. Introduction

In recent years, the concept of *flexicurity* arouses more and more interest. It is a solution based on assumption that flexibility and security of employment can be linked together, the belief that the two elements are not contradictory, but on the contrary – they can interact with each other, as argued by, among others, T. Wilthagen and F. Tros. Solutions provided by the concept of *flexicurity* are successfully applied in Denmark or the Netherlands.

In times of crises and many unsolved problems the EU struggles with many challenges of the socio-economic nature. Therefore, it is worth considering whether the concept of *flexicurity* could at least partly solve the issues mentioned and provide the answers to the challenges that face us today.

This article attempts to explain the sources and main objectives of the concept of *flexicurity*, its implementation in selected EU Member States and the evaluation of the solutions' effectiveness with particular emphasis on the years of crisis, i.e. 2007-2013. The solutions proposed by the model of flexible employment and social security seem interesting, especially in times of crisis and economic slowdown.

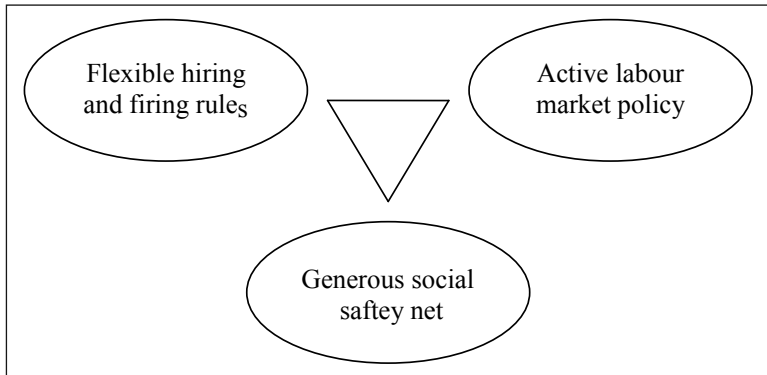
2. Birth and main principles of *flexicurity*

The first models using *flexicurity* – type solutions were shaped at the turn of the '80s and '90s of the XX century. Denmark and the Netherlands are the precursors in combining flexibility with social security. In the publications of the European Commission, the so-called 'White Papers' devoted to the economy and employment, the examples of reforming the labor market with the implementation of *flexicurity* are often cited as worthy of imitation. The Danish and Dutch experience is considered to be the basis for designing the so-called European Employment Strategy (EES).

The Danish model of *flexicurity* relies on abandoning high employment stability for flexibility that ensures the employers' ability to regulate the level of employment, depending on

the conditions in the labor market. The consequence is a lower level of employment protection, while providing a high level of social protection and the availability of the activation programs (Rymsza, 2005, p. 15).

Figure 1. The Danish model of flexible and secure labor market



Source: Andersen, Svarer, 2007, p. 3.

The Dutch model is related to the promotion of temporary and part-time employment and gradual expansion of social protection for atypical forms of employment (Rymsza, 2005, p. 16). In practice, people employed in part-time jobs still have limited access to social benefits (Rymsza, 2005, p. 17). Vital for this model is the role of temporary employment agencies that act as a partner and mediator in the labor relations. The agreement between the employers' confederation, acting in the interests of employers, trade unions on behalf of employees and the parties representing the government is essential for the development of *flexicurity*. Hereby the employers can hire or fire workers, trade unions support those dismissed and the government helps retrain workers so they can find new jobs (Gładzicka-Janowska, 2013, p. 199).

In conclusion, the essence of *flexicurity* is the assumption that labor market flexibility and social security are not mutually exclusive. M. Rymsza notes that in countries that do not have that agreement (e.g. France and Germany) developing a balance between flexibility and security turns out to be extremely difficult and 'attempts to deregulate the labor market lead to further polarization of the positions of trade unions and employers organizations' (Rymsza, 2005, p. 17). It should be noted that cooperation between social partners is different in countries which are regarded as the precursors, where high levels of workers' unionization have positive effects on the stability of decentralized collective agreements between them than in other EU Member States.

3. Attempts to implement the concept of *flexicurity* in the European Union

In the European Union the relevant records concerning the idea of an integrated strategy for simultaneous enhancement of flexibility and security on the labor market were reflected in such documents as the White Paper by J. Delors in 1993 and in EES in 1997 (Cymbranowicz, 2014, p. 208).

The popularity of this concept is relatively short, but nonetheless perceived as one of the key tools that will lead to achieving the objectives of long-term strategy for socio-economic development and adapting European model of socio-economic policy to the contemporary challenges (Commission of the European Communities, 2007; Rezolucja Parlamentu Europejskiego..., 2007).

In 2000 an extraordinary summit of the European Council, completely devoted to socio-economic problems, was held in Lisbon under the slogan: *Employment, economic reform and social cohesion – towards Europe of innovation and knowledge*. It resulted in formulating a new strategy for the years 2000-2010, laying new economic and social priorities. In 10 years the EU was to be 'the most competitive and dynamic knowledge-based economy in the world, capable of sustainable growth that creates more jobs and greater social cohesion'. Among the priority objectives and macroeconomic goals, a key position was occupied by the issues related to labor market and employment, including among others: activation and prevention of unemployment and economic inactivity, creating new jobs and promoting entrepreneurship, aid in adaptation and mobility on the labor market and the promotion of human capital development, lifelong learning and professional activation (Głąbicka, 2005, p. 126).

After four years the Lisbon strategy went through a review. The Report of the High Level Group, prepared under the direction of Wim Kok, has shown little progress: it turned out that no country fully implemented the provisions (Cymbranowicz, 2014, pp. 195-198). Recommendations contained in the report have been included in the document adopted at the next European Council in 2005 in Brussels, entitled *Working together for growth and jobs. A new start for the Lisbon Strategy* (Commission of the European Communities, 2005). The renewed Lisbon Strategy focused primarily on increasing employment, productivity and competitiveness of the EU. Unfortunately, neither the original nor the new version has proved to be effective enough to be considered a success. These failures however, did not harm the idea of *flexicurity*. The success in Denmark and the Netherlands confirmed its importance.

In the Communication *Towards Common Principles of Flexicurity: More and better jobs through flexibility and security* from June 2007, the European Commission presented guidelines for implementation of *flexicurity*. Adopting those solutions would have a major impact on the modernization of the European labor market. The document states that 'Europe must create more and better jobs. It must reduce segmented labor markets and precarious jobs, and promote sustained integration and accumulation of skills' (Commission of the European Communities, 2007). In every EU Member State, due of various political and socio-economic systems, the ways of implementing are different and thus so are the results, however the European Commission set out common principles of European model of *flexicurity* and encourages the Member States to use them¹. These include among others:

1. Reinforcing the implementation of the EU strategy for growth and jobs and strengthening the European social model.
2. Balance between rights and responsibilities.

¹ In December 2007 The EU Employment and Social Affairs Council adopted a document entitled *Common rules for the application of flexicurity*, which is based on a European Commission proposal from June 2007. The European Commission is expected to begin public initiative in form of 'Mission regarding the model of a flexible labor market and social security' to ensure the full integration of the 'Common rules for the implementation of flexicurity'. The mission carried out series of visits between April and July 2008 in France, Sweden, Finland, Poland and Spain. Their aim was to promote the implementation of *flexicurity* by its adaptation to the socio-economic conditions of individual Member States. Cf.: European Commission, *Mission for flexicurity: Terms of Reference*, Brussels, 8.2.2008, EMPL/D/XPM/DD D(2008) 2899.

3. Adapting *flexicurity* to different situations, needs and challenges of the Member States.
4. Reducing the gap between people without stable employment, working under the unconventional and unstable contracts and employed on a permanent, full-time jobs.
5. The development of *flexicurity*, both internally (by helping employees career advancement) and externally (helping to shift work).
6. Supporting gender equality and promoting equal opportunities for all.
7. Producing balanced policies to promote an atmosphere of trust between social partners, public authorities and other stakeholders.
8. Ensuring a fair distribution of costs and benefits of *flexicurity* policies and contributing to sound and financially sustainable budgetary policies.

The Commission Communication from June 2007 overtook slightly period of crisis and economic slowdown in Europe. Therefore, in the new conditions, a quick revision of the long-term strategy for growth and jobs was needed. In March 2010, the Commission issued a Communication entitled *Europe 2020 – A strategy for smart, sustainable and inclusive growth* (European Commission, 2010). At the summit in Brussels, the European Council adopted the Europe 2020 strategy (Conclusions European Council, 2010), focused on activities aimed at increasing competitiveness, productivity, growth potential and economic convergence in Europe.

According to the new strategy for jobs and growth, one of the main determinants of the economic development is greater number of jobs². With the new European Employment Strategy (part of the Europe 2020) it will be possible to create more and better jobs. It supports activities that will allow to achieve the following objectives by 2020 (<http://ec.europa.eu/social/main.jsp?langId=en&catId=958>):

- increase the employment rate in the age group 20-64 years to 75%,
- decrease the amount of early school leavers to below 10% and increase the percentage of people in the age group 30-34 finishing colleges and universities to at least 40%,
- reduce the number of people at risk of poverty or social exclusion by at least 20 million.

Essential for those objectives is the so-called flagship initiative of 2010 – *An agenda for new skills and jobs*³. This initiative includes specific actions that are supposed to help in (<http://ec.europa.eu/social/main.jsp?langId=en&catId=958>):

- speeding up reforms improving flexibility and security in the labor market,
- adapting employees' qualifications to labor market needs,
- improving the quality of jobs and working conditions,
- creating a better environment for job creation.

In conclusion, the implementation of the *flexicurity* occupies an important place in the European Employment Policy. The European Commission puts emphasis on cooperation of the authorities and research institutions, aimed to develop and implement the model of *flexicurity* appropriate for each of the Member States. Referring to the eight aforementioned *flexicurity* principles, these actions should focus on providing (<http://ec.europa.eu/social/main.jsp?catId=102&langId=en>):

1. Flexible and predictable labor contracts achieved by compliance with labor laws, collective agreements and modern principles of organization of work.

² Currently the number of working-age population decreases, and thus the stability of social protection systems is at stake. The solution is to increase the number of people of working age who are economically active.

³ This program was an initiative of the European Commission in 2010, being a part of aforementioned Europe 2020 strategy.

2. Effective labor market policies helping workers find employment.
3. Implementation of comprehensive lifelong learning strategies in order to promote constant ability of workers, particularly from the most vulnerable social groups, to adapt to the labor market.
4. Modern social security systems to provide support in the form of financial assistance to encourage employment and facilitate labor market mobility.

These are the four typical pathways, designed for all EU Member States so they can develop their own strategies, because, as have already been mentioned – there is no universal model of *flexicurity*.

4. Effectiveness of *flexicurity* solutions in selected EU Member States in the years 2007-2013

This part of the essay provides an analysis of the test results carried out on the components of *flexicurity* model for selected EU Member States⁴. Due to the period covered, the study attempts to answer the question whether *flexicurity* works not only in times of economic prosperity, but also in crisis. The assessment criterion is the ability to maintain the difference between the lower level of unemployment (typical for countries with flexible labor markets), and the level of unemployment recorded in states with more generous social welfare systems (typical for countries with less flexible labor markets). In the latter, significantly higher levels of unemployment could have been observed before the crisis in 2007. A good comparison of the unemployment rate is Denmark, where the *flexicurity* model is applied in labor market policy since the '90s, and other Member States of the EU-15 (see Tab. 1 and Fig. 2).

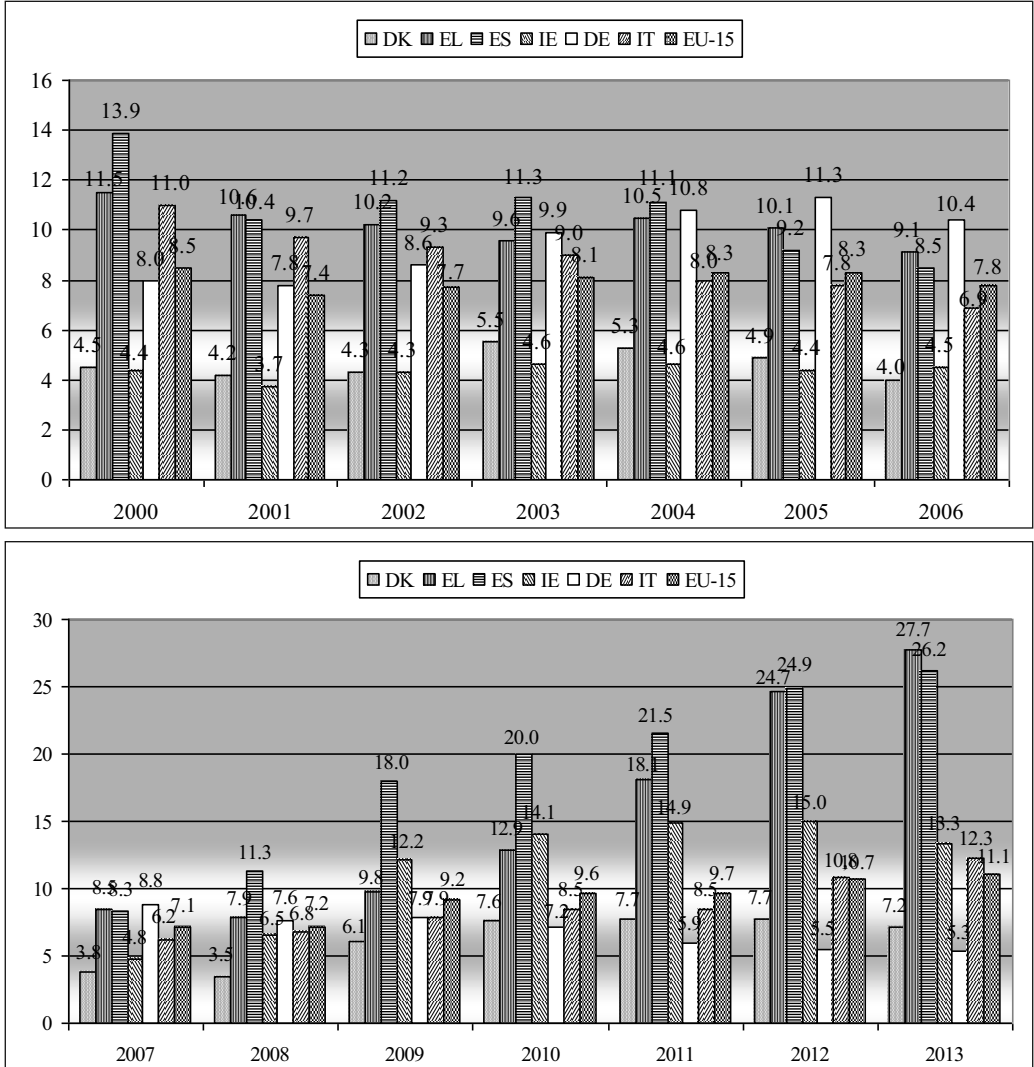
Table 1. Unemployment rate in the EU-15 in 2000-2013 (age group 15-64, in %)

Category	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
AT	4.7	4.0	4.9	4.8	5.9	5.7	5.3	4.9	4.2	5.4	4.9	4.6	4.9	5.4
BE	6.6	6.2	6.9	7.7	7.4	8.5	8.3	7.5	7.0	8.0	8.4	7.2	7.6	8.5
DK	4.5	4.2	4.3	5.5	5.3	4.9	4.0	3.8	3.5	6.1	7.6	7.7	7.7	7.2
FI	11.2	10.4	10.5	10.5	10.4	8.5	7.8	6.9	6.4	8.4	8.5	7.9	7.8	8.3
FR	10.3	8.6	8.7	8.6	9.2	8.9	8.9	8.0	7.4	9.1	9.3	9.2	9.9	9.9
EL	11.5	10.6	10.2	9.6	10.5	10.1	9.1	8.5	7.9	9.8	12.9	18.1	24.7	27.7
ES	13.9	10.4	11.2	11.3	11.1	9.2	8.5	8.3	11.3	18.0	20.0	21.5	24.9	26.2
NL	2.7	2.1	2.6	3.6	4.7	4.8	3.9	3.2	2.7	3.4	4.5	4.4	5.3	6.7
IE	4.4	3.7	4.3	4.6	4.6	4.4	4.5	4.8	6.5	12.2	14.1	14.9	15.0	13.3
LU	2.4	1.8	2.6	3.7	5.1	4.5	4.7	4.1	5.1	5.2	4.4	4.9	5.2	5.9
DE	8.0	7.8	8.6	9.9	10.8	11.3	10.4	8.8	7.6	7.9	7.2	5.9	5.5	5.3
PT	4.0	4.1	4.8	6.5	6.7	8.0	8.1	8.5	8.0	10.0	11.4	13.3	16.3	17.0
SE	5.5	4.8	5.0	5.6	6.8	7.9	7.1	6.2	6.3	8.5	8.8	8.0	8.1	8.2
UK	5.6	4.7	5.1	4.9	4.6	4.8	5.4	5.4	5.7	7.7	7.9	8.2	8.1	7.7
IT	11.0	9.7	9.3	9.0	8.0	7.8	6.9	6.2	6.8	7.9	8.5	8.5	10.8	12.3

Source: own study based on Eurostat database *Unemployment rates by sex, age and nationality (%)*.

⁴ The data used in the study was obtained from Eurostat and OECD databases, however some limitations were due to their incompleteness.

Figure 2. Unemployment rates in selected Member States of the EU-15 in 2000-2013 (age group 15-64 years, in %)



Source: own study based on Eurostat database *Unemployment rates by sex, age and nationality (%)*.

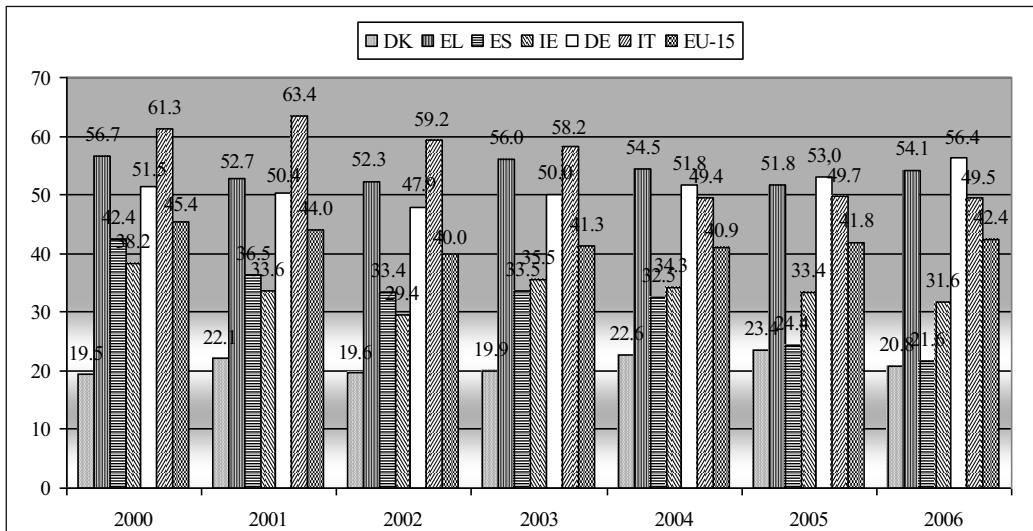
The data on Figure 2 indicate a much lower level of unemployment in Denmark compared to the EU-15. Moreover, Figure 3 shows that its structure is also preferable since the share of unemployed for 12 and more months among all unemployed was relatively small (see Tab. 2 and Fig. 3). Surely this is an argument in favor of employment flexibility.

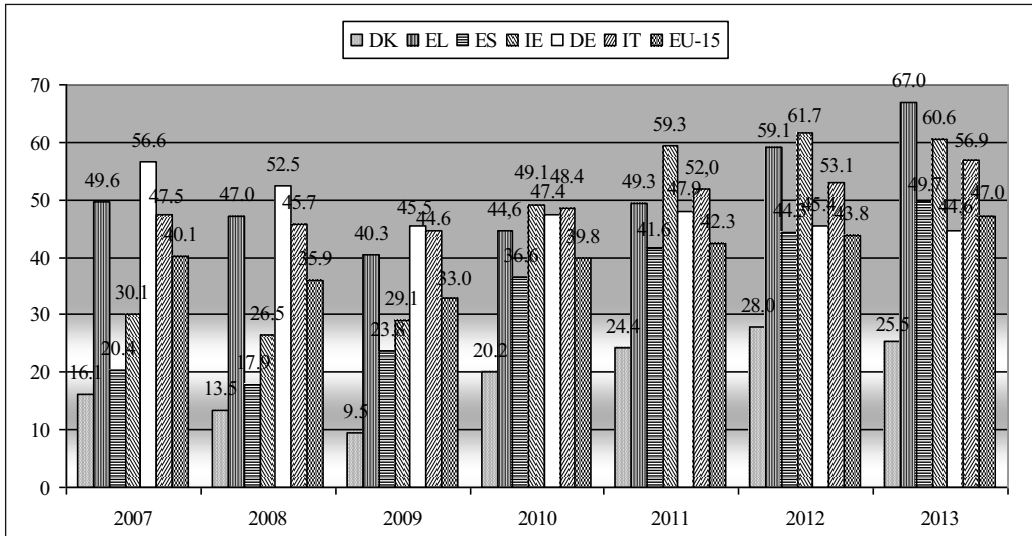
Table 2. Long-term unemployment rate in the EU-15 in 2000-2013 (age group 15-64 years, in %)

Category	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
AT	28.5	26.1	16.4	23.0	27.9	25.5	28.0	27.2	24.3	21.7	25.5	26.2	24.9	24.6
BE	56.3	51.7	49.6	46.3	49.6	51.7	51.2	50.4	47.5	44.2	48.8	48.4	44.7	46.1
DK	19.5	22.1	19.6	19.9	22.6	23.4	20.8	16.1	13.5	9.5	20.2	24.4	28.0	25.5
FI	24.6	23.6	21.2	21.3	21.1	25.8	25.2	22.8	18.4	16.7	24.0	22.2	21.3	20.8
FR	39.7	36.8	32.7	37.6	39.1	41.1	42.0	40.2	37.4	35.2	40.2	41.5	40.4	40.4
EL	56.7	52.7	52.3	56.0	54.5	51.8	54.1	49.6	47.0	40.3	44.6	49.3	59.1	67.0
ES	42.4	36.5	33.4	33.5	32.5	24.4	21.6	20.4	17.9	23.8	36.6	41.6	44.3	49.7
NL	b.d.	b.d.	26.6	29.0	32.7	40.2	42.9	39.3	34.4	24.2	27.5	33.5	33.7	35.5
IE	38.2	33.6	29.4	35.5	34.3	33.4	31.6	30.1	26.5	29.1	49.1	59.3	61.7	60.6
LU	22.4	28.4	27.4	24.7	21.0	26.4	29.5	28.7	32.2	23.2	29.3	28.6	30.3	30.4
DE	51.5	50.4	47.9	50.0	51.8	53.0	56.4	56.6	52.5	45.5	47.4	47.9	45.4	44.6
PT	43.9	39.2	35.4	32.7	43.3	48.2	50.5	47.1	47.4	44.2	52.2	48.3	48.7	56.3
SE	30.7	19.5	20.0	16.1	17.8	b.d.	b.d.	13.9	12.7	13.2	18.6	19.6	19.0	18.6
UK	27.8	27.6	22.9	22.7	21.1	20.9	22.2	23.7	24.1	24.5	32.5	33.4	34.6	36.2
IT	61.3	63.4	59.2	58.2	49.4	49.7	49.5	47.5	45.7	44.6	48.4	52.0	53.1	56.9

Source: own study based on Eurostat database *Long-term unemployment (12 months or more) as a percentage of the total unemployment, by sex, age and nationality (%)*.

Figure 3. Long-term unemployment in selected Member States of the EU-15 in 2000-2013 (age group 15-64 years, in %)





Source: own study based on Eurostat database *Long-term unemployment (12 months or more) as a percentage of the total unemployment, by sex, age and nationality (%)*.

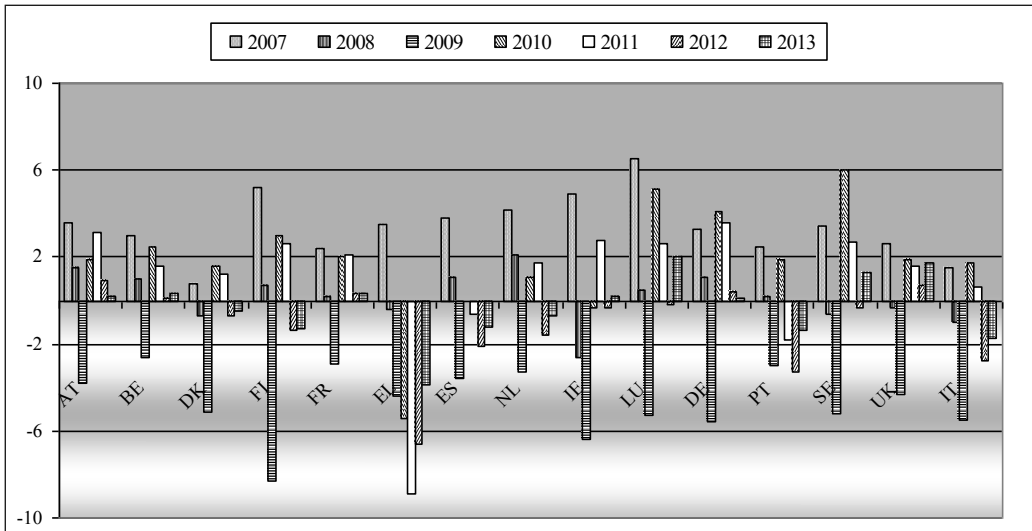
The economic crisis in 2007-2010 and its effects indicate that during the slowdown, the relation observed earlier is not working. For example, in 2007-2010 the GDP of both Denmark and France decreased at a similar rate (see Tab. 3). Comparing this data with the change of another indicator – unemployment, it turns out that in Denmark the change was nearly three times higher (an increase of 3.8%) than in France (up by 1.3%) (see Tab. 1).

Table 3. Change in GDP growth in the EU-15 in 2007-2013 (in%)

Category	2007	2008	2009	2010	2011	2012	2013
AT	3.6	1.5	-3.8	1.9	3.1	0.9	0.2
BE	3.0	1.0	-2.6	2.5	1.6	0.1	0.3
DK	0.8	-0.7	-5.1	1.6	1.2	-0.7	-0.5
FI	5.2	0.7	-8.3	3.0	2.6	-1.4	-1.3
FR	2.4	0.2	-2.9	2.0	2.1	0.3	0.3
EL	3.5	-0.4	-4.4	-5.4	-8.9	-6.6	-3.9
ES	3.8	1.1	-3.6	0	-0.6	-2.1	-1.2
NL	4.2	2.1	-3.3	1.1	1.7	-1.6	-0.7
IE	4.9	-2.6	-6.4	-0.3	2.8	-0.3	0.2
LU	6.5	0.5	-5.3	5.1	2.6	-0.2	2.0
DE	3.3	1.1	-5.6	4.1	3.6	0.4	0.1
PT	2.5	0.2	-3.0	1.9	-1.8	-3.3	-1.4
SE	3.4	-0.6	-5.2	6.0	2.7	-0.3	1.3
UK	2.6	-0.3	-4.3	1.9	1.6	0.7	1.7
IT	1.5	-1.0	-5.5	1.7	0.6	-2.8	-1.7

Source: own study based on Eurostat database *Real GDP growth rate – volume (%)*.

Figure 4. Change in GDP growth in the EU-15 in 2007-2013 (in%)



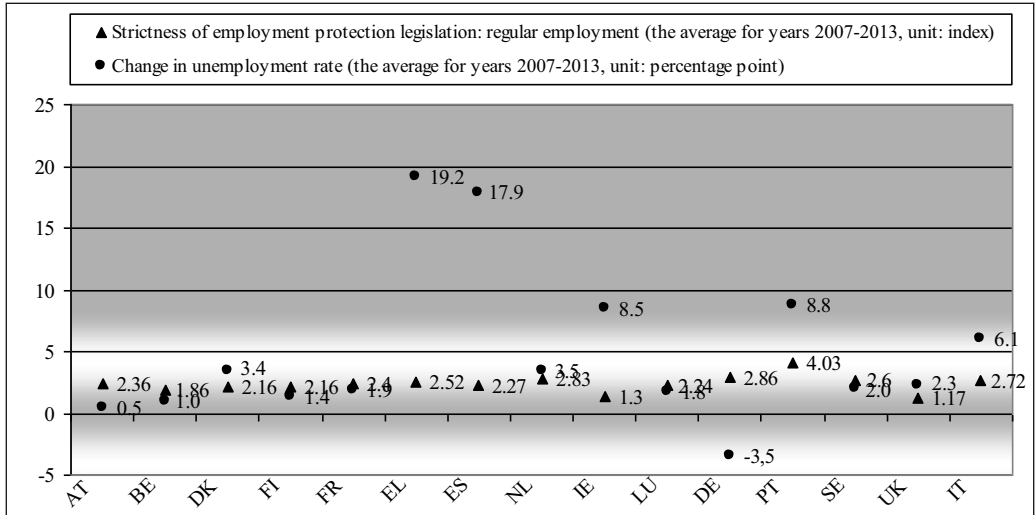
Source: own study based on Eurostat database *Real GDP growth rate – volume (%)*.

At this point it is worth noting that in Denmark, despite the *flexicurity*, unemployment has risen quickly. In 2007 Denmark had the lowest unemployment rate in the EU (3.8%), in 2013 took only 5th place (7.2%). A similar trend also applies to many other Member States of the EU-15, significantly differing from each other in degree of protection on the labor market (see Fig. 5 and 6).

Analyzing Figure 5, it can be stated that among the EU-15, the United Kingdom has the least regulated labor market (1.17) and during the initial period of economic crisis experienced significant changes in the level of unemployment (up from 5.4% in 2007 to 7.9% in 2010, that is by 2.5%). Therefore the models of flexible labor markets indeed are not the best solution in the fight against unemployment in the short term. It does not change the fact that in the long term this relationship is reversed.

After overall analysis, it can be concluded that there is a negative correlation between greater protection of the labor market and smaller changes in the level of unemployment. It is illustrated by the situation of countries like Greece, Spain, Ireland, Portugal and Italy, where a high rate of restrictive employment protection (with the exception of Ireland) is accompanied by a significant, double-digit increase in the unemployment rate. The changes in the level of GDP and unemployment in the EU-15 observed at the same time can be another example. The data summarized in the Figure 6 indicates that in the short term, *flexicurity* does not work – both Denmark and Anglo-Saxon countries recorded large falls in GDP growth (respectively from 1.6% to -5.7%, and from 3.4% to -5.2%). However, in the long term, this relationship was reversed – the states characterized by major regulations in the labor market in a period of decline in GDP growth recorded bigger changes in the unemployment level than those with less restrictive solutions.

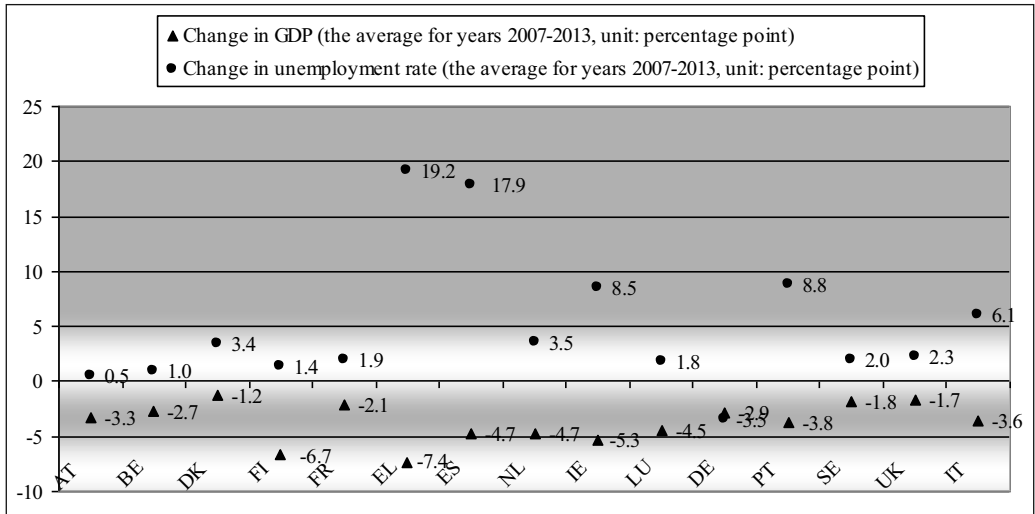
Figure 5. Regulations of the labor market and unemployment rate in the EU-15 in the period of economic crisis



Disclaimer: The OECD indicators of employment protection are indicators of the strictness of regulation on dismissals of employees on regular/indefinite contracts and the use of temporary contracts. For each year, indicators refer to regulation in force on the 1st of January. Data range from 0 to 6 with higher scores representing stricter regulation.

Source: own study based on OECD database: *Strictness of employment protection legislation: regular employment*, and Eurostat database: *Real GDP growth rate – volume (%)*.

Figure 6. Changes in the amount of GDP and unemployment rate in the EU-15 in the period of economic crisis



Source: own study based on OECD database: *Strictness of employment protection legislation: regular employment*, 4.04.2015 and Eurostat database: *Real GDP growth rate – volume (%)*.

These findings support the view that there is no positive correlation between flexible labor markets and unemployment in times of crisis. Countries with the lowest degree of labor market regulation in the EU-15 also did not defend themselves against the effects of the crisis, and their unemployment rates deteriorated. It can be said that during the economic crisis *flexicurity* concept has not fully worked. However, it is worth noting that the solutions it promotes, served and still serve to minimize its negative effects (Tasci, Zaman, 2011).

5. Conclusion

In conclusion, it can be said that the concept of *flexicurity* can be an effective solution in terms of economic and social policies of each Member State of the EU, where its solutions will safeguard the interests of both employers and employees. The implementation of the concept of *flexicurity* may be successful only if the condition of creating and maintaining a balance between the desired level of employment flexibility and social security is satisfied. Conditions of this balance are clearly set out by the theorists of the idea, as well as the benefits of its achievements.

The analysis verifying the effectiveness of *flexicurity* (on the example of the Danish model) from the point of its positive impact on unemployment during the economic crisis showed that it does not prevent the decrease of employment and increasing unemployment. The concept of *flexicurity* is therefore not a simple solution and an antidote for all the ills of the labor market, including problems in times of crisis and economic slowdown.

Bibliography

1. Andersenn T.M., Svarer M. (2007), Flexicurity – Labour Market Performance in Denmark, *CESifo Economic Studies*, Vol. 53, 3.
2. Cymbranowicz K. (2014), Flexicurity – A New Tool of for Human Recources Management [in:] *Knowledge – Economy – Society. Contemporary Tools of Organizational Resources Management*, (eds.) P. Lula, T. Rojek, Cracow, Foundation of the Cracow University of Economics.
3. Cymbranowicz K. (2014), Wpływ kryzysu gospodarczego na politykę rynku pracy i zatrudnienia w państwach członkowskich Unii Europejskiej [in:] *Kryzys Unii czy kryzys w Unii? Kierunki dyskusji nad przyszłością integracji europejskiej*, (ed.) H. Tendera-Właszczuk, Warszawa, Difin.
4. Gładzicka-Janowska A. (2013), Flexicurity – koncepcja i jej weryfikacja w okresie spowolnienia po 2007 roku, *Optimum. Studia Ekonomiczne*, No. 3(63).
5. Głabicka K. (2005), *Rynek pracy w jednoczącej się Europie*, Warszawa, Wydawnictwo Wyższej Szkoły Pedagogicznej TWP.
6. European Commission, *Europe 2020 – A Strategy for Smart, Sustainable and Inclusive Growth*, Brussels, 3.3.2010, COM(2010) 2020.
7. European Commission, *Mission for Flexicurity: Terms of Reference*, Brussels, 8.2.2008, EMPL/D/XPM/DD D(2008) 2899.
8. Commission of the European Communities, *Towards Common Principles of Flexicurity: More and Better Jobs through Flexibility and Security*, Brussels, 27.6.2007, COM(2007) 359 final.

9. Commission of the European Communities, *Working Together for Growth and Jobs. A New Start for the Lisbon Strategy*, Brussels, 2.2.2005, COM(2005) 24 final.
10. Conclusions European Council, Brussels, 17 June 2010, EUCO 13/10, http://ec.europa.eu/eu2020/pdf/council_conclusion_17_june_en.pdf.
11. Rezolucja Parlamentu Europejskiego z 29 listopada 2007 r. w sprawie wspólnych zasad wdrażania modelu “flexicurity”, P6_TA(2007) 0574.
12. Rymcza M. (2005), W poszukiwaniu równowagi między elastycznością rynku pracy i bezpieczeństwem socjalnym. Polska w drodze do flexicurity? [in:] *Elastyczny rynek pracy i bezpieczeństwo socjalne. Flexicurity po polsku?*, (ed.) M. Rymcza, Warszawa, Instytut Spraw Publicznych.
13. Tasci M., Zaman S. (2011), Unemployment after the Recession: A New Natural Rate?, *Economic Commentary*, No. 385.
14. Wilthagen T., Tros F. (2004), The Concept of “flexicurity”: A New Approach to Regulating Employment and Labour Markets [in:] *Flexicurity: Conceptual Issues and Political Implementation in Europe*, *Transfer: European Review of Labour and Research*, Vol. 10, No. 2.
15. <http://ec.europa.eu/social/main.jsp?langId=en&catId=958> [4.04.2015].
16. <http://ec.europa.eu/social/main.jsp?catId=102&langId=en> [4.04.2015].

Chapter 2

The Prospects of the Creation of Economic Unions in the Context of the Labour Productivity of the National Economies

Jurij Renkas

1. Introduction

Stability of labour productivity index shows that it is a good measure of the economic level achieved by a particular economy. Also it is a good basis to build the comparative ratings, as well as to monitor the development of individual states. This article focuses on determining the level of labour productivity of the economy of Ukraine, Belarus and the Russian Federation in comparison to the economies of other countries. It also suggests an original solution to the problems of creation of monetary unions.

2. Characteristics of labour productivity Q

The Q-value is the labour productivity, defined as the value of production that is attributable to the monetary unit of labour costs. It is a function of several variables: the technical equipment of labour, asset turnover, return on assets and the level of payment. The model of this function is well-researched and presented in previous researches (Dobija, 2009a, 2014b; Koziol, 2007; Renkas, 2014). In these studies there was shown that the functional relationship between the above given variables determines the level of productivity.

The starting point of the treatment of non-linear expenditure function of the process of production is the representation of the process of production in prices as a function of production costs (Dobija, 2007b, pp. 17-18):

$$P = K (1 + r) (1 + I) \quad (1)$$

where P is the value of production during the year in prices, K is the cost of production, r is the profitability I – profitability percentage, which is above average.

If the difference between the selling price (P) and cost of production (K) to denote the variable N (i.e., $N = P - K$), then in the above given equation the variable r will be presented as $r = N/K = P/K - 1$. The value of N/K is the profitability cost and is a function of two variables: return on assets $ROA = N/A$ indicator that determines the turnover of assets in relation to the cost of K . It is known (Dobija, 2007a), the average value ROA is at the level of 0.08 [1/year].

The replacement of I in equation (1) refers to the percentage of return that is above average. When there is the percentage of I , this means that the enterprise has a value, which is called the intellectual capital. Just then the percentage of profit exceeds its average value in the sector, and the intellectual capital of the enterprise can be calculated using the following equation:

$$N/(A + X) = 0.08 \quad (2)$$

that is,

$$X = N/0.08 - A = 12.5N - A \quad (3)$$

where A is the value of the assets of the company. This issue is described more particularly by D. Dobija (2003) in her work. Assuming that the turnover is represented by the value $w = K/A$, we get:

$$K = w \times A \quad (4)$$

Hence, $r = N/wA$, that is:

$$r = ROA/w \quad (5)$$

In its turn, the production costs include: W – the cost of labor and B – other expenses provided for the technology and production process, from which we get the equation:

$$K = W + B \quad (6)$$

The cost of materials, amortization and cost of services, which are the part of the value of B , we attribute to the assets. So, we get the amount of the assets in relation to the cost, reduced by the amount of accrued wages. Then $B/A = z$, i.e. $B = A \times z$, where z is the rate of annual asset utilization. So, now we can write the formula:

$$P = (W + A \times z) (I + r) (I + I) \quad (7)$$

where A – the assets according to the historical cost. After doing the appropriate mathematical transformations, the production cost can be represented as:

$$P = W \times [I + A/W \times z] (I + r) (I + I) \quad (8)$$

Because the cost of labour W is derived from the human capital ($W = u \times H$, where u is the percentage of human capital payment, and H is the total value of human capital of workers), after doing appropriate transformations, we obtain the following formula:

$$P = W \times [1 + A/H \times z/u] (1 + r) (1 + I) \quad (9)$$

Using the approximate equation: $1 + x \approx ex$, we can express the production function using the following formula:

$$P = W e^{r+I} [1 + A/H \times z/u] = W \times Q \quad (10)$$

$$Q = e^{r+I} [1 + A/H \times z/u] \quad (11)$$

where Q – value, which determines the productivity. The Q -value is the labour productivity, which we understand as the multiplier of labour cost that determines the cost of production. It is also the cost of production per monetary unit of the labor costs. The obtained functional relationship expresses the non-linear relationship between seven variables that determine productivity:

$$Q = \left[1 + \frac{A}{H} \times \frac{z}{u}\right] \exp\left[\frac{ROA}{w} + I\right] \approx \exp\left[\frac{Az}{uH} + \frac{ROA}{w} + I\right] \quad (12)$$

Comparing the above given formal description of production with existing patterns of production and economic growth, which are presented in works of M. Woźniak (2004, pp. 126-147) and other authors, it can be confirmed that this model is one-dimensional, as it indicated by the formula $P = W \times Q$, since labour productivity Q is a function of several variables, namely: the technical equipment of labour A/H , asset turnover, return on assets ROA and the level of payment.

On the basis of the function of production, we can use the model of production of the synthetic value of control M (Dobjija, Jędrzejczyk, 2007, p. 209). It will look like the following:

$$P = W \times e^{r+I} \left(1 + \frac{A}{H} \times \frac{z}{u}\right) \cong W \exp \frac{A \times M}{H} \quad (13)$$

where, M is a synthetic value which determines the level of management.

The variable M integrates the influence of all the above given variables that are associated with making decision. Namely, the variable asset turnover (z), the wage level (u), profitability (r) and the intellectual capital (I): $M = M(z, u, r, I)$. These variables are directly associated with current decisions of the company management.

The variable of control M is set using the system of accounting and reporting of the company. These two systems generate the data needed to measure it. Therefore, the above given non-linear function of production may be used to establish the level of the enterprise management. According to this model the value of the variable of control M can be set if there is a possibility of establishing the value of human capital of employees (H).

Since the establishment of the variable of human capital (H) is quite problematic, in this case you can replace the main indicator of wages L (here applies the relationship: $L = p \times H$ (with $p = 0.08$), which is determined by the value of H as a function of L). Therefore, the variable of human capital H is calculated using the sum of the basic wage L (i.e. $N = L/d = 12.5 L$), which is much easier to install in the accounting system of the enterprise.

After doing the appropriate transformations, we obtain the following equation:

$$P = W \times Q \cong W \exp \frac{A \times M}{H} = W \times e^{\frac{A \times P \times M}{L}} \quad (14)$$

From the point of view of the whole economy of the country all manufactured and marketed products consist of the total value of gross domestic product (GDP). Therefore, in the context of the above given equations in macroeconomic research it used the following relation:

$$GDPR = W \times Q \quad (15)$$

where $GDPR$ – is real GDP, W is the total wage fund in the economy, Q is the rate of labour productivity. That is, the rate of labour productivity in the economy is presented as the ratio of the total value of real GDP to the total wage fund in the economy.

In its turn, dividing equation (16) by the total number of workers in the economy, we get:

$$GDPRE = E \times Q \quad (16)$$

where, E is the average annual wage of employees, and $GDPRE$ – the cost of real GDP per worker. From the equation (16) we see that the preservation of the long-term development requires not a decrease, but an increase of the real purchasing power of the average wage and at the same time, at least, maintaining the achieved level of productivity. Also this shows that the rise in the wage rate can occur only under condition of preservation or growth of the rate of labour productivity Q .

3. Labour productivity as a determinant of real wage in the economy of Ukraine

On the basis of statistical data it is possible to calculate the labour productivity of a particular country and analyze its changes. Below are the calculations of the index of labour productivity for the economy of Ukraine, Belarus and the Russian Federation.

A method of calculation of the labour productivity for the economy of Ukraine, is based on the use of the general model setup of this indicator ($Q = \text{GDP}/W$). This is a direct calculation. The total amount of wages in the economy of Ukraine is calculated by multiplying the average annual wage in the country (per person) on the total number of all workers in the economy. To this amount is added the quota of social insurance and subtracted the percentage of wages that refer to the public sector. In Ukraine, as in the most countries, wages in the public sector are financed from taxes. From point of view of the human capital theory it is known that work is a transfer of the human capital of the worker to the objects of labour. This applies to each kind of the work and also individuals who work in the public sector. And this, in its turn, indicates that work in this sector is self-financed (Dobija, 2004, 2005, 2006, 2009b).

Therefore, despite the simplicity of the expression $Q = \text{GDP}/W$ calculation of this indicator on the basis of the available data is quite troublesome. Because wages in the public sector during the current economic policies are financed by taxes withheld from the wages of the workers in the private sector, to determine the correct rate of labour productivity Q it is necessary to reduce the total amount of wages in the economy (W) to the portion of taxes allocated to the financing of wages in the public sector. It is assumed that 15% of taxes paid by workers from wage fund

wages in the public sector (Jędrzejczyk, 2013). The revised wage rate is characterized as the rate of the wages, which can be used.

From the point of view of the above given, the rate of labour productivity determines the value of real GDP that is attributable to unit of wages which can be used. All statistics and quota of the real GDP were taken from the official website of the State statistics service of Ukraine (<http://www.ukrstat.gov.ua>). Table 1 presents the estimates of labour productivity of the economy of Ukraine in 2006-2013.

Table 1. The calculated rate of labour productivity for the economy of Ukraine in 2006-2013

Year	GDP, mln. UAH	Number of employees, thousand people (1)	The average size of the annual salary by one person, UAH (2)	The social insurance, % (3)	The total amount of wages in the economy W ($1 \times 2 \times 3$), mln. UAH	The total amount of wages in the economy W, adjusted by a percentage wages for the budget sector (*) ($W \times 0.85$), mln. UAH	Labour productivity (Q = GDP/W)
2006	544,153.0	20,730.4	12,492.0	1.372 (37.2%)	355,298.8	302,004.0	1.80
2007	720,731.0	20,904.7	16,212.0	1.372 (37.2%)	464,980.4	395,233.3	1.82
2008	950,503.0	20,972.3	21,672.0	1.372 (37.2%)	623,590.0	530,051.5	1.79
2009	914,720.0	20,191.5	22,872.0	1.372 (37.2%)	633,617.0	538,574.5	1.70
2010	1,085,935.0	20,266.0	26,868.0	1.372 (37.2%)	747,063.5	635,003.9	1.71
2011	1,316,600.0	20,324.2	31,596.0	1.372 (37.2%)	881,048.2	748,891.0	1.76
2012	1,408,900.0	20,354.3	36,300.0	1.372 (37.2%)	1,013,717.4	861,659.8	1.64
2013	1,410,609.0	20,404.1	39,180.0	1.372 (37.2%)	1,096,821.6	932,298.3	1.51

(*) it is assumed that 15% of taxes paid by workers from wage fund wages in the public sector.

Source: own elaboration based on statistical data from <http://www.ukrstat.gov.ua>.

From the theoretical analysis it is known that a decrease of the rate of labour productivity Q, in the context of its role in the formation of economic relations, is a very negative phenomenon. If such a situation arose, it is possible to state that the total amount of wages in the economy was too large in relation to the amount of real GDP.

As we can see from Table 1, the rate of labour productivity Q in Ukraine has decreased over the past few years. This means that with each subsequent year on 1 hryvnia of labour costs accounted a smaller amount of real GDP. For example, in 2013 this indicator was 1.51 (Tab. 1), whereas in developed countries (e.g. USA, UK, Germany) it exceeded 3.0 (Kozioł, 2007, p. 312).

This is a very negative trend in the economy of Ukraine, which demonstrates the necessity of taking prompt measures which will be aimed at changing the economic policy in the state.

4. The assessment of productivity in the economy of Belarus and the Russian Federation

A method of calculating the labour productivity Q for the economy of Belarus, is also based on the use of the general model setup of the given indicator ($Q = \text{GDPR}/W$). The process of its definition is held in the same manner as for the economy of Ukraine. The calculated rate of labour productivity of the economy of Belarus during 2006-2013 is presented in Table 2. The necessary statistical data were taken from the Internet page of the National statistics Committee of the Republic of Belarus (<http://www.belstat.gov.by/ofitsialnaya-statistika>).

Table 2. The calculated rate of labour productivity of the economy of Belarus during 2006-2013

Year	GDPR, mlrd. BYR	Number of employees, thousand people (1)	The average size of the annual salary by one person, BYR (2)	The social insurance, % (3)	The total amount of wages in the economy W ($1 \times 2 \times 3$), mln. BYR	The total amount of wages in the economy W , adjusted by a percentage wages for the budget sector ^(*) ($W \times 0.85$), mln. BYR	Labour productivity ($Q = \text{GDPR}/W$)
2006	79,267.0	4,470.2	6,985,992.0	1.35 (35%)	42,158,854.9	35,835,026.7	2.21
2007	97,165.0	4,518.3	8,328,540.0	1.35 (35%)	50,801,637.1	43,181,391.5	2.25
2008	129,791.0	4,610.5	10,418,028.0	1.35 (35%)	64,843,629.4	55,117,085.0	2.35
2009	137,442.0	4,643.9	11,779,008.0	1.35 (35%)	73,845,722.6	62,768,864.2	2.19
2010	164,476.0	4,665.9	14,607,600.0	1.35 (35%)	92,012,761.1	78,210,847.0	2.10
2011	297,158.0	4,654.5	22,797,600.0	1.35 (35%)	143,250,429.4	121,762,865.0	2.44
2012	530,356.0	4,577.1	44,113,200.0	1.35 (35%)	272,579,212.4	231,692,330.6	2.29
2013	636,784.0	4,545.6	60,736,800.0	1.35 (35%)	372,715,017.4	316,807,764.8	2.01

(*) it is assumed that 15% of taxes paid by workers from wage funded wages in the public sector.

Source: own elaboration based on statistical data from <http://www.belstat.gov.by/ofitsialnaya-statistika>.

As we can see from Table 2, the rate of labour productivity in the economy of Belarus is characterized by high stability. This, in its turn, indicates a high stability of the economic situation in this state. In addition, during 2006-2013, this figure was higher than the level of 2.0.

The rate of labour productivity in the economy of the Russian Federation (Tab. 3) established on the basis of statistical data of the Federal statistics service of the Russian Federation (http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/accounts). Its calculation during the 2006-2013 presented in the following table.

Table 3. The calculated rate of labour productivity of the economy of the Russian Federation during 2006-2013

Year	GDPR, mlrd. RUB	Number of employees, thousand people (1)	The average size of the annual salary by one person, RUB (2)	The social insurance, % (3)	The total amount of wages in the economy W (1×2×3), mln. RUB	The total amount of wages in the economy W, adjusted by a percentage wages for the budget sector ^(*) (W×0.85), mln. RUB	Labour productivity (Q = GDPR/W)
2006	36,134.6	69,168.7	127,606.8	1.3 (30%)	11,474,315.4	9,753,168.1	3.70
2007	39,218.7	70,770.3	163,120.8	1.3 (30%)	15,007,340.3	12,756,239.3	3.07
2008	41,276.8	71,003.1	207,481.2	1.3 (30%)	19,151,350.9	16,278,648.3	2.54
2009	38,048.6	69,410.5	223,650.0	1.3 (30%)	20,180,743.6	17,153,632.1	2.22
2010	39,762.2	69,933.7	251,426.4	1.3 (30%)	22,858,134.6	19,429,414.4	2.05
2011	41,457.8	70,856.6	280,430.4	1.3 (30%)	25,831,452.8	21,956,734.9	1.89
2012	42,882.1	71,545.4	319,546.8	1.3 (30%)	29,720,741.4	25,262,630.2	1.70
2013	43,447.6	71,391.5	357,504.0	1.3 (30%)	33,179,552.3	28,202,619.4	1.54

(*) it is assumed that 15% of taxes paid by workers from wage fund wages in the public sector.

Source: own elaboration based on statistical data from http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/accounts.

As we can see (Tab. 3) the index of labour productivity in the Russian Federation is characterized by a significant decline. Only for six years its size was reduced by half. It is a very negative tendency in the context of human capital theory and the equivalent wages.

Summarizing everything, it should be noted that the index of labour productivity Q can be effectively used in the analysis of the level and trends of the development of the particular countries. This, in its turn, makes it possible to build the appropriate ratings.

5. The tendencies of the development of individual countries in the context of labor productivity Q

The Table 4 shows the tendencies of development of individual countries in the context of labour productivity Q. The following countries were compared: Ukraine, Belarus, Russian Federation, Poland, USA, UK, Germany and China. The values of labour productivity Q in the US, UK, Germany, Poland and China are taken from (Dobija, 2014a).

Table 4. The comparison of labour productivity in the selected countries during 2006-2013

Countries/Year	2006	2007	2008	2009	2010	2011	2012	2013
Ukraine	1.80	1.82	1.79	1.70	1.71	1.76	1.64	1.51
Belarus	2.21	2.25	2.35	2.19	2.10	2.44	2.29	2.01
Russia Federation	3.70	3.07	2.54	2.22	2.05	1.89	1.70	1.54
Poland	1.88	1.99	1.85	1.87	1.90	1.94	1.96	1.99
Germany	3.31	3.38	3.39	3.28	3.17	3.16	3.35	3.37*
USA	3.46	3.47	3.56	3.50	3.45	3.65	3.62	3.66*
UK	3.20	3.52	3.44	3.08	3.10	3.22	3.28	3.31*
China	1.42	1.51	1.69	1.76	1.77	1.78	1.89	1.97*

*The estimated level of labour productivity Q.

Source: Dobija, 2014a. The data around Ukraine, Belarus and the Russian Federation, own calculations.

As we can see from the Table 4 the index of labour productivity Q is a good basis for interpreting the economic position of particular country compared to other countries. It can be used to characterize and compare the levels and tendencies of development in various countries. We should note that the trend of reducing the rate of labour productivity is maintained in the economy of Ukraine and the Russian Federation. This is quite a negative situation that demonstrates the need of urgent changes in the economic policy of both states. In its turn, the change in the index of labour productivity in the economy of Belarus during the period of 2006-2013 indicates a high stability of the economic situation in the country. Thus, making appropriate comparisons of labour productivity Q in the different countries we can install and monitor the trends of their development.

Also on the basis of the comparison of labour productivity Q of different countries we can make an important statement concerning the creation of economic unions. Such alliances can be created between countries that have close values of Q. Otherwise, there will be a situation that we could observe in the economy of Greece after the introduction of the Euro in this country. A country like Germany with the index of labour productivity 3.4 cannot be directly compared with Greece, where the figure barely exceeds 2.0. Therefore, only countries with a similar index of Q may form economic unions (Tab. 5). This question is described more particularly by M. Dobija (2014b) in his work.

Table 5. The grouping of countries in the context of productivity (2006)

1 < Q < 2		2 < Q < 3		3 < Q < 4	
Poland	1.88	Greece	2.08	Germany	3.33
Estonia	1.78	Slovenia	2.27	Switzerland	3.53
Portugal	1.85	Spain	2.17	UK	3.20
Slovakia	1.86	Italy	2.49	France	3.20
Czech Republic	1.87	Belarus	2.21	Belgium	3.35
Hungary	1.95			Netherlands	3.44
Ukraine	1.80			Denmark	3.43
				Russian Federation	3.70

Source: Dobija, 2014b, p. 170. The data around Ukraine, Belarus and the Russian Federation, own calculations.

The list of macroeconomic problems, that can be solved by using the indicator of labor productivity Q , is large enough and is given below. However, it should be noted that the equation $GDP = W \times Q$ is the basic model which allows to understand the nature of the formation of the GDP in the state. This model shows the role of wages, which creates demand, standard of living and the inflation rate and labour productivity determines the organization and management of manufacturing and administrative processes in the country.

Major macroeconomic problems, that are solved when you apply the indicator of labour productivity, include:

- the control of inflation. Inflation disappears by itself if the sources of their origin disappear. The main source of inflation is the issuance of money in isolation from labour. It also occurs when the number of people who earn a lot increases, and creates not equivalent products. Inflation depends on real productivity (Dobija, 2011a, p. 148) and will be equal to zero if the real and nominal efficiency is equal. Furthermore, the actual productivity cannot decrease. This situation is achieved when wages correspond to the value of labour;
- the control of the size of the public sector. This control involves determining the allowable amount of wages in the public sector (in the planned year), under the condition that Q is not reduced. The reduction of the sum of wages $W = ABC/Q$ by the sum of wages earned in the private sector determines the allowable size of wages in the public sector.

In addition to the above given interpretations it is also known the in-depth studies of the use of labour productivity in macroeconomics. Mieczysław Dobija in the context of the theory of labour productivity has set the allowable sum of credit for the economy (Dobija, 2010, pp. 177-179). The allowable amount of the loan, under condition of zero inflation, is presented as $W(Q - a)$, where a represents the part of wages that are combined to form deposits in commercial banks.

Marcin Jędrzejczyk, in his turn, using the theory of labour index has explored a model of estimating the average value of the exchange rate (Jędrzejczyk, 2013). From the research of this author arises that the average annual value of the exchange rate (ER) is a function of the square of parity of labour productivity.

Also, as it can be seen from Table 4, the rate of labour productivity Q is a good basis to build the important rankings of the states. With its help, we can characterize and compare the development levels of different countries. The stability of labour productivity indicator is a good measure of the achieved economic level.

The measurement of labour productivity allows us suggest an important hypothesis, which concerns human capital and wage. This hypothesis specifies that in order to achieve complete conformity of the legally established minimum wage with the minimum wage established on the basis of human capital theory, the rate of labour productivity needs to reach the level at least 2.8. In the economy, which is characterized by a measure of labour productivity at the level of 2.8 and above, the employee receives wages at a decent level, and this allows compensating the scatteration of the individual human capital. In Ukraine and the Russian Federation the labour productivity is only 1.51 and 1.54 in 2013. This situation shows the lack of conditions for the preservation of human capital in the economies of these states.

6. Conclusion

The category of productivity Q is widely used in macroeconomics. In Ukraine, as in the Russian Federation, this figure decreases over the past few years. This is a very negative tendency indicating the need to implement the urgent actions aimed at changing the economic policy of the state. The calculations show that in 2013 the indicator of labour productivity in Ukraine and the Russian Federation hardly exceeded the level of 1.5, while in Western Europe it exceeded 3.0. One of the ways to improve the situation should be paying the wage level in the state that would ensure their conformity to the value of human capital of workers. This problem requires the application of the theory of equivalent wages that corresponds to the value of human capital of workers. The achievement of complete conformity of the basic wage to the theory of human capital requires achieving a productivity level at least 2.8. In its turn, the change in index of labour productivity in the economy of Belarus during 2006-2013 allows to conclude this country has the high stability of the economic situation and its orientation of the equivalent payment of workers. Also on the basis of the comparison of labour productivity Q of different countries we can make an important statement concerning the creation of economic unions. Such alliances can be created between countries that have close values of Q. Therefore, only countries with a similar index of Q may form economic unions.

Bibliography

1. Dobija D. (2003), *Pomiar i sprawozdawczość kapitału intelektualnego przedsiębiorstwa*, Warszawa, Wydawnictwo Wyższej Szkoły Przedsiębiorczości i Zarządzania im. Leona Koźmińskiego.
2. Dobija M. (2004), Natura pieniądza i kapitału a samoregulacja w gospodarce towarowo pieniężnej [in:] *Zmiany instytucjonalne w polskiej gospodarce rynkowej*, (ed.) A. Noga, Warszawa, Wydawnictwo Polskiego Towarzystwa Ekonomicznego.
3. Dobija M. (2005), Financing Labour in the Public Sector without Tax Funds, *Argumenta Oeconomica Cracoviensia*, No. 4, <http://ssrn.com/abstract=956553>.
4. Dobija M. (2006), Bezpodatkowe finansowanie płacowych wydatków rządowych [in:] *Polityka gospodarcza i finansowa państw w procesie akcesji z Unią Europejską*, (ed.) A. Szplit, Kielce.
5. Dobija M. (2007a), Abstract Nature of Capital and Money [in:] *New Developments in Banking and Finance*, (ed.) L.M. Cornwall, New York, Inc., Nova Science Publishers.

6. Dobija M. (2007b), Teoria procentu i wzrostu kapitału [in:] *Gospodarowanie zasobami finansowymi w rozwoju organizacji*, (ed.) A. Szplit, Kielce, WSEiP.
7. Dobija M. (2009a), Analiza zbieżności gospodarki polskiej i ukraińskiej według zmian produktywności pracy [in:] *Konwergencja modeli ekonomicznych. Polska i Ukraina*, (ed.) M. Gabriel Woźniak, Kraków, Fundacja Uniwersytetu Ekonomicznego w Krakowie.
8. Dobija M. (2009b), *Teoria kapitału jako podstawa reformy systemu finansów publicznych. Nierówności społeczne a wzrost gospodarczy. Uwarunkowania instytucjonalne*, Zeszyt No. 14, Rzeszów, Wydawnictwo Uniwersytetu Rzeszowskiego.
9. Dobija M. (ed.) (2010), *Teoria pomiaru kapitału i zysku*, Kraków, Wydawnictwo Uniwersytetu Ekonomicznego w Krakowie.
10. Dobija M. (2011a), Abstract Nature of Money and the Modern Equation of Exchange, *Modern Economy*, Vol. 2, doi:10.4236/me.2011.20019.
11. Dobija M. (2011b), Labor Productivity vs. Minimum Wage Level, *Modern Economy*, Vol. 2, doi: 10.4236/me.2011.25086.
12. Dobija M. (2014a), Formation of the Integrative Currency Area, *SOP Transactions on Economic Research*, Vol. 1, No. 1, January.
13. Dobija M. (2014b), Geopolityczne przesłanki i ekonomiczne podstawy unii walutowej euro-py centralnej, *Studia i Materiały. Miscellanea Oeconomicae*, Rok 18, No. 1/2014, Uniwersytet Jana Kochanowskiego w Kielcach.
14. Dobija M., Jędrzejczyk M. (2007), Funkcja produkcji a wysokość wynagrodzeń premiovych, *Zeszyty Naukowe UEK*, No. 752, Kraków.
15. Dobija M., Renkas J. (2011), Zatrątnajna funkcja proiżwodstwa w formirowanii zarabotnojj platy na priedprijatii, *Zbirnyk naukowych prac CzDTU, Seria: Nauki ekonomiczne [Tekst]: Wypusk 27: W trzech częścicach: Część I*, M-wo oswoity i nauky Ukrainy, Czertkasy, CzDTU.
16. Jędrzejczyk M. (2013), *Kurs walutowy a ekwiwalentna translacja wartości ekonomicznych w gospodarce*, Warszawa, Difin.
17. Kozioł W. (2007), Wykorzystanie analitycznej funkcji produkcji w procesie motywacji płacowej, *Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, No. 752, Kraków.
18. Renkas J. (2014), *Produktywność pracy i wolnorynkowy kurs walutowy a rozwój ekonomiczny Ukrainy, Nierówności społeczne a wzrost gospodarczy*, Zeszyt No. 38, Rzeszów, Wydawnictwo Uniwersytetu Rzeszowskiego.
19. Woźniak M.G. (2004), *Wzrost gospodarczy. Podstawy teoretyczne*. Kraków, Wydawnictwo Akademii Ekonomicznej w Krakowie.
20. <http://www.ukrstat.gov.ua> [06.05.2015].
21. <http://www.belstat.gov.by/ofitsialnaya-statistika> [06.05.2015].
22. http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/accounts [06.05.2015].

Chapter 3

The Experience of Increasing the EU Energy Efficiency

Mykola Voznyuk

1. Introduction

Hence, the article presents the experience of implementing policies on energy efficiency, which proves that to achieve the best results, energy efficiency should be integrated into other areas of economic and social policies – from industrial development to transport, housing and communal services and the environment, that is, almost into all areas of the state. This study is an attempt to analyse energy efficiency standards, methods, measures on improving energy efficiency in EU. Also it is described EU documents on energy efficiency and Principles of the EU power engineering policy.

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

The task of priority energy development has always been among the main economic problems of the EU. Previously, this problem used to be solved by conducting adequate policy within individual states, but the growing problem of energy resources and competition as well as strengthening the link between politics and economy have brought up the issue of the EU energy security and made it all-European one.

2. Compulsory measures on improving energy efficiency

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

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

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

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

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

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

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

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

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

3. Stimulating measures on improving energy efficiency

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

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

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

tax of energy distribution. ENOVA SF also finances investment programs in the field of increasing energy efficiency of state and municipal buildings, regularly conducts information campaigns for the population about the need to save energy, conducts trainings and provides education.

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

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

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

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

4. Educational measures on improving energy efficiency

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

5. EU documents on energy efficiency

Generally, the EU applies an integrated approach to developing a legal framework for energy efficiency. The main types of legal documents used in the EU are: resolutions (mandatory for use by all the EU countries); directive (compulsory for member states in terms of results to be achieved and to be reflected in the national legal framework); decisions (mandatory only for individual entities); recommendations (not compulsory, are declarative documents).

One of the key EU documents on energy efficiency was the “Action Plan on Energy Efficiency for 2007-2020” (20-20-20 Plan). The main goals set for execution are: the relative energy consumption savings of at least 20% due to increasing energy efficiency compared to conventional scenario; achieving the mandatory 20% share of renewable energy in the EU total energy consumption by 2020; reduction of greenhouse gas emissions by 20% compared to basic level by Kyoto 1990 protocol; increase of energy efficiency in housing sector by 20%; modernization and energy efficiency in power generation sector due to efficiency increase by 20%; achieving by the EU countries 10% volume of combining electricity and gas transportation systems till 2010.

In June 2012 the EU Directive on energy efficiency (EU Directive 2012/27/EU) was adopted, which defines the whole set of measures to improve energy efficiency and contains the following: *reconstruction of buildings* – the member states of the EU have to do reconstruction of at least 3% of the heated buildings, occupied by public authorities; *increasing the efficiency of power systems* – power companies that fall within the scope of the Directive must achieve a certain level of energy efficiency of production processes and energy transportation (one of the requirements is the annual reduction (from 2014 to 2020) in total energy consumption by 1.5% compared to 2009 level; *power audit* – a wide range of organizations and companies, large power consumers which need to pass the power audit procedure (power audit procedure should be held not later than 3 years after the Directive ((2012) came into force and it should be held every 4 years by qualified power auditors); *increasing of heating and air conditioning systems efficiency* – by December 2015 all EU member states should complete and submit to the Commission the reports on the current situation and plans in the area of combined thermal and power generation in the field of heating and air conditioning; *development of financing mechanisms* – public authorities should develop and implement specific funding (investing) mechanisms of energy efficiency; *European and national objectives* – according to the Directive the overall aim concerning the reduction of energy consumption in the EU is the specified level of 20% by 2020, simultaneously, each of the EU member states should set its own goals to increase energy efficiency and actualize its strategies every three years (2014, 2017 and 2020) [4, c. 17].

Other important EU Directives relating to energy efficiency include: Energy Consumption of Buildings Directive (2002/91/EU-EPBD and 2010/31/EU), which anticipate the need for energy certification of buildings and introduce standards for energy consumption of buildings; Ecodesign Directive (eco-oriented products design – 2005/32/EU and 2009/125/EU), which establishes certain requirements for organic products that consume energy as well as measures to reduce energy consumption by such products and, consequently, to reduce the negative impact on the environment; Directives on Energy Labeling of Products (1992/75/EU and 2010/30/EU), concerning labeling and standardization of information on energy consumption of household devices (setting energy efficiency classes); EU Directive on increasing the share of using renewable energy sources (2009/28/EU).

The development of the EU energy policy is carried out by all the governing bodies of the EU, but the leading role is played by the European Commission. General Directorate for Energy and Transport deals with issues of operational nature. The tasks to reduce power supply by 13% by 2020, to raise the share of renewable energy sources to 20%, to reduce carbon emissions by 20% became specific EU guidelines in power engineering. In January 2007 the integrated package of actions was adopted which were intended to reform the energy sector and form a common energy policy. The main objectives defined by the new document were infrastructure development, reducing external vulnerability of the European Union countries, control of negative climate changes.

Attitude to nuclear power is changing. Now it is seen as an important factor in strengthening power security, researches on possibilities of using hydrogen as energy are being intensified. The conducted legal, informational and organizational work has provided experts with reasons to believe that mid-2007 was the time when formally liberalization of the EU market was completed. At the same time, it should be noted that the actual provision of free competition is far from completion as objective differences in formation and functioning of national energy markets that emerged in the process of economic development, counteract the formation of uniform prices. For example, in Estonia, people pay for consumed gas (net of tax) on average 195 Euros per 1 thousand cub.m, in Poland – 340 Euros in Belgium – about 400 euros, in Germany – 545 euros (average price for the EU – 475 Euros). A similar situation exists in the electric power engineering sector: prices range from 5.8 euro cents per kWh in Estonia to 9.10 cents in France or Spain, 14.3 cents in Germany.

6. Principles of the EU power engineering policy

It should be added that the EU energy power policy can be seen as the one having two vectors – internal and external. Within the Union there is some unity of understanding power engineering issues and ways to solve them, whereas such unity does not exist in understanding foreign economic strategy on power engineering issues. It is clear that the status quo was formed under the influence of a number of reasons. Firstly, it should be noted that the EU countries have different levels of power supply by their own energy resources. Norway and Denmark are comparatively provided with primary energy sources, Poland and the UK possess large reserves of coal, which reduces the energy problems acuteness, whereas for such countries as Austria or the Czech Republic energy imports issue is a matter of survival. Secondly, European countries differ in geographical location. States, located in the north of Europe, require more energy and have limited possibilities of using solar energy. Southern countries consume less energy in their household sector and have broader prospects for solar power development. In addition, geographic location of maritime countries makes it possible for them to solve the issues of energy supply using tanker fleet, which continental countries are deprived of. Remoteness of different countries to the states exporters of energy is also different. Thirdly, the EU countries differ by the structure and scale of production, which is also a factor in energy consumption. The level of production is also different, which means that there are different possibilities for energy efficiency. Fourthly, each country has shaped its energy balance based on established economic relations with other countries in this area. For example, Germany has five independent and quite reliable energy supply sources, while, the Czech Republic is limited to one. Fifthly, market relation and competition under which regulatory policy is limited are the mechanism of meeting energy needs in the EU.

7. Conclusion

Experience of the developed countries proves that a problem of energy-conservation is a complex problem: it is related to innovative changes of the production equipment, to the use of the newest technologies, the search of new energy sources, to the solution of environment protection problems etc. Solution of this problem is possible only under condition of conducting the purposeful state policy of energy-conservation, which on the whole is one of the criteria of assessing the international authority of a country, including assessing its investment attraction.

The basic principle of the EU power engineering policy is called convergence principle that provides for the division of responsibility between individual companies, national bodies of executive power and the EU as a whole, as well as the gradual convergence of individual countries and formation of a common European position.

Bibliography

1. *Pro svitovyi dosvid vprovadzhennya energozberigayuchykh zahodiv*, <http://www.minregion.gov.ua/zhkh/reforma-zhitlovo-komunalnogo-gospodarstva/pro-svitoviy-dosvid-vprovadzhennya-energozberigayuchih-zahodiv-u-zhitlovo-komunalnomu-gospodarstvi-991852>.
2. Shevtsov A.I., Barannik V.O., Zemlyani M.G., Ryauzova T.V. (2014), *Energoefektyvnist u regionalnomu vymiri: problemy ta perspektyvy*, Kyiv, Natsionalnyi instytut strategichnykh doslidzhen'.
3. *Vykorystannya energozberigayuchykh tehnologii v krajinah EU: dosvid dla Ukrainy. Analitychna zapyska*, www.niss.gov.ua/articles/262/.

Chapter 4

Dynamics of Exchange Rates in the Context of General-Equilibrium Model of an Open National Economy

Roksolana Holub

1. Introduction

There are many scientific papers devoted to the dynamics of exchange rates and theories that explain that dynamics, but there still remains the whole layer of information flow to be considered. The rejection of this fact significantly detracts understanding of the nature, causes and consequences of instability, which take place in the market of foreign currency assets. The approach to the analysis of exchange rate that is based on the assessment of national accounts identities for the open economy can be considered aggregate macro-level approach. This approach absorbs the majority of fundamental factors of exchange rates volatility (hereinafter – ER).

Examination of factors that determine the dynamics of exchange rates is an important subject of economics. The System of National Accounts (hereinafter – SNA) is the most common economic and statistical system of indicators that reflects economic activity in each country with a clear reference to the major internal and external macroeconomic aggregates that measure the level of economic development of the country. The comparison of ER and SNA indicators is logical, due to the fact that ER services the operations, which are reflected in SNA, in particular in the Balance of Payments (hereinafter – BOP). On the other hand, the BOP shapes the sizes of currency inflows and outflows (supply and demand for currency) through the export-import operations with goods, services, capital and financial assets.

In our opinion, the dependence of exchange rate dynamics on dynamics of indicators, which are integral and derivative of national accounts basic identity for an open economy, should be the primary focus in the context of understanding the macroeconomic fundamentals of the currency exchange rate.

To understand the object under research more profoundly we outlined the following proposals: to identify the relationship of exchange rates with indicators of Balance of Payments and international investment position of a country; to outline the theoretical and methodological foundations for the analysis of factors revaluation and devaluation of the national currency, based on the analysis of transmission mechanisms between sectors of the national economy, with the main

focus on the indicators of the external sector, which are reflected in the balance of payments and international investment position.

There are many scientific papers of famous foreign scientists, including Michael Mussa (1976), Jacob Frenkel (1976), Rudiger Dornbusch (1980), Sebastian Edwards (1988), Ronald MacDonald and Mark Taylor (1991), Jerome Stein and Paul Reynolds (1997), Jeffrey Williams, Ashok Bari and David Bailey (1998), Mario Bleier and Marko Skreb (1999), Kenneth Rogoff (2002), Dietrich Fausten (2005), Roberto Cardarelli and Alessandro Rebucci (2007), which are devoted to theoretical and methodological foundations and practical aspects of relationships between ER and SNA. Among Ukrainian scientists who examined the above relationships, we should name Yanina Belinska (2007), Oleksandr Dzyublyuk (2007), Viktor Shevchuk (2008) and Fedir Zhuravka (2008).

The following generally acknowledged and special methods of learning economic processes were used: methods of analysis and synthesis, abstraction, induction and deduction, explanation, mental experiment and graphical method.

2. Analysis of the dynamics of exchange rates

There are three sets of issues in analysis of condition, dynamics and development problems in open economies, among others scholars differentiate three blocks of the issues (Blejer, Skreb, 1999):

- the problem of measuring the flow of goods, services and capital;
- determining the factors that lead these flows and determine their intensiveness;
- mechanism for price regulation setting up, under which a country sells and buys products in the international market (terms of trade).

In our view, the transactions of open national economy with the rest of the world reflect two types of macro-level management decisions that should be the subject of prior attention:

- intertemporal decisions (how much to borrow from the rest of the world? Essentially, how much the economy may consume or invest more than the amount that is produced today, by borrowing surplus from abroad and paying for excess consumption/investment in the future? Or how much the economy can save or lend to the rest of the world in order to obtain additional financial benefits from such loans in the future?);
- intratemporal decisions (where to buy/produce (within national jurisdiction or outside) the goods and services that a country uses or the objects in which it invests?).

It is also necessary to determine to what extent the answers to the above two questions must remain static? And, actually, the analysis of the relationships between national macroeconomic accounts, in particular, the analysis of the external sector accounts, helps to answer the questions, and that makes for its special value in producing macroeconomic policy, and in the context of understanding the fundamental factors of currency exchange rate in a particular country.

The most important macroeconomic indicators include gross domestic product (GDP) and gross national product (Revenue/Income) (GNP (I)).

It is known that: $GNP(I) = GDP + \text{factor payments received from non-residents (usually our citizens)} - \text{factor payments sent to non-residents (usually citizens of another country)} = GDP + \text{net factor payments received from abroad from non-residents (System of National Accounts, 2008)}$.

Another macroeconomic aggregate indicator of national accounts system (hereinafter – SNA) is the gross national disposable income (GNDI). $GNDI = GNI + \text{current transfers from non-residents} - \text{current transfers to non-residents} = GNI + \text{net current transfers}$.

The external sector accounts of the SNA are crucial for the analysis of currency exchange rate factors. There are two types of external sector accounts – Balance of Payments (BOP) and International Investment Position (IIP) of the country.

External sector accounts consist of the following components (IMF's Balance of Payments Manual, 2007):

BOP – includes all economic transactions (flows) of the national economy with other countries. BOP includes only transactions between residents and non-residents, for clearly defined period of time (year, quarter, month), namely BOP is a reflection of the flow (transactions) but not the stock.

BOP – is a statistical report that at a certain point of time reflects the value of financial assets of the country's residents (including reserve), which are essentially claims on non-residents as well as residents commitment to non-residents. The difference between assets and liabilities of the country on a certain date is a net balance of BOP, which indicates either net claims or net liabilities of the country to the outside world;

The accounts of other changes in financial assets and liabilities is a statement of other flows (such as changes, caused by the revaluation) and can agree BOP data with BOP data for a certain period of time.

Important structural components of BOP are: current account (hereinafter – CuA), the capital account (hereinafter – CaA) and financial account (hereinafter – FA).

CuA saldo represents the difference between the amount of export and income to receivable and the amount of imports and income to pay. The value of the CuA balance is equal to the difference between savings and investment in the economy. Thus, information about the CuA balance is important for macroeconomic analysis and understanding of operations essence in the country because it represents money that the country receives from residents in exchange for their net exports, including net income from its factors of production used abroad.

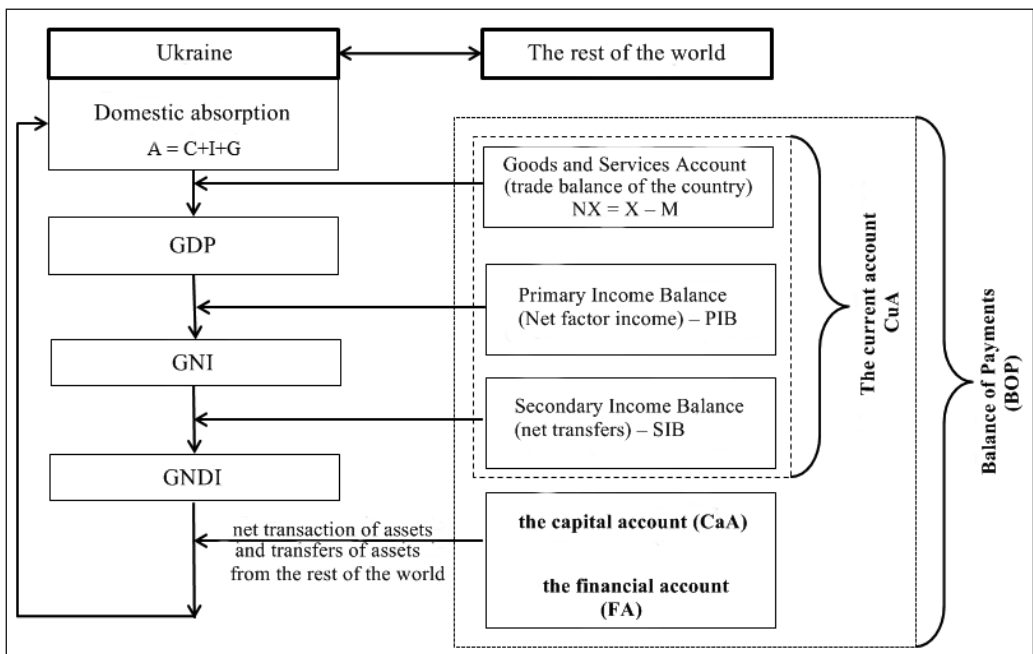
CaA is a flow of financial and non-financial assets and liabilities which arise outside transactions that occur within the current account. The purchase and sale of unproduced non-financial assets is recorded on this account (*sale of the land to a nonresident, registration of leases with non-residents, issuance of licenses to non-residents on using radio frequencies, purchase/sale of property rights*) that are not accounted in the CuA. Another part of CaA are the *capital transfers* (transactions when the rest of the world gives our country the resources to provide investments, but does not receive anything in return from the objects having economic value. These are natural transfers of non-financial assets, write-off of the external debt, compensation, etc.).

We can note that the total balance of CuA and CaA may result in either net lending (surplus) or net borrowing (deficit) in our country's economic relations with the rest of the world. From a conceptual point of view, this amount is equal to the net balance of FA. FA indicates the way profit is spent (how rapidly financial assets of our country are growing, while accumulating requirements to the rest of the world – the net purchase of financial assets) or the way deficit is financed (how rapidly our debt grows – net increase of debt obligations) in relations to the rest of the world. In other words, FA is divided into two classification groups that cover transactions with financial assets (assets) and operations with financial liabilities (liabilities).

The most important component of the FA that relates to the composition of assets is such a category as: reserve assets (international reserves – monetary gold, special drawing rights, reserve position in the IMF, foreign currency assets which consist of cash deposits, securities deposits and other requirements). Operations with FA are reflected in the balance of payments and, in view of the fact that these operations influence the balances of assets and liabilities, are also reflected in the integrated report of the international investment position (IIP). FA with the account of other changes in financial assets and liabilities (AOC) can explain the changes in the IIP for a certain period of time.

It should be noted that the external sector accounts (the right side of the chart in Fig. 1 demonstrates balance of payments basic accounts) are in close relationship with the domestic sector accounts of the national economy (the left side of the chart in Fig. 1 demonstrates the main elements of the national income/production).

Figure 1. The relationship between the main macroeconomic aggregates and balance of payments accounts



Source: own work.

The factor income in BOP (wages of employees, interest payments, royalties, income from equity, income from the rent or sale of land and other assets) are reflected in the account of primary incomes. The Primary Income Balance (PIB) represents the value of net factor income: it is the difference between factor income that the economy receives from the rest of the world and those of factor payments that it makes for the rest of the world.

The transfers (assistance, grants, money transfers of individuals working abroad) are recorded on account of secondary income. Secondary Income Balance (SIB) is the difference between

transfers that are derived from the world and those transfers that are committed by residents for the rest of the world. This displays the value of net transfers of the country.

All conclusions derived from the analysis of the external sector accounts are based on the absence of formal and informal restrictions on international and domestic operations, and on the fact that business units of market have free reaction to price signals and macroeconomic policies. It is also *expected that the country of the analyzed external sector does not effect the global interest rates* (classified as SOE “small open economies”, namely, it is a price-taker but not a price-maker and has a small share of world exports and imports of goods and services) (Mankiw, 2000).

The major accounts of SNA can be represented as accounting identities. Thus, according to the definition of GNP outlined above, it is possible to derive *the basic equation of macroeconomics* – identity of the national accounts for an open economy that is written as follows:

$$Y = C + I + G + NX \quad (1)$$

This equation presents the total amount of goods and services of a country (Y), submitted by the sum of consumption (C), gross accumulation of capital (investment – I), government purchases (G) and net exports (NX). The net export reflects the state of trade balance with the world and it is equal to the difference of prices exported from the country (X) and goods and services imported into the country (M):

$$NX = X - M \quad (2)$$

Under the condition exports and imports are equal and the index of net export is zero ($NX = 0$) means the balance in foreign trade is achieved. In this case GDP equals the sum of domestic spending ($Y = C + I + G$). A country that exports more than imports serves in the global market as a net exporter in the global market, and its GDP exceeds the amount of domestic spending. If the country imports more than exports means that it serves as a net importer in the world market and its internal expenditures exceed the output (the country consumes more than it produces).

It should be emphasized that the interpretation of parameter Y in the national accounts depends on what is included in the rate of NX. If the income of a resident of the country received him abroad is included in the index of net export, then $Y = \text{GNP}$. Conversely, if $Y = \text{GDP}$, then the income, derived by a resident abroad should not be included in the composition of NX. In the future we will proceed from the fact that $Y = \text{GNP}$. In other words, that the rate of net export includes all services which are appropriate for this country and outside factors of production – labor and capital (land ownership is included in the capital).

After a general definition of the main figures of payment balance we outlined above we have to look at a formal form of submission of the CuA and CaA, based on the identity of the national accounts. For this purpose we rewrite the identity (1) in the following form:

$$Y - C - G = I + NX \quad (3)$$

The left side of identity (3) is a national savings (S). In this way we obtain:

$$NX + (I - S) = 0 \quad (4)$$

The latest form of the identity of national accounts establishes a connection between the inflow of financial resources in the country ($I - S$), which results in the accumulation of capital and outflow of goods and services from the country (NX), which balances the capital inflow ($(I - S) = -NX$).

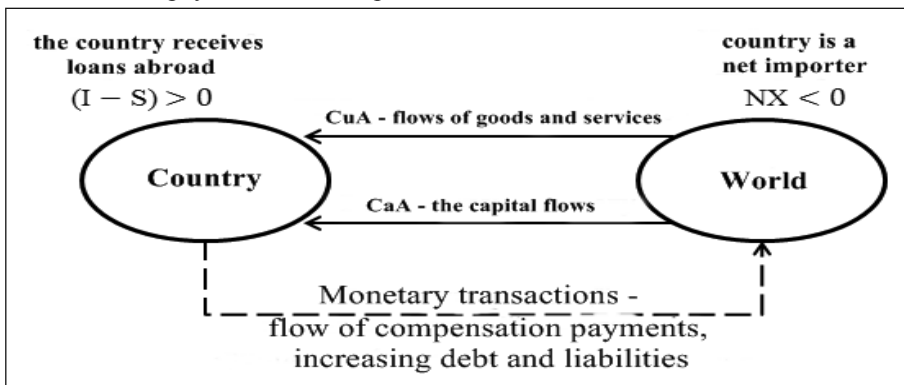
In the case when the investments are greater than the amount of domestic savings, their funding is done by the resources borrowed from the global financial markets.

The main identity of national accounts claims that CuA and CaA articles of balance of payments should be balanced, in order to make a zero saldo in the balance of payments, in other words, in order to make BOP balanced:

$$NX + (I - S) = \text{BOP (balance of payments)} = 0 \quad (5)$$

The condition of balancing the BOP does not prohibit its components deviate from zero – CuA deficit must be balanced by surplus balance of CaA and vice versa. If the balance of CaA is positive (investments are bigger than savings) – the country receives loans in the global financial markets, offsetting the deficit of CuA by these loans (see. Fig. 2 – country imports more goods and services than exports, net export is minus, the flow of goods, services and capital is directed from the rest of the world to the country, while the flow of compensation payments, payments, growing debt and obligations (financial transactions) – is directed from the country to the rest of the world).

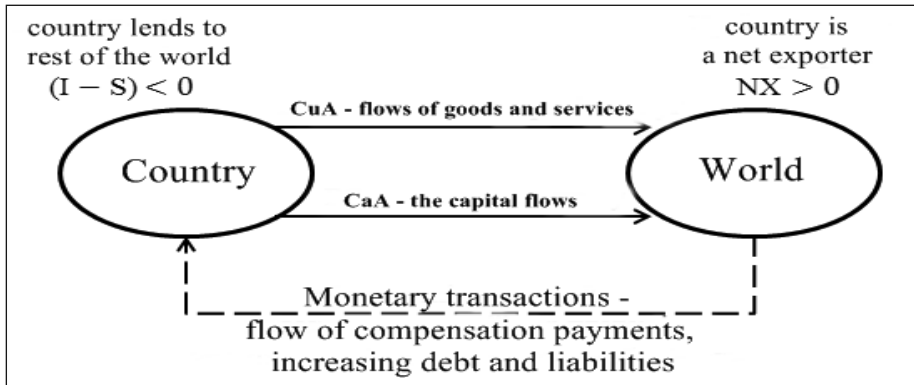
Figure 2. Balance of payments of net importer



Source: own work.

Otherwise, a graphical representation of net exporter's BOP will have the form presented in Figure 3.

Figure 3. Balance of Payments of net exporter



Source: own work.

The form of BOP, illustrated in equation (5), is incomplete because it does not include another macro-level category of accounting, which is called official (international) reserves (OR – official reserves/IR – international reserves).

Change of OR reflects an increase or decrease in government savings as a result of those operations, which are not included in the CaA, for example, as a result of buying/selling foreign currency, gold or other internationally recognized monetary assets by a central bank. The full form of balance of payments will be as follows:

$$NX + (I - S) + OR = BP = 0 \tag{6}$$

In this way, the saldo of the CuA is balanced not only by CaA saldo, but also by the sum of (CaA + OR). We remind that OR is an essential part of FA.

In the context of deepening the understanding of the macroeconomic fundamentals of currency exchange rate, it is advisable to pay more attention to the relationship between the elements of existing accounts of gross national income and balance of the CuA (current balance). Considering the relationships given schematically in Figure 1, as well as the identity of national accounts for an open economy, given in equation (1), we can write the formula for determining GNDI (Gross National Disposable Income):

$$GNDI = GDP (GNP) + PIB + SIB \tag{7}$$

where:

PIB – The Primary Income Balance;

SIB – Secondary Income Balance (net transfers).

Calculating GDP (GNP) by expenditures, the formula (7) can be written as follows:

$$GNDI = C + I + G + NX + PIB + SIB \tag{8}$$

The sum of the first three terms in the equation (8) is called absorption (domestic consumption) and denoted by the letter “A”, the following three terms of this equation form the balance of the CuA (CuB – current account balance). In this way, from the equation (8), we can derive the equation for the finding of the CuA balance:

$$\text{CuA} = \text{GNDI} - \text{A} \text{ or } \text{CuA} = \text{GNDI} - (\text{C} + \text{I} + \text{G}) \quad (9)$$

The equation (9) in the literature is often called as absorption approach to defining the current balance of the country.

The essence of the relationship outlined above is that the CuA deficit arises when a country spends on domestic consumption (absorption) more than it produces. Based on the described fact, we obtain the following couple of identical inequalities:

$$\text{CuA} < 0 \Leftrightarrow \text{GNDI} < \text{A} \quad (10)$$

$$\text{CuA} > 0 \Leftrightarrow \text{GNDI} > \text{A} \quad (11)$$

From the inequality (10) follows the obvious conclusion that to reduce the negative balance of CuA, the country should: increase the volume of production (use unused production capacity in the short period of time); to improve performance in the medium-term time; carry out the structural reforms in the economy to increase the competitiveness of domestic production in foreign markets in the long period of time; reduce the absorption rate (combination of relevant factors of reducing negative balance CuA is also possible).

We should opportunely note that the memorandum of the IMF always contains three basic requirements for a borrowing country: to move to a flexible exchange rate, to reduce the deficit of public finances and to carry out the structural reforms (*Ukraine and the IMF*, 2014).

Specifying the nature of national savings (S), outlined in (3), we define them through GNDI:

$$\text{S} = \text{GNDI} - \text{C} - \text{G} \text{ or } \text{S} = \text{GNDI} - \text{C}_p - \text{C}_g \quad (12)$$

where:

C_p – consumption, carried out by private institutional units of the economy (private sector);

C_g – consumption, carried out by public authorities (public sector).

The national savings can also be decomposed into private and public:

$$\text{S}_p = \text{YD}_p - \text{C}_p = (\text{GNDI} + \text{TR} + \text{INT} - \text{T}) - \text{C}_p \quad (13)$$

where:

S_p – private domestic savings;

YD_p – disposable income of private institutional units;

TR – government transfers to private institutional units;

INT – interest payments that the government pays to private institutional units on government bonds;

T – taxes that are paid by private institutional units to a state.

Government (state/public) savings can also be expressed by the following formula:

$$S_g = YD_g - C_g = (T - TR - INT) - C_g \quad (14)$$

where:

YD_g – disposable income of the government (state).

In this way, given the expansion of aggregate volume of national savings into the private and public components ($S = S_p + S_g$), and the formulas (13), (14), by which the amount of private and public savings is determined, we receive confirmation of the equation (12) due to the fact that when the equations (13) and (14) are added, the amount of government transfers, interest payments and taxes are mutually reduced:

$$S = S_p + S_g = \text{GNDI} - C_p - C_g \quad (15)$$

We'd like to note that in the calculation of the amount of national savings, given its expansion in private and public, we do not deduct investments (gross capital) from gross national income because capital expenditures are carried out in order to increase future productivity and not to meet current consumer needs.

In view of equations (3), (8) and refinements introduced by equation (12) and (15), we obtain another formula for calculating the CuA balance:

$$\text{CuA} = S - I = (S_p - I_p) + (S_g - I_g) \quad (16)$$

where:

I_p – private domestic investment;

I_g – national government investment.

The essence of the relationship outlined above is that the CuA deficit occurs when the gross domestic investment is greater than the gross national savings. Based on the described fact, we obtain the next couple of identical inequalities:

$$S < I \Leftrightarrow \text{CuA} < 0 \quad (17)$$

$$S > I \Leftrightarrow \text{CuA} > 0 \quad (18)$$

The deficit (negative balance) of the CuA in the context of the inequality (17) means that the excess gross capital formation (investment) is imported into the national economy, in other words – it is financed from abroad (due to the net borrowing from abroad).

The problem of “twin deficits” is often analyzed in the literature: it is a the situation in the economy when there are two deficits simultaneously – both the deficit of the CuA ($\text{CuA} < 0$) and the deficit of state (consolidated) budget ($S_g < I_g$). Understanding the reasons leading to the emergence of twin-deficits and finding ways of their solution is the significant factor of balancing the BOP, which in its turn will have a positive impact on the exchange rate of the national currency.

In order to provide the overview of the national economy equilibrium structure and the role of balance of payments in it we need to abstract from the details of individual market transac-

tions and to focus on the main elements. To do this, we hold a clear distinction between the three types of markets – market goods and services, market of financial instruments and money market. The basis for this distinction is that goods and services directly meet the needs of individual economic agents, while financial instruments may do it only indirectly because of the control over the goods and services, held by the holder of financial instruments (assets). The special status of money as a legal instrument of payment provides basis for further selection and consideration of the money market. By marking all non-monetary financial assets as “bonds” to clearly simplify it, we find that all transactions in the economy are related to goods and services, bonds, or money market in certain combinations. Transactions that take place within a homogeneous market, if they do not violate the rules of monetary exchange, do not have an essential value from a macroeconomic point of view (these transactions are only able to improve the welfare of the individual interested agents) because they are related with a change in ownership of similar objects, that leaves a permanence of the overall balance between supply and demand within the limits of a particular market.

The total equilibrium structure of the national economy is formed by the combination of these three kinds of markets with the addition of some restrictions. The rational behavior suggests that individuals should consider their budget constraints. The disposable income can be used for purchase of goods and services or for savings. Savings can be held in the form of real assets ($\Delta K \equiv I$: investments), in the form of financial assets (ΔB : bonds) or in the form of money (ΔM) (*The difference indicative « Δ » marks a change in a variable; in this case, the changes in stock of capital/investment (K), bonds (B), or money (M)*). Whereas any transaction involves the simultaneous purchase and sale of the same value, then all transactions aggregation in any particular market should give a zero balance. Transactions in each of the three markets may involve both residents (domestic sector) and non-residents (external sector). The differences in the behavior and economic motivation of private and public agents, the responsibility of government and public authorities for carrying out the economic policy provides basis for further division of the national economy internal sector into private and public sectors. On the basis of previously mentioned observations, the general equilibrium structure of the national economy can be represented as a matrix composed of three markets and three sectors (see Tab. 1).

Table1. General equilibrium structure open economy

Market \ Sector	Internal (private)		Internal (public)		External (BOP)
Goods and services	$S - I$	+	$T - G$	=	NX
	-		-		-
Financial assets (bonds)	ΔB_p	+	$-\Delta B_p$	=	ΔNF
	-		-		-
Money	ΔM	+	$-\Delta DC$	=	ΔOR
	=		=		=
	0	+	0	=	0

Source: Fausten, 2005, <http://www.eolss.net>.

The last column of Table 1 is a reflection of the balance of payments in the context of its components we examined above: the trade balance (net cross-border flows of goods and services), the balance of bonds (capital account) and cash balance (financial account).

The analysis of the last column of the table also shows that the BOP must be balanced: the last (southeast) cell matrix is always zero. Net exports (NX), or the trade balance are defined as difference between cross-border sales (exports: X) and purchases (imports: M) of goods and services. Purchase of bonds by non-residents increases stocks of foreign financial assets at the disposal of the national economy while selling national bonds to foreigners – reduces these stocks. The increase in net foreign assets of the country (ΔNF) is CaA balance or balance of net capital flows. And net cash flows of payments in the form of cross-border transactions in gold, foreign exchange reserves or IMF special drawing rights, changes the international (official) country reserves (ΔOR) scope.

Cross-border sales of goods, services and bonds in amounts that exceed their acquisition should be paid by internationally accepted means of payment (gold, reserve currency, debt securities of foreign countries, etc.). This is equivalent to net income from sales of goods and services to non-residents can be used to purchase debt claims to non-residents (bonds issued by governments of foreign countries) or to purchase international reserves:

Or

$$\begin{aligned} NX &= \Delta NF + \Delta OR, \text{ or} \\ NX &= \Delta NF - \Delta OR = 0 \end{aligned} \tag{19}$$

Table 1 illustrates also the basic relationships which bind the balance of payments and the national economy. Domestic goods and services not sold to domestic economic agents, private or public, are to be sold abroad. From another perspective, the amount of private savings (S) exceeding the private investment (I), and the amount of public savings – taxes collected (T) exceeding the government spending on goods and services (G) is the flow of net exports:

$$(S - I) + (T - G) = NX \equiv X - M \tag{20}$$

Similarly, internal private economic agents may increase the share of corporate bonds in their private investments portfolios ($\Delta B_p > 0$) or the share of state bonds (ΔB_g), or the proportion of bonds by non-residents (ΔNF). Moreover, in the third case there may be a purchase of foreign bonds by non-residents or repatriation national (corporate and/or government) bonds previously sold to non-residents.

$$\begin{aligned} \Delta B_p &= \Delta B_g + \Delta NF, \text{ or} \\ \Delta B_p - \Delta B_g &= \Delta NF \end{aligned} \tag{21}$$

Finally, changes in the money supply, which is owned by domestic private economic agents are generated either by national government or by foreigners. National Bank of the country

will issue fiduciary money in exchange for reserves, which consist primarily of bonds issued by the national government (DC), as well as in exchange for internationally recognized assets reserves (OR). Thus, the increase in private money supply (ΔM) which exceeds internal credit expansion (ΔDC) should be reflected in the growth of international (official) reserves held by the country (ΔOR):

$$\begin{aligned}\Delta M &= \Delta DC + \Delta OR, \text{ or} \\ \Delta M - \Delta DC &= \Delta OR\end{aligned}\quad (22)$$

The described above identity (19-22) is a detailed list of the structural relationship between BOP and national economies. For a positive trade balance ($NX > 0$), the country needs surplus national savings ($S_n \equiv (S - I) + (T - G) > 0$), *in other words, the country needs a net savings of the private* ($S - I > 0$) and public sector ($T - G > 0$). Combinations of surpluses and deficits in the private and public savings are also possible but the surplus of one of them has to cover the deficit of the other one ($\Delta M > 0$). Budget constraints of the domestic private sector require net private savings to be reflected in the growth of bonds in private savings portfolios ($\Delta B_p > 0$), *or the growth of monetary assets* ($\Delta M > 0$). Diversification of private savings is also possible – a combination of private and government bonds and cash assets as a form of depositing domestic private savings. If the trade surplus is associated with domestic public savings (i.e. surplus of the consolidated budget of the state), then the amount of surplus can reduce the supply of government bonds sold in the open market or directly to the central bank of the country. The latter, in its turn, reduces the volume of fiduciary money that the central bank will issue in exchange for domestic government bonds. In any case, the decrease in the volume of domestic bond issue or monetary issue must be accompanied by an equivalent increase in net reserves of foreign bonds and/or international (official) reserves. These changes in net holdings of foreign assets are compensators for positive trade balance of the country, that is, they are the fees received from residents in compensation for the flow of net exports of goods and services from our country to the rest of the world. In general, in order to maintain the balance of rows and columns of Table 1, changes in any cell are offset by changes in at least two other cells, which, in its turn, causes further compensatory changes to rows or columns of general equilibrium structure of the national economy.

The last column of Table 1 can be interpreted as the budgetary constraints of the external sector, or as limiting the balance of payments. Net imports of goods and services from abroad can happen only if foreigners are willing to accept promissory notes that residents and government offer as payment. These include revenue bonds and other financial instruments and foreign reserves. Conversely, the acquisition of net foreign assets (capital flight) are to be financed either through trade surplus or through international reserves spent on their payment. The essence of the balance of payments constraints is reduced to the principle of “equality in exchange”. For any period of time, the net transaction flows, which are formed by three main markets are in equilibrium (zero), regardless of behavioral motives that underlie this balance.

Thus, cross-border transactions are subject to symmetric restrictions, the essence of which is that the account balance of the external sector of the national economy must be equivalent in size and opposite in sign with the same balance of non-resident, which is the counterpart of our country in foreign economic activity. Export or acquisition of assets by one country generates corresponding imports or sales of assets in another country. In view of the above, the matrix

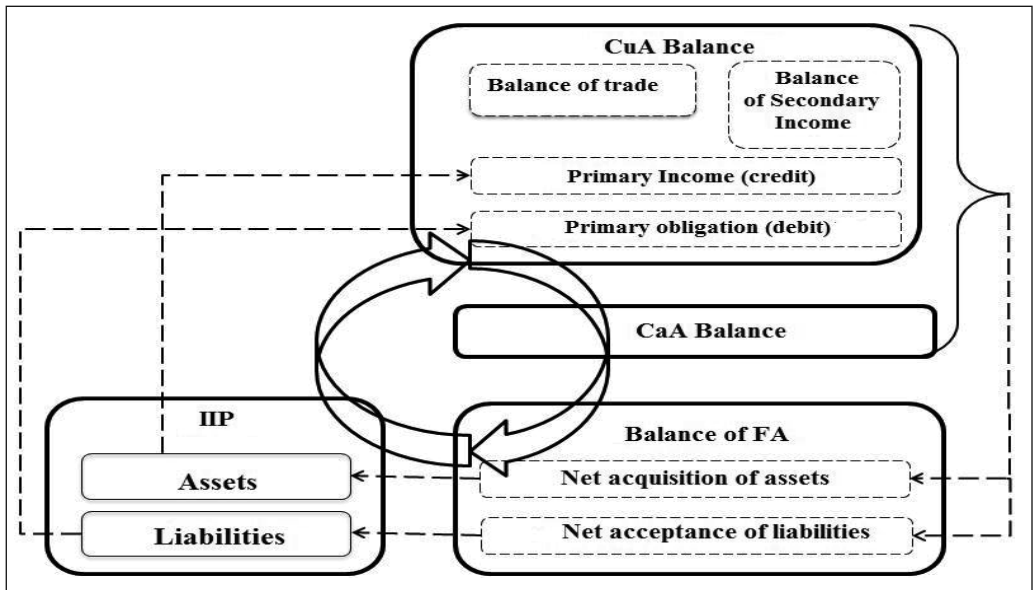
of the equilibrium structure of the economy can expand in the global economy, which the last column will illustrate the consolidated balance of payments of the world and serve as a reflection of aggregate global interdependence of open national economies.

In view of the special role of BOP in understanding the structural aspects of balancing national economy, it is useful to focus on the BOP main analytical perspectives in conjunction with the DEC countries.

The analysis of financing the balance of payments is a great demonstration of the validity of fundamental macroeconomic mechanisms and interactions, which in their turn are fundamental exchange rate factors.

Consider an economy which at a particular time has a certain stock of assets and liabilities, which level and composition is described in the IIP (Fig. 4). These assets and liabilities generate a stream of income and cash flows that are reflected in the initial credit (factor) income that is part of the CuA. The total value of these flows creates a balance of primary incomes CuA (PIB). In its turn, the balance of primary incomes, with the trade balance and balance of secondary income (SIB) define the CuA balance. If then we sum up CuA balance and CaA balance we'll get FR balance, which is the difference between net acquisition of assets and net acceptance of liabilities (the result of the latter, in its turn, increases the stock of either the assets or the liabilities of the country to the rest of the world). So the mechanism of circulation of assets and liabilities between the IIP, CuA, CaA and FA works.

Figure 4. Assets and liabilities mechanism of circulation to the countries in the rest of the world

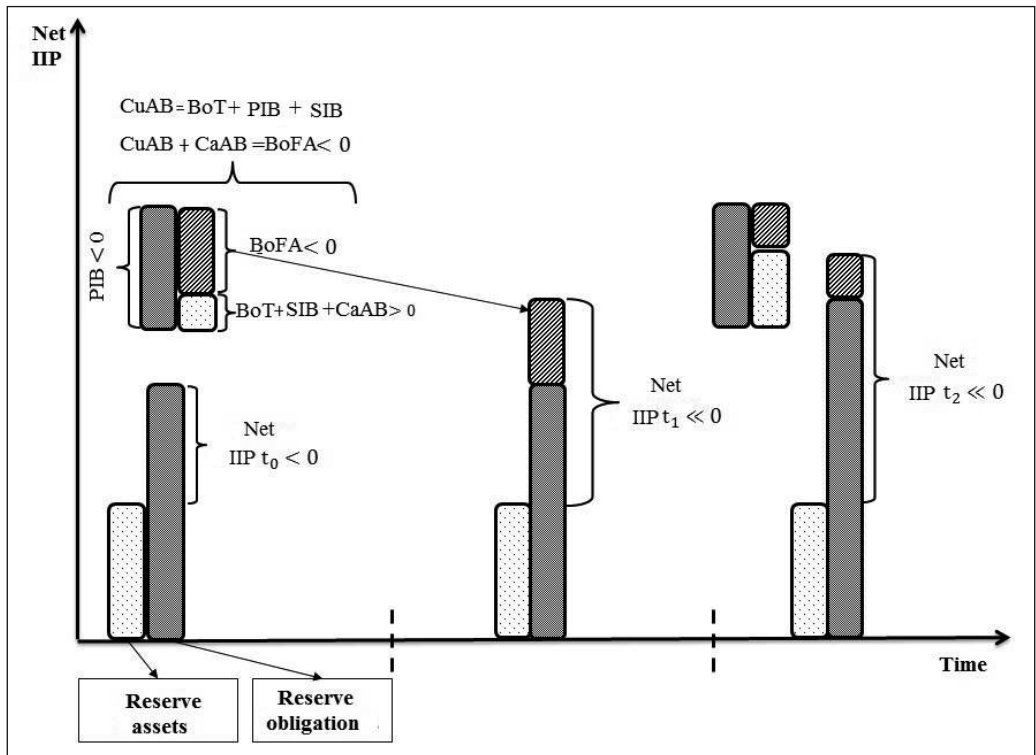


Source: own work.

Outlined in Figure 4 assets and liabilities circulation mechanism of the country to the rest of the world is useful to consider the dynamics to better understand the consequences of its actions. To do this, consider the situation in which a country at a particular time (t_0) has a negative

balance of net IIP (international liabilities stock exceeds international assets stock). In this case, even a positive trade balance (PTB), the secondary income balance (SIB) and the capital account balance (CaAB) may not be sufficient to pay all obligations that arise from a negative balance of net IIP. The result is that primary income balance (PIB) will have a significant deficit, CuA balance will be negative. To exit from this situation, the country will have to either sell the remainder of its international reserve assets or increase its liabilities to the rest of the world, or to do both simultaneously. At the end of the period under consideration the net IIP deficit will be even greater compared to the original. And even if in subsequent periods surplus PTB, SIB and CuAB increases, this increase may be still insufficient to cover the deficit of primary income (Fig. 5).

Figure 5. Dynamics of international liabilities accumulation



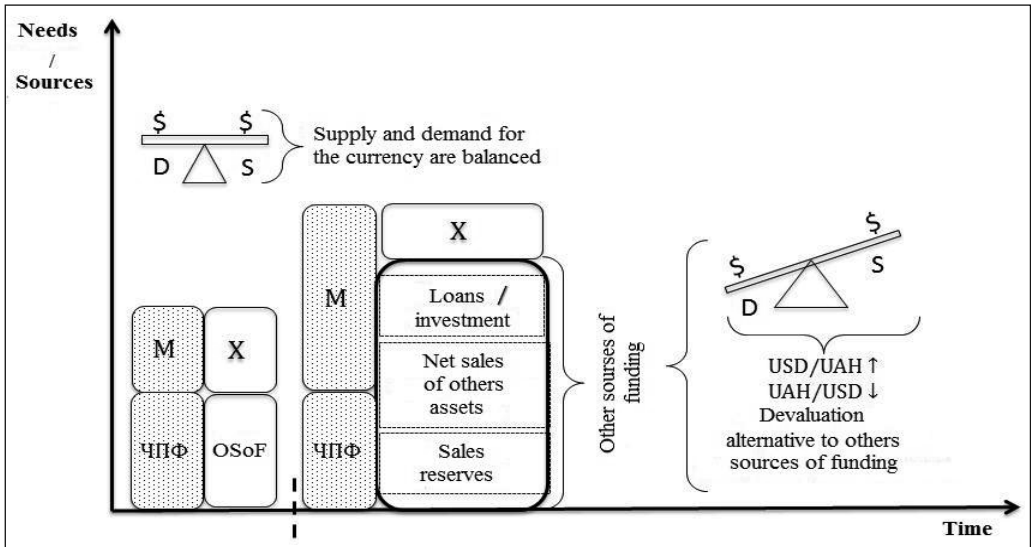
Source: own work.

For better understanding of the problems of BOP in relation to DEC it is advisable to reorganize its components by distinguishing those that generate the obligation on future paying off (repayments) and those that are sources of future funding these payments (repayments). The most important source of funding is the revenue from exports of goods and services (X). In the short period the mentioned funding source remains unchanged in scope (limitations are imposed by production capacities and demand the rest of the world). Import of goods and services (M) is the generator of the need in a source of funding. In the short period of time the value of imports is also inflexible (restrictions are imposed by tastes, preferences and purchasing power of con-

sumers of imports and the inability of the national economy to conduct rapid import substitution). In addition, the country has other net financing needs, which are derived from the net IIP.

Let's try again to consider the graphical interpretation of the relationship between BOP and IIP, but this time in the context of changes in exchange rates (Fig. 6).

Figure 6. Devaluation alternative to other sources of funding



Source: own work.

Suppose that in a certain period of time the country's needs in financing ($ChPF + M$) were balanced with its financing sources ($OSoF + X$). In the next period, imports (M) of the country significantly increased, while exports (X) decreased. Suppose that the country in the short period of time is not able to reduce the available funding requirements and its own import volumes and is not able to increase exports. To balance the difference in the financial needs of the country, it is necessary to increase other sources of funding ($OSoF$) for the appropriate amount, the main components are: loans in foreign financial markets and/or direct and foreign portfolio investments; net sales of other assets of the country; sale of international assets (reserves) of the country.

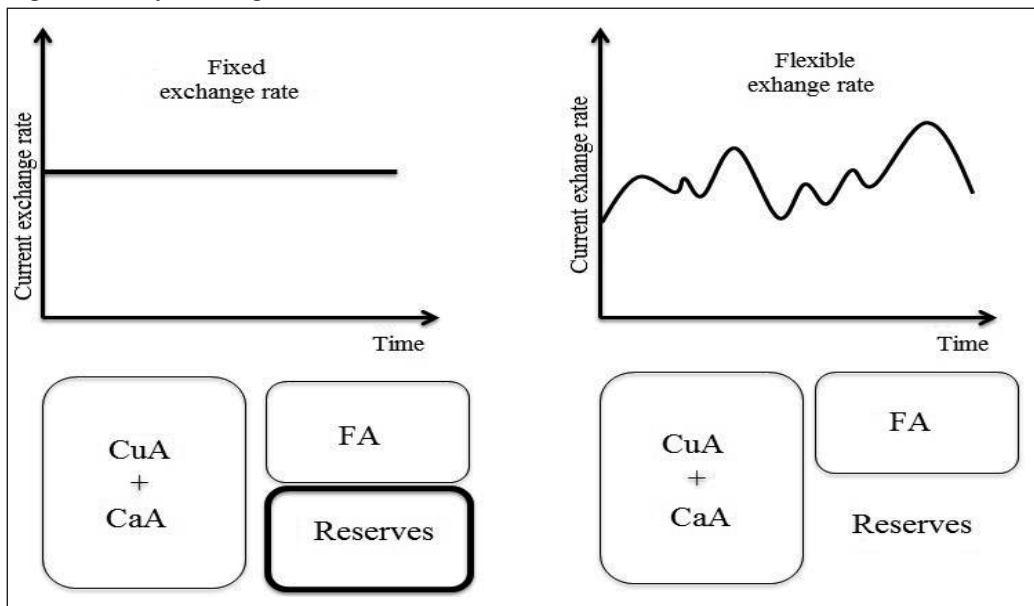
Our assumptions about the situation in the country can be even more difficult (example of modern Ukraine) – the country was given the lowest credit rating, there is unstable political situation in the country, part of the territory is involved in military operations. The consequence of these complications is the fact that the only sources of funding the needs in the short period of time remain net sale of other assets and international reserves of the country (additional loans from the IMF and other international organizations do not solve the problem, but only transfer its multiplicative negative consequences in future periods). Medium term alternative for the country is reducing imports while increasing the volume of exports.

Another consequence of the dramatic crisis for the country in question (for Ukraine) is that it is unable to borrow from foreign markets, it cannot sell its assets due to the extremely high political and military risks of investing in its assets and it has exhausted its own international

reserves. Under these conditions, unbalance of resource requirements and sources of their funding, the amount of foreign currency that the country needs significantly exceeds the available amount in its holdings. It means that demand for foreign currency significantly exceeds the supply. In other words, the relative demand for domestic currency compared to foreign one is substantially changing (not for the national one) – the exchange rate is significantly devalued (every time more and more units of domestic currency should be paid for one unit of foreign currency and/or vice versa). Thus, the DEC is another (in the circumstances – the most significant) tool of “financing” imbalances arising between income flows into and liabilities flows of the country to the rest of the world.

In conclusion, it is necessary to specify the role played by the exchange rate regime, which is determined by the central bank of the country, in terms of BOP, IIP, and therefore all structural cross-sectoral cooperation of the national economy. First of all, the exchange rate affects the amount of international reserves, monetary policy, and the way how the change in external markets conditions is reflected in the national economy. Figure 7 shows two opposing modes of exchange rate – fixed and flexible.

Figure 7. Daily exchange rate and international reserves



Source: own work.

Fixed exchange rate regime requires the central bank to maintain a predetermined level, the value of the national currency to that of a particular foreign currency, or to a group (basket) of foreign currencies. In case of excess demand for foreign currency, the central bank will have to sell an additional amount aiming at depreciation of foreign currency to the appropriate level of fixed exchange rate (to the full satisfaction of excess demand). The excess demand for foreign currency is generated by the country BOP. In the case where the total CuA and CaA value changes

are not balanced by equal FA changes international reserves are used to deal with the imbalances. In case of excess demand for foreign currency, the central bank is forced to sell reserves to rebalance (to equalize imbalances). Under these conditions, the exchange rate dynamics graph will look like a straight horizontal line (see Fig. 7).

In terms of a flexible exchange rate, the central bank does not exercise any intervention in the event of imbalances similar to the above, and therefore does not spend international reserves for these purposes. Negative imbalances that arise between the CuA and CaA on the one hand and FA on the other cannot be solved by the sale of international reserves. Under these conditions, the exchange rate dynamics graph will look like wandering wavy lines. In other words, the central bank allows excess supply and demand of foreign currency to be absorbed by corresponding price dynamics. There is also intermediate options exchange mode (dirty swimming). It means that the central bank carries out interventions and/or takes additional administrative sanctions on the foreign exchange market to smooth peak volatility of the exchange rate.

Thus, the exchange rate regime determines how fast the changes in the rest of the world (external prices, volume and availability of credit) will be reflected in the dynamics of the national economy real sector. All above said, in its turn, singles out another channel through which the external sector affects other sectors of the economy – through the financial account. This channel is particularly important for those countries for which it is open (free access to global financial markets purchase/sale of assets and liabilities). Wide access to international credit affects monetary sector of the economy, and through it the real sector, and as a result – the CuA. On the other hand, changes in monetary policy (higher interest rates) will be an additional factor in attracting capital into the country and thus will influence the financial account. Improving the investment climate in the real sector will attract direct investment into the country; the government can borrow in external markets, which also affect the state of the FA. Opposite policies will slow the inflow of capital into the country and significantly reduce the amount of financial account. All previously investigated information will foster a new wave of imbalances in the TB and IIP in the economy as a whole, negatively affecting the amount of international reserves (under fixed mode) and devaluing national currency (under condition of flexible exchange rate).

3. Conclusion

Important structural components of a country's BOP are: current account, capital account and financial account. BOP is a reflection of the flow (transactions) but not stock.

Balance of primary incomes (Primary Income Balance – PIB) is the difference between factor income that the economy receives from the rest of the world and those of factor payments that it makes to the rest of the world – represents the net factor country income. The balance of secondary income (Secondary Income Balance – SIB) is the difference between transfers derived from the world and those transfers that are made by residents to the rest of the world – represents the net transfers of the country.

The value of the CuA balance equals the difference between savings and investment in the economy, represents the money that the country receives from non-residents in exchange for its net exports, including net income from using factors of production abroad.

The overall balance of CuA and CaA may indicate net lending (surplus) or net borrowing (deficit) in our country's economic relations with the rest of the world. From a conceptual point of view this amount equals the net balance of FA.

FR represents how the surplus is spent or how the deficit is financed in relations with the rest of the world. The most important component of the FA which relates to the composition of assets is a category of reserve assets. The FA balance is the difference between net assets acquisition and net acquisition of the liabilities (the result of the latter, in turn, increases the stock of either assets or liabilities of the country to the rest of the world).

The international investment position is a statistical report for certain period of time (the difference between assets and liabilities in a country on a definite date is a net balance of IIP). Positive total balance CuA and CaA promotes the country's IIP reinforcing.

All conclusions derived from the analysis of the SNA are based on the absence of formal and informal restrictions on international and domestic operations. They are also based on the fact that the free market business units respond to price signals and macroeconomic policies. It is also expected that the country external sector which is the object of analysis does not affect the global interest rates (referred to "small open economies"). That means it is the price-taker but not the price-maker and it has a small share of world total exports and imports of goods and services.

Exchange rate could be another tool of imbalances leveling arising between income flows into the country and liabilities flows of the country to the rest of the world apart from export earnings, loans, investments, net sales of assets and international reserves. The ability of exchange rate to perform its specified role in the economy depends on what exchange rate regime the central bank chooses: fixed or flexible. Automatic imbalances level reflected in BOP components is possible only under the flexible exchange rate. However, a sudden and excessive volatility of flexible exchange rates also bears significant risks to the real economy in the short time horizon. Among other things, the exchange rate determines how quick changes in the rest of the world (external prices, volume and availability of credit) will be reflected in the dynamics of the national economy real sector.

Exchange rate and its regime in a country have a significant impact on BOP and IIP performance, therefore, on all cross-sectoral cooperation of the national economy. First, the exchange rate effects the amount of international reserves, monetary policy, as well as all transmission mechanisms that occur both in the aggregate inter-sectoral links in the structure of the national economy and the country's links (cooperation) with the rest of the world (regulates the way the change in external markets are reflected in the national economy).

Bibliography

1. Blejer M., Skreb M. (1999), *Balance of Payments, Exchange Rates, and Competitiveness in Transition Economies*, Boston, Kluwer Academic Publishers.
2. Cardarelli R., Rebucci A. (2007), *Exchange Rates and The Adjustment of External Imbalances, Spillovers and Cycles in the Global Economy*, World Economic Outlook (International Monetary Fund).
3. Dornbusch R. (1980), *Exchange Rate Economics: Where Do We Stand?*, Brookings Papers on Economic Activity.

4. Edwards S. (1988), Real and Monetary Determinants of Real Exchange Rate Behavior: Theory and Evidence from Developing Countries, *Journal of Development Economics*, <http://www.nber.org/papers/w2721> [02.12.2015].
5. Frenkel J. (1976), A Monetary Approach to the Exchange Rate: Doctrinal Aspects and Empirical Evidence, *Scandinavian Journal of Economics*.
6. Fausten D.K. (2005), Determinants of the Balance of Payments and Exchange Rates [in:] *International Economics, Finance and Trade, Encyclopedia of Life Support Systems (EOLSS)*, Developed under the Auspices of the UNESCO, <http://www.eolss.net> [02.12.2015].
7. *IMF's Balance of Payments and International Investment Position Manual, Sixth Edition* (2007), <http://www.imf.org/external/pubs/ft/bop/2007/bopman6.htm> [02.12.2015].
8. MacDonald R., Taylor M. (1991), Exchange Rate Economics: A Survey, *IMF Working Paper*, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=884894 [02.12.2015].
9. Mussa M. (1976), The Exchange Rate, the Balance of Payments and Monetary and Fiscal Policy under a Regime of Controlled Floating, *Scandinavian Journal of Economics*.
10. Rogoff K. (2002), Dornbusch's Overshooting Model After Twenty-Five Years, *IMF Working Paper*, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=879418&download=yes [02.12.2015].
11. Stein J., Allen P. (1997), *Fundamental Determinants of Exchange Rates*, Oxford University Press Inc.
12. System of National Accounts (2008), *European Communities, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations and World Bank*, <http://unstats.un.org/unsd/nationalaccount/sna2008.asp> [02.12.2015].
13. Ukraine and the IMF (2014), *Letter of Intent, Memorandum of Economic and Financial Policies, and Technical Memorandum of Understanding*, www.imf.org/external/np/loi/2014/ukr/081814.pdf [02.12.2015].
14. Williams G. (1998), Are Exchange Rates Determined by Macroeconomic Factors?, *Applied Economics*, <http://www.tandfonline.com/doi/abs/10.1080/000368498325813#.VJ7sHUj0A> [02.12.2015].
15. Белінська Я. (2007), *Валютно-курсове регулювання, проблеми теорії та практики*, монографія.
16. Дзюблюк О. (2007), *Валютна політика, підручник*.
17. Журавка Ф. (2008), *Валютна політика в умовах трансформаційних змін економіки України*, монографія.
18. Манків Г. (2000), *Макроекономіка*.
19. Шевчук В. (2008), *Платіжний баланс, економічне зростання і стабілізаційна політика*.

Chapter 5

The Intensity of Asset Productivity and Recovery in Industrial Enterprises

Stanisław Młynarski, Jarosław Kaczmarek

1. Introduction

An analysis of economic structures allows for assessing the extent of specialisation and proportions between their particular components as well as for evaluating the course of production processes, their effectiveness and the impact of technical advancement. In the economies which undergo a systemic transformation process great significance is attributed to restructuring which conditions growth at the microeconomic level. Many authors believe that changes in Poland since 1990 have been radical in character because of their scope, depth and pace. This view requires an in-depth analysis and empirical verification. Such an analysis is carried out in this paper from the perspective of micro and mezo-economic changes as well as one of the significant economic areas – fixed asset management.

The most significant economic processes include production processes based on the technology and engineering of the means of production. They constitute productive corporate assets and as technical means they serve the fundamental purpose of company activities – production. The achievement of this objective is described by means of a number of technical issues. The most significant role is played by the economics of the use of assets.

The analysis focuses on the measurement and assessment of effects of fixed asset management (recovery) processes, cost productivity and technical advancement (the replacement of living labour with objectivised labour). These factors have an impact on restructuring changes at the level of enterprises, groups of entities (components of PKD – sections of Polish classification of economic activities) and whole economy.

The paper verifies the hypothesis concerning the radical character of changes in the Polish economy since 1990 in one of the significant areas of restructuring – productive asset management. The object of the research are industrial companies and their groups (components of PKD).

2. The fixed assets management

The economic concept of fixed capital may be discussed from the material and financial point of view. In the first approach fixed capital is referred to as fixed assets. According to the golden balance sheet rule, fixed capital is the financial equivalent (a source of financing) of the company's tangible fixed assets. Considering the fact that the process of engaging capital as fixed asset components is referred to as investments, fixed capital, in the financial approach, may be referred to as the company's investment capital and viewed as the total financial resources earmarked for the manufacture or purchase of tangible fixed asset components (Borowiecki, Czaja, Jaki, 1997, p. 55).

Fixed assets are the major components of the industrial company's tangible fixed assets; they serve production purposes for longer periods of time, retaining their natural physical condition, so they do not constitute a material part of the manufactured goods (Goldmann, 2006, pp. 146-182). They are subject to wear and tear (in a physical and moral/economic sense), and they gradually assign a portion of their value to the manufactured products; they are recovered for a number of times after partial use and are subject to one-time full recovery after being worn out (Borowiecki, 1989, pp. 8-9).

Fixed assets, the components of corporate material and technical resources, perform different technological, production, organizational and economic functions. Therefore, the efficient organization and management of fixed assets conditions the proper functioning of business entities (Janasz, 1991, pp. 14-15). Fixed asset management, understood in a broad sense, includes all technical, organizational and registration issues related to the acquisition, use, liquidation and recovery of fixed assets (Kaczmarek, Młynarski, 2006, pp. 259-274). Fixed asset management aims to increase production and reduce company costs with a minimal use of fixed asset resources (Borowiecki, 1993, pp. 81-84).

3. The use of fixed assets

The use of fixed assets is a part of the process of managing assets which begins when they are handed over to the user in good state of repair to be used effectively and serve the purpose they are designed for. The process ends when assets are transferred to technical service staff for the recovery of their original efficiency or for liquidation. The elements of the process of use – in a dynamic approach – are the processes of the use of fixed assets and the periods during which they wait to be used (Wodniak-Sobczak, 1994, p. 14).

In the process of business activities companies should seek solutions which ensure cost reductions and prevent excessive use and decapitalization. This approach to fixed asset management is reflected in developing an appropriate corporate strategy (Iwin, Niedzielski, 2002, p. 110). A strategy for the use of production facilities should identify an appropriate proportion between the time of use and breaks in the use of assets. A compromise must be reached between maximum levels of productivity and minimum costs of use. The right decisions lead to the optimal use of assets. An effective strategy for the use of fixed assets should be however appropriately correlated with the company's overall development strategy.

The general principle of rational economics suggests that rationality occurs when the available resources lead to a maximum level of the required structure of production output (goods or

services) (Borowiecki, Czaja, Jaki, 1997, pp. 72-73). Therefore, the rational use of fixed assets can be achieved on the basis of two methods – through maximizing the value of production and minimizing the costs of applying the available assets to generate production output. In the first approach the degree of achieving the set tasks is measured by the productivity of fixed assets as the relation of the achieved volume of production to the volume of fixed assets (Lewandowski, 1997, pp. 22-24).

The issue of the productivity of fixed assets is frequently discussed as an area of macroeconomic analyses from the point of view of the pace of an increase in production assets and its impact on employment and labour facilities. It is proven that the fixed asset productivity ratio is the most appropriate measure of the optimal use of fixed assets.

In this context optimal fixed asset management is not a category identical with fixed asset management or its productivity but rather its primary and synthetic measure. Therefore, an analysis of the company's use of fixed assets is confined to the analysis of the costs of the use of fixed assets and the financial result related to the use of fixed assets (Iwin, Niedzielski, 2002, p. 118).

4. The reproduction of fixed assets

The achievement of the company's main targets is a decision-making process which ensures maximum benefits in a given environment through the use of the appropriate volumes, structure and quality of fixed assets (Janasz, 1991, pp. 238-241). It implies the necessity of adopting an appropriate asset reproduction policy (Młynarski, Kaczmarek, 2012, pp. 191-204).

The fixed asset reproduction cycle is a more specific area than the concept of the circular flow of assets. As an economic indicator it specifies a period of time during which the utility value of fixed assets is reproduced (Janasz, Urbańczyk, Waśniewski, 1988, pp. 114-115). It expresses the speed and periodical character of the replacement of worn means of labour, i.e. the periodicality of the full recovery of fixed assets in a new natural form.

The following concepts may be defined: the average reproduction cycle of the entire set of fixed assets and the individual reproduction cycle of the particular components. The average fixed asset reproduction cycle, unlike the individual cycle, does not lead to the fluctuations in the utility value (Wodniak-Sobczak, 1994, pp. 118-120).

There is a qualitative difference between the concept of the reproduction cycle and the period of the use of fixed assets. Generally, the reproduction cycle and the period of use are equivalent concepts in terms of quantitative indicators with respect to the separate components of fixed assets in the process of extended reproduction. These concepts, however, have different qualitative dimensions.

The reproduction cycle represents a dynamic process of developing fixed assets, a transfer from one qualitative dimension to another, and it characterizes the continuity of reproduction. It is an indicator which expresses the speed of fixed asset reproduction. The period of use, on the other hand, is a static concept – it does not indicate the continuity of reproduction, merely specifying the period of the use of fixed assets in their specific natural form. Therefore, the fixed asset's individual reproduction cycle should be compared with the individual period of use. With regard to the company's entire fixed assets, considerable differences occur between the average actual periods of use and reproduction cycles (Młynarski, Kaczmarek, 2009, pp. 205-217).

The length of the reproduction cycle is a general measure of production intensification. The acceleration of the process of reproducing the available fixed assets, i.e. reducing the length of the reproduction cycle, increases production effectiveness and is based on accelerated technological advancement. However, excessively shortened reproduction cycles may lead to relative losses due to the ineffective use of high quality available assets (Wodniak-Sobczak, 1994, p. 124). Consequently, it may be assumed that minimising the reproduction cycle is generally desirable, bearing in mind, however, that the functioning of specific mechanisms prevents economically unjustified short cycles. These mechanisms include the appropriate levels of extended reproduction and liquidation ratios; the latter one may be determined in such a manner that the length of the reproduction cycle remains constant independently of the rising or falling level of the extended reproduction ratio.

5. The measurement of the assets productivity and recovery of production fixed assets

In the economies which undergo a systemic transformation process great significance is attributed to restructuring which conditions growth at the microeconomic level. Many authors believe that changes in Poland since 1990 have been radical in character.

The term restructuring in the context of corporate goals and expansion can be considered as a process of reconstructing or transforming structures – it implies structural changes in material resources which increase the significance of all structural components that represent modernity and greater effectiveness as compared with existing solutions (Karpiński, 1986, p. 20). Also, in the Polish economy it indicates one of the levels of transformation (Hübner, 1992, p. 153), and as a systemic reconstruction or modernisation, it is a complex, multi-level and long-term process (Singh, 1993, p. 27; Durlík, 1998, p. 47).

A restructuring process as a corporate expansion method (Stoner, Freeman, Gilbert, 1997, p. 266) is designed to achieve two objectives (Sapijaszka, 1996, pp. 209-217): to eliminate differences between development trends in the business environment and a company's own development policies, and to transform a company, enabling it to keep pace with external changes and even to be ahead of these changes (Porter, 1985, pp. 50-62; Slatter, 1984, p. 89; Copeland, Koller, Murrin, 1997, p. 33).

An assessment of restructuring activities can be considered from the perspective of achieved results, their effectiveness and impact as well as specific characteristics (partial effects). The partial effects of restructuring, e.g. increased productivity, technical advancement and changes to the value and structure of production resources, determine corporate value and the effectiveness of company activities (Hurry, 1993, pp. 69-54; Copeland, Koller, Murrin, 1997, p. 304; Siudak, 2001, pp. 114-117).

Restructuring is quantified here on the basis of a synthetic (multi-property) measure and its components (Kaczmarek, 2012, pp. 103-114), which explains and values four basic processes – technological advancement and the replacement of living labour with objectified labour, the process of creating the capital and asset productivity structure (as the reversed sum of partial capital intensity values) as well as the productivity and recovery of production fixed assets. The last two processes, which describe and affect restructuring activities at the mezostructure level, are analysed, discussed, measured and assessed in the further part of the paper.

The assessment focuses on the industrial mezostructure¹ and its components – PKD groups of companies (the Polish classification of activities)². An analysis concerned to a selected group of companies (over 14 thousand) for long time series (1990-2014)³. The conducted ranging procedure is a basis for assessing the structural durability of the analysed structure as well as the classification of its mezzo-aggregates – the sections of PKD (726 observation units).

The analysed productivity of total assets (PM) is divided into fixed asset (M_T) and current assets components (M_O) in such a way that the reversed sum of their capital intensity $\left(NS = \frac{M_T}{PS} + \frac{M_O}{PS} \right)$ equals the productivity of total assets. It allows assessment of the impact of the two capital intensity values on the situation of mezostructure entities (dispersion) and the central point of the mezostructure.

$$PM = \frac{PS}{M}; PM = \frac{1}{NS}; NS = \frac{M_T}{PS} + \frac{M_O}{PS} \quad (1)$$

The process of reproducing fixed assets is significant for creating corporate material resources, especially in the case of an industrial company. The separation of fixed asset reproduction ratio (OM_T) and fixed asset outlay ratio $\left(\frac{N}{M_T} \right)$ as well as fixed asset use ratio $\left(\frac{ZU}{M_T} \right)$ in the process of business activities (ZU is expressed by depreciation Am) shows the dynamics of the process and the impact of the two factors on the reproduction process.

$$OM_T = \frac{N}{Am} = \frac{N}{M_T} \div \frac{ZU}{M_T} \quad (2)$$

The analysed areas include the dispersion of mezostructure entities, the position of the central point⁴ and its changes affected by the defined factors. The ranging method⁵ is applied to assess the frequency and duration of positions of mezostructure entities on the ranging list. The average

¹ The notion of industrial activity includes PKD sections: B – Mining and quarrying, C – Manufacturing, D – Production and supply of electricity, gas, steam, etc.

² According to the PKD 2007 classification, 30 PKD industrial groups are analysed, and the collected data describe business entities – non-financial companies with more than 10 employees, which meet statistical disclosure obligations (referred to as F-01/-01, and F-02 and SP) – 14,382 entities as at the end of 2014. Until 2007, PKD 2004 had been in force, which used different criteria of classification. Consequently, in 1990-2007, PKD includes 27 groups composed of 14,447 companies (as at the end of 2007). Analysed industrial enterprises had in 2014 the share of value added in the entire group of companies (production, trade and services) in the amount of 54.1%, and this in turn share in the institutional sector enterprises in Poland at 88.7%.

³ For comparative purposes, all figures represent the values for 2007 according to two classifications – PKD 2004 and PKD 2007. All tables and figures in the paper refer to a previously specified data source of official statistics and they are authors' research.

⁴ The central point of economic mezostructure is not expressed by average result values – it refers to the mutual relations between factor values (“super object”).

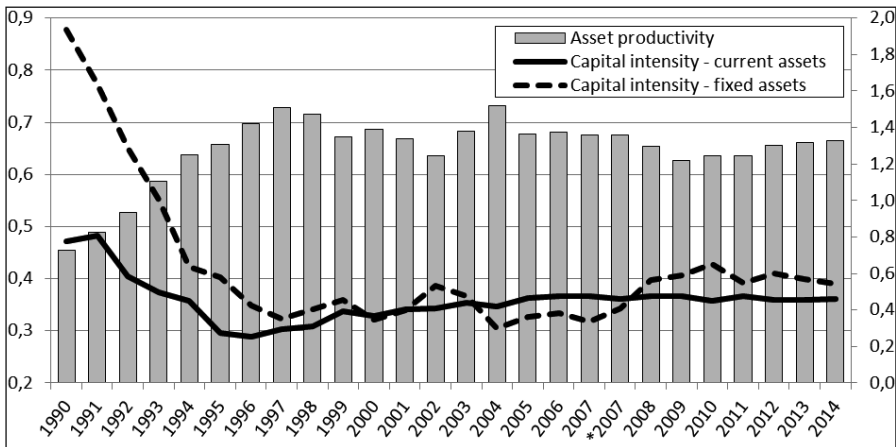
⁵ The lowest range value is referred to the highest analysed measure with the use of the mean range method.

ranging position and its changeability⁶ facilitates the classification of mezostructure entities into four groups (classes): (1) high and stable position, (2) high position and considerable changeability, (3) low and stable position, (4) low and highly changeable position.

6. The partial capital intensity vs. assets productivity

In the analysis of the productivity of total assets, fixed and current asset factors are differentiated – the reversed sum of their capital intensity equals the productivity of total assets. It facilitates the determination of the position of mezostructure entities in the coordinate structure whose axes are described by means of the partial values of capital intensity (see Fig. 1).

Figure 1. The impact of fixed and current assets on sales revenues – industrial mezostructure entities in 1990-2014



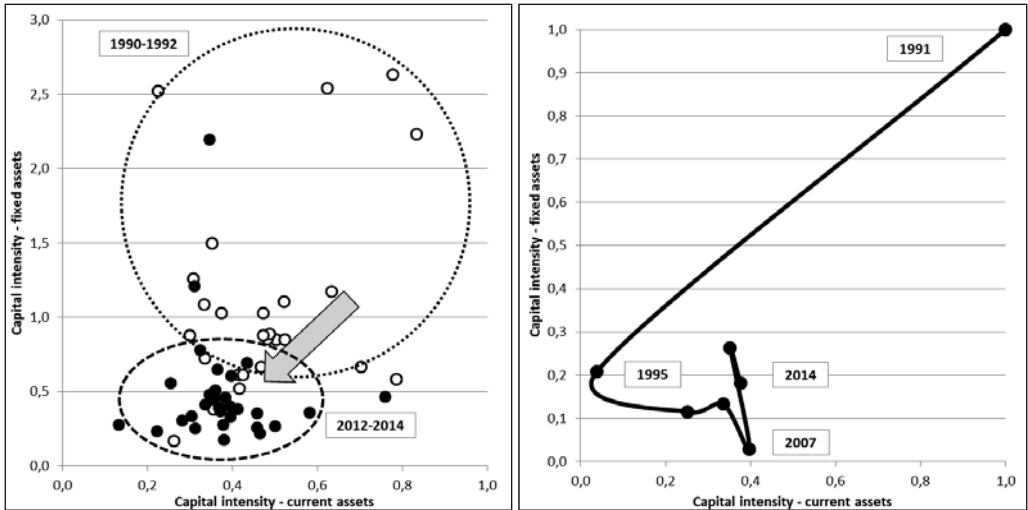
Note: values are not denominated. Asset productivity – right axis.

Source: author's research.

Reduced capital intensity had been characterised by high dynamics only until 1995. The subsequent years recorded a slight increase in the impact of fixed assets on sales revenues in the period of economic recovery, while the impact of current assets was relatively stable. It implies that the productivity of current assets did not increase despite economic expectations (increased efficiency of current asset management).

⁶ Changeability is expressed by standard deviation – the lower the value, the greater emphasis laid on mean values. It indicates lower diversification.

Figure 2. Position of entities in relation to the impact of fixed and current assets on the value of sales in industrial mezostructure (left-hand side, 1990-1992 – white points, 2012-2014 – black points) and the path of central point in 1990-2014 (right-hand side)



Note: the values are not denominated and have been subject to unitarisation (the path of central point).

Source: author’s research.

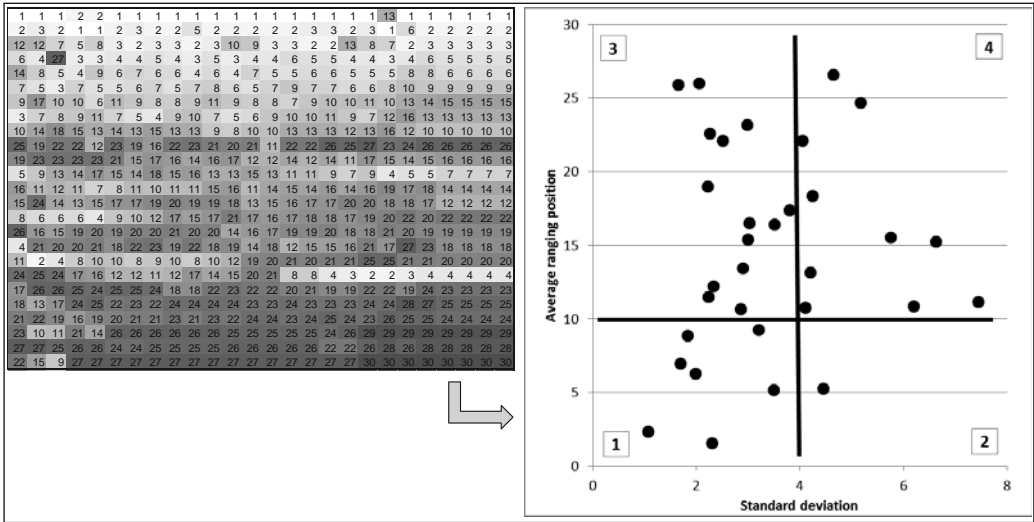
In 2011, the industrial mezostructure records considerable density (smaller differences in terms of capital intensity measures) as compared with 1990, while the central point, being closer to the beginning of the coordinate system, (positive assessment – both factors are distimulants) indicates that the lowering of revenues is more affected by fixed assets than current assets (see Fig. 2).

With regard to the groups of the PKD entities (Polish classification of activities) with the highest ranging positions in terms of the impact of fixed assets on sales revenues, 1990-2007 and 2007-2014 periods recorded slight changes, and apart from traditional industries (mainly mining) this group included technical infrastructure entities (e.g. production and supply of electricity, gas, steam, etc.), as well as manufacture of pharmaceuticals and medicines. Similar characteristics refer to the impact of current assets.

An assessment of the ranging position of the particular PKD entities in terms of productivity (as the reversed sum of partial capita intensity values) leads to the conclusion that the recorded changes refer to a greater durability of the ranging structure of entities, which is reflected in the density of entities, assessed on the basis of the value of standard deviation. Therefore, groups of PKD entities can be identified with high, average and low but always stable ranging positions (see Fig. 3)⁷.

⁷ The following criterion is adopted: high – range up to 10, average – range 11-20, low – above 20.

Figure 3. Average ranging position and standard deviation for PKD entities of industrial mezos-structure in terms of asset productivity in 1990-2014 (left-hand side – the heat map)



Source: author's research.

In 1990-2014, PKD entities with a position up to 10 and changeability up to 4 (high and stable positions, 27% of entities) represent:

- 12. Tobacco products,
- 19. Manufacture of coke, oil refined products,
- 26. Manufacture of computer, electronic and optical products,
- 31. Production of furniture,
- 14. Production of clothing products,
- 33. Repair, maintenance and installation of machinery and equipment,
- 29. Manufacture of motor vehicles, trailers and semi-trailers.

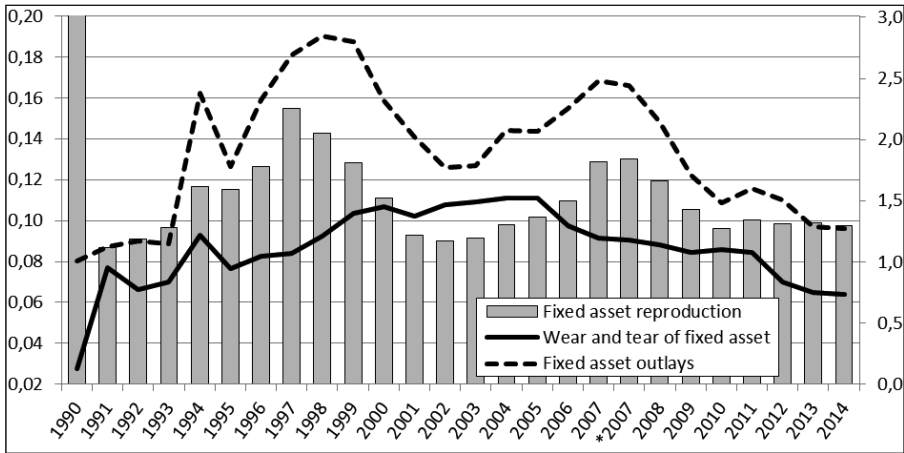
In the last years (2007-2014) notes appearance the production of vehicles, computers and electronics products (industries which represent technologically advanced goods).

7. The size and intensity of the fixed assets reproduction

The fixed asset reproduction process recorded different values in 1990-2011 in terms of its intensity, which corresponded to particular business cycles. Low ratios are recorded in 2001-2005, below the level at the initial stage of the transformation process. A next slight increase is recorded in 2006-2008, followed by a decrease.

The separation of the fixed asset outlay ratio and the fixed asset use ratio in the process of business activities indicated different dynamics of changes. The asset outlay factor is characterised by considerable differences in the course of time (corresponding to business cycles), while the values which describe the wear and tear of assets are relatively stable, with the tendency to decrease since 2006 (see Fig. 4).

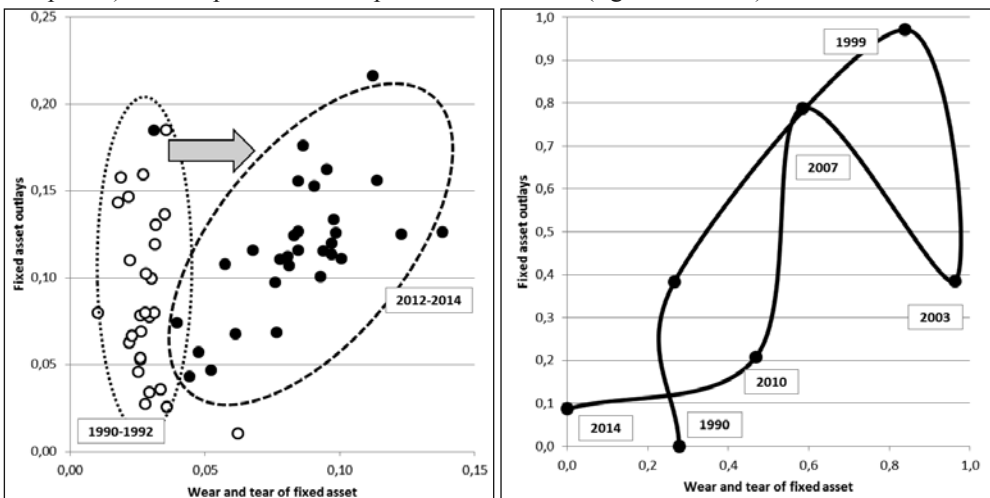
Figure 4. The values of fixed asset outlays and wear and tear ratios in industrial mezostructure in 1990-2014



Notes: values are not denominated. Fixed asset reproduction – right axis.
 Source: authors' research.

Changes in the industrial mezostructure are also characterised by the dispersion of its entities between the years 1990-1992 and 2012-2014 – PKD entities record considerable differences in terms of the use of fixed assets. The line of the central point, apart from having the shape of a loop in 1993-2010, has a position in 2014 more closer to the beginning of the coordinate system (negative assessment) (see Fig. 5).

Figure 5. Position of entities in relation to fixed asset outlay ratio and wear and tear of fixed asset ratio in industrial mezostructure (left-hand side, 1990-1992 – white points, 2012-2014 – black points) and the path of central point in 1990-2014 (right-hand side)



Note: the values are not denominated and have been subject to unitarisation (the path of central point).
 Source: authors' research.

The course and character of the identified changes mark industrial mezostructure characteristics at the level of fixed asset reproduction ratio, from the point of view of average ranging positions and their changeability (see Fig. 6). In the period 1990-2014 most of PKD entities are characterised by high changeability and low ranging positions (61% of entities).

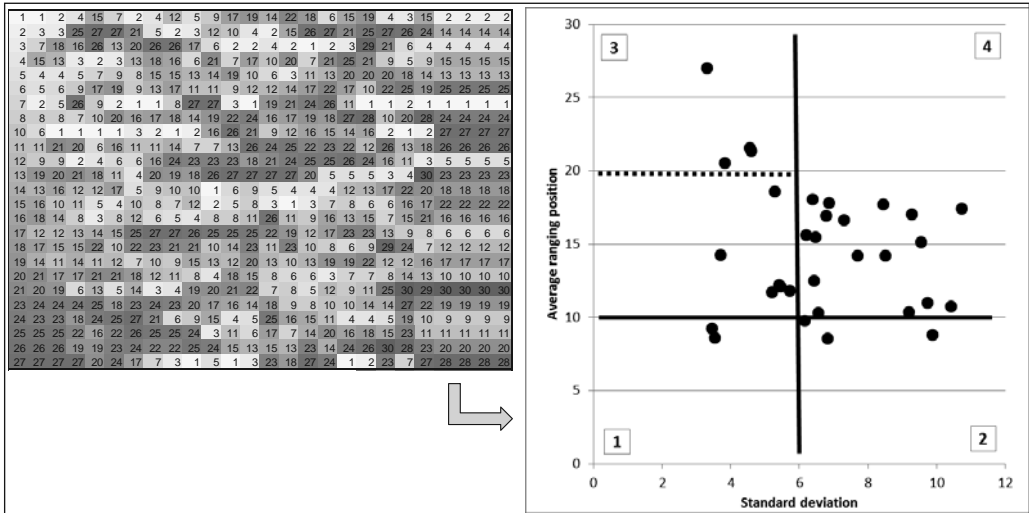
The PKD group with high stability (fixed asset reproduction ratio – average ranging positions to 10, standard deviation to 6) includes only the two following entities:

- 32. Other manufacturing,
- 33. Repair, maintenance and installation of machinery and equipment.

PKD entities with a position up to 20 and changeability up to 6 (medium and stable positions) represent:

- 10. Manufacture of food,
- 22. Manufacture of rubber and plastic products,
- 23. Manufacture of other non-metallic mineral products,
- 20. Manufacture of chemicals and chemical products,
- 28. Manufacture of machinery and equipment (nec.).

Figure 6. Average ranging position and standard deviation for PKD entities in industrial mezostructure in relation to fixed asset reproduction ratio in 1990-2014 (left-hand side – the heat map)



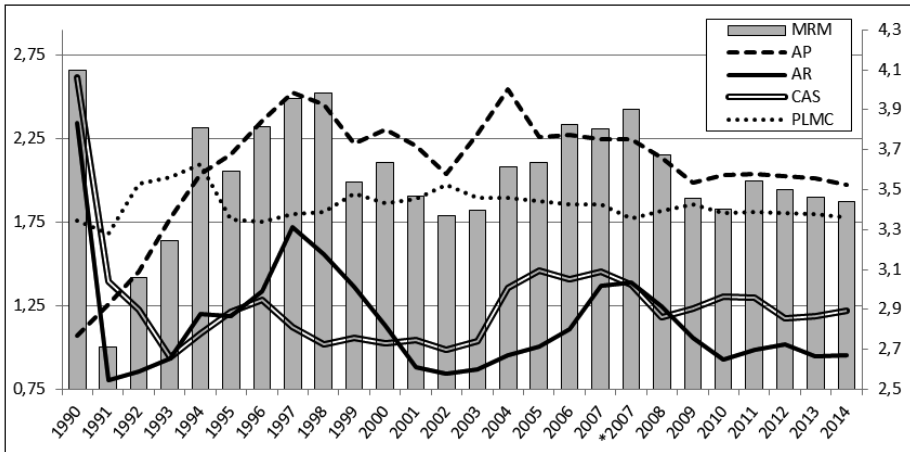
Source: authors' research.

8. Conclusion

The systemic transformation has diversified the industrial mezostructure in terms of its volumes and trends in changes. These changes can be assessed on the basis of the synthetic restructuring measure (it includes variables: productivity of labour and material costs, capital and asset productivity structure, assets productivity, recovery of production fixed assets) (Kaczmarek, 2012, pp. 191-215). The initial phase is characterised by a downturn in 1993-1994, followed by a quick recovery in the subsequent two years. The changes in this period are unique in character –

in the following years, apart from the economic upturn the restructuring process does not achieve such high levels (see Fig. 7).

Figure 7. Characteristics of industrial mezostructure restructuring process in the years 1990-2014



Notes: (PLMC) – productivity of labour and material costs, AP – assets productivity, CAS – capital and asset productivity structure, AR – recovery of production fixed assets. Multivariate restructuring measure (MRM) – right axis. The values have been subject to standardisation.

Source: authors' research.

As regards fixed asset management in the PKD entities of industrial mezostructure, can draw the following conclusions generalizing:

- the productivity of total assets does not undergo any significant changes,
- greater changes are recorded in fixed asset outlays with current asset outlays remaining relatively steady,
- the fixed asset reproduction process records low dynamics in 2004-2008 (economic upturn), lower than in the previous period of economic upturn (1993-1997),
- asset outlays are characterised by considerable changes in the course of time (corresponding to respective business cycles), while wear and tear values remain steady.

Bibliography

1. Borowiecki R. (1989), Czynniki wzrostu efektywności gospodarowania kapitałem trwałym w przedsiębiorstwie, *Working Papers – Akademia Ekonomiczna w Krakowie*, No. 507.
2. Borowiecki R. (1993), *Zarządzanie kapitałem trwałym w przedsiębiorstwie*, Kraków, Secesja.
3. Borowiecki R., Czaja J., Jaki A. (1997), *Strategia gospodarowania kapitałem w przedsiębiorstwie. Zagadnienia wybrane*, Warszawa–Kraków, TNOiK.
4. Copeland T., Koller T., Murrin J. (1997), *Wycena: Mierzenie i kształtowanie wartości firmy*, Warszawa, WIG–Press.

5. Durlik I., *Restrukturyzacja procesów gospodarczych. Reengineering – teoria i praktyka*, Warszawa, Agencja Wydawnicza „Placet”.
6. Goldmann K. (2006), *Odtwarzanie środków trwałych w polityce amortyzacyjnej*, Warszawa, C.H. Beck.
7. Hübner D. (1992), Transformacja i rozwój [in:] *Gospodarka Polski w procesie transformacji*, Warszawa, IRiSS.
8. Hurry D. (1993), Restructuring in the Global Economy: The Consequences of Strategic Linkages between Japanese and U.S. Firms, *Strategic Management Journal*, No. 14.
9. Iwin J., Niedzielski Z. (2002), *Rzeczowy majątek trwały. Amortyzacja i inwestycje rzeczowe w finansach przedsiębiorstw*, Warszawa, Wydawnictwo Naukowe PWN.
10. Janasz W. (1991), *Gospodarowanie majątkiem trwałym w przedsiębiorstwie*, Szczecin, Uniwersytet w Szczecinie.
11. Janasz W., Urbańczyk E., Waśniewski T. (1988), *Gospodarka środkami trwałymi w przedsiębiorstwie*, Warszawa, PWE.
12. Kaczmarek J. (2012), *Mezostruktura gospodarki Polski w okresie transformacji. Uwarunkowania, procesy, efektywność*, Warszawa, Difin.
13. Kaczmarek J., Młynarski S. (2006), Uwarunkowania niezawodnościowe i organizacyjne w gospodarowaniu majątkiem trwałym, *Working Papers – Wydział Zarządzania Uniwersytetu Gdańskiego*, No. 2.
14. Karpiński A., *Restrukturyzacja gospodarki w Polsce i na świecie*, Warszawa, PWE.
15. Lewandowski J. (1997), *Zarządzanie środkami trwałymi i gospodarką naprawczą w przedsiębiorstwie*, Łódź, Wyd. Marcus.
16. Młynarski S., Kaczmarek J. (2009), The Management of Durability and Reliability of the Means of Production in Companies [in:] *Global and Regional Challenges for the 21st Century Economics*, R. Borowiecki, A. Jaki, Cracow, Cracow University of Economics – Foundation of Cracow University of Economics.
17. Młynarski S., Kaczmarek J. (2012), The Rationality and Optimization of Use of Assets – Active Assurance of Safety and Reliability [in:] *Dilemmas of the Contemporary Economy Facing Global Changes*, (eds.) J. Kaczmarek, T. Rojek, Cracow, Cracow University of Economics – Foundation of Cracow University of Economics.
18. Porter M.E. (1985), *Competitive Advantage. Creating and Sustaining Superiorer Performance*, New York, The Free Press.
19. Sapijaszka Z. (1996), Dylematy i perspektywy restrukturyzacji przedsiębiorstwa [in:] *Restrukturyzacja w procesie przekształceń i rozwoju przedsiębiorstw*, (ed.) R. Borowiecki, Kraków, Akademia Ekonomiczna w Krakowie – TNOiK.
20. Singh H. (1993), Challenges in Researching Corporate Restructuring, *Journal of Management Studies*, No. 30.
21. Siudak M. (2001), *Zarządzanie wartością przedsiębiorstwa*, Warszawa, Politechnika Warszawska.
22. Slatter S. (1984), *Corporate Recovery. A Guide to Turnaround Management*, London, Penguin Business.
23. Stoner J.A.F., Freeman R.E., Gilbert D.R. (1997), *Kierowanie*, Warszawa, PWE.
24. Wodniak-Sobczak B. (ed.) (1994), *Gospodarowanie kapitałem w firmie*, Katowice, Akademia Ekonomiczna w Katowicach.

Chapter 6

The Small and Medium Businesses During an Unstable Economic Situation in Ukraine

Anatolii Mazaraki, Nataliia Ilchenko

1. Introduction

The small and medium enterprises conduct their activities mainly on the domestic market. Their activity contributes to the employment and realizes the creative possibilities of the population, reduces unemployment and creates a middle class, strengthens political stability. They quickly adapt to changes in the business environment and provide rational transfer of capital from one sphere to another. Thus, small and medium enterprises ensure the competitiveness of the national economy due to political and economic stability of most of the internal market. Today it is the basis of socio-economic model of the EU. They account for about 2/3 of the employed and 60% of value added. They have an incentive to promote competition in the European economy; large companies were forced to enhance the effectiveness and incorporate new technologies. The Small and Medium Businesses help the state to solve economic (creation of the competitive environment, the functioning of private capital, attracting the foreign investment), social issues (creation of new jobs, solving the problems of poverty). Therefore, the research of the problem in the article is quite relevant.

2. Purpose and basic research problems

The problems of assessment of problems of small business development were the subject of research among many scientists, including Z. Varnaliya, P. Haidutsky, T. Hredzheva, J. Zalila, V. Zbarsky, D. Liapina, I. Maksimenko, A. Mazaraki, A. Merkulov, A. Chukhno and others. Determining the level of small and medium-sized businesses in these studies is usually restricted to the analysis of indicators of the contribution of small businesses (excluding individual – business entities) in the overall employment rates in the economy, production and sales products. Therefore, given the deep theoretical study of the main aspects of the development of small and medium business in Ukraine, the question of identifying current problems of development of the small and medium business, as well as support from the public authorities remain unresolved.

The purpose of the article is to study the actual problems that hinder the development of SMEs and problems of further development.

3. Research of small and medium business development in Ukraine

With the outbreak of hostilities in the eastern Ukraine, Ukrainian business is still adapting to the economic changes in the country. Companies which have been working for a long time on the market are forced to reduce personnel and are looking for new ways to survive. Enterprises that carry out foreign exchange transactions and purchase goods or raw materials from the area of the European Union or the United States are forced, due to the situation of instability and fluctuations in exchange rates, freeze their activities.

According to the current legislation of Ukraine, the participants of economic relations are legal entities and individuals. At the beginning of 2013 in Ukraine economic activity carried 364,935 entities, of which 20,189 – the medium enterprises and 344,048 – the small companies and 1,235,192 – individual entrepreneurs. The trend towards quantitative growth was characteristic only for individual entrepreneurs who operated in the medium business.

According to the information from the Unified State Register of Enterprises and Organizations of Ukraine at the beginning of 01.01.2013 was 6,704,488 registered business entities, of which 1,405,069 legal entities and 5,299,419 individuals – entrepreneurs (Tab. 1).

Table 1. Basic indicators of state registration of business entities in Ukraine in 2008-2012 years

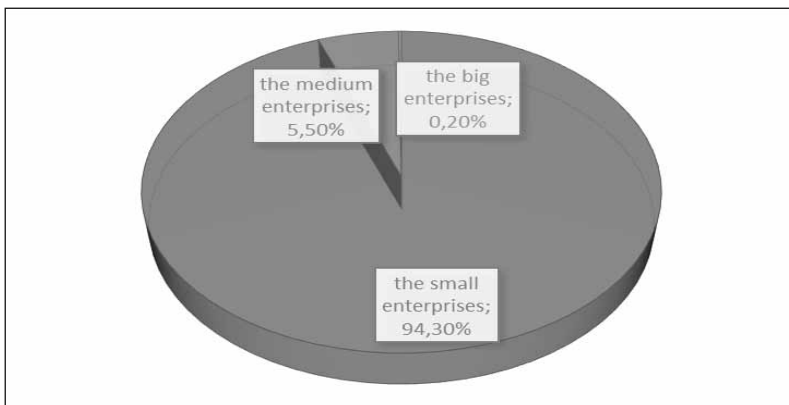
Indicators (end of year)	2008	2009	2010	2011	2012
Total quantity of registered (legal entities and individuals – entrepreneurs) business entities, including:	5,715,779	5,970,779	6,270,107	6,499,970	6,704,488
• the quantity of registered legal entities	1,204,526	1,252,437	1,303,360	1,3579,22	1,405,069
• the quantity of registered individuals – entrepreneurs	4,510,608	4,718,342	4,966,747	5,142,048	5,299,419
The total quantity of active business entities, including:	3,899,782	3,973,916	4,094,025	4,045,317	4,046,270
• the quantity of registered legal entities which are not suspended their activities	917,532	981,105	978,514	1,003,268	1,025,857
• the quantity of registered individuals – entrepreneurs which are not suspended their activities	2,982,250	3,112,694	3,115,511	3,042,049	3,020,413

Source: The State Statistics Service of Ukraine, http://ukrstat.org/uk/druk/publicat/kat_u/publtorg_u.htm#.

The total quantity of registered business entities, compared to the same period last year increased by 204,518 which is 3.15% more than in the same period last year. The quantity of active business entities as of 01.01.2013 is 4,046,270 units, up 0.02% over the same period last year, of which 698 of big business, 20,550 medium enterprises and 1,578,879 of small businesses.

During the years of 2011-2012, there was a decrease in the quantity of small and medium businesses. In the structure of business entities increased the proportion of medium enterprises with 1.24% of businesses in 2011 to 1.29% of the total number of business entities in 2012 by reducing the quantity of subjects small business. In the structure of domestic business according to the size of enterprises as of 01.01.2013, the share of small enterprises was 94.3%, average – 5.5% and large – 0.2% (Fig. 1). In the period of 2010-2012 years these figures have not changed.

Figure 1. The quantity of enterprises according to their size in percentage to the total amount of enterprises on 01.01.2013

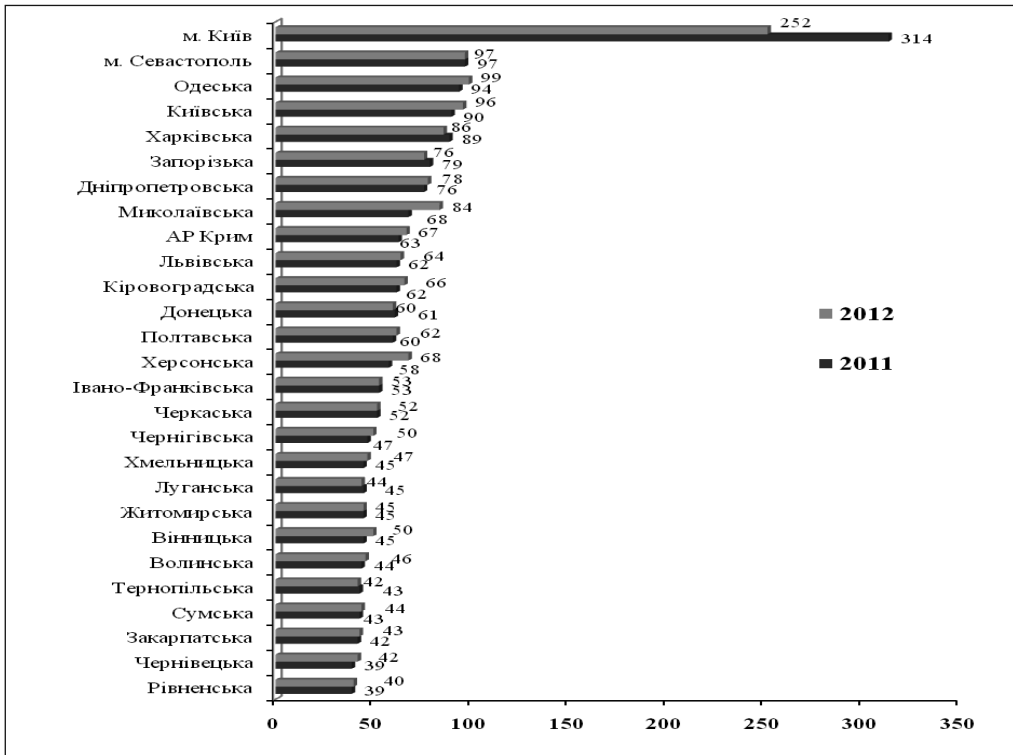


*Statistical data on the quantity business entity, depending on their size calculated according to the criteria of large, medium, small and micro enterprises defined in the Commercial Code of Ukraine as amended on 22.03.2012. As the new criteria came into effect in 2012, to ensure comparability of data by the State Statistics of Ukraine held a retrospective calculations of such information in 2010 and 2011.

As in the previous years, the vast quantity of small and medium enterprises of Ukraine are focused in Dnipropetrovsk, Donetsk, Kyiv, Lviv, Odesa, Kharkiv regions and in Kiev itself. The low quantity indicators of medium and small enterprises demonstrate Volyn, Ivano-Frankivsk, Rivne, Ternopil, Chernivtsi regions and Sevastopol.

In the regions the best quantity indicators of small companies on 10 thousand people population of Ukraine are in Kyiv and Sevastopol, Odessa, Kiev and Kharkiv regions. The lowest rates of small companies on 10 people of Ukraine are in Ternopil, Sumy, Transcarpathian, Chernivtsi and Rivne regions (Fig. 2). In the beginning of 01.01.2013 the total number of individual entrepreneurs for the 10 thousand people in Ukraine is 271 enterprises, up 6.6% less than for the period of 2012. The best indicator of this are in Sevastopol, Khmelnytsky, Kyiv, Mykolaiv and Odesa regions, and the worst – in Kirovohrad, Rivne, Volyn, Ternopil and Lviv regions.

Figure 2. The quantity of small enterprises for 10 thousand of population by regions of Ukraine (units)



Source: *Analytical Report on the Status and Prospects of Development of Small and Medium Businesses in Ukraine, 2014.*

Due to the difficult situation in the Eastern Ukraine, the entrepreneurs who were able to transfer their assets, particularly in Kyiv, are trying to occupy new niches in the business. Players who existed earlier are being superseded, and, accordingly, the staff that faced redundancy earlier in the capital of Ukraine is being hired.

In Kyiv during 9 months in 2014 despite the difficult political and socio-economic situation, positive trends in the development of entrepreneurship were observed in comparison with the corresponding period of 2013. The amount of newly established business entities and the amount of taxes and fees to the consolidated budget from the subjects from small and middle entrepreneurship have increased.

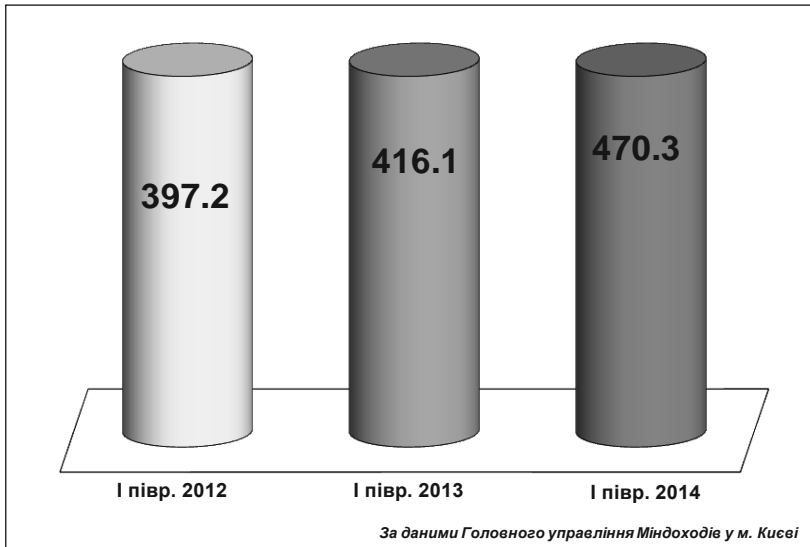
However, negative trends are also evident: the quantity of liquidated entities increased, quantity of entities that pay taxes and the amount of revenue in taxes and fees to the city budget decreased.

According to the data of the Main Directorate Ministry of revenue in the city of Kyiv at the beginning of 01.07.2014 the total quantity of business entities registered as taxpayers increased compared to the corresponding period of the previous year by 13.0% and amounted to 470,300.

The number of legal entities increased by 3.8% and amounted to 211.9 thousand. The quantity of individual entrepreneurs increased by 21.9% and amounted to 258.4 thousand persons.

The total quantity of business entities that pay taxes increased compared to the corresponding period of the previous year by 1.3% and amounted to 300.4 thousand.

Figure 3. Dynamics of entities in m. Kyiv registered as taxpayers, thousand units.

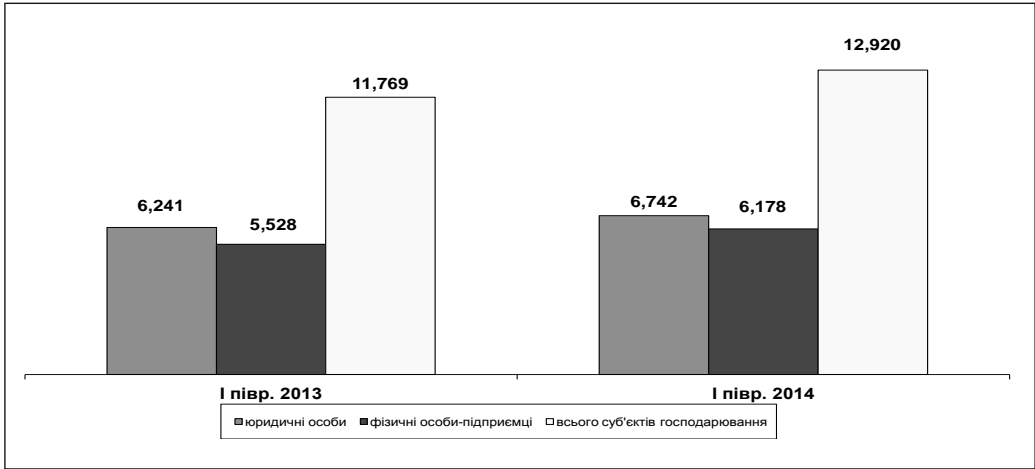


Source: The information are developed by the authors based on the Main Directorate of the Ministry of Revenue in Kiev.

The revenues from taxes and fees of business entities in the budget increased: during the first half of 2014 49.9 million UAH., which is 7.0% more than in the corresponding period of 2013 was received. Revenues of the city budget decreased by 4.0% and resulted in 4.5 bln. USD.

The quantity of new businesses during the first half of 2014 increased compared to the corresponding period of the previous year by 9.8%, including a number of new legal entities – by 8.0%, individual entrepreneurs – 11.8%. Total state registrars registered in the city of Kyiv 12,920 of the new registered entities, including – 6,742 legal entities and 6,178 individual entrepreneurs.

Figure 4. Dynamics of the quantity of newly created entities in the city of Kiev, units



Source: The information is developed by the authors based on the Main Directorate of the Ministry of Revenue in Kiev.

According to the indicators of development of small and medium enterprises the city of Kyiv remains the leader among the regions of Ukraine. At the beginning of 2014 in the capital of Ukraine was concentrated 22.1% of small and medium enterprises of Ukraine, their number exceeds the average level in Ukraine in 3.5 times. At small and medium enterprises of the capital of Ukraine more than 18% of all employees of small and medium-sized enterprises Ukraine are employed, their sales of goods (works, services) accounted for 35.9% of the total.

Indicators of small businesses as the results of 2013 compared with the previous year improved, the medium-sized enterprises have deteriorated. In the beginning of 2014 in the city of Kiev there were 86,685 SMEs, of which 82,973 small and 3,712 medium on the 10 thousand persons of population there are 303 enterprises (including 290 small and 13 medium). Compared with the previous year, the total number of SMEs increased by 11,506 units or 15.3%. This increase was due to increased number of small businesses with 11 to 772 units or 16.5%. The quantity of medium enterprises decreased by 266 units or 6.7%. On the 10 thousand persons of population the total quantity of SMEs increased by 37 units. (The quantity of small businesses increased by 38 units, the medium – decreased by 1 unit.).

The average quantity of employees of SMEs in the city of Kyiv in 2013 decreased compared to the previous year by 1% and amounted to 883.3 thousand persons or 58.6% of the total number of employees of the city. This negative trend was observed due to a decrease of 1.9% of average quantity of employees of enterprises, there were 501.3 thousand people. The number of employees of small businesses increased by 0.3% and amounted to 382.0 thousand people.

The number of newly established business entities during 9 months in 2014 increased in comparison with the corresponding period of the previous year by 6.1%, including legal entities – 10.4%, individual entrepreneurs – by 1.5%. Totally Kyiv state registrar registered 21,786 newly created legal entities, including 11,772 entities and 10,014 individual entrepreneurs. At the same time we have negative trends emerging: increased number of liquidated economic entities reduced the number of business entities, entities that pay taxes and the amount of revenue from

these taxes and fees to the Ukrainian budget. In the 2014 year 36,865 business entities were liquidated. This is 5.7 times more than in the corresponding period of 2013, including 11,772 legal entities (8 times more) and 25,093 individual entrepreneurs (5 times more).

According to the State Statistics Service, the quantity of companies and individual entrepreneurs in general terms on the subjects of large, medium and small businesses in wholesale and retail trade for 2014 unchanged compared to 2013, respectively – in% of the quantity of medium enterprises decreased by 0.2% in % of the quantity of small businesses increased by 0.1% (Tab. 2).

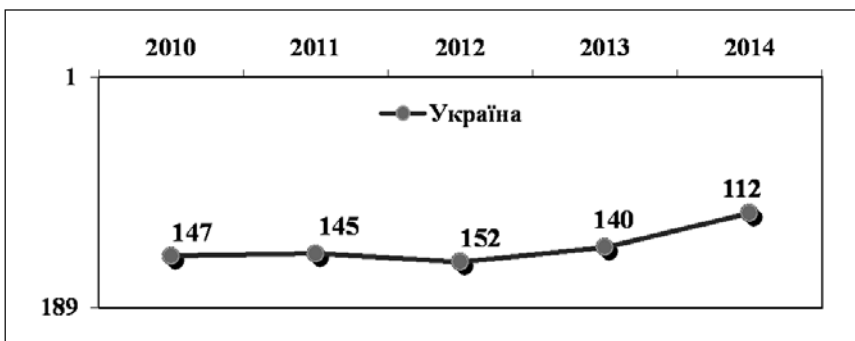
Table 2. The quantity of companies and individual entrepreneurs on their size in general quantity the business entities of large, medium and small businesses in wholesale and retail trade in 2010-2013 years

Years	in % of the total quantity of large enterprises	in % of the total quantity of medium enterprises		in % of the total quantity of small enterprises	
		enterprises	individual entrepreneurs	enterprises	individual entrepreneurs
2010	100	94.9	5.1	8.9	91.1
2011	100	96.2	3.8	11.7	88.3
2012	100	96.1	3.9	11.9	88.1
2013	100	95.9	4.1	12.0	88.0

Source: The information is developed by the authors based on the State Statistics Committee of Ukraine.

According to the rating of the World Bank “Doing Business-2014” (hereinafter – rating business conditions) Ukraine rose by 28 positions compared to last year’s rating and ranked 112th place. Ukraine is recognized as a country that has achieved the best results in improving the regulatory environment among all countries in 2012 and 2013. The World Bank noted that reforms in Ukraine are carried out in eight of the ten directions, which corresponds to the research of the rating of business conditions. Moreover, Ukraine topped the list of the ten countries that have made the greatest progress in improving the business environment.

Figure 5. Dynamics of change of Ukraine’s position in the ranking of business conditions during 2010 and 2014



Despite the war with Russia and the difficult economic situation since the beginning of the year in Ukraine, our country has entered the first hundred in the ranking of ease Doing Business-2015,

researched by experts of the World Bank and the International Finance Corporation, rose by 16 positions and took 96th place (this is stated in the weekly analytical bulletin of the International Centre for Policy Studies (ICPS) “Foreign Policy Insight”).

At the same time, experts note that despite the significant improvement, neighbors are still ahead of Ukraine. In particular, Poland took 32th place in the ranking, Bulgaria – 38th, Romania – 48th, Belarus – 57th, Russia – 62nd, Moldova – 63rd. The leader in the world rankings ease of doing business is traditionally Singapore. Also in the top ten were included: New Zealand, Hong Kong, Denmark, South Korea, Norway, the US, the UK, Finland and Australia.

The rating is based on 10 indicators and covers 189 countries. In the rating the data taken into account from May 2013 to June 1, 2014, Ukraine managed to improve its position in the ranking due to the following factors. On the 49 Ukraine’s position increased in terms of “Simplify the tax for businesses” through the introduction of e-filing system. However, other significant improvements in taxation in this period did not happen.

4. Problems of small and the medium business development in Ukraine

According to the research carried out at the beginning of 2015, the overall economic situation in Ukraine is worse than in late 2014. The index of evaluation of business activity decreased in February 2015 from -0.42 to -0.29 compared with October 2014.

45.45% of small businesses enterprises, as well as 40.9% of medium and 41.8% of large enterprises consider the economic situation to be negative for their enterprises and do not expect any positive changes for 2015. 11.9% of the surveyed enterprises considered the situation in the company to be good in late 2014, in February 2015 this figure dropped by another 1.3%. Thus, the share of surveyed production enterprises which does not expect any changes in financial and economic situation amounts to 63.2% for small enterprises and 65.35% for medium ones.

In 2015 the enterprises expect from the government in the first place tax reforms and equal opportunities. Thus, in 2014 39.35% of enterprises voted for equal conditions for all business entities, while 23.5% expected the state support for companies in their sector, 19% needed state support for energy saving measures in the company, 13.1% voted for state support in the implementation of innovative activities.

On January 1, 2015 year tax reform came into force provided by the Law №71-VIII “On Amendments to the Tax Code of Ukraine and some other legislative acts of Ukraine on tax reform”. On the one hand, tax reforms reduce the number of taxes from 22 to 9, but, on the other hand, the tax rates increase. At the beginning of 2015, the law “On the development and support of small and medium-sized businesses in Ukraine” was passed, but so far it is not clear which sector the state will support.

5. Conclusion

Thus, the analysis of the questionnaire data showed the most acute and urgent problems in the sphere of small businesses. Among them the following should be noted:

1. Lack of the investment funds.
2. Terms of external financing of small businesses.
3. Status and efficiency of business support structures.
4. Lack of necessary information about the sources of possible support of business entities.
5. State of the tax system.

Corruption, excessive taxation and inadequate administration actively destroy small businesses. Some qualitative reforms are urgently needed. We have distinguished the following: legalization of all employees; imposing a moratorium on the dismantling of some objects of small business and other ways to eliminate or limit it which are stated by the law; the state should support those companies that are modernizing and introduced technologies, which save energy; companies need help to implement European standards for release of Ukrainian products to the European market.

Bibliography

1. *Analytical Report on the Status and Prospects of Development of Small and Medium Business in Ukraine* (2014), <http://www.dkrp.gov.ua/info/3226>.
2. *Analytical Report on the Status and Prospects of Development of Small and Medium Businesses in Ukraine* (2014), State Service of Ukraine for Regulatory Policy and Business Development, <http://kievcity.gov.ua/news/15460.html>.
3. *Ease of Doing Business in Ukraine* (2015), <http://russian.doingbusiness.org/data/exploreconomies/ukraine/>.
4. *The Activity of Business Entities* (2013), http://ukrstat.org/uk/druk/publicat/kat_u/publ9_u.htm.
5. The State Statistics Service of Ukraine, http://ukrstat.org/uk/druk/publicat/kat_u/publtorg_u.htm#.

Chapter 7

Trends and Conditions of Developing R&D Activities the SME Sector¹

Katarzyna Bartusik

1. Introduction

In the era of increasing competition, technical and technological advancement and shortened product life cycles an increasingly important role is played by organizational development. This form of development is reflected in companies' various innovation undertakings. Focus on innovations enables organizations to maintain and strengthen their competitive position, facilitating their sustained growth. This process is conditioned by the availability and effective use of internal resources. The paper discusses R&D activities in Poland, the prevailing trends in this area as well as development conditions. We are aware of a number of constraints and barriers faced by organizations in which the development of R&D is a significant aspect of business activities. Therefore, the question can be posed whether R&D activities, despite the existing obstacles, are likely to be effective in Polish companies in the years to come.

2. The role of R&D activities

R&D activities represent a company's key innovation-related undertakings. For a number of years, companies have given increasing attention to increasing their innovativeness. The Frascati Manual defines research and development activities (R&D) as follows: "Research and experimental research (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications". Generally, the major objective of research and development activities is to create and implement technological innovations in the area of products and processes. This term comprises products already launched and processes which are new in terms of technological solutions, as well as significant improvements in these products and processes. An innovation is regarded as implemented when it is launched

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on the market or applied in a production process (innovation within the framework of a process) (Tamowicz, Pieńkowski, Rybacka, 2010, p. 8).

The common foundation for innovation comprises all research, technological, organizational, financial and trade activities which lead to, or are likely to lead to developing technologically new, or improved products and processes. A special role in this area is played by research and development activities, covering three types of activity (The Frascati Manual, 2010, p. 34): basic research, applied research and experimental development. A synthetic presentation of such activities is shown in Table 1.

Table 1. The characteristics of R&D activities

Basic research	Applied research	Experimental development
Experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use in view	Research work undertaken primarily to acquire new knowledge, directed primarily towards a specific practical aim or objective	Systematic work, drawing on existing knowledge gained from research and/or practical experience. It is directed to producing new materials, products or devices and/or to installing new or improving existing processes, systems and services

Source: research based on Frascati Manual, 2010, p. 34.

Research and development activities can be defined as two interlinked processes which, as a result of the use of technical innovations, lead to innovative products or improvements in existing ones.

Research and development activities, similarly to business undertakings, can assume different forms. The selection of appropriate methods should be preceded by an analysis of the available potential and the adoption of an effective strategy aimed to identify the implementation process. R&D activities can be based on the following methods:

- a company's own unit,
- a company's own R&D department,
- joint R&D projects,
- outsourcing of R&D activities.

The characteristics of these methods are presented in Table 2.

Table 2. Presentation of various forms of R&D activities

A company's own unit	A company's own R&D department	Joint R&D projects	Outsourcing of R&D activities
<ul style="list-style-type: none"> • requires sufficient staff and research teams • appropriate R&D infrastructure • continuous development of R&D infrastructure • necessity of substantial outlays • competences in the effective use of R&D resources • motivation to engage in cooperation with various external entities • awareness of risk involved in R&D activities 	<ul style="list-style-type: none"> • a less developed model • company focuses on selected core activities • company must allocate funds to basic R&D infrastructure • necessity of outlays for developing a research team • scientific workers can act as advisors or consultants • due to a limited potential the entity is likely to engage in cooperation with other R&D units or other companies to achieve its objectives 	<ul style="list-style-type: none"> • no specific requirements with regard to staff • availability of infrastructure conditioned by a company's role in project (as stipulated by an agreement) • expenditures determined by a contract between partners • awareness of sharing profits and losses resulting from cooperation • medium risk, limited scope of research 	<ul style="list-style-type: none"> • possible reduction in R&D activities as a result of eliminating fixed costs and initial costs of investments • no requirements with regard to staff • no requirements with regard to infrastructure • total costs covered by commissioning party • necessity of monitoring progress of R&D activities • medium risk, no impact on results and possible modification in commissioned work
The most appropriate solution when an entrepreneur wants and is able to exercise overall control over R&D activities	The selection of this method provides the possibility of offering R&D services to other entities	Increasing interest in this method due to limited potential of SMEs	Applied especially in cases when a company does not have necessary expertise and R&D infrastructure

Source: author's own research based on Tamowicz, Pieńkowski, Rybacka, 2010.

3. A synthetic analysis of R&D activities in the SME sector (conditions and development trends)

The Polish R&D and Innovations sector is diversified in terms of its institutional structure. The share of innovative businesses in the total number of production companies is approx. 16%, while in the number of service companies – 12%. It should be noted that an increasing number of Polish companies are setting up their own R&D departments (point 2) and so called modern service centres, characterised by diversified activities.

These units include shared service centres and business process outsourcing centres, IT outsourcing centres and R&D centres. In the recent 3 years Poland's sector of modern business services has increased by 50%. Currently, the number of centres with foreign participation amounts to 470 entities (66 entities were set up last year). The majority of existing entities have largely increased their range of services.

A number of centres have been established by Polish investors. Service centres are expected to expand rapidly in the coming years in light of their declarations with regard to expected increases in employment. The scientific potential of the Polish R&D and Innovation sector comprises 936 research units (2014). The results of parametric assessments conducted in 2014 indicate that 50 of them are characterised by top notch facilities, enabling them to undertake effective and creative scientific projects. The increasing presence of international R&D centres in Poland seems to confirm the high competences of local specialists in various sectoral research areas.

The main objective of R&D centres is to maintain a company's competitive edge (they usually operate as SSCs), working for one corporation. In the areas which require substantial outlays R&D centres sometimes work for several corporations which are in stiff competition (e.g. Siemens-Nokia). Out of the 300 analysed R&D service centres, 40% of entities carry out R&D activities, the majority of them focusing on IT-related knowledge. Poland-based centres include large research and development entities which specialise in innovative electro-machine products (ABB), electronics (Alcatel-Lucent, Samsung), and motor-car products (Delphi, Faurecia). Relatively little research is conducted in the pharmaceutical industry.

In 2014, the Ministry of Science and Higher Education developed the Polish Roadmap for Research Infrastructures. The Roadmap comprises 53 projects (20 more than in 2011). An increase in the number of projects is expected to enhance research centres' scientific potential and intensify cooperation with businesses. In this context, attention should be given to a very significant role played by business environment institutions. Reports and data published by the Central Statistical Office confirm rapid development in this area of activity in the subsequent years. It is facilitated, among others, by EU funds. The objective of business environment institutions is to support entrepreneurs' R&D initiatives and to introduce innovative solutions. These institutions include technological parks, entrepreneurship incubators, technology transfer centres, business angel networks, and local loan fund systems. In 2014-2020, National Key Clusters are to be launched as a new form of R&D and Innovation activities. In accordance with the recommendations of the working Group for future cluster policies, included in the report entitled *The Trends and Assumptions of Cluster Policies in Poland up to 2020*, cluster policies in the 2014-2020 financial perspective aim to increase and strengthen:

- the innovativeness of the Polish economy as a result of intensified cooperation,
- interactions and transfers of knowledge within the system of clusters and supporting the development of strategic economic areas through national and regional key clusters.

It should be noted that an analysis of reports and data published by the Central Statistical Office indicates that one of the strengths of the Polish R&D and Innovation sector is its engagement in cooperation between businesses and institutions in the area of innovation. In this context, Poland records average European results. The most frequent forms of cooperation include cooperation with suppliers (23%) and clients and consumers (14%).

Cooperation between academia and business is expected to have a major impact on the development of the R&D and innovation sector up to the year 2020, leading to the increased influence of the developing sector on the Polish economy condition. Statistical data indicate that by

the year 2013 Poland had recorded an increase in R&D expenditures, the number of employees and companies' participation in financing R&D and innovation activities.

In 2013, internal outlays for R&D activities (GERD) amounted to PLN 14,423.8m. It represents an increase in research and development activities by PLN 70.9m as compared with the year 2012. The share of internal expenditures for R&D programmes in GDP, expressed as R&D intensity, stood at 0.87% in 2013, representing a decrease by 0.02 percentage points. Table 3 presents selected GERD and GDP ratios (current prices).

Table 3. Selected GERD and GDP ratios (current prices)

Description	2009	2010	2011	2012	2013
Internal outlays – GERD (PLN millions)	9,070	10,416	11,687	14,353	14,424
GDP in PLN millions	1,361,850	1,437,357	1,553,582	1,615,894	1,662,052
GERD/GDP ratio (%)	0.67	0.72	0.75	0.89	0.87

Source: GUS (Central Statistical Office), R&D activities in Poland in 2013.

Also, the analysed period recorded an increase in the number of R&D employees: in 2009, the percentage of R&D staff per 1,000 employees stood at 7.6, and in 2013 at 9.3, indicating an increasing trend in the subsequent years.

In the context of SME development prospects it should be noted that the successful implementation of innovations launched as part of R&D programmes relies heavily on the effective use of available resources and competences. It is the SME sector that contributes most to innovations. Therefore, R&D should be linked to and cooperate closely with the production sector. Intensified integration in this area is recorded in the group of companies which manufacture innovative high-tech products, representing global market niches as a result of their high level of specialisation (Baruk, 2004, p. 26). The rapid technological advancement and changes in customer preferences enforce and stimulate innovative businesses to develop their research and development activities with a view to adapting their products to the current needs of the market. It also encourages companies to intensify cooperation with other entities.

Companies which do not have their own R&D units can cooperate with research centres through innovation-oriented institutions. Such cooperation facilitates technology transfers from R&D units to the SME sector. The institutions which promote innovation include, as previously stated, technological parks, technology and innovation transfer centres, and entrepreneurship incubators.

Unfortunately, SMEs are facing various challenges including increasing international competition and new technologies, making their hitherto applied organizational and management methods ineffective. There are a number of factors which condition R&D activities and require adopting a new approach to R&D management: increasing internationalization of corporate research activities, intensified transfers between science and technology, and increased costs of research (Baruk, 2004, pp. 29-30).

Companies' R&D activities are affected by various factors which determine their scope and intensity. These factors are presented in a synthetic way in Table 4.

Table 4. The determinants of R&D activities in the SME sector

Determining factors	Characteristics
Ability to engage in innovative projects in R&D units	<ul style="list-style-type: none"> • translating creative ideas to feasible projects and implementing them in a company's R&D unit, which maintains or increases a company's competitiveness • a key role is played by staff's intellectual potential and the effectiveness of management's initiatives
Skills related to the absorptiveness of innovations	<ul style="list-style-type: none"> • positive attitude of staff and management to innovations related to R&D and organization • a key role is played by such factors as employee participation and management's intellectual potential and effectiveness
Structural potential for strengthening a competitive position	<ul style="list-style-type: none"> • organization's potential to increase its market share in the context of available technical and R&D resources • a key role is played in this area by structural capital
Competences in developing product innovativeness	<ul style="list-style-type: none"> • adding new features to a product or extending the range of products with the use of R&D technological and financial potential • this factor is related to R&D technological potential and business intelligence
Effectiveness of technical and technological potential	<ul style="list-style-type: none"> • level and attractiveness of technologies available in R&D units • this area is affected by technical, technological and financial potential, and business intelligence
Potential to finance R&D activities	<ul style="list-style-type: none"> • current financial surplus and available sources of financing

Source: Pawłowski, 2005, p. 29.

The factors which stimulate R&D activities include technology transfers from other countries, resulting from international economic relations maintained by domestic organizations, for example R&D projects implemented abroad with foreign entities, overseas trainings for Polish staff, etc. Such activities contribute to the development of R&D activities.

Important factors stimulating R&D activities also include the typology proposed by D.W. Birchall and M.S. Armstrong (2001, pp. 94-96), who identify the following groups of factors: internal environment, external environment, R&D process, and development management.

A number of other factors can be identified, but their relevance and impact are determined by a specific form and scope of business activities, the size of an organization and its core business.

4. Conclusion

Currently, R&D activities play a special role in the context of the changing environment, increasing international competition, technological advancement as well as changing consumer preferences. R&D activities in the SME sector will be subject to continuous changes, conditioning their development. Presently, SMEs are facing a number of barriers to their research and development activities including difficult access to bank loans (high interest rates), the lack of own financial resources and R&D infrastructure, uncertain demand for products, legislation, difficulties in identifying market needs and establishing cooperation with other institutions.

At the national economic level the main objective will be to strengthen the role of research in innovative projects through intensifying cooperation between science and the private sector, and increasing innovation-oriented awareness. A key role in this process is played by supporting R&D activities, intensifying cooperation between science and industries, and enhancing international R&D cooperation.

It should be noted that innovativeness without the support of R&D activities will not be possible. Therefore, it is necessary to create appropriate conditions for stimulating development in this area and encouraging new entrepreneurs to engage in research and development activities. These activities will determine the level of the innovativeness and competitiveness of Polish businesses and the entire economy.

Bibliography

1. Baruk J. (2004), Innowacje a rozwój gospodarczy, *Problemy Jakości*, No. 7.
2. *Determinanty innowacyjności i rozwoju przedsiębiorstw* (2011), Warszawa, PARP, www.badania.par.gov.pl/index.more/18781 updated on 4 May 2011 [10.02.2015].
3. *Encyklopedia Zarządzania*, http://mfiles.pl/pl/index.php/Badania_i_rozw%C3%B3j [19.09.2014].
4. Nieć M. (2013), Działalność innowacyjna przedsiębiorstw w Polsce na tle krajów Europy [in:] *Świt innowacyjnego społeczeństwa. Trendy na najbliższe lata*, Warszawa, PARP.
5. Pawłowski J. (2005), Diagnoza potencjału innowacyjności i konkurencyjności przedsiębiorstw, *Przegląd Organizacji*, No. 5.
6. *Przegląd 300 międzynarodowych centrów usług. Definicje, segmentacja, zatrudnienie, plany i prognozy* (2008), DIS, październik.
7. Stankiewicz J.M. (2005), *Konkurencyjność przedsiębiorstwa. Budowanie konkurencyjności przedsiębiorstwa w warunkach globalizacji*, Toruń, TNOiK.
8. Tamowicz P., Pieńkowski M., Rybacka M. (2010), *Jak uruchomić działalność B+R w firmie? Poradnik*, Gdańsk, Instytut Badań nad Gospodarką Rynkową.
9. The Frascati Manual (2010), *Pomiar działalności naukowo-badawczej. Proponowane procedury standardowe dla badań statystycznych w zakresie działalności badawczo-rozwojowej*, Ministerstwo Nauki i Szkolnictwa Wyższego.
10. www.pi.gov.pl/klastry/chapter_95885.asp
11. www.bip.mg.gov.pl/O+ministrerstwie/jednostki+organizacyjne+nadzorowane+lub+podlegle/centra+badawczo+rozwojowe

Chapter 8

Open Innovation in Polish Enterprises

Natalia Przybylska

1. Introduction

Modern enterprises function in constantly changing conditions. The acceleration in the production of goods based on knowledge, meeting expectations of more and more demanding clients determines the functioning of economic entities all over the world. Facing up the reality, requires possessing by enterprises such characteristics as innovativeness or elasticity. They allow to preserve the dynamic balance with the surrounding. Present organizations are aware of the intense competition and of how many new channels of distribution and promotion it operates with. Therefore, those entrepreneurs who want to achieve a success, undertake innovative actions which can provide them a competitive position on the market (Abou-Zeid, Cheng, 2004, p. 261). More and more attention is given to the new models of innovation management. One of them is open innovation model, commonly referred to as the paradigm.

The main purpose of this article is to characterize the existing interdependencies between the use of open innovation and innovativeness of Polish enterprises. This goal can be achieved by provide a review of current literature on open innovation and analyse research¹ conducted among small and medium-sized Polish enterprises. The recent research results point on growing role of the small and medium enterprise (SME) sector as a core element in its strategy to foster economic growth, employment and poverty alleviation.

The facility of an enterprises to recognize the value of new, external possibilities is critical to its innovative abilities. This capability suggest that it is largely a function of variety connections with entities ambient. The nowadays discussion focuses on the cognitive basis for the factors that influence innovativeness. The role of diversity of expertise within an organization is crucial component to take a challenge to nowadays management. The actual research on business activity provided some useful insights into the problem of how to create innovative activities by cooperation. Changes on our world lead us to a new era, which is characterized by intense participation of people in the global production. Forms of mass cooperation and co-creation change the exist-

¹ The research was funded by the research project “Innovation of small and medium sized enterprises through the economic crisis – conditions, trends and models” obtained under the competition of the National Center for Science – Opus 5. The project manager is Maciej Zastempowski, Associate Professor UMK.

ing business models. A widespread access to the Internet and modern technologies enable us to jointly undertake innovative actions (Tapscott, Williams, 2008, p. 28).

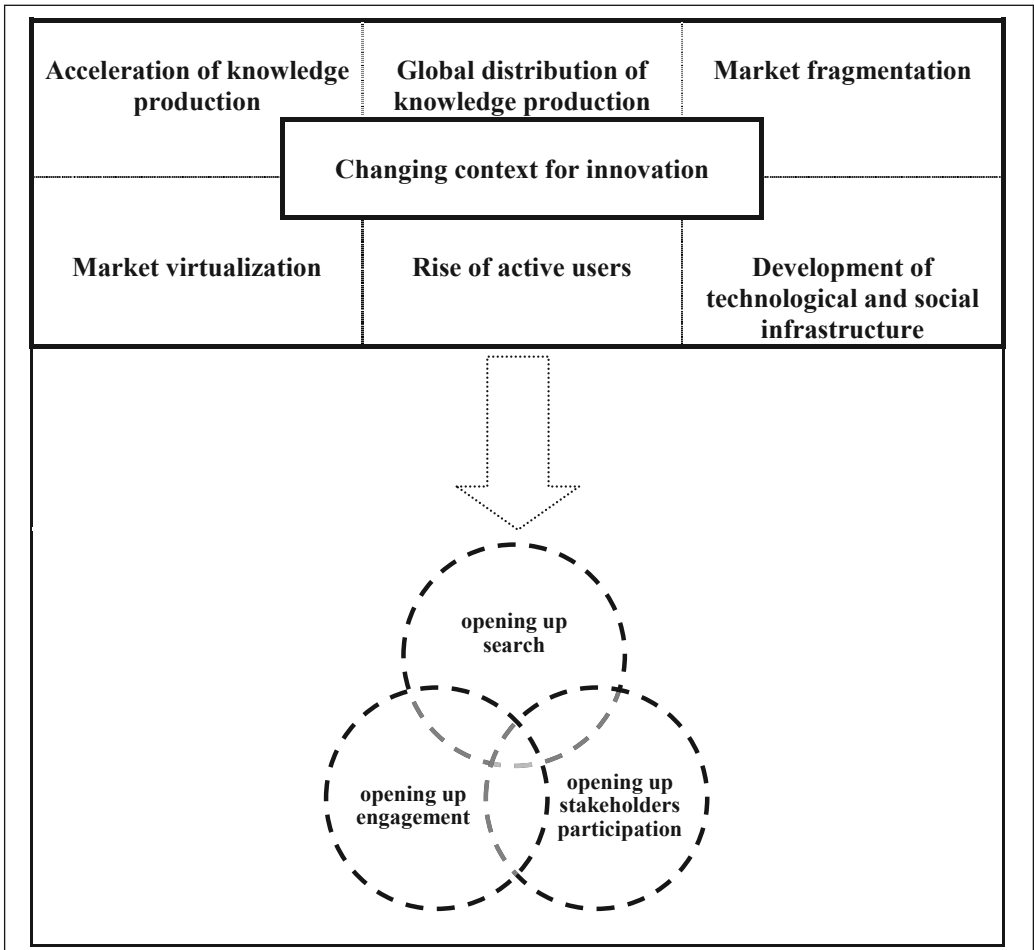
2. Conceptual framework of open innovation

Creating various links between enterprises and other market actors is a part of today's management. The idea of cooperation seemed to be one of the crucial elements that fits to the challenges of the global economy. Rapidly changing the operating conditions, accelerating the technological, political and social progress has determined new rules. The development of contemporary firms enables them to create, develop and commercialize innovations in order to strengthen their market position. Presently, entrepreneurs establish a competitive advantage, thus creating innovativeness is not based only on their own sources (in contrast to the past – based only on own research and development resources). Nowadays, an effective method to achieve a success is to seize the outside opportunities through involving external entities in the processes of creating and implementing innovations. Entrepreneurs are aware of the fact that they are unable to employ only the best workers and that there is often a need to engage employees from outside of the company. Nowadays, it is possible to establish a cooperation with excellent external professionals. The role of such cooperation is emphasized due to a very simple reason, namely, there is no organization which possesses all sources to achieve a stable market lead (Hammel, Prahalad, 1999, p. 156).

Creation of wide and valuable relation with potential partners in innovation process is constantly repeated in the whole world. Certain data demonstrated that factors which differentiate successful or less successful innovating firms are the indicators of, so called, “cosmopolitan approach” of building networks of innovation that follows from the open context of innovation approach (Bessant, Tidd, 2013, p. 265) (Fig. 1).

The leading theory of the open innovation is described as paradigm which “assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology”. Alternatively, it is “innovating with partners by sharing risk and sharing reward”. The boundaries between a firm and its environment have become more permeable, what means that innovations can be easily transferred inward and outward (Chesbrough, 2003, p. 1).

Figure 1. Changing context of innovation



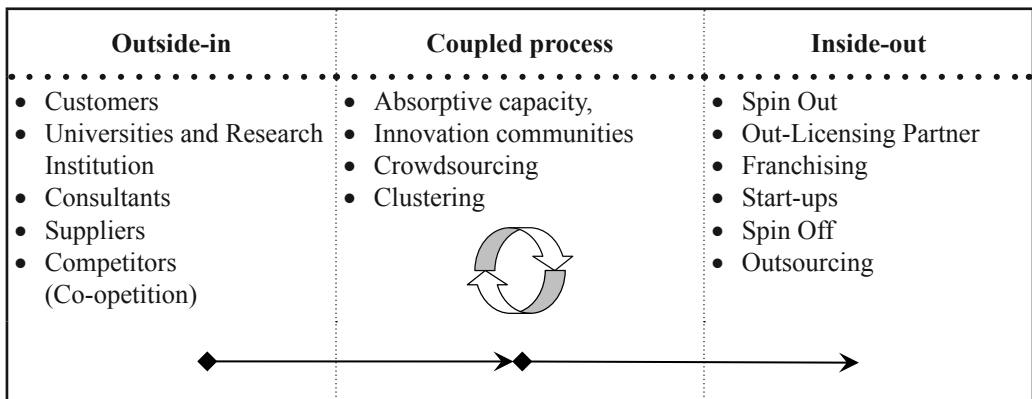
Source: based on Bessant, Tidd, 2013, pp. 266-267.

The open innovation processes combines internal and external ideas altogether in a wide range of platforms, structures and systems used in business models. These models define also the inner workings of certain parts of the stipulate. Basically, the open innovation suggests that the benefits of internal R&D activities are decreasing, and the company is focused rather on reaping the knowledge and experience of numerous external sources (Lameras, Hendrix, Lengyel et al., 2012, p. 13). The open approach to innovation management process emphasizes that the linear sequence of knowledge creation within the limits of the company and its diffusion, deployment and utilization are no longer possible in closed walls of the company, on the contrary, there is a need to go beyond its boundaries. Modern times are called by H. Chesbrough the “era of open innovation”, and are characterized by a quest for knowledge iteratively from a variety of sources, such as suppliers, customers, universities, research laboratories, consortiums, consultants, start-ups, new business units, and competitors (Fasnacht, 2009, pp. 88-93). Enterprises that choose

the outside-in approach are determined to cooperate in order to create new knowledge and ideas which can then be integrated into the firm’s knowledge. The inside-out process can contribute to increasing assets and revenues through commercializing inventions to a number of different industries and markets. It requires firm to allow for unused and underutilized ideas to go outside the organization for others to use in them in their businesses (Fig. 2).

Stimulus to the development of the cooperation is often a need for tangible and intangible assets in the form of agreements or access to unique knowledge or skills. The main activities in terms of collaboration are the replacement of their existing resources, joint acquisition of new resources and joint use of available resources in order to obtain benefits for all partners. The basis for the start of the cooperation is both evaluation of the benefits and risks associated with interaction. In various forms of cooperation entrepreneurs see the opportunity to achieve the objectives, benefits, and perform tasks. It presents many challenges, such as choice of a combination of optimal forms of relationships (Danielak, 2012, pp. 42-44).

Figure 2. Pillars of open innovation model



Source: based on: Lamas, Hendrix, Lengyel et al., 2012, pp.17-23; Meissner, p. 12.

In 2010-2012 a survey was conducted as a part of an international consortium for the European Commission. The aim of the project was called “INNO-Grip” (Global Review of Innovation Policy Studies) and was a large-scale empirical analysis (130,000 firms from 22 European countries) of the open innovation impacts and determinants. The highest number of the firms innovatively active is in countries which are characterized by high levels of R&D. Despite the R&D, intensity National income-levels play a major role. It is also noticeable that those countries, classified as ‘Technology User Countries’, show, as well, relatively high concentrations of innovation active firms. Whereas small firms with a low income and low R&D countries are the least likely to be modernized. In terms of technology sectors, the greatest power of small firms, as measured by the innovation sales ratio, is reserved for the knowledge of intensive services sector. The SMEs engage less in industry search than large firms. The largest disproportion exists in the technology manufacturing and in the cognizance of the intensive services. The results of innovative collaboration presents that there are two types of countries which promote innovative collaboration to a much higher degree than others: that is in countries characterized as technology users and in those characterized by the high levels of R&D, which are technology leading countries.

In these regions, even the SMEs exhibits innovative collaboration above the European average. In high income, but low R&D countries, the SMEs cooperate less strongly than the European average is. Having an international collaboration partner in addition to domestic ones is associated with immense positive effects in innovation performance across the board. Another data shows that effects of science system collaboration have an advantageous impact on enterprises. Small firms derive a larger effect from collaboration than the larger ones in which it is more common. The larger the firm is, the more intensively open innovation practices are used, however, greater benefits through co-innovation derive smaller entities (Ebersberger, Sverre, Iversen, Kimer, Som, 2011, pp. 31-131).

3. Empirical approach

The fragment of the empirical research which has been analyzed in this article was carried out in March and April 2015 in the framework of the research project named “Innovation of small and medium-sized businesses in the economic crisis – conditions, trends and models” obtained under the competition of the National Center for Science – Opus 5.

A total number of 258 SMEs participated the national study. The selected sample of SMEs was chosen in a representative manner in relation to a structure of companies in terms of their size, their number in a given region and NACE section (Fig. 1).

In this paper, we present selected aspects of the results in innovative activities and the use of practices in the field of open innovation.

The innovation of enterprises was considered through the prism of:

- subjective assessment of entrepreneurs;
- the number of new or significantly improved products and services;
- scale of implemented innovations (only for the company, for the market in which they operate, country, Europe, world);
- the number of new processes;
- organizational changes;
- marketing innovations;
- the nature of implemented changes (from a minor to a radical) according to the 4P model (paradigm, product, process, position).

Entrepreneurs asked about innovation answered in the affirmative way in majority – 83% of respondents, while small enterprises had 80% affirmative answers, with medium sized businesses of 95% affirmative responses.

New products were implemented by 61.8% of enterprises. Every fifth of those companies implemented more than six new products in the past two years. Less frequent indications were characterized by improved products and new and improved services (Fig. 2).

Scale of implemented innovations most often refers to the level of the market in which it operates, while 35.7% of companies limit themselves only to own organization, and only 14% of organizations create new solutions in the country. Only 3% of all enterprises are pioneers in the field of new products and services on a European scale, with two entities of the respondents that have implemented an innovation on a global scale, which is 0.0078%.

The use of open innovation has been characterized as efforts to create new solutions through external acquisition or sharing of knowledge, ideas or technologies and implementation of joint

projects in order to increase innovation of a company. In the context of open innovation Polish organizations most often acquire innovations – 46.3%, elaborated knowledge or technology provides 27.6% of companies, and 21.5% of them establish cooperation.

An open innovation index taking values 0-1 was created for the purposes of this study. The new index was used in the study of the correlation between the scale of the use of open innovation and the results of innovative activities.

The correlation study used Pearson's correlation coefficients and Spearman's rank. All of the article correlations are statistically significant. There is a correlation of average strength – 0.327 and 0.365 respectively between the index and open innovation both in the number of new products and innovative companies. The analysis took into account the relationship between open innovation and evaluation of cooperation between business and the environment in the area of creating new solutions, the correlation coefficient also indicates the average strength at the level of 0.339. The strongest impact is characterized by the relationship between the rate of open innovation and the frequency of cooperation – 0.442.

The analysis of innovative activity of Polish enterprises presented above leads to several conclusions. Research indicates that Polish entrepreneurs use open innovation mostly through external sourcing innovation. This indicates the awareness of the need to also look for external sources of innovation that is designed to complement the internal resources of the company. Cooperation for innovation is usually taken with suppliers and customers, it is also best assessed. Enterprises using open innovation on a larger scale are likely to cooperate and to evaluate the cooperation with external entities in a better manner. Based on the study it can be concluded that practices in the field of open innovation will continue to gain in importance. Both EU politics and the growing needs of the environment suggest that there is no other way toward the business' development than a greater openness to cooperation.

4. Conclusion

Innovation is at the heart of modern business and state institutions. Business development will be possible only if it will be able to meet the demands of the modern and changing environment. Ability of a company to use the resources of the external environment increasingly determines its existence. Thanks to the use of practices in the field of open innovation it is possible to implement innovation processes in a more efficient manner. Thanks to the cooperation and obtaining sources of innovation beyond organizational boundaries and sharing out the knowledge or technology entrepreneurs can generate new streams of value. This article aims to characterize the existing correlation between open innovation, which are called new paradigm of innovation management and innovation activities of Polish small and medium-sized enterprises.

Bibliography

1. Abou-Zeid E., Cheng Q. (2004), The Effectiveness of Innovation: A Knowledge Management Approach, *International Journal of Innovation Management*, Vol. 8, No. 3.
2. Bessant J., Tidd J. (2013), *Innovation and Entrepreneurship-second Edition*, Chichester, John Wiley & Sons Ltd.

3. Chesbrough H.(2003), *Open Innovation: The New Imperative for Creating and Profiting from Technology*, Boston, Harvard Business School Press.
4. Danielak W. (2012), *Kształtowanie kapitału relacyjnego w małym i średnim przedsiębiorstwie*, Wrocław, Wyd. Uniwersytetu Ekonomicznego we Wrocławiu.
5. Ebersberger B., Sverre J., Iversen E., Kimer E., Som O. (2011), *Analysis of Innovation Drivers and Barriers in Support of Better Policies. Economic and Market Intelligence on Innovation*, Oslo, PRO INNO Europe: INNO-Grips II report, Brussels: European Commission, DG Enterprise and Industry.
6. Fasnacht D. (2009), *Open Innovation: The New Business Paradigm*, Berlin, Springer Berlin Heidelberg.
7. Hammel G., Prahalad C.K. (1999), *Przewaga konkurencyjna jutra: Strategie przejmowania kontroli nad branżą i tworzenia rynków przyszłości*, Warszawa, Business Press.
8. Lamas P., Hendrix M., Lengyel D. et al. (2012), *Research Review on Open Innovation: Literature Review and Best Practices*, OpEx, www.dropbox.com/s/jig4q0088cruii6/D6.1%20%28FINAL%29.pdf.
9. Tapscott D., Williams A.D. (2008), *Wikinomia. O współpracy, która zmienia wszystko*, Warszawa, Wydawnictwa Akademickie i Profesjonalne.

Chapter 9

Benefits of Clustering in IT Sector

Marcin Szplit, Andrzej Szplit

1. Introduction

Almost everyone knows about The Silicon Valley cluster. In the mid- to late 1990s several successful computer technology related companies emerged in Silicon Valley in California. This led anyone who wished to create a startup company to do so in Silicon Valley. The surge in the number of Silicon Valley startups led to a number of venture capital firms relocating to or expanding their Valley offices. This in turn encouraged more entrepreneurs to locate their startups there (Huber, 2011, pp. 107-126).

It was most successful case of clustering in IT sector. According to this pattern Kielce Technology Park started to build similar organisation, named FutureHUB ICT Cluster.

2. Developing of a cluster

The basis for building knowledge-based economy is the skills and competencies of people and organizations. They depend on the cooperation in between them in the area of the network, including clusters. Clusters ensuring effective transfer, development and practical use expertise in innovation processes completed application and diffusion of innovation in the economy.

Cluster is a geographic group of cooperating and competing companies and related institutions, which represent areas of activity, are complementary.

Clusters also include supporting enterprises, financial institutions, research and development laboratories, as well as companies from close branches (Porter, 2000, pp. 15-34).

A cluster is a geographical area with a high concentration of interrelated firm together (Ibrahim, Fallah, Reilly, 2006, p. 410). In a cluster, there are synergistic effects in the area transfer of knowledge and the development of partner companies participating in the implementation process innovation activities on its premises.

Form clusters, and at the same time competing cooperating with each other defined area participants innovation processes:

1. Enterprises representing industries that form the basis of operation and other complementary resources of their knowledge, potential and innovative skills.

2. Universities, R&D institutes, including the company's spin-off, other providers of knowledge, innovative solutions, professional services, the company intermediary in the transfer of knowledge and innovation, offering support financial innovation (including venture capital, business angels).

Participants use the cluster effect of location; offer them better the possibility of access to new techniques, technology, knowledge, information of the markets. They work together, using complementary knowledge and innovative solutions.

There are 9 steps that must be done to develop the cluster:

1. Demand analysis.
2. Define your cluster/define your goals.
3. Identify basics and requirements.
4. Develop roadmap.
5. Definition of services.
6. Foundation of cluster organisation.
7. Functional/operational action plans.
8. Strategic plan.
9. Review & modify.

In first step Demand analysis there are several questions:

- Who are your customers?
- What do they want?
- Which stakeholders must we align?

From this follows:

- What do we want to achieve with this cluster?
- What do we need in order to achieve targets?
- How will we proceed?

FutureHub ICT Cluster is an association created on the initiative of the Kielce Technology Park in response to the needs of software companies. The mission of the cluster is to build a strong centre of IT industry cooperation/ICT in Poland. The cluster was created to support local entrepreneurs operating in the market of services and solutions for information technology at regional, national and international levels.

The customers of the FutureHub ICT Cluster are companies that are connected to ICT sector. They most important need of customers and members of the cluster are developing a business and make it profitable. It is possible in cooperation with different types of companies involved in ICT sector. FutureHUB need support from universities, research institutions and public administration.

The main goals of FutureHUB are:

1. Cooperation – we support the development of cooperation between businesses, universities, research institutions and public administration.
2. Education – educational and business activities in the creation and development of enterprises of the IT industry/ICT and upgrading skills of current and future employees of companies is a key task FutureHUB cluster.
3. Promotion – the role of the cluster is to promote the offer of its members as well as cluster activities in the country and abroad. The Association supports the activities focused on internationalization and export development.
4. Implementation – we cooperate with the sphere of science and research – development and initiate research and develop – deployment with members of the cluster in the area of IT/ICT.

Target group of FutureHUB are companies that are member of the cluster. They need support in marketing, law and fund raising. The budget of the cluster is build by members and by the activity of Kielce Technology Park. All administrative issue are covered by Kielce Technology Park. Also Technology Park offer form members of the cluster own infrastructure like workspace, office, laboratory as well as software and hardware.

As a result of definition of services FutureHUB build a model (Eisingerich, Bell, Tracey, 2010) for business support. That model activities include as follows:

- access to a database of contacts, clients, customers, experts, IT professionals, help in recruiting workers, apprentices, trainees;
- the opportunity to participate in trade fairs, business meetings, cooperation exchanges, conferences;
- promoting the company through the website cluster, handouts, news;
- access to laboratory services and possibilities for creating and testing innovative products and services;
- assistance in applying for external funding for the implementation of joint projects;
- support activities focused on internationalization and export development;
- representation of cluster members in contacts with the local administration and central authorities, as well as supra-regional and international contacts.

To develop strategic roadmap of long term plans for FutureHUB the most important issue is permanent pool of business angels and venture capital.

3. IT cluster in Poland

IT companies' efforts to improve competitiveness are manifested by creating cluster initiatives. Clusters join enterprises, even these competing with each other, which cooperate basing on the synergy effect in business activities. Examples of the forms of such cooperation are preparing a joint offers, lobbying activities, joint placement of orders or joining distribution channels. Clusters often engage the representatives of science who look for the ways of commercialization of research results, business organizations and local governments interested in enterprise development in their regions.

Table 1. IT and ICT clusters on Poland

Name	Sector of activity	Region of activity (province)
ICT Amber	telecommunications, telephony, information technology	Warmia-Masuria Province
Interizon – Pomerania ICT Cluster	information technology, electronics, telecommunications, automatics and robotics	Pomerania Province
Digital Archiving Cluster	long term data storage	Lubuskie, Wielkopolska, Lower Silesia and Pomerania Province
The ICT West Pomerania Cluster	information technology, telecommunications	West Pomerania Province
FutureHUB	Informatics, telecommunications, education	Świętokrzyskie

Source: own work based on Polish Information and Foreign Investment Agency.

4. Conclusion

In building clusters of the board of cluster should think about the offer for new member. Probably the best way to find new members will the next 5 years until 2020. This is connected with plans presented by European Commission to strengthen cooperation between science and business. Financial support of clusters is a part of European Innovation Policy (http://cordis.europa.eu/innovation/en/policy/communications/innov_comm.html).

Bibliography

1. Eisingerich A.B., Bell S.J., Tracey P. (2010), How Can Clusters Sustain Performance? The Role of Network Strength, Network Openness, and Environmental Uncertainty, *Research Policy*, Vol. 39, Iss. 2.
2. Huber F. (2011), Do Clusters Really Matter for Innovation Practices in Information Technology? Questioning the Significance of Technological Knowledge Spillovers, *Journal of Economic Geography*, Vol. 12.
3. Ibrahim S.E., Fallah M.H., Reilly R.R. (2006), Do Localized Clusters Influence Creation of Inventors, *Creativity and Innovation Management*, Vol. 15, No. 4.
4. OECD study "Competitive Regional Clusters: National Policy Approaches", May 2007, http://www.oecd.org/document/2/0,2340,en_2649_33735_38174082_1_1_1_1,00.html.
5. Porter M.E. (2000), Location, Competition and Economic Development: Local Clusters in a Global Economy, *Economic Development Quarterly*, Vol. 14, No. 1.
6. <http://www.clusterobservatory.eu/>.
7. http://cordis.europa.eu/innovation/en/policy/communications/innov_comm.html.
8. <http://www.europe-innova.org/index.jsp>.
9. <http://www.proinno-europe.eu/>.

Chapter 10

The Analysis of Syndication Impact at the Effectiveness of Venture Investors

Elena Rogova, Alexey Maslyakov

1. Introduction

The objective of this study is to examine the syndication impact at venture investors' performance. Venture investors invest in projects with high growth potential, if projects' initiators can implement this potential. The investments are long-term, and very often projects are at an early stage when their prospects are still uncertain, thus venture capital is characterized with high level of uncertainty and risk, which is rewarded to investors by the opportunity to obtain high yields. To reduce risks, the governance companies of venture funds (venture firms) are applying various different strategies, among which the syndication is usually very popular. According to different studies (Brander, Amit, Antweiler, 2002; Wright, Lockett, 2003; Deli, Santhanakrishnan, 2010), 30% of venture capital investments in Europe and 65% in the US have been syndicated. It should be mentioned that although experts note the growing importance of syndication (Lockett, Wright, 2001), its effectiveness is not studied enough. Syndication is seen primarily as a tool of risk elimination that is based on the classical principles of portfolio theory (diversification reduces risk), but also it is motivated by the idea of information exchange and knowledge-sharing between the partners, which can improve the quality of project selection. At the same time, much less attention is paid to the impact of the syndication at venture investors' performance, which is the subject of this study.

The research is fulfilled by methods of correlation and regression analysis at the sample of more than 7,000 venture firms' deals in the biotech sphere for the period of 2005-2013. The approach to the venture firms' propensity to syndication is developed, as the model of its efficiency assessment on the base of the Long-Nickels Public Market Equivalent indicator.

The paper is organized as follows. The next section discusses the nature of syndication and its role in venture funding. Then we describe the methodology of the research and data sampling methods. Further we present the results of the empirical study. In conclusion, we discuss the results of the study, its limits, managerial applications and directions for further research.

2. Syndication and its role in venture capital investments

A syndicate is understood as a group of subjects taking the decision to act together in the conditions of uncertainty that leads to a benefit distributed between them (Wilson, 1968). In the context of venture capital investments syndication arises when two or more venture capital firms invest in one portfolio company within the same investment round (Brander et al., 2002; Tian, 2012). For venture capital firms one of the main reasons of such behavior is risk reduction due to the portfolio diversification. It is very important for the venture capital market, which possess lower liquidity than a classic stock market and because of this, does not provide investors with a variety of risk limitation tools.

Besides this obvious consideration, the syndication gives the opportunity of information exchanged between venture capital firms, thereby reducing the uncertainty of prospects for investing into specific companies (Lerner, 1994). The news that a VC firm with a good reputation had entered in the deal, is considered as a signal for other investors (Biasis, Perotti, 2003). Also academic papers discuss such motivation for syndication as the increase of successful exits from portfolio companies probability (Hochberg et al., 2007; Das et al., 2011) and more favorable prospects for entry into the new and interesting projects (Manigart et al., 2002).

In addition to financial motives, an informal knowledge transfer is very important. Such knowledge, increasing in the process of syndication, can improve the quality of project selection and to provide more qualified help to portfolio companies from venture capital firms (Casamatta, Haritchabalet, 2007). A synergistic effect appears: if a venture capital firm, due to its knowledge and experience, is able to increase the value of the project and its probability of success, the value growth related to the volume of investments would be higher if several firms specializing in different aspects of the project would invest together. Also, the synergistic effect may be expressed in the reduction of investment costs of syndicated transactions as a result of mutual learning (Chemmanur, Tian, 2011).

Alongside with the benefits of syndication, the academic literature discusses its drawbacks – the complexity of syndicated deals closing, the risk of unfair behavior of partners, and the emergence of competition between the partners (Sharifzadeh et al., 2012). Moreover, the syndication can lead to an increase of failures probability. For example, if a portfolio company does not meet the expectations of the syndicate, the individual investors due to their own resource constraints begin to pay less attention to it, shifting the responsibility to others whose behavior may be the same (Dimov, De Clercq, 2006).

The motives that make venture investors to syndicate are well understood. However, much less attention in the academic literature is given to the impact of the syndication at the performance of venture investors, and, in the first turn, at profitability, which is a reward for the high risk of such investments.

3. Methodology and data sampling

To evaluate the effectiveness of venture capital investments, it is necessary to compare them with yields that investors could earn for the comparable time period at the stock market. In order to assess the returns at the stock market, the criterion of time weighted return (TWR) could be ap-

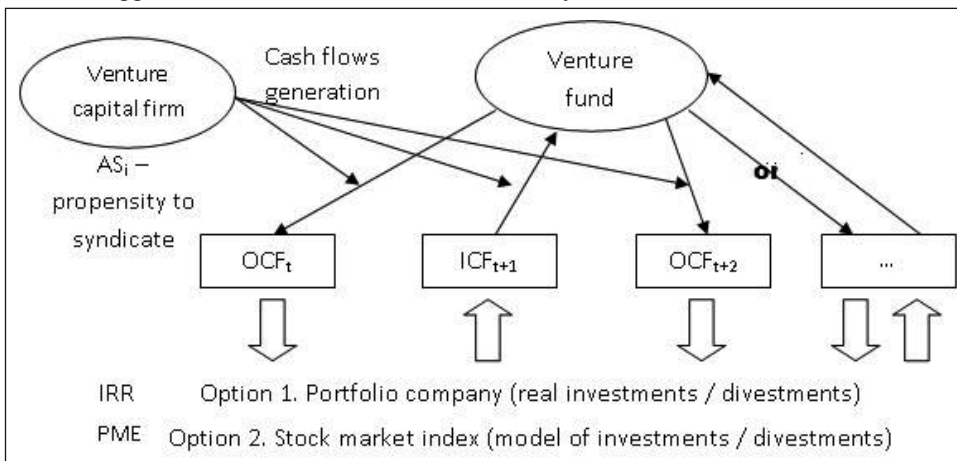
plied (Rouvinez, 2003). TWR is defined as the geometric mean of periodical returns obtained for the sub-periods ($i = 1, N$) at the portfolio R_i :

$$TWR = \prod_{i=1}^N (1 + R_i) - 1. \tag{1}$$

TWR ignores the uneven distribution of cash flows related to the initial object of investment over time, which is typical for venture capital investments, because of the additional inflows in various rounds of investments and exits from portfolio companies. To overcome this limitation of TWR, in this study we propose an analysis of venture investments returns on the base of a comparative profitability index which is called a Public Market Equivalent (PME) (Long, Nickels, 1996). It is compared with the internal rate of return (IRR), which could be gained by investing in the stock market index in the periods when the venture capital fund obtains investments and divesting in the periods when the fund returns money to investors. Similar approach for venture capital firms whose investments analyzed in this paper is to assess cash inflows when a firm is investing in portfolio companies and cash outflows at the exit through the sale of a share or IPO.

Thus, our approach is based upon the comparative analysis of returns gained by venture investors and investors' returns at the stock market. This approach is represented by Fig. 1.

Figure 1. An approach to venture investors' returns analysis



Source: own work.

Each venture capital governs funds and is making decisions on investing money from these funds to portfolio companies. At the moment of investing, the cash flow from a fund is directed to portfolio companies, which in the PME model corresponds to the acquisition of shares (index) at the same value (outcome cash flow, OCF). At exit, cash from portfolio companies is returning to the fund, which indicates the success of a deal (income cash flow, ICF). At this time, the shares in the PME simulation model are put for sale. Thus, in the simplest case, when the venture capital

firm at time t is investing in a portfolio company, and at the time $t + 1$ comes out of it, we have the following equation:

$$\frac{ICF_{t+1}}{OCF_t} = OCF_t \times \frac{I_{t+1}}{I_t} \times k, \quad (2)$$

where $\frac{ICF_{t+1}}{OCF_t}$ is the return at the venture capital market;

$\frac{I_{t+1}}{I_t}$ is the return on investments in the stock market (index);

k is the multiple, reflecting the excess of the returns at the venture capital market at the returns on the market index.

The obvious limitation of the approach is that multiple k equals to 0 for investments in portfolio companies, from which the exit has not been performed, and the probability of a successful exit for venture capital market is small. For example, 44% of venture capital investments in biotechnologies industry end with failure and complete or partial loss of assets invested (Cockburn, 2004). To overcome this limitation, it is expected that the capital frozen in the investee company for a long time, is at risk, and the expected return on investments is diminished at the default probability of the portfolio companies. This assumption allows us to calculate the value of k for all deals in the sample.

To determine the propensity of participants to syndicate, we developed a deal syndication index, DSI , similar to Herfindahl-Hirschman index:

$$DSI = \sum_{i=1}^n S_i^2, \quad (3)$$

where S_i is the share of participant i in the whole volume of investments for a syndicated deal.

The index value of 10,000 means that only one investor completed the deal (no syndication). A high score means that one of the venture investors was a leading player in the deal, and shares of the remaining participants were negligible. Low values indicate a more uniform distribution of the investments between the syndicating funds. Unlike other approaches, e.g. (Dimov, De Clercq, 2006), this approach takes into account the structure of a syndicate.

Further we calculated a fund syndication index for each deal as follows:

$$FSI_{i,j} = \frac{S_i^2}{DSI_j}, \quad (4)$$

where $FSI_{i,j}$ denotes a fund syndication index for venture fund i in the deal j .

To estimate the total investment behavior of a fund, fund syndication indexes in certain deals were averaged. The example of such calculation is presented in Table 1.

Table 1. An example of calculation of the tendency to syndicate

	Fund 1	FSI ₁	Fund 2	FSI ₂	Fund 3	FSI ₃	DSI	Character
Deal 1	20%	0.06	0%	0	80%	0.94	6,800	High level of concentration
Deal 2	25%	0.17	50%	0.66	25%	0.17	3,750	Moderate level of concentration
Mean	—	0.115	—	0.66	—	0.555	—	—
Behavior	Low level of participation (portfolio diversification)		No specific behavior		Concentration at a certain deal (leading investor) with portfolio diversification in others			—

Source: own work; VentureXpert database.

A propensity of individual funds to syndicate by grouping funds firms and averaging the indexes for the syndication fund is converted into venture capital firms' syndication indexes, which is calculated separately for each venture capital firm.

The sampling was made with VentureXpert database. The initial sample consisted of 7,290 deals for the period from January 2005 to December 2013. The biotechnology industry was selected, where syndication was strongly expressed because of the complexity of business models. Further, deals that had not provided with data on the amount of investment, venture capital firm, and (or) the fund involved in the transactions, were excluded from the sample. As a result, the number of deals amounted to 5,420; the total amount of funds involved was 2,864, they were governed by 1,647 venture capital firms that invested in 2,096 portfolio companies. By analyzing the amount of co-investing firms in each round, and the share of the participation of each company there was calculated a venture capital firm syndication index for each venture capital firm.

In parallel, the data were collected on the exits from the portfolio companies: a type of exit, the period before the exit, exit date, the total revenue from the exit. For the period of the study, exits were made from 342 portfolio companies (16% of the sample). 27% of exits were excluded from further analysis, as they did not provide with data on companies' value at the exit date.

These two data sets became the basis for calculation the returns on venture capital investments. For each deal (and for each venture capital firms in the sample) the multiple k, characterizing its effectiveness in comparison with the market index, was calculated. For the market index, chosen the iShares NASDAQ Biotechnology Index, aggregating the shares of companies from the biotechnology and biopharmaceutical industries, with trading session at the NASDAQ, was chosen.

4. Empirical study results

The descriptive statistics on VC firms syndication indexes is presented in Table 2.

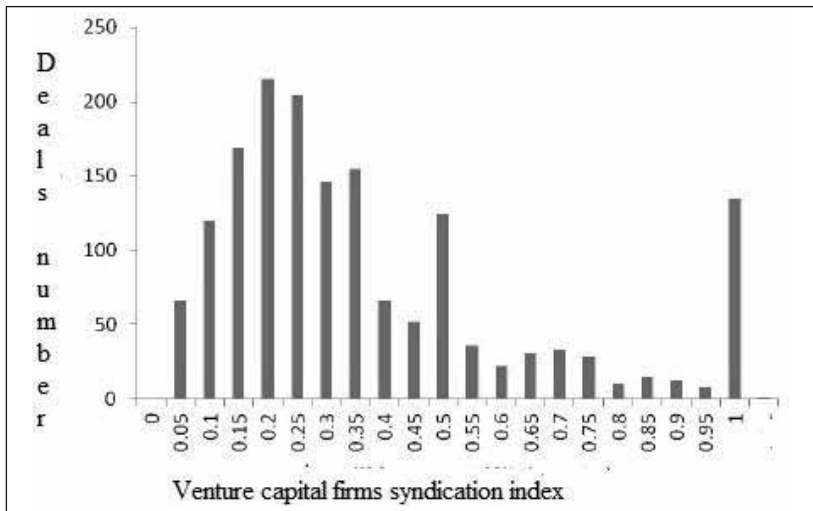
Table 2. Descriptive statistics on VC firms syndication indexes for the sample

Mean	0.355083
Median	0.266683
Standard deviation	0.267666
Variance	0.071645

Source: own work.

The histogram of the frequency distribution of the averaged venture capital firms syndication index is presented at Figure 2.

Figure 2. The frequency distribution of the venture capital firms syndication index



Source: own work.

The conclusion could be made on the high level of an overall degree propensity to syndication for venture capital firms in the biopharmaceutical industry. More than 80% of deals were performed with the participation of the fund at 50% or less in the total amount of investments in the deal.

The descriptive statistics on multiple k is presented in Table 3.

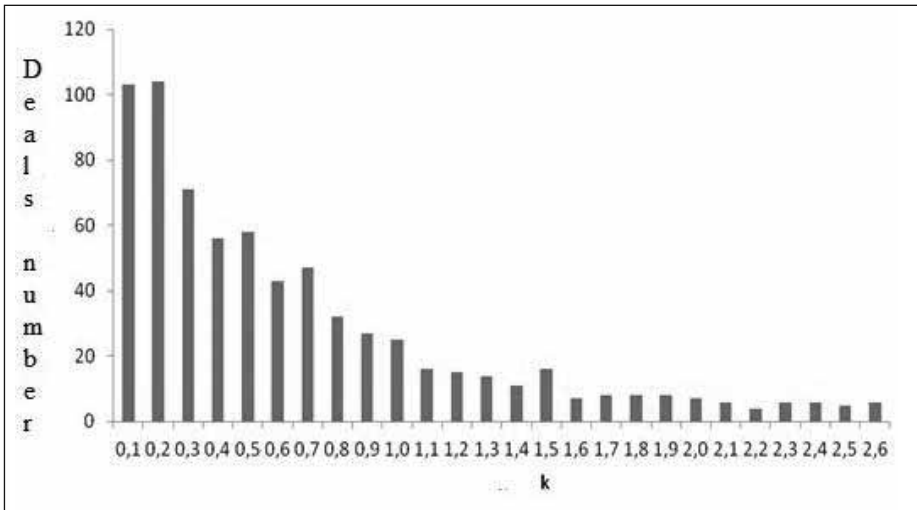
Table 3. Descriptive statistics on multiple k for the sample

Mean	1.315165
Median	0.685914
Standard deviation	2.818677
Variance	7.944939

Source: own work.

The histogram of the frequency distribution of multiple k is presented at Figure 3.

Figure 3. The frequency distribution of multiple *k*



Source: own work.

The analysis demonstrates that only 20% of deals bring a higher return than the stock market.

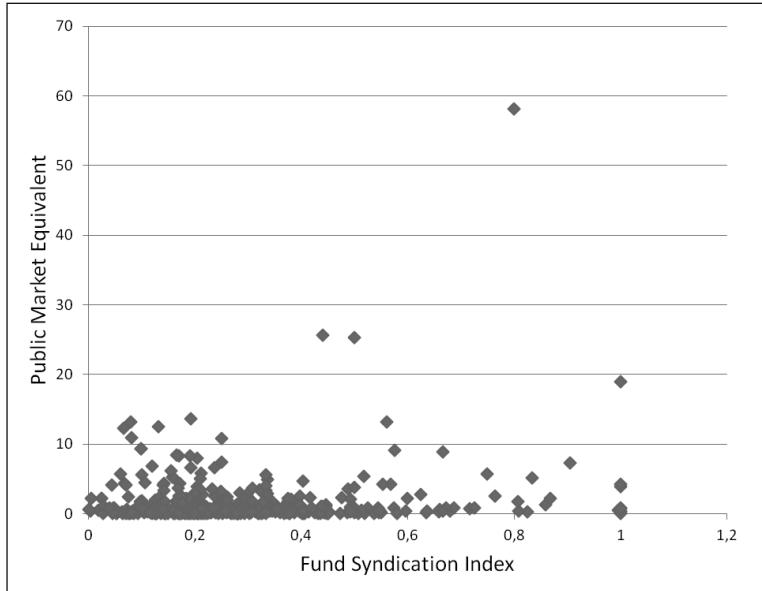
Correlation analysis between the PME data and the syndication index (Fig. 4) revealed that the effect of syndication at the performance of venture capital investors is insignificant and cannot be considered as a decisive factor of their success. For further analysis an econometric model was developed that considers syndication together and in comparison with other factors that may have an impact at the performance of venture capital investors. The factors for the model are presented at Table 4.

Table 4. Characteristics of the model

Factor	Description	Characteristic
FSI	VC firm syndication index (0-1)	VC firm’s activity in investors attraction to its own deals or deals of other VC firms
NO_FUND	Number of venture funds governed by a VC firm (1-22)	The scope of VC firm’s activity
NO_DEAL	Number of deals through the period of observation (1-20)	Investments activity of VC firm
LN_TCAPITAL	Natural logarithm from the whole capital governed by a VC firm	VC firm’s ability to attract money from investors
INV_CAPITAL	Volume of capital invested through the period of observation (\$ 0.2 mln – \$ 33 mln)	Firm’s resources and activities in their investing
AGE	Average age of a VC firm at the moment of transaction (1-53)	VC firm’s experience

Source: own work.

Figure 4. The correlation between PME and FSI



Source: own work.

On the results of the model testing non-significant variables were excluded, and model characteristics were improved through the changes in its specification. The final model is presented in Table 5.

Table 5. The final model for assessment the syndication impact at PME

Dependent Variable: LOG(PME)				
Method: Least Squares				
Sample: 1 710				
Included observations: 710				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
NO_DEAL	-0.118606	0.006741	-17.59544	0.0000
LOG(INV_CAPITAL)	0.634219	0.023369	27.13921	0.0000
FSI	0.134933	0.075501	1.787176	0.0743
C	-1.053800	0.043094	-24.45375	0.0000
R-squared	0.515314	Mean dependent var		-0.539636
Adjusted R-squared	0.513255	S.D. dependent var		0.743323
S.E. of regression	0.518595	Akaike info criterion		1.530232
Sum squared resid	189.8723	Schwarz criterion		1.555951
Log likelihood	-539.2322	Hannan-Quinn criter.		1.540167
F-statistic	250.2046	Durbin-Watson stat		1.682266

Source: own work.

The following conclusions could be made from the modeling:

1. The number of deals affects negatively at the performance indicators, that may be associated with a decrease in the quality of project management. As stated in (Dimov, De Clerq, 2006), venture capital firms, due to limited resources, focus on the most successful projects, often neglecting the projects with a lower probability of success. As the share of really successful projects in the total number of projects is small, it can be assumed that the increase in the number of deals that is directly related to the increase in the number of portfolio companies reduces the efficiency of resource use venture capital firms.
2. The total amount of capital employed has the greatest impact at the performance. It seems logical that if the venture firm provides more investments for their projects, the success rate increases, which would reflect positively at the firm performance.
3. Syndication has high significance and affects strongly the investors' activities. But because the increase in the syndication index leads to a reduction in the propensity to syndication, its impact on the performance of venture capital firms is negative.

5. Conclusion

The results of the empirical study have confirmed the importance of syndication and its negative impact at the performance of venture capital investors. For further research other industries may be involved and examined. A separate area of study may be related to risks associated with syndicated deals, which were not closed at the period of observation.

The results can be used in Russia. Despite the small volume and the closeness of venture capital market, it quite clearly demonstrates a trend to an increase of the syndication propensity. According to the Russian Venture Company (*Analytical Review...*, 2013), in 2012 the total volume of syndicated deals reached USD 857.2 million, compared with USD 414 million in 2011. In 2013 and 2014 the trend towards syndication has increased. The main reasons for this were, on the one hand, the geopolitical risks, which caused a decrease in the inflow of foreign investment. On the other hand, members of the Russian venture community intended to improve communications and increase the level of mutual trustiness, which also contributes to the syndication. Although today the number of transactions for the study of the impact of syndication at the Russian venture market is too small, as the industry develops, the findings of this study may be useful for building the investment strategy of venture capital funds.

Bibliography

1. *Analytical Review of Syndicated Venture Deals and Crowd-investing 2013*, Moscow, Russian venture company, http://rusbase.vc/media/upload_tmp/pbk_2013_01_2.pdf [22.03.2015].
2. Biasis B., Perotti E. (2003), *Entrepreneurs and New Ideas*, Discussion paper, Toulouse University and CEPR, University of Amsterdam and CEPR.
3. Brander J., Amit R., Antweiler W. (2002), Venture-Capital Syndication: Improved Venture Selection vs. the Value-Added Hypothesis, *Journal of Economics & Management Strategy*, No. 11(3).
4. Casamatta C., Haritchabalet C. (2007), Experience, Screening and Syndication in Venture Capital Investments, *Journal of Financial Intermediation*, No. 16.

5. Cockburn I. (2004), The Changing Structure of the Pharmaceutical Industry, *Health Affairs*, No. 23(1).
6. Das S.R. et al. (2011), Polishing Diamonds in the Rough: The Sources of Syndicated Venture Performance, *Journal of Financial Intermediation*, No. 20(2).
7. Deli D.N., Santhanakrishnan M. (2010), Syndication in Venture Capital Financing, *Financial Review*, No. 45(3).
8. Dimov D., De Clercq D. (2006), Venture Capital Investment Strategy and Portfolio Failure Rate: A Longitudinal Study, *Entrepreneurship Theory and Practice*, No. 30(2).
9. Gompers P.A., Lerner J. (2001), The Venture Capital Revolution, *The Journal of Economic Perspectives*, No. 15(2).
10. Hochberg Y.V., Ljungqvist A., Lu Y. (2007), Whom You Know Matters: Venture Capital Networks and Investment Performance, *The Journal of Finance*, No. 62(1).
11. Korteweg A., Sorensen M. (2010), Risk and Return Characteristics of Venture Capital Backed Entrepreneurial Companies, *Review of Financial Studies*, No. 10.
12. Lerner J. (1994), The Syndication of Venture Capital Investments, *Financial Management*, No. 23(3).
13. Ljungqvist A., Richardson M. (2003), The Cash Flow, Return and Risk Characteristics of Private Equity, *NBER Working Paper Series*, January, <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.201.2476&rep=rep1&type=pdf> [18.03.2015].
14. Lockett A., Wright M. (2001), The Syndication of Venture Capital Investments, *Omega*, No. 29.
15. Long A.M., Nickels C.J. (1996), *A Private Investment Benchmark*, AIMR Conference on Venture Capital Investment, http://alignmentcapital.com/pdfs/research/icm_aimr_benchmark_1996.pdf [22.01.2015].
16. Manigart S., Lockett A., Meuleman M., Wright M., Bruining H., Landström H., Desbrières P., Hommel U. (2006), The Syndication Decision of Venture Capital Investments, *Entrepreneurship Theory and Practice*, No. 30(2).
17. Rouvinez C. (2003), Private Equity Benchmarking with PME+, *Venture Capital Journal*, August, 34-38, http://www.capdyn.com/newswriter_files/private-equity-international-aug2003.pdf [22.01.2015].
18. Sharifzadeh A., Walz U. (2012), Syndication of VC Investments, Governance and Contract Design [in:] *The Oxford Handbook of Venture Capital*, (ed.) D. Cumming, Oxford, Oxford University Press.
19. Wilson R. (1968), The Theory of Syndicates, *Econometrica*, No. 36(1).
20. Wright M., Lockett A. (2003), The Structure and Management of Alliances: Syndication in the Venture Capital Industry, *Journal of Management Studies*, No. 40.

Chapter 11

The Strategic Development of Ukraine's Hospitality Industry in Terms of Globalization

Lyudmyla Zavidna

1. Introduction

In the period of strengthening globalization and world integration processes our domestic hospitality branch is becoming the infeasible part of the world hospitality industry. Successful operation and supplying continuous development of hospitality enterprises are the prime task in the conditions of market economy and dynamically uncertain and unstable environment. In such circumstances the system of strategic development should have more various methods to resist than expected amount of negative changes that may occur in the environment (Malska, 2009, pp. 36-37).

Any country requires having an appropriate level of hospitality industry development as it supports the reactivation of all the social and economic contacts and relationships, it also strengthens economic potential of regions and improves the image of a state, its particular cities in the international community.

Theoretical basis and practical recommendations regarding the strategic development of hospitality enterprises and problems of strategic management of hospitality enterprise was researched in scientific works of national and foreign authors: V. Azara, R. Braymera, M. Boyko, O. Bondarenko, O. Vynohradovoyi, S. Drahuntsova, O. Durovycha, T. Doroshenko, M. Kabushkina, N. Kuznyetsovoyi, N. Kutsenko, L. Luk'yanovoyi, A. Mazaraki, T. Maruschaka, S. Melnychenko, H. Munina, S. Nalyvaychenko, L. Nechayuka, M. Novak, Yu. Opanaschuka, H. Pyatnytskoyi, Kh. Rohlevoyi, N. Sviridovoyi, T. Tkachenko, D. Uokera, S. Tsokhly, O. Chudnovskoho, I. Yakovenko and others.

2. Solving of the problem

The modern hospitality industry has been developing rapidly in Ukraine and has become a welcome and profitable branch. According to the United Nations World Tourism Organization

(UNWTO) and the statistical data of the World Bank Ukraine is included to the top 15 world leaders and the top 10 European countries as to the amount of involved tourists. Annually more than 20 million foreign guests visit our country (<http://ru.osvita.ua/vnz/reports/management/15286/>). According to the State statistical reporting 24.7 million tourists visited Ukraine in 2013, this amount increased by 1.7 million comparatively 2012, and this difference equals 7.2%. Their total costs amounted about 4.8 billion \$, therefore an average sum left by each overseas tourist in Ukraine is about 200\$. Tourists considered Lviv, Odesa and Kyiv the most attractive cities.

According to the data of the State Statistics of Ukraine in 2013 the number of hotels and similar types of accommodation increased 2.07 times comparing to 2010 and amounted 3,582 units. According to information given in Table 1, starting since year 2011 the quantity of economic agents in sphere of hospitality business began to grow rapidly (on 82.7% comparing to 2010 year) and made 3,162 (<http://www.ukrstat.gov.ua/>). The increase in growth rate was explained by necessity to provide the conduction of Euro 2012.

Table 1. Dynamics of quantity of hotels and similar accommodation facilities in Ukraine during 2008-2013 years

Period	Quantity of hotels and similar accommodation facilities, units	Increase rate, %	Number of beds, ths.	Increase rate, %	Number of accommodated persons, ths.	Increase rate, %
2008	1,595	12.3	162.0	19.8	4590.1	0.7
2009	1,684	5.6	176.4	8.9	3622.2	-21.1
2010	1,731	2.8	186.6	5.8	4047.8	11.7
2011	3,162	82.7	154.2	-17.4	4656.8	15.0
2012	3,144	-0.6	162.8	5.6	4983.9	7.0
2013	3,582	13.9	179.1	10.0	5467.8	9.7

Source: arranged by the author.

In general potential of hotels and similar accommodation facilities there were 89,685 rooms with total capacity – 179,104 beds (Tab. 1 and 2), the biggest part of them (53.5%) made rooms of the first category, rooms of de luxe category made 16% of the total accommodation fund (<http://www.ukrstat.gov.ua/operativ2013/tur/zr/>).

The total capacity of hotels in Ukraine, starting since year 2008 up to and including 2010 was intensively growing, but in year 2011 there was a significant decrease of 17.4%. The situation improved in 2012 and this positive trend remained unchanged until 2014.

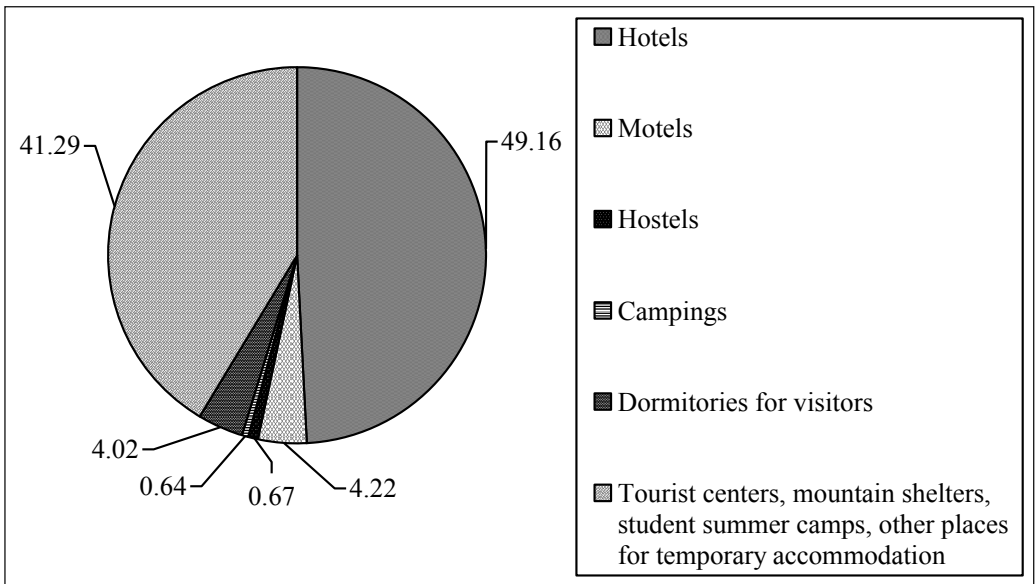
According to functional structure of hospitality industry enterprises on territory of Ukraine the services of temporary accommodation in 2013 were provided by 1,761 hotels, 151 motels, 24 hostels, 23 campings, 144 dormitories for visitors and 1,479 tourist center, mountain shelters and other places for temporary accommodation (http://www.ukrstat.gov.ua/operativ/operativ2013/tur/zr_u.html/). The largest share is occupied by hotels – 49.16% and 41.29% tourist centers, mountain shelters and other places of temporary accommodation (Fig. 1), which along with the traditional hotel industry enterprises offer to their clients the complete complex of services connected with reception, accommodation, catering and servicing.

Table 2. Quantity of hotels and similar accommodation facilities by types, capacity and visitors serviced in 2013 year

Types	Totally, од	Quantity of beds, pieces	Quantity of services visitors		
			In total	Including foreign visitors	
				persons	%
Hotels and similar accommodation facilities	3,582	179,104	5,467,815	1,276,132	23.3
Hotels	1,761	116,003	4,492,864	1,168,109	26.0
Motel	151	4,391	140,221	4,947	3.5
Hostels	24	662	33,299	6,423	19.3
Campings	23	598	11,077	728	6.6
Dormitories for visitors	144	10,346	150,028	7,502	5.0
tourist centers, mountain shelters, student summer camps, other places for temporary accommodation	1,479	47,104	640,326	88,403	13.8

Source: arranged by the author.

Figure 1. Distribution of hotel industry enterprises by types in 2013 year, %

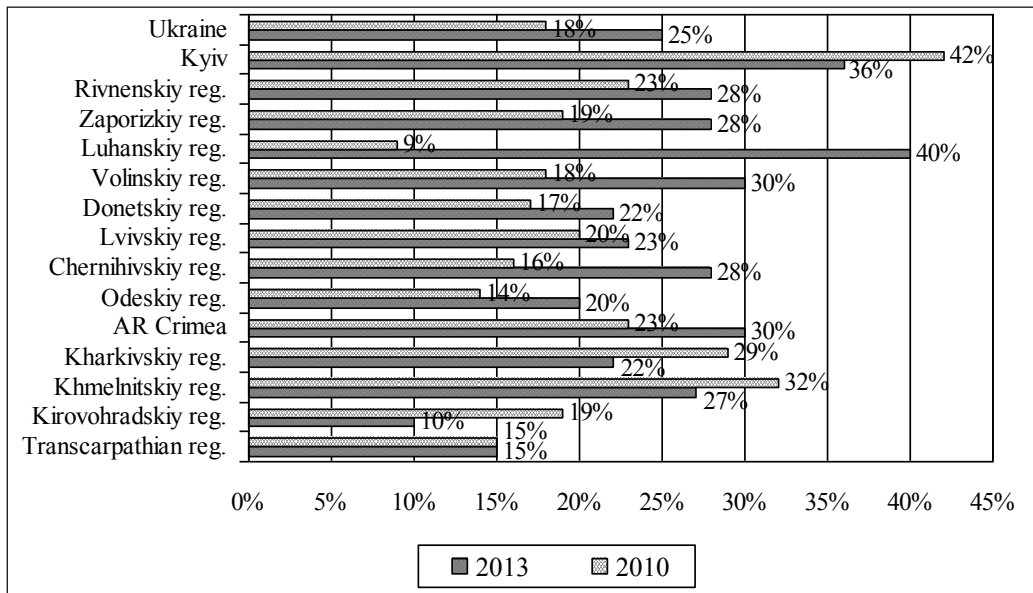


Source: arranged by the author according to information (http://www.ukrstat.gov.ua/operativ/operativ2013/tur/zr_u.html/).

But as in any other branch of economy the hospitality industry is characterized having unstable development trends which depend on the seasonal fluctuation of demand and inability

of storing hotel product, rising prices on services and insufficient level of service quality together with low elasticity of demand at price change. According to WTO results an average hotel occupancy in the world amounts 65-75%. In Ukraine this indicator varies from 10% in Kirovogradskiy region to 36% and 40% in Kyiv and Luganskiiy region respectively (Fig. 2). In general in Ukraine the hotel enterprises occupancy didn't exceed 25% of capacity; the share of unprofitable enterprises in the total hotel enterprises quantity amounted 30% (<http://www.sworld.com.ua/simpoz2/141.pdf>).

Figure 2. The loading level of hotels and similar accommodation facilities in Ukraine, %



Source: arranged by the author according to information (<http://www.smallhotels.com.ua/>).

The hotel service market of Ukraine mostly consists of small hospitality enterprises (92%), middle hotel companies make 6.6 % and the large ones make 1.4 %. The association of small hotels and apartments in Ukraine determines the hotel with 100 beds accommodation availability as the small hospitality enterprise.

The total profit of hotels and similar accommodation facilities in 2013 amounted 102.9 million UAH, that is 1.5 times more than in previous year, including 83.8 million UAH – profit from providing actually hotel services. The major hotel activity (selling rooms) earned the income of 42%, and providing extra services earned the income of 17.2% (<http://www.sworld.com.ua/simpoz2/141.pdf>).

One of the main preconditions for hospitality industry development in Ukraine is creating a favourable investment policy and searching finance sources for construction of new enterprises and for restoring operating establishments.

According to the results of 2011 year the economic agents directed 2934.7 millions UAH in developing of hotels and other temporary accommodation facilities, making investments into the fixed assets. In comparison with 2010 it showed 156.9% growth of investments. Still when

evaluating the situation from the point of view of investors' readiness to make further capital investments in hotel real estate objects, it should be noted, that after hotel "boom" caused by Euro-2012, at present moment there is rather disturbing negative trend in Ukraine connected with the slowdown of capital investments in development of hotel business. The proof of this is the gradual reduction in index of capital investment in development of hotels and similar accommodation facilities from 118.9% in 2011 to 82.7% in 2013 year (refer Tab. 3).

Table 3. Capital investments in activity of hotels and similar accommodation facilities in 2010-2014 years

Indicators	Years				
	2010	2011	2012	2013	January-March 2014
Volume of investments in activity of hotels and similar accommodation facilities, millions UAH	1,870.4	2934.7	2,117.0	1,858.3	266.9
Index of capital investments in hotels and similar accommodation facilities, %		118.9	103.1	82.7	118

Source: arranged by the author according to information (<http://www.ukrstat.gov.ua/>).

The above mentioned trend could be clearly demonstrated on example of capital market of hotel real estate. It should be mentioned that the average annual growth rate of total room fund of Kiev city made in average 3-5%. Starting since 2013 year the volume of investments and consequently the supply have significantly decreased: so during 2013 year only 3 new hotels were opened in Kyiv, while in the end of this year there were near 10 hotel projects on different stages of realization. This fact, in our opinion, means only that the plenty of investors do not have guarantees of stability and security for investing their capital in objects of real estate in Ukraine. This forces them to observe cautious investment policy, which involves minimizing the risk of capital losses (<http://realt.aviso.ua/uk/news?id>).

Prospects for development of the hotel business in Ukraine are closely connected with tourist business. Positive forecast is probable in case of increase inflows of foreign group and individual tourism. The experts assume that Ukraine has high estimates and positive feedback from international rating agencies: Globe Spots, National Geographic, Trip Advisor, The Lonely Planet, which after conduction of "Euro-2012" raised tourist forecasts for country from "outsider" to "must see" and changed perception of Ukraine to the level of popular tourist destinations (<http://jll.com/news/225/jll-hotel-investment-outlook/>).

Thus, according to Program of tourism development in Kiev city about 2.279 thousands of additional rooms of high and medium price range should be released on capital market till the end of 2015 year, which should increase the current supply on 83%.

Among other aspects of country's hotel market development we should admit the increase of quantity of international hotel operators on the market: the first hotels under administration of Wyndham Hotel Group (Ramada Encore Kyiv) and Fairmont Raffles Hotels International (Fairmont Grand Hotel Kyiv) opened doors to their visitors in 2012 year. Besides the expan-

sion of hotel brands line took place under administration of international operators present on the market: InterContinental Hotels & Resorts, manager of the hotel Intercontinental, the first hotel under brand Holiday Inn was opened in Kiev, and operator Carlson Rezidor Hotel Group, who develops the hotel network Radisson Blu, announced about the opening of hotel under brand Park Inn in 2013 year.

On the nearest 3-4 years near 11 hotel projects were declared for realization in 2017: these are hotels under the brands that were not yet presented in Ukraine: Swisshotel (2015), Hilton (2014), Renaissance (2014), Sheraton (2014), Aloft (2015), Best Western (2016). In case these projects will be implemented, it will help to increase the amount of supplied room fund in the capital by 23.1% (www.lhonline.com/green/housekeeping/innovation_hotel_products.ru).

But unfortunately the events of late 2013 – early 2014 years in Ukraine do not give grounds for optimistic forecasts in development of hotel real estate market. The main reasons for such situation, in our opinion, are the following:

1. Deep political crisis in the country that already has serious economic consequences.
2. Deterioration of economic situation and reduction of economic stability in the country.
3. Impossibility to predict the market conditions in key segments of the financial market (currency, credit, capital market and so on). Hence the sharp fluctuations of the national currency and interest rates on long- and short-term credits. In such conditions the attraction of long-term financial resources for funding of hotel projects realization becomes significantly complicated or even impossible.
4. Availability of preconditions for limiting the possible inflow of investment resources is connected with increase of fund investing risk level. Readiness of potential investor to input the funds is primary conditioned by his confidence regarding those funds return considering the expected rate of profitability. At present moment neither investor has such confidence. It forces them to hold “waiting position”, and in some cases even freeze the development of already launched hotel investment projects.
5. Carrying of military operations within territory of the country, which causes the decrease in tourist attractiveness of Ukraine for foreign tourists. This situation creates preconditions for reduction of foreign tourist flow and the number of business travellers, who form the demand on services of hotel companies. And as we already know, the demand reduction leads to decrease in room fund offers.

Elimination of these reasons will create preconditions for the inflow of “live” capital in sphere of hotel business and will contribute to further expansion of potentially high opportunities of Ukraine regarding the development of hospitality industry in the future.

The implementation of strategic development of the company in hotel business is possible only if the company is strategically oriented, where the staff has strategic thinking, where the system of strategic planning exists, which gives possibility to develop and apply an integrated system of strategic plans, while current activity is aimed at achieving strategic goals.

3. Conclusion

For provision of effective functioning of hotel business companies it is required to have the scientific justification of their development strategies, which correspond with advanced world experience and successful practice of national leading enterprises.

In order to eliminate these negative factors, as well as for strategic development of hotel industry of Ukraine, it would be reasonable to:

- elaborate and implement a national strategy for development of tourism industry, the main focus of which will be on developing and promoting the new tourist routes on international market;
- balance the pricing and quality of basic and additional hotel services;
- develop and implement innovative measures for individualization of hotel product of each company and form new national brands on hotel service market of Ukraine;
- deepen the specialization and conceptualization of hotel facilities;
- form international hotel chains and consortiums under the influence of globalization;
- provide the personification of servicing and focus on customer's needs and requests;
- provide the diversification of services;
- introduce computer technologies into hospitality industry.

Globalization and concentration of hotel business is manifested in creation of large corporations and hotel chains. This approach gives hotel companies a possibility to regroup and concentrate additional resources for development of their business.

Therefore, the proposed measures will promote the competitiveness of hotel industry of our country and will adequately represent the national hotel product on international level.

Bibliography

1. *How the Crisis Influenced the Hotel Real Estate in Ukraine?*, <http://realt.aviso.ua/uk/news?id=265504d9-3a83-4f65-ba9e-60f3717e4f95>.
2. *Innovation in Hotel Products and Services*, http://www.lhonline.com/green/housekeeping/innovation_hotel_products.ru [12.03.2015].
3. Malska M. (2009), *Hospitality Business: Theory and Practice*, Centre of Educational Literature.
4. *Modern Trends of the Development of Ukraine's Hospitality Market*, <http://www.sworld.com.ua/simpoz2/141.pdf> [09.02.2015].
5. Report of Company Jones Lang LaSalle (2014), *Hotel Investment Outlook*, London, Jones Lang LaSalle, <http://jll.com/news/225/jll-hotel-investment-outlook/> [28.01.2014].
6. State Statistics Service of Ukraine, *Capital Investments by Types of Economic Activity (KVED-2010)*, <http://www.ukrstat.gov.ua/> [12.05.2014].
7. State Statistics Service of Ukraine, *Collective Accommodation Facilities in 2008-2009 Years*, <http://www.ukrstat.gov.ua/> [27.03.2014].
8. State Statistics Service of Ukraine, *Collective Accommodation Facilities in 2010-2013 Years*, http://www.ukrstat.gov.ua/operativ/operativ2013/tur/zr_u.html/ [12.05.2014].
9. State Statistics Service of Ukraine, <http://www.ukrstat.gov.ua/operativ2013/tur/zr> [27.02.2015].
10. The Association of Small Hotels and Apartments in Ukraine: official web-site <http://www.smallhotels.com.ua/> [22.09.2014].
11. *The Development of Ukrainian and International Hospitality Industry*, <http://ru.osvita.ua/vnz/reports/management/15286/> [10.03.2015].

PART II

THE ROLE OF BANKS, FINANCE AND INSURANCE IN THE DEVELOPMENT OF ECONOMIC ACTIVITY



Chapter 12

The Central Bank's Role in Mitigating the Risk of Balance-sheet Policy of Private Sector and under Unstable Conditions

Jacek Pera

1. Introduction

In its operations, the Central Bank faces numerous problems related to the economic cycles and structure of economy. Major problems are upheavals, instability and supply shocks connected with the situation on global markets. In an open economy, capital flows have a strong effect on, *inter alia*, values and fluctuations of exchange rates, and thus price dynamics. Certain prices are subject to various forms of control (e.g. taxes, price limits or local prices). On numerous markets, market mechanisms are poor due to limited competition. Some inflation-strengthening trends need to be fought, including those of the indexation of salaries, social security benefits or production cost and prices. Tight public finance is a serious problem in numerous countries. Budget deficit and the resulting public debt affect the economy materially. This means that the monetary and fiscal policies need to be coordinated.

Analysis of the literature and economic processes indicate that the Central Bank conducts its activity designed to stabilise prices at the expense of transitory drop of the economic growth rate. However, it is worth to incur that expense to later reap the benefits of price stability supporting a long-term economic growth. If the monetary policy focuses in a short run on supporting economic growth by stimulating domestic demand or exports with an adverse effect on price stability, then the inflation-dampening process lengthens and its cost grows. We need to remember that it is only after a time that the effects of monetary policy are seen (Wójtowicz, 2006, p. 20).

The analysis of the subject referred to above is based on a discussion of the following partial objectives:

1. Nowadays role and importance of the Central Bank in the national economy.
2. Nature and significance of risk and uncertainty in the Bank's operations.
3. The Central Bank's role in the mitigation of the risk of balance-sheet policy of the private sector, implemented under economic instability and crisis.

The main objective of this study is to present the Central Bank's role in the mitigation of the risk of balance-sheet policy of the private sector, implemented under economic instability

and crisis. It has been assumed that mitigation of the risks related to the private sector's balance-sheet policy is especially required under economic instability and crisis, but with policy implementation level and intensity under control.

The analytical part of the study is mainly based on the literature and the author's personal expertise in the area.

2. Nowadays role and importance of the Central Bank in the national economy

In the market economy, economic processes are controlled by product and production means markets, where supply and demand are balanced. The primary role plays money as the value metric (facilitating valuation), means of payment (facilitating settlement of liabilities) and means of hoarding (facilitating saving) (Wójtowicz, 2006).

On the country level, money is created by the Central Bank, which is nowadays, in each country, the supreme institution of the banking system and which plays the following four crucial roles in the country's financial system:

1. Bank of issue – the only institution authorised to issue currency. The exception here is the US banking system, where 12 Regional Federal Reserve Banks (forming the Federal Reserve System) are authorised to issue the uniform currency (US dollar). As the bank of issue, the Central Bank is the only institution authorised to issue currency being the exclusive legal tender in a given country; it also defines the value and time of such issues, and is responsible for currency trading liquidity. It also organises trading and controls the quantity of currency in trade.
2. Bank of banks; as such, it:
 - supervises transactions of commercial banks, executed in both the domestic currency and foreign currencies;
 - advances borrowings to enhance lending activities;
 - indirectly sets interest rates for credit facilities and deposits at commercial banks;
 - defines rates for mandatory reserves, controlling commercial banks' lending activity in line with the needs of national economy (monetary policy).

It also maintains accounts of commercial banks, collects their deposits and advances credit facilities to those banks. When a bank is in a tough financial position, the Central Bank provides aid as the last-instance lender (Wójtowicz, 2006, p. 14).

In particular, the Central Bank is the regulator supervising commercial banks with a view to ensuring the security of deposits kept at banks and the stability of the banking sector. It organises the system of financial settlements, maintains current interbank clearings and actively participates in the interbank money market. The Central Bank is responsible for the stability and safety of the entire banking system. As the bank of banks, it supervises banks' operations, and in particular monitors banks' compliance with the Banking Law. Further, it supervises payment systems in its country.

3. Bank of the government; as such, the Central Bank:
 - collects income,
 - performs transactions involving state budget expenses,
 - advances to the government credit facilities to finance budget deficit,

- manages public debt,
- executes open market transactions,
- collects reserves of gold and foreign currencies (<http://www.google.pl/#sclient=psyab&q=czuske...>).

The Central Bank services the state budget, but should not finance the budget deficit. It manages the government's reserves of foreign currencies which ensure the liquidity of international transactions and secure solvency in financial relations with other countries. In particular, the Central Bank maintains bank accounts of the government and its central agencies, special purpose funds and state budget entities, as well as executes their payment instructions.

4. Bank of the national economy; in this role, the Central Bank:

- controls money supply, maintaining it at a level harmonised with the needs of the national economy at any given time;
- guarantees credit availability, defines terms and conditions for credit advancement, and controls exchange rates.

These factors and roles define the initiatives of each Central Bank with respect to its national economy. Such initiatives include:

- ensuring the economy's internal stability and growth;
- cooperation with other Central Banks, primarily in the scope of international currency exchange serving the purpose of stabilisation or control of exchange rates;
- generating income financing the state budget.

Central Banks' attitudes observed in recent years justify the conclusion that the Banks have been striving to achieve the following sets of objectives at the level of national economy:

- maintaining the internal value of the national currency (inflation mitigation), as well as its external value (preventing dramatic adverse fluctuations of exchange rates);
- ensuring the development of a sound, transparent and stable financial system; supporting the efficiency and competitiveness of the national financial system exposed to foreign competition (<http://www.google.pl/#sclient=psyab&q=czuske...>).

The role and importance of the Central Bank in the structure of its national economy is further enhanced by its cooperation with major international banks, including:

A. Cooperation with the International Monetary Fund (IMF).

The cooperation focuses on the development of the Bank country's position on key issues related to IMF membership.

The Central Bank participates in annual reviews of the economy carried out by IMF experts. The findings of such review form a basis for reports on and growth forecasts concerning a given economy.

Another field of the Central Bank's cooperation with the IMF is programmes of assessment of the financial sector and of promotion of international statistics standards.

B. Cooperation with the World Bank (WB) and European Bank of Reconstruction and Development (EBRD).

The Central Bank presents its country's position on the crucial issues discussed by the WB and EBRD. The Bank's representatives participate in annual meetings of the WB Group and the proceedings of the EBRD.

The Bank also services foreign liabilities towards and receivables from international financial institutions.

C. Cooperation with the Bank for International Settlements (BIS).

The Central Bank maintains, on a continuous basis, working relations with the BIS in the scope of new financial instruments and the BIS's deposit offering (http://www.google.pl/#sclient=ps_yab&q=czuske...).

To sum up, the contemporary Central Bank is the pivotal institution in the monetary system. It has the exclusive authority to issue currency being the legal tender in its country. The Central Bank is responsible for the actual value of money, that is for its purchasing power. Therefore, it implements a monetary policy meant as actions and initiatives designed to ensure long-term price stability with instruments available under the adopted mode of operation (Wójtowicz, 2006, p. 14).

3. Nature and significance of risk and uncertainty in the Central Bank's operations

Risk is among the key drivers of attitudes observed on the financial markets. It is also one of the most important considerations of the bank operations and factors affecting the results thereof. However, no single definition of the risk exists which would accurately reflect its nature. Which definition is assumed primarily depends on the context and purpose. The risk can be defined as a measure of uncertainty concerning future financial performance or as a measure of deviation of the actual results from expectations. If the first method of risk defining is assumed, a deviation could be both positive and negative. Hence, no definite nature (whether favourable or adverse) of the risk is predefined; possible occurrence of fluctuations in any direction is only factored in (Skopiec, 2010, p. 169).

On the other hand, the risk can be viewed as a measure of loss likelihood. The focus is on the negative side here, the risk is seen as a phenomenon driving negative (adverse) deviations from the financial targets or forecasts. It is then defined as a situation in which an adverse deviation from the required or expected situation occurs (Skopiec, 2010).

In conclusion, two basic concepts of the risk are considered in economics. The negative concept defines the risk as a threat of a loss. Business entities take steps designed to mitigate the risk. According to such approach, the risk is a possibility of not achieving the set objective. The neutral concept of risk sees it as the both a threat and an opportunity (e.g. an opportunity to generate a larger profit owing to having taken the risk).

The risk occurs where the result of an action is not known, which means that the actual result may be both better or worse than expected. An entity taking the risk does so with a view to achieving additional benefits, referred to as the risk premium. Thus understood, the risk is a possibility of achieving a result deviating from the expectation (Skopiec, 2010, p. 170).

The risk is often identified with uncertainty. However, they are not synonyms. The risk is primarily objective in its nature, while uncertainty is subjective. The risk could be defined as objectified uncertainty of the occurrence of an unwanted event. The risk may be measured as a probability, which is an objective criterion. Uncertainty could only be measured as a level of belief that the event will occur, which is a subjective criterion. In other words, the risk is quantifiable, unlike uncertainty (Skopiec, 2010).

The risk and uncertainty are inherent in the operations of any bank. They both affect any bank's day-to-day operations and have a material effect on a bank's profit or loss. They are also important considerations in developing plans and growth strategies.

From the historic perspective, it is easy to see that Central Banks have since their origins been involved in initiatives designed to support the stability of the financial system. The oldest Central Banks, such as the Bank of England or Bank of France, were established by governments to service the governments' financial needs connected with war expenses.

The problem with stability emerged when commercial banks, striving to maximise profits, were falling to temptation of issuing bank notes for a value in excess of the reserves of gold, silver or sovereign bonds held. A financial system was then disturbed by frequent crises and business entities' confidence in the system was repeatedly put to test. In such circumstances, the restoration and maintenance of financial system stability by rebuilding businesses' confidence in the currency and financial institutions was a material premise for the establishment of the Central Bank (Kałużyńska, 2009, pp. 130-132).

From the Central Bank's perspective, maintaining the stability of financial system is highly material, given the link of the stability to the Central Bank's key responsibility: maintaining the stability of prices. The financial system plays a key role in the transmission of monetary stimuli to the real domain, and its instability can render effective monetary policy infeasible.

One should keep in mind that financial stability is closely connected with price stability and striving to maintain one of them in no way excludes striving for the other. The literature indicates that, while in the short run these two objectives may compete, in the long run they complement each other. There is no doubt that any disturbance in the financial system materially hinders maintaining stable prices. On the other hand, price stability has a favourable effect on financial stability. It is emphasised, though, that – while both inflation and deflation are detrimental to financial stability – the price stability alone is a necessary but not sufficient condition for the stability of the financial system (Kałużyńska, 2009).

Another premise for the Central Bank's involvement in maintaining stable operation of the financial system is its role as the regulator of payment systems crucial to the entire financial system, and one of preconditions for a streamlined operation of payment systems is the security of financial institutions forming them. The stability of the banking system is of special importance to maintaining a stable financial system (irrespective of whether the system is bank-oriented – then referred to as the European or Continental System – or market-oriented, known as the Anglo-Saxon System), given the role banks play in financing the economy and payment settlements and the scope of the transfer of bank-taken risk onto other entities. Any collapse in a payment system is directly and adversely reflected in the pattern of payments and commerce, and if such collapse continues, it may dramatically affect the economy due to the deteriorated confidence in financial institutions and currency on the side of business entities. While the primary and ultimate objectives of Central Banks' policies all over the world are supporting price stability and financial system stability, this first objective only is stipulated in the Banks' charters, relevant provisions of acts on the Central Bank or even constitutions. Supporting financial stability is *explicite* stipulated in an act on the Central Bank or another legal act with respect to just a couple of Central Banks in the world.

The Central Bank's responsibility for the efficient operation of the financial system is rather implied by an extended construction of the provisions stipulating its responsibility for the efficiency and security of the payment system, forming the most important element of financial market infrastructure. And, as indicated above, the efficiency and security of the payment system is in turn a fundamental necessary condition for the security of the financial system (Kałużyńska, 2009).

4. The Central Bank's involvement in the mitigation of the private sector's balance-sheet policy followed under instability and crisis – attempted assessment

During the most recent financial crisis, the steps taken by the Central Banks had a material effect on the mitigation of risks related to the private sector's balance-sheet policies. An attempt at an assessment of that steps should be preceded by an analysis of the tools used to mitigate the risk in terms of the scope and consequences of the crisis. The range of steps taken by the Central Banks in this scope was very broad and included both the instruments which the banks had normally used and brand new initiatives. The both groups of instruments are discussed below.

A. New mitigating initiatives

In 2008-2009, FED initiatives included:

1. USD 85m credit facility for American International Group (AIG), an insurer, in exchange for the US Administration taking over 79.9% of shares in AIG.
2. Higher limits made available under the bank liquidity support programmes and acceptance of pledges over company shares as collateral.
3. Special instruments introduced by FED during the crisis, available for a specified time only, including:
 - Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF) – an instrument available to all US deposit institutions, bank holding companies, as well as for US-based branches and agencies of foreign banks, for financing the acquisition of high-quality Asset-Backed Commercial Papers (ABCP) from Money Market Mutual Funds (MMMF);
 - Commercial Paper Funding Facility (CPFF) – a programme intended to enhance credit availability to companies and households. Using the instrument, the Federal Reserve Bank of New York financed the acquisition, through a Special Purpose Vehicle, USD denominated three-month commercial papers with high rating. The papers may be both unsecured or asset backed (ABCP), and may be issued by a US company or a US-based branch of an off-shore company;
 - Money Market Investor Funding Facility (MMIFF) – funds for financing the acquisition of USD denominated certificates of deposit, bank debt securities (bank notes) and commercial securities issued by high-rating companies, maturing within 7-90 days. The programme is addressed to Money Market Mutual Funds and other selected funds operating on the money market, such as: funds owned or managed by US banks, pension, insurance or trust funds, or local governments. The value of the programme is USD 600bn;
 - Term Asset-Backed Securities Loan Facility (TALF) – a USD 200bn credit programme for holders of high-rating ABSs, secured by new consumer loans and borrowings for small enterprises. Facilities under the programme have a three-year maturity. The US State Treasury is to contribute USD 20bn under the Troubled Assets Relief Program (TARP).
4. FED also concluded USD swaps with the Central Banks of Australia, Brazil, Denmark, Japan, Canada, South Korea, Mexico, Norway, New Zealand, Singapore, Switzerland, Sweden, and the United Kingdom, as well as with the European Central Bank (ECB). This enabled directing USD denominated funds onto the financial markets in those states (Stopyra, 2011, pp. 42-45).

Bank of England (BoE) prepared and implemented a package of initiatives supporting the liquidity on the UK market. The package included:

1. Special Liquidity Scheme – designed to arrange for banks for additional liquidity by enabling them to convert high-quality low-liquidity assets into treasury bills. The programme, originally scheduled to last six months, was launched in April 2008, to be extended in September 2008 until January 30th 2009 and its value was increased to GBP 200bn in April 2008. The programme value originally projected at at least GBP 50bn finally totalled GBP 185bn. 32 institutions used aid of this form. The nominal value of the assets accepted under the programme was approximately GBP 287bn. BoE measured them at GBP 242bn as at January 30th 2009. The majority of those assets were Residential Mortgage-Backed Securities or residential mortgage covered bonds.
2. The second comprehensive intervention package supporting the banking sector (January 2009):
 - Widening discount window (since January 2009). The maturity was extended from 30 days to one year with a view to provide long-term liquidity to banks. The widened discount window is available to banks and building societies for an additional fee, and the list of acceptable collateral is larger than under the credit guarantee programme;
 - Asset Purchase Facility (APF, since January 2009) – instrument created with a view to make credit more available to firms by increasing the liquidity of certain instruments. The dedicated fund had GBP 50bn at its disposal. The Bank of England has been purchasing high-quality (investment grade) claims of the private sector, including commercial papers, corporate bonds, papers covered by the Credit Guarantee Scheme and, to a limited extent, securities-backed claims created in the course of securitisation. The APF Fund has been increased to GBP 150bn, including GBP 50bn earmarked for the purchase of the private sector's assets.
3. Asset Purchase Programme (since March 2009) – initiative undertaken as part of the quantitative easing policy, implemented by the issue of the Central Bank's currency reserves. An amount of GBP 75bn was applied towards:
 - purchase of the private sector's assets under the APF programme and BoE's purchase, on the secondary market, through a special purpose vehicle, of treasury bonds with maturities ranging from five to 25 years (Stopyra, 2011).

In the Euro zone, the European Central Bank was faced, from the one hand, by expectations (voiced by some EU countries) that it will follow a policy similar to those of FED and the Bank of England and, from the other, by Germany's position expressed by the then Bundesbank President and stating that the quantitative easing policy would push inflation up, which would contradict the ECB's key operational objective. Currently, the ECB uses a broad range of hedging assets, the same for all types of refinancing transactions. In November 2008, the ECB enhanced the list to include USD, GBP and JPY denominated bonds issued by European issuers (Stopyra, 2011).

Poland was significantly less affected by the global banking crisis than the Euro zone. Therefore, the NBP exploited easing in its monetary policy on a minor scale, compared with the US or the Euro zone. However, to guarantee the appropriate liquidity level in the banking system, the NBP developed and implemented (in October 2008) the Trust Package: a set of financial instruments enhancing not only PLN liquidity, but also, through swaps, the liquidity of foreign currencies (USD, EUR and CHF). The introduction of swaps stemmed from the Central

Bank's concern for the foreign currency liquidity of banks operating in Poland, as a substantial part of residential loans advanced prior to 2008 were denominated in CHF or EUR. However, while NBP transactions enhancing banks' PLN liquidity were executed in large numbers (as some commercial banks would rather invest excess funds in one-day deposits at the Central Bank), the extent of swaps was limited (Stopyra, 2011, p. 51).

Apart from the tools presented above, Central Banks also use additional non-standard tools of mitigating the risks related to the private sector's balance-sheet policy followed in unstable environment. These tools serve the purpose of implementing specified policies and include:

1. The Central Bank's purchase of long-term sovereign securities from banks; the increased demand for sovereign debt pushes its prices up and presses down the securities' yield curve which is usually a benchmark for the valuation of higher-risk private securities. Thus the yield curve for such private securities should go down. These developments should enliven the investment and aggregate demand.
2. The Central Bank's purchase of private securities with the direct effect on wholesale securities markets in periods of low liquidity, and on the margins prevailing on those markets.
3. The Central Bank does not purchase securities to its own portfolio, but facilitates the access to its currency for banks, by extending to them credit facilities with longer maturities and on non-standard terms (e.g. by extending the list of accepted collateral to include securities whose markets are liquid at the time) (Przybylska-Kapuścińska, 2010, pp. 59-60).

B. Risk-mitigating initiatives taken to date

1. Interest rate control – used, when the authorities fail to achieve the intended level of interest rates with market operations or when a long-term interest rate is covered by monetary policy objectives. Interest rate control results in financial resources not being allocated in line with price mechanisms, bank deposits are replaced with assets generating return on the market, intermediation is avoided or non-bank intermediation looked for. Interest rate caps make credit facilities appear less expensive and encourage excessive use of capital.
2. Credit ceilings – enable effective control and supervision of bank borrowings, minimising loss of control of monetary mass during transition to indirect instruments, where the transmission mechanism is not known in full. On the other hand, such ceilings distort resource allocation, deteriorate efficiency and discourage the use of banking intermediation. Credit ceilings are difficult to implement where a large number of banks operate.
3. Statutory liquidity ratios – create mandatory demand for specified instruments (usually connected with sovereign debt), reducing the issuer-incurred cost. On the other hand, they distort competition by imposing limitations to be followed in bank asset management. They disrupt the process of instrument valuation and deter the growth of the secondary market. They also contribute to loosening the budget discipline.
4. Direct credit facilities – a manner of distributing credit facilities advanced by the Central Bank, used mainly to finance a selected sector of economy. The allocation process for such facilities is highly discretionary and prone to improper selection of borrowers, and thus leads to credit allocation far from optimum.
5. Rediscount ceilings – stabilise interbank interest rates from below; they are used to rediscount securities issued by issuers operating in selected sectors and provide liquidity to selected banks. A rediscount rate below the market rate may deter the growth of the interbank money market.

6. Mandatory reserves – create demand for reserves, and thus enhance the foreseeability of the demand. The mandatory reserve rate may be increased in response to excess liquidity of banks or in order to bring about structural changes in the demand for reserve money. Banks view mandatory reserves as a tax levied on the banking system, driving up the spread between interest rates on deposits and those on credit facilities. For this reason, the functions of mandatory reserves have been evolving towards interest rate stabilisation, which can be achieved with low reserves and low rates of interest thereon.
7. Rediscount windows – public announcement of the rediscount rate as they rate key to the Central Bank's policy strengthens the effects of signalling this policy direction. The initial effect on the market is higher than in the event of open market transactions. It creates demand for securities accepted for a discount. The usefulness of the instrument increases, when the market lacks securities necessary for open market transactions. The instrument is inconvenient if the Central Bank has to aim at a proper level of money supply, because banks execute transactions within the rediscount window on their own initiative. The criteria to be met by securities eligible for rediscount and window access conditions are sometimes used as selection instruments of the monetary policy.
8. Lombard loans or overdraft facilities – short-term debt, more expensive than any other alternative source of financing. A Lombard loan may only be advanced upon an application to the Central Bank, while an overdraft facility is advanced automatically. The related drawbacks are similar to those identified with respect to the rediscount window. The Lombard rate has often been seen as the main signal of a new direction in the monetary policy.
9. Banks' deposits at the Central Bank – facilitate liquidity management for the banking sector. They enable the minimisation of alternative cost arising when the banks are not able to invest its excess liquidity in another, more profitable way. The Central Bank sets the interest rate for such deposits and such rate is the lowest rate of return available on the market.
10. Public sector deposits – instrument feasible if there is known (planned) the daily volume of transfers of the government's funds from and to the banking system. Transferring the government's deposits between the Central Bank and commercial banks may be the key instrument offsetting the effect of movements of the government's funds on short-term liquidity. The solution lacks transparency and hinders the development of the secondary market for sovereign securities.
11. Loan auctions – tool to value the Central Bank's credit facilities, used, when the market is not fully developed and lacks the interbank market rate, which could serve as benchmark. An interest rate is established serving as such benchmark, while simultaneously allocating credit facilities on the market terms. On the other hand the Central Bank is exposed to the credit risk which is difficult to estimate; the problem of negative selection emerges.
12. Sale of the Central Bank's securities on the primary market – A flexible instrument of short-term liquidity management, as the initiative is on the Central Bank's side and the broad range of securities types and auctions supports accurate control. If the government does not accept volatile interest rates for the auctions of sovereign securities, then the Central Bank's own securities give it operating independence. Where treasury securities and the Central Bank's securities are on the market in the same time, the issue agents have to coordinate their actions. The Central Bank could be exposed to loss if liquidity sterilisation would require a high-value issue.

13. Sale of the treasury securities on the primary market – supports liquidity management, as in the event of the sale of the Central Bank’s securities, provided that the Central Bank and government coordinate their actions appropriately. This tool encourages the care of fiscal discipline if financing of the budget deficit by the Central Bank is prohibited. Debt management can contradict the objectives of the monetary policy if the State Treasury conducts auctions in such manner as to acquire funds at a price below the market one. If money supply management is based on primary market transactions, frequent auctions can hinder the development of the secondary market.
14. FX swaps, unconditional FX sell and buy transactions – In the event of a well-developed FX market and inactive market of treasury securities, swaps may substitute for repo transactions on sovereign securities. Outright FX (sell and buy) transactions can prove useful, when the FX market is developed better than the money market. The Central Bank could incur losses if FX transactions are performed with a view to changing an exchange rate deemed adverse.
15. Secondary market – conditional and unconditional sell and buy transactions – they could be executed under a continuous system and with use of various securities accepted as security; hence their significant flexibility. Being transparent, they support market growth. They are immediately reflected in the developments on the money market. Such transactions are feasible on a liquid and deep market. For this measure to work, the Central Bank has to hold appropriate quantities of the securities traded in (Kałuzińska, 2009, pp. 140-142).
16. Exchange rate policy – The Central Bank’s activities lead to changes in the private sector’s net exposure to foreign currencies through transaction executed on foreign FX markets. This is the way for the Central Bank to control exchange rates, the levels and/or fluctuations of exchange rates, introduced at a given level of FX policy.
17. Debt management policy – The Central Bank’s activities focus on the public debt market. They are designed to change the structure of the private sector’s receivables from the government (structure of public debt held by the private sector). The claims include securities with differentiated maturity structure, as well as bank reserves maintained at the Central Bank. The fundamental idea behind maintaining sovereign securities is an attempt to change the result on such securities, and thus taking at least partial control of financing cost and asset prices.
18. Credit policy – The Central Bank’s transactions are aimed at specific segments of private debt and at the securities market. They affect the structure of the private sector’s balance sheet through changes in the profile of the Central Bank’s exposure to the private sector’s liabilities. Such changes could be driven by changing the quantity of the private sector’s liabilities towards the Central Bank or by transfers, between the private sector and public sector (the Central Bank and government), of debt toward the private sector. In practice, Central Banks most often use modifications consisting in introducing additional security instruments, changing maturities or counterparts of classic tools of monetary policy: by advancing credit facilities or purchasing the private sector’s debt, including preferred stock (Przybylska-Kapuścińska, 2010, pp. 60-61).

Summarising the presented tools used by the Central Bank to mitigate the risks of the private sector’s balance-sheet policy, one should assume that a full and proper assessment of their effectiveness (which in particular refers to non-standard tools) takes a time, which in turn depends on the extent to which instability is subjectively experienced by business entities in individual coun-

tries and on differences between a given Central Bank and the respective private sector in their views on which problems and how urgently need to be solved.

A proper summary seems to be the identification of potential relations between individual segments of the financial market and the private sector's balance-sheet policy. Table 1 below sets forth those relations.

Table 1. Relations between individual segments of the financial market and the private sector's balance-sheet policy

Policies and tools		Private sector's balance sheet		
		FX exposure	Public sector's claims	Private sector's claims
Interest rate control, Credit ceilings, Direct credit facilities, Rediscount ceilings, mandatory reserves, Rediscount windows, Lombard loans, Banks' deposits, Public sector's deposits, Loan auctions, Sale on primary and secondary markets, FX swaps	Foreign currencies	X		
	Public debt		X	
	Credit facilities			X
	Bank reserves			

Source: author's study based on Przybylska-Kapuścińska, 2010, pp. 60-61; Borio, 2009.

These relations facilitate the identification of the Central Bank's ability to affect the private sector's balance-sheet policy using the four key special policies of: exchange rates, debt, credit facilities and reserves (Przybylska-Kapuścińska, 2010). In each of those areas, the Central Bank uses (related to above) both standard and non-standard mitigation tools.

5. Conclusion

In the face of the most recent financial crisis and global economic instability, major Central Banks have been trying to conduct active monetary policy, which would, through making liquid resources available to commercial banks, assist those banks in making it through the period of financial turbulence. However, the scale of mitigating activity and methods used to mitigate the risks related to the private sector's balance-sheet policy have varied largely from one Central Bank to another. The scale and methods used resulted from the strategies adopted by individual Central Banks for risk mitigation and offsetting the adverse effects of ensuing instability and crisis. In the implementation of a mitigation policy for risks related to the private sector's balance-sheet policy, care has to be taken of determining and maintaining a proper level and intensity of the tools used. In line with the assumption adopted for this study, one should keep in mind the following:

1. Using, in practice, asymmetric treatment of deviations from the target; it would be useful to analyse total loan value increase or, more broadly, monetary mass, on which inflation depends in a longer time horizon.
2. Monetary analysis, which, if too detailed, would lengthen the time horizon assumed for the creation of monetary policy, but, on the other hand, would support better control of threats to the stability of the financial sector.
3. Increase in total credit or monetary mass, which is reflected in the growth of inflation, and thus generates more serious risk and, in consequence, inflates a dangerous bubble on the assets market.
4. In developing monetary policy, drawing conclusions from direct analysis of the situation on individual asset markets.
5. Monetary analysis enabling those difficulties to be negotiated, as it focuses on the causes of the bubbles, that is the rapid growth of total credit or, more broadly, monetary mass.
6. Role of the financial crisis, which deteriorates the effect of interest rate reductions on the total demand. It is so, as the crisis is accompanied by a decrease in the natural interest rate; it also intensifies frictions on financial markets. Both the decrease in natural interest rate and the intensified frictions on financial markets reduce the Central Bank's announced interest rate, while this rate is used to stimulate the aggregate demand.
7. The Central Bank's abstaining from such actions which would decelerate restructuring and a return of the natural interest rate to its pre-crisis value, and would further intensify financial frictions.
8. Pushing interest rates down close to zero, which might both postpone restructuring and intensify financial frictions.
9. Occurrence of frictions on the financial market, intensified by the crisis, and rendering substituting certain assets by other more difficult. The Central Bank may try to mitigate the frictions with unconventional initiatives designed to change asset structure of business entities.
10. The more the extent to which intensification of financial frictions weakens the effect of reduced interest rates on the aggregate demand, the more intense those initiatives should be.
11. The Central Bank should not go too far in its attempts to stabilise exchange rates.
12. The risk of a deep recession in a given country might be perhaps mitigated by postponing the economy's entering the boom phase.
13. The Central Bank's monetary policy should support minimising the risk of dramatic reduction of the Bank's ability to control demand for credit.
14. Experience of recent years proves that the cost of premature tightening of monetary policy is lower than the cost of a delayed one (http://www.for.org.pl/upload/File/JSLB_2011/Reakcja...).

Bibliography

1. Borio C. (2009), Unconventional Monetary Policies: An Appraisal, *BIS Working Papers*, No. 292, November.
2. Kałuzińska V. (2009), Bank centralny wobec kwestii stabilności systemu finansowego, *Ruch prawniczy, ekonomiczny i socjologiczny*, LXXI fasc., No. 1.

3. Przybylska-Kapuścińska W. (2010), Instrumenty banku centralnego w ograniczaniu ryzyka w dobie kryzysu finansowego [in:] *Ryzyko w finansach i bankowości*, (eds.) B. Filipiak, M. Dylewski, Warszawa, Difin.
4. Skopiec D. (2010), Problem ryzyka operacyjnego w kontekście dynamicznych przemian w działalności banków, *Studia Ekonomiczne*, No. 2.
5. Stopyra J. (2011), Działania banków centralnych w erze turbulencji finansowych, *Rocznik Żyrardowski*, Vol. IX.
6. Wójtowicz G. (2006), Bank Centralny w Gospodarce Rynkowej, *Bank i Kredyt*, No. 1.
7. http://www.for.org.pl/upload/File/JSLB_2011/ReakcjabankowcentralnychnakryzysARzoncaJSLB2011.pdf [13.05.2015].
8. http://www.google.pl/#sclient=psyab&q=czuszk+marcin+miejsce+i+rola+banku+centralnego+w+gospodarce&oq=czuszk+marcin+miejsce+i+rola+banku+centralnego+w+go&gs_l=hp.1.0.33i21.47218.134952.1.136759.38.38.0.0.0.155.4207.13j25.38.0...0.0...1c.1.14.ps_yab.7kKxwnNugLw&pbx=1&bav=on.2,or.r_qf.&bvm=bv.46751780,d.Yms&fp=bbb3fdd8f0883228&biw=1067&bih=522 [13.05.2015].

Chapter 13

Models of Entry of Foreign Banks on the Polish Market. The Case of Banco Santander and Raiffeisen Bank

Paweł Piskorz

1. Introduction

In the last 25 years Polish market was often chosen by foreign financial institutions as a location to expand business. The most significant among various reasons was a high potential for growth of the real economy, large number of population and low level of the banking penetration ratio. Entry models and timing of expansion differ among particular financial institutions. For instance, ING started expansion as early as 1996 by acquiring Bank Śląski. This decision was associated with high risk, although it allowed them to quickly build a significant market share and establish position. Other institutions like Santander have postponed the decision to enter the Polish market or chose to pursue a different strategy, as Raiffeisen did.

Analysis of different cases showed that most of the institutions decide to implement some combination of an organic growth model with elements of mergers and acquisitions. The usually first step was to establish a representatives office and then gradually expand through new branches or transaction. Raiffeisen pursued the organic growth model from 1991 until 2013 when they finalized the merger with Polbank. By contrast, Santander decided to quickly expand its operation only six years after entering the Polish market.

2. The strategy of Raiffeisen Bank in Poland

Raiffeisen Zentralbank Osterreich AG in its current form was founded in 1927 in Vienna, although the idea and first banking activities had begun in 1862. The bank operations were universal and consist of serving individual and corporate clients. On home market Raiffeisen pursued strategy of organic growth which proved very effective. Therefore until 1987 the bank was operating only in Austria.

Globalization and liberalization of regulations were two of the most important reasons that determine changes in the global banking sector. Increasing pressure from international competi-

tion lead Raiffeisen to reinvent its strategy and expand abroad. This allowed it to grow faster and achieve sufficient size to protect itself from a potential acquisition. First foreign market entered by Raiffeisen was Hungary in 1987 (http://www.rbinternational.com/e-Business/01_template1/829189266947841370-829188968716049154_829601505693631049-829601505693631049-NA-2-EN.html). The expansion strategy was concentrated in Central and Eastern Europe region. Raiffeisen decided to slowly increase its presence on a particular market using its own brand. This allowed to closely monitor all the operations and sustain control over the whole process which lead to risk reduction and more stability for the institution.

The model of entry on the Polish market was in line with usually adopted strategy. In 1991 Raiffeisen established representative office to provide service to its corporate customers that were expanding operations to Poland. Until year 2000 bank specialized in this segment of the market with some additional financial services, for instance, factoring.

In 2000 Raiffeisen decided to change the strategy and increase its presence on the Polish market. Introduction of the offer for individual clients allowed to enhance its position and improved financial results. In the end of the year the bank had 30 branches in most of major cities. During this year customer deposits grew from 1.5 billion PLN to 2.5 billion PLN, up 63 percent from the prior year. Loans grew by 40 percent from 1.5 billion PLN in 1999 to 2.1 billion PLN in year 2000. Even though the growth was very dynamic Raiffeisen was able to enhance profitability by almost tripling net profit from 7.6 million PLN to 21.5 million PLN. That improvement lead to increase in return on equity to 7.7 percent from 3.3 percent the prior year (Raport roczny 2000, Raiffeisen Bank).

Analysis of the first year results showed that pursued strategy was beneficial for the institution. Good condition of Polish economy and its above average growth prospects contributed to the success of the expansion process as well. The board decided to open new branches and engage more resources to gain market share and attract new clients.

In the beginning this strategy proved to be very effective. The bank expended its branch network from 30 in year 2000 to 100 in 2008. In this period annual growth of deposits averaged more than 30 percent and reached 15.6 billion PLN in 2008. Annual growth of loans averaged 35 percent and increased to 21.7 billion PLN. Net profit more than doubled each year. In 2008 Raiffeisen reported 360 million PLN, compare to 7.7 million PLN in year 1999 (Raport roczny 2000-2008, Raiffeisen Bank). Dynamic growth during this period proved that strategy of organic growth could be very successful. Raiffeisen was able to take advantage of the economies of scale and deep knowledge about the Polish market. However, good future prospects for growth deteriorated with the beginning of the global financial crisis.

Even though the Polish economy was growing instead of falling into recession in 2009, the year was very difficult for the banking sector. Increasing number of defaults and non-performing loans put pressure on the capital base of all institutions. Moreover, the regulatory authorities closely monitored banking operation and required them to raise more capital. For Raiffeisen this shift lead to revision of its aggressive growth model.

The process of adjusting corporate strategy to the new economic environment began in 2009, as a result net profit decreased by almost 60 percent to 146.8 million PLN (Raport roczny 2009, Raiffeisen Bank). The bank also reported a slight reduction in deposits and loans. Furthermore, Raiffeisen reduced number of branches and focused on improving efficiency.

Next three years were challenging, even though in 2011 growth dynamics were restored and net profit was close to 2008 level, the board decided to modify the strategy. Increasing competi-

tion from other banks had reduced potential for the organic growth model. Raise in banking penetration ratio was important as well, together with growing importance of mobile and internet banking. It became more difficult to sustain dynamic growth and protect market share. Raiffeisen to address this issues decided to expand its operation through acquisition and therefore ended the period of organic growth model which had begun in 1991.

In February 2011 Raiffeisen informed that it will buy 70 percent of Polbank which was a subsidiary of Greek EFG Eurobank Ergasis (*Raiffeisen Bank International przejmuje 70 procent Polbanku*, http://raiffeisenpolbank.com/documents/30393755/30395121/8_get_file.pdf). Devastating effects of the financial crisis fractured economic stability of the parent company. To acquire more capital Greek institution decided to sell its polish operations. Polbank, which had a strong individual customers exposition, was a good addition to Raiffeisen mainly corporate business model.

The final result of the transaction was creation of a new entity Raiffeisen Polbank. The process of merging took almost two years. In December 2012 Polish Financial Supervisory Authority allowed the two banks to merge. The formal integration was finalized on 31st of December 2012 (*Fuzja prawna Raiffeisen Bank Polska i Polbank EFG*, <http://raiffeisenpolbank.com/documents/30393755/30395121/Fuzja+prawna+Raiffeisen+Bank+Polska+i+Polbank+EFG.pdf>). New entity was a sixth biggest bank in Poland in terms of assets and serve almost 1 million clients. Combined assets amounted to 54.7 billion PLN. The size increase and additional expenses covered during the process had a strong influence on profitability, as a consequence net profit dropped to just 8.6 million PLN in 2012.

3. Santander expansion on the Polish market

Banco Santander was founded in 1857 in small city in northern Spain. Its main purpose was to clear financial settlements for the regional entrepreneurs. Until 1922 the bank operated mainly in Santander province, since then it started to expand to other parts of Spain. First foreign operations were established in 1951 on Cuba. In the next fifty years Santander implemented aggressive strategy which allowed it to grow rapidly and establish significant presence in several countries. Currently the key markets are Spain, United Kingdom, Germany, Poland, Brazil, Argentina, Chile, Mexico and United States.

Banco Santander entered the Polish market in 2003, by acquiring small operation unit from Bank of America. Establishing representatives office with limited activity allowed to gain knowledge about the market and assess economic outlook. This model of entry was in line with global strategy implemented by the group. Next year Santander decided to buy Polskie Towarzystwo Finansowe which held a portfolio of car loans. Two entities were then merged together and finally rebranded to Santander Consumer Bank.

Santander strategy to focus on consumer market allowed it to gain sufficient knowledge and acquire resources for further expansion. Spanish institution had a strong exposition on the Latin American markets which gave them necessary stability and protected business during the financial crisis.

Next step was taken in 2009, as a result of the global financial crisis AIG was forced to sell its polish operations. Santander decided to take advantage of that opportunity and expand its operations on the Polish market. Acquisition of AIG Bank was a strategic decision for Santander.

American institution had a strong individual customer base which allowed Spaniards to establish universal banking business in Poland. AIG Bank in 2009 reported 7.2 billion PLN in assets, although the crisis resulted in decrease in net profit to just 29 million PLN (*Raport roczny 2009*, AIG Bank Polska). The process of formal integration was finished in 2011 after the approval from Polish Financial Supervisory Authority.

Transaction with AIG Bank was a first major acquisition on the Polish market although not the most important one. In 2010 Allied Irish Bank, owner of Bank Zachodni WBK was forced to seek government aid. Regulators approved the founding although they expected the institution to raise more capital by disposing foreign assets.

Banco Santander was one of a few global institutions that had sufficient capacities to acquire other institutions in the post crisis environment. AIB received offers for BZ WBK from Bank PKO BP, BNP Paribas and Santander. The offer for 70 percent of the Polish bank amounted to 2.9 billion PLN (<http://www.parkiet.com/artukul/967385.html?print=tak>). The process started in 2010 and required an approval of Polish Financial Supervisory Authority. The decision was issued in February 2011 and the transaction was finalized on the 1st of April 2011. It is important to notice that Polish law requires that company which acquires more than 66 percent of a publicly traded entity has an obligation to buy all shares in a tender offering. As a result Banco Santander offered price of 226.89 PLN with attempt to buy all 73,079,013 shares. Finally the Spanish institution bought 69,912,653 shares which represented 95.67 percent of the capital (<http://www.polskatimes.pl/stronaglowna/386167,banco-santander-kupil-w-wezwaniu-69912-653-akcji-bz-wbk,id,t.html>).

In the end of 2011 Banco Santander had two separate entities on the Polish market Santander Consumer and Bank Zachodni WBK. Even though Spaniards already engage in two acquisitions and held a strong market share in 2012 the board informed investors that Santander is interested in acquisition of Kredyt Bank. In this case situation was similar to BZ WBK, its Belgian owner KBC was experiencing financial difficulties due to more strict regulations from Basel III and implementation of new bank taxation in Hungary. To adhere to stricter regulations, KBC had to improve capital base and decided to sell Polish operations.

First information about the initial agreement were publicly disseminated in February 2012. The agreed terms of transaction resulted in shares swap between both institutions, 6.96 shares of BZ WBK for 100 shares of Kredyt Bank. Final result was that Santander hold 76.5 percent of merged bank and KBC had 16.4 percent, Spaniards also agreed to help to reduce the KBC stake below 10 percent after the transaction was finished (<http://www.reuters.com/article/2012/02/28/idUS56195+28-Feb-2012+HUG20120228>). It was agreed that new entity will stay under BZ WBK brand. The transaction was finalized in January 2013 after receiving an approval from Polish Financial Supervisory Authority a month earlier. The combined institutions had a network of more than 1,000 branches and serve more than 3.5 million customers.

Banco Santander strategy on the Polish market was very similar to previously pursued models of entry. In the beginning a small representatives office was established with a purpose to obtain knowledge about the market and develop a base for further expansion. The next step was to expand through mergers and acquisitions of well-established institutions with a stable market share. In Poland Spanish bank was able to take advantage of effects of the global economic crisis which forced AIG, AIB and KBC to sell Polish units. Aggressive bidding and merging this three entities lead to creation of third largest bank in Poland in terms of assets in just five years from the start of the expansion.

4. Analysis of the effectiveness of entry model. Case of Raiffeisen and Banco Santander from 2007 to 2013

Raiffeisen and Banco Santander have implemented two separate models of entry on the Polish market. Both of them have advantages and disadvantages and either one demand specific conditions to be successful.

Raiffeisen strategy of internationalization was developed based on an organic growth. Austrian institution focused on expansion in Central and Easter Europe region and implemented similar model of entry in all countries. The most important benefit of the organic growth model is retention of control by parent company. The whole process may be closely monitored and as a result inherited risk might be managed. Moreover, this strategy is less costly and future cash flows are more predictable (Venzin, 2009, p. 163).

However, an organic growth strategy has its disadvantages. The most important one is that it is time-absorbing. Slow growth could be more sustainable, although pressure from competitors or changing economic outlook could deteriorate the benefits. It is also important to notice the scarcity of resource, for instance the best venues for branches. In general, local institutions have the necessary knowledge and ability to acquire them before entering company. In some cases the foreign brand could be a disadvantage as well. It is especially important if the target market have high concentration and customers prefer brands that are familiar to them.

In case of Raiffeisen the organic growth model in Poland proved to be successful for a few years until business environment had changed due to the global financial crisis. Opposite strategy was implemented by Banco Santander. Spanish institution had a lot of experience in mergers and acquisitions, mainly as a result of aggressive growth model in Latin America.

The strategy pursued by Banco Santander allows it to obtain a relatively high market share in a short period of time. It had some other benefits as well, for instance access to resources or well-known brand. After an acquisition Santander may share some of its capacities to develop economies of scope and scale which leads to cost reduction and profitability improvement.

The main risk of this strategy is the process of integration. Parent company expects to develop synergy with acquired institution. In some cases due to language, cultural or regulatory barriers this process could extend in time and expected return may fall below previously estimated amount. This situation is especially important for companies with strong corporate structure that is not flexible enough to integrate another entity. However, in case of Banco Santander this factor does not seem very important due to specific knowledge and expertise on mergers and acquisitions. More significant aspect is the price paid for acquired institution, Santander usually offers premium. In case of overestimating potential benefits combined with high price may result in negative effects and deterioration of wealth for shareholders.

As previously noted Raiffeisen strategy proved to be effective in period between year 2000 and 2007. The situation changed drastically due to the global financial crisis. In the next years the bank was still able to expand its business, although the growth rate was significantly lower than before the crisis. Until 2011, in which Raiffeisen acquired Polbank, assets grew on average by 13.3 percent a year and reached 32.8 billion PLN. In this period bank experience some difficulties in attracting new deposits, even though the overall amount increased, the dynamic was slower than loans. Rising interest rates environment and credit crunch effect had a strong influence on profitability. In four years the net profit rose by just 0.4 percent and return on equity declined from 21.1 percent in 2007 to just 11.2 percent in 2011.

Table 1. Selected data for Raiffeisen Bank in 2007-2013 (in thousands of PLN)

Category	2007	2008	2009	2010	2011	2012	2013
Loans to Customers	12,405.1	15,605.6	14,968.6	16,142.1	19,633.5	32,185.9	30,129.8
Customers Deposits	16,452.5	21,763.5	19,205.1	19,611.4	22,938.8	39,527.9	37,576.9
Assets	21,422.6	29,525.8	25,641.4	27,520.2	32,822.1	54,684.9	53,400.7
Equity	1,606.2	2,296.4	2,584.6	2,833.9	3,028.9	5,707.9	6,118.7
Net profit	338.7	360.7	146.8	267.1	339.9	8.6	183.5
ROA	1.6%	1.2%	0.6%	1.0%	1.0%	0.0%	0.3%
ROE	21.1%	15.7%	5.7%	9.4%	11.2%	0.2%	3.0%

Source: own work based on Raiffeisen Bank annual reports from 2007 to 2013.

In 2012 Raiffeisen engaged in acquisition of Polbank. This strategic decision had a strong influence on the balance sheet of new formed entity. The transaction and integration process proved to be very costly and resulted in further profit deterioration. Net profit declined to just 8.6 million PLN in 2012. However, next year there were some signs of improvement. Assets decrease about 2.3 percent and net profit amounted to 183.5 million PLN which was about 55 percent of level reported in 2007. Analysis of the financial statements showed that during the period between 2007 and 2013 loans to customers and deposits grew on average 23.8 percent and 21.4 percent respectively. The scale of operation had increased significantly although the profitability was decreasing. Further synergy effects that may be exploited through integration of Polbank might lead to an improvement in this area.

Analysis of Banco Santander case showed some significant differences. In 2007 the scale of operation was smaller than Raiffeisen. Reported by Spanish institution assets amounted to 7.8 billion PLN compared to 21.4 billion PLN for the Austrian bank. Implemented strategy based on merging well established institutions proved to be effective during the post crisis period.

Table 2. Selected data for Banco Santander operations in Poland in 2007-2013 (in thousands of PLN)

Category	2007	2008	2009	2010	2011	2012	2013
Loans to Customers	7,537.7	9,684.4	9,437.9	12,047.9	49,663.8	49,005.2	79,607.4
Customers Deposits	7,020.3	8,998.6	83.4	4,225.4	52,032.5	53,889.6	85,536.9
Assets	7,847.8	10,080.6	9,914.9	13,755.2	73,107.2	71,669.8	120,323.5
Equity	583.7	790.9	865.3	1,612.9	9,270.2	11,297.2	16,025.9
Net profit	87.5	105.6	24.5	291.3	1 512.5	1 967.2	2 431.7
ROA	1.1%	1.0%	0.2%	2.1%	2.1%	2.7%	2.0%
ROE	15.0%	13.4%	2.8%	18.1%	16.3%	17.4%	15.2%

Source: own work based on Santander Consumer Bank, BZ WBK and Kredyt Bank annual reports from 2007 to 2013.

Integration of Bank Zachodni WBK and AIG Bank in 2011 were the most important operations for the further expansion and position on the Polish market. Combined assets for three institutions amounted to 73.1 billion PLN and were almost ten times higher than in 2007. Moreover, change of ownership did not have negative influence on profitability. Reported net profit in 2011 amounted to 1.5 billion PLN with 16.3 percent return on equity. Year 2012 may be described as stagnation. Management focused on integration and cost reductions. Thus reported net profits grew by 30 percent to almost 2.0 billion PLN, even though the scale of operation was similar to the prior year. The next year Spaniards finalized another transaction by merging Kredyt Bank, after that Santander created the third largest banking group in Poland in term of assets after PKO BP and Unicredit.

5. Conclusion

Banco Santander and Raiffeisen implemented different strategies on the Polish market. The organic growth model pursued by Austrians proved to be effective for a period between 2000-2007, although external factors and shrinking potential of Polish economy had a negative impact on the results after 2007. Growth dynamics have been declining and profitability decreased significantly. The final result was a decision to engage in merger with Polbank. The transaction enhanced the scale of business although the process of integration proved to be time-absorbing. Encountered difficulties on the Polish market and on home market resulted in global change in strategy for the whole Raiffeisen group. In February 2015, Austrians informed that Polish and Slovenian operation will be sold along with Internet bank Zuno.

In contrast the strategy implemented by Banco Santander had been very effective. In just six years from small bank, with prime exposé on car loans, allowed to build the third largest institution in Poland. Moreover, the merger of Kredyt Bank with Bank Zachodni WBK may still result in benefits including cost reduction and some synergy effects that might occur during the process. According to recently published information Spaniards intend to start process of rebranding to unify Santander brand among all markets.

Bibliography

1. *Fuzja prawna Raiffeisen Bank Polska i Polbank EFG*, <http://raiffeisen-polbank.com/documents/30393755/30395121/Fuzja+prawna+Raiffeisen+Bank+Polska+i+Polbank+EFG.pdf> [07.05.2015].
2. Heffernan S. (2007), *Nowoczesna Bankowość*, Warszawa, PWN.
3. Iwanicz-Drozdowska M. (2007), *Konglomeraty finansowe*, Warszawa, Polskie Wydawnictwo Ekonomiczne.
4. Kowalewski O. (2011), *Bankowość Międzynarodowa próba nowego podejścia*, Warszawa, Oficyna Wydawnicza.
5. *Raiffeisen Bank International przejmuję 70 procent Polbanku*, http://raiffeisenpolbank.com/documents/30393755/30395121/8_get_file.pdf [07.05.2015].
6. *Raport roczny 2000-2013 (2001-2014)*, Raiffeisen Bank.
7. *Raport roczny 2007-2013 (2008-2014)*, Santander Consumer Bank.
8. *Raport roczny 2011-2013 (2012-2014)*, Bank Zachodni WBK.

9. *Raport roczny 2013* (2014), Kredyt Bank.
10. Slager A. (2005), *Internationalization of Banks Strategic Patterns and Performance*, Wiedeń, SUERF.
11. Smith R.C., Walter I. (2003), *Global Banking*, Oxford, Oxford University Press.
12. Venzin M. (2009), *Building an International Financial Services Firm*, Oxford, Oxford University Press.
13. <http://www.parkiet.com/artykul/967385.html?print=tak> [07.05.2015].
14. <http://www.polskatimes.pl/stronaglowna/386167,banco-santander-kupil-w-wezwaniu-69-912-653-akcji-bz-wbk,id,t.html> [07.05.2015].
15. http://www.rbinternational.com/eBusiness/01_template1/829189266947841370-829188968716049154_829601505693631049-829601505693631049-NA-2-EN.html [07.05.2015].
16. <http://www.reuters.com/article/2012/02/28/idUS56195+28-Feb-2012+HUG20120228> [07.05.2015].

Chapter 14

The Patterns of Sovereign Debt Negotiations¹

Czesław Mesjasz, Lidia Mesjasz

1. Introduction

The recent negotiations with Greece and other cases of external indebtedness of developing and developed countries remind about unsolved challenges of sovereign debt management. The decisive part of sovereign debt management is its restructuring, which is achieved in the long lasting and complex, multi-party negotiations.

While there exists a vast literature about international debt, the negotiation process itself has usually been given less attention. Most of the studies are focused upon formal aspects of negotiation, e.g. modelling the bargaining process with dynamic, stochastic, general equilibrium model. Such problems as the process of negotiation, bargaining, behavior of negotiators, structure of negotiation situation, the consequences of multi-actor negotiation are not given sufficient attention.

The aim of the paper is to provide framework concepts of sovereign debt restructuring negotiations referring to a universal collection of characteristics of negotiation. The pattern is used to present selected characteristics of debt restructuring negotiation. In the paper a preliminary set of those characteristics is depicted. In the further research it should allow for elaborating detailed models of sovereign debt restructuring negotiation.

In the first part sovereign debt and negotiations associated with its preparation and restructuring are discussed. Characteristics of sovereign of sovereign debt negotiations are presented in the second part of the paper. In the final part the proposal of framework pattern of negotiation process, the characteristics of structural model and the examples of formal models of debt restructuring negotiations are presented.

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2. Sovereign debt negotiations

2.1. Sovereign debt and its restructuring

Sovereign debt (public/government/national debt) is issued by a national government. It is theoretically considered to be risk-free, as the government can employ different measures to guarantee repayment, e.g. increase taxes or print money. Government debt can embody internal debt (owed to lenders within the country) and external debt (owed to foreign lenders).

In practice, there have been multiple cases in which governments could not serve their debt obligations and had to default. As a consequence, investors ask for different yields across countries. The more a country's repayment ability is in question and the riskier sovereign debt becomes, the higher is its yield. Sovereign debt differs within and across countries e.g. by its maturity, the currency in which it is issued and whether it offers nominal or real interest rates (ft.com/lexicon, 2015).

Governments usually borrow by issuing securities, government bonds and bills. Less creditworthy countries sometimes borrow directly from a supranational organization – the IMF, the World Bank. As the government draws its income from much of the population, government debt can be viewed as an indirect debt of the taxpayers. Unlike private debt, sovereign debt is especially difficult to enforce. The legal doctrine of sovereign immunity limits suit against defaulting sovereigns, while few government assets are available for attachment in foreign jurisdictions. Due to numerous cases of difficulties of repayment by the countries and even the cases of default, the main concern of theory of economics are the problems with restructuring of sovereign external debt.

Sovereign debt restructuring can be defined as an exchange of outstanding sovereign debt instruments, such as loans or bonds, for new debt instruments or cash through a legal process (Das et al., 2012, p. 7). Two elements in a debt restructuring can be distinguished:

- debt rescheduling, which can be defined as a lengthening of maturities of the old debt, possibly involving lower interest rates; debt reschedulings imply debt relief, as they shift contractual payments into the future;
- debt reduction, which can be defined as a reduction in the face (nominal) value of the old instruments.

Debt restructuring can be accomplished under two types of circumstances. First, routine liability management operations (LMOs), such as debt swaps. LMOs are purely voluntary market exchanges, and usually occur in normal times (Papaioannou, 2009, p. 15; Das et al., 2012, p. 7) which can be also used for extra gains by the borrowers yet do not create any need for additional operations. Second, all kinds of restructuring forced by negative external and internal conditions affecting the borrower, i.e. distressed debt restructuring.

Majority of research on sovereign debt management focus on distressed debt restructurings, which usually imply some form of debt reduction. Following the definition of Standard & Poor's (Chambers, Kraemer, 2011; Das et al., 2012, p. 7), distressed debt exchanges can be defined as restructurings at terms less favorable than the original bond or loan terms. The "less-favorable terms" could include a reduced principal amount, extended maturities, a lower coupon, a different currency of payment, or effective subordination.

Debt restructuring and default are closely related but not identical. A default is the failure of a government to make a principal or interest payment on due time (beyond the grace pe-

riod). Credit ratings agencies like Standard and Poor's (S&P) define a default as beginning either when the sovereign breaks the contract, or when the sovereign tenders an exchange offer of new debt with less favorable terms than the original issue. Defaults can be partial, when only parts of the country's debt are not being serviced (Tomz, Wright, 2013, p. 13). For example, it is often the case that interest payments continue, while principal payments are suspended. A default can also imply a stoppage of all debt payments towards creditors. These instances are also referred to as a debt moratorium or payment standstill.

Usually, restructurings occur after a default. Restructurings, known as postdefault restructurings, can be defined as debt exchanges that occur after a payment default, i.e., after the government has gone into arrears on parts or all of its debt to creditors. In fact, most debt restructuring processes are triggered by a default event. There may be also other specific cases, preemptive debt restructurings, which can be defined as debt exchanges that occur prior to a default, so that outstanding debt instruments are exchanged before the government misses any payments. While not all restructurings are preceded by a default, it is also important to underline that not all defaults are followed by a restructuring. There have been many instances in which governments temporarily miss payments, which, however, are eventually repaid. This means that a default is resolved (or "cured") without a debt restructuring (Das et al., 2012, p. 8).

Another category of debt restructuring are buybacks (repurchasing) and debt swaps. In buybacks outstanding debt instruments are exchanged against cash, often at a discount. There are three reasons why governments in emerging market countries undertake debt buybacks and swaps: to reduce debt service payments, to minimize sovereign risk, and to develop domestic capital markets. Sometimes countries have other objectives, such as releasing collateral and eliminating restrictive bond covenants, but these tend to be subsidiary to the main objectives (Medeiros et al., 2007, p. 6).

2.2. Sovereign debt negotiations

While there is a broad literature about international debt, the negotiation process itself has usually been given less attention. Some earlier works are Sachs (1984), Bulow and Rogoff (1988, 1989a, 1989b), Fernandez-Ariaz (1991), Mesjasz (2000). In all the above mentioned works, negotiations of sovereign debt restructuring are the main point of interest. However, negotiation is also necessary before drawing any debt contract, should it be credit or bonds. Therefore the following divide of sovereign debt-related negotiations is proposed: debt contract preparatory negotiation and debt restructuring negotiation. The first group includes credit/loan negotiation and bond negotiation. In the latter case, different form of auctions are also applied. Undoubtedly the sovereign debt restructuring negotiation is a complex process determined by the number of participants, diversity of participants, number of issues, diversity of issues, duration and numerous external factors. Four negotiating situations can emerge in debt restructuring:

- one lender vs. one borrower,
- one lender vs. multiple borrowers,
- multiple lenders vs. one borrower,
- multiple lenders vs. multiple borrowers.

Due to the number and diversity of lenders, in the sovereign debt restructuring negotiations a coordination problem may arise. The creditors can be private, public or international financial

organizations. The coordination of public lenders is accomplished by the so-called Paris Club and coordination of private lenders is done by the London Club. Instead of multiple one-to-one negotiations, the debtor countries can negotiate with the Clubs who are the representatives of all lenders, public or private. The international financial institutions – the World Bank, and the IMF can also take part in the negotiation as the third part. In the recent case of the Greece crisis, the European Union and the European Central Bank are also involved as the partners and as the third parties.

Negotiations to restructure sovereign debt are time consuming, on average taking more than six years to complete. Such delays are costly to all parties. Sovereign debtors in default face disruption in their access to world capital markets, while creditors suffer large losses in the value of their investments (Pitchford, Wright, 2010, p. 3).

There is another factor determining negotiations of sovereign debt restructuring. Bulow and Klemperer (1996) analyzing the sales of companies have drawn a conclusion that that under specific situations auctions are more favorable than negotiations. Using this argument (Kamlani, 2008, p. 6) argues that the debt-exchange process is more closely aligned to an auction process than a negotiation. In this paper a classical model of two parties or multiple parties negotiation/bargaining is applied.

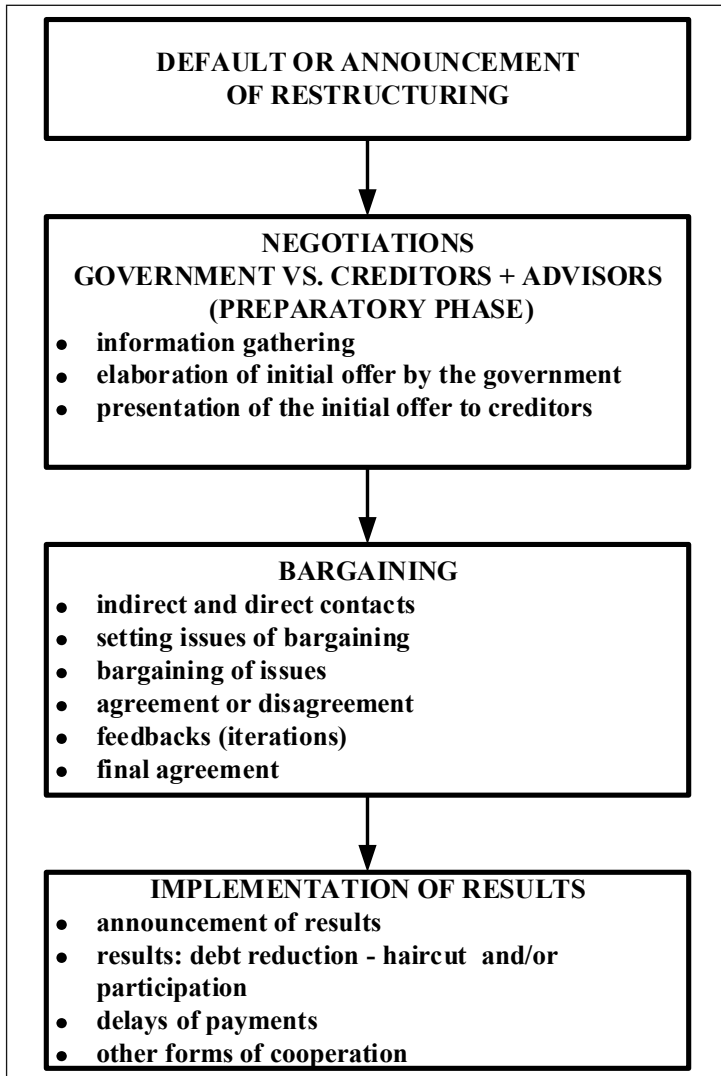
3. Negotiations of debt restructuring

3.1. Framework pattern of negotiation process

Sovereign debt restructuring negotiations can be viewed as a specific type of negotiation. An inspiration for negotiation may come from various areas of knowledge. In the discussions on sovereign debt restructuring negotiations the approach based on formal game models is dominating. Such an approach seems insufficient since other factors also play an important role in those negotiations.

Therefore it seems necessary to extend the set of “traditional” methods of analysis of sovereign debt restructuring negotiations. A natural extension is to draw on the models of negotiation used in management, politics, trade, and in social sciences in general. Negotiation in those areas is analyzed from multiple points of view – social, behavioral, cultural, economic and mathematical. Since in most of the models the processual approach is applied thus as the point of departure a framework process of debt restructuring is proposed.

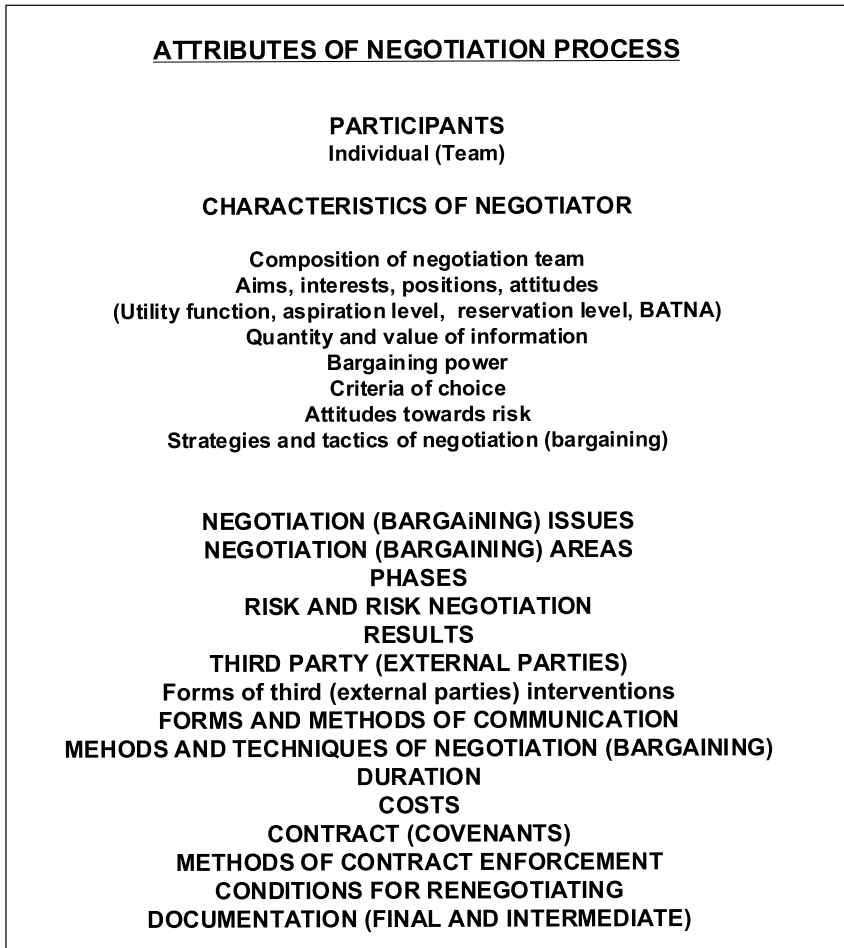
Figure 1. Framework process of debt restructuring



Source: own research.

Obviously such an approach will make the subject of research much more complex but under the present circumstances it is the only possible way of studying sovereign debt restructuring negotiations. The process of negotiating can be depicted with the following characteristics.

Figure 2. Attributes of negotiation process



Source: own research.

3.2. Structural model

In majority of considerations on sovereign debt restructuring attention is focused upon the differences between this kind of debt and other, “classical” corporate debt, debt of other institutions and domestic lending. Understanding of international debt negotiations starts from recognizing the difference between domestic and international lending regarding the enforcement of the debt contracts. In domestic lending the legal system allows collateral to be attached, which provides a guarantee for the creditor and an incentive to comply for the debtor. Insufficient collateral may lead to debt restructuring and even bargaining, but under normal circumstances the liquidation value of the collateral can be expected to be enough to assure contract compliance (Fernandez-Ariaz, 1991, pp. 4-5).

Table 1. Structural interpretation of sovereign debt negotiation process

UNIVERSAL CHARACTERISTICS	SPECIFIC CHARACTERISTICS
Participants	Debtor country, representatives of foreign governments, representatives of foreign banks, representatives of bondholders (state, banks, other financial institutions)
Negotiation (bargaining) issues	Debt restructuring – reduction, rescheduling, swaps, debt forgiveness, internal economic reforms by the borrower, changes of debt maturity
Phases	Initiation – credit “event”, identification of situation (pre-emptive activities, insolvency, default), preparation for renegotiation, renegotiation (bargaining), implementation of solution
Risk and risk negotiation	Low risk of costs of sovereign default (theoretical); in reality the restructuring and especially default may be costly for lenders, negotiated risk sharing, absence of collateral
Results	Debt restructuring decrease, debt forgiveness (partial, complete)
Third party (external parties)	World Bank, International Monetary Fund, London Club (private lenders), Paris Club (public lenders), European Central Bank
Forms of third (external parties) interventions	World Bank – delegated monitoring, provider of additional resources IMF – delegated monitoring, provider of additional resources London Club – coordination of private lenders Paris Club – coordination of public lenders ECB – debt of EU members
Duration	Continuous process, prolonged negotiation from 1 to 6 years
Costs	High transaction costs, high agency costs of all parts involved
Contract (covenants)	Legal binding contract, political agreement, declaration of will, reputation contracts, cash in advance contracts Covenants constraining activities of the borrower Covenants influencing decisions of the borrower, e.g. sales of assets, restructuring of assets Sets of ratios (indicators) to be observed by the borrower (e.g. asset-to-liability or revenue-to-cost ratios), possibility of collective action clauses
Methods of contract enforcement	Threat of loss of reputation, restrictions in access to international borrowing, institutional pressure, political pressure
Conditions for renegotiation	Possibility of perpetual renegotiations

Source: own research.

Usually the negotiations take place between multiple bank lenders or representatives of bondholders and representatives of the debtor country. They bring about all consequences of multiple-party negotiations – increased complexity, multitude of conflicting interests, possible multiple coalitions. Negotiations between the banks' consortium and each country in the context of a debt crisis can be schematically described as follows. The banks abide by the rule of law because otherwise they would lose the possibility of applying legal sanctions. The country, however, does not have this constraint and can renegotiate its obligations in any period. Therefore, without loss of generality, renegotiations seeking a rescheduling agreement can be assumed to take place in every period if the constraint is established that the outcome cannot be detrimental to the country, compared to complying with the original schedule in the current period (Fernandez-Ariaz, 1991, p. 11).

The above general approach to sovereign debt negotiations can be an adequate point of departure for developing a more precise and at the same time more universal model of this type of negotiations. The ideas applied so far in studies of the debt restructuring negotiations are insufficient since they omit behavioral, psychological, historical and cultural aspects. Therefore the characteristics included in the framework model approach proposed in Figure 2 can be specified as to reflect the structure of sovereign debt restructuring negotiations in a more detailed way. The characteristics presented above in Table 1 are not complete but they only show the directions for further specification.

3.3. Formal models

Mathematical models of negotiators behaviour and decision making constitute the most popular instrument of studying debt restructuring negotiations. They are treated both as an extension and at the same time as a foundation of qualitative, mainly institutional and behavioural considerations. It is obviously not possible to present a complete survey of all formal models. The following models of negotiation can be treated as representative ones in the analyses of debt restructuring:

Game theory-based models

Game theory constitutes a foundation of economic theory of the sovereign debt. From the point of view of negotiation theory and practice, the studies of sovereign debt can be divided into two groups. The first, dominating one, includes the works in which sovereign debt-related negotiations are only a part of considerations. The following exemplary writings can be assigned to this group, e.g. (Bulow, Rogoff, 1989a).

The second group embodies the studies applying various ideas from game theory to the studies of sovereign debt negotiations. It should be added that the most significant contribution of game theory to studying sovereign debt restructuring negotiations is not just a collection of general conclusions but a framework to conduct analysis of the strategic interactions of participants. The attraction of game theory is that although the mathematical formalism underlying it is simple and easy to understand, it can be applied in wide range of strategic problems and as the source of heuristically valuable analogies and metaphors (Fernandez-Ariaz, 1991; Dao, Viet Linh, 2013, Bulow, Rogoff, 1989b).

Contractual approach

Contracts constitute one of key elements of theory of corporate finance, corporate governance and negotiations. Applications of contractual approach can be illustrated by the concept posed by Pitchford and Wright (2010). In this paper, they have developed a theory of sovereign debt restructuring negotiations based on the observation that it takes place in a weak contractual environment, where the sovereign cannot commit to making identical settlement offers to all creditors. Delay then arises endogenously due to a strategic holdout effect whereby creditors delay entering into a settlement in the expectation of better terms at a later date. (Pitchford, Wright, 2010, p. 3). Sovereign debt negotiations take place in a “weak contractual environment” which can be characterized by the five following features. The first is fundamental to the problem of sovereign default (Pitchford, Wright, 2010, p. 3):

1. Sovereigns lack the ability to commit to contracts.
2. All creditors must settle before the sovereign can regain normal credit market access.
3. A settlement exchanges defaulted debt for an immediate cash payment (or its equivalent) and expunges any future legal rights on the defaulted debt.
4. Creditors incur substantial transactions costs, some of which are difficult to verify.
5. Creditor efforts to coordinate have been frequent, but often ineffective.

Brinkmanship modelling

The model of conflict typical for the Cold War has been recently revived during the negotiations between Greece and its Eurozone creditors (The Guardian, 2015). Greece and the representatives of creditors made several steps which could have led to “Grexit” or other situations like default with unpredictable consequences. It was a typical conflict situation which is called “brinkmanship”. It is a shared risk of a dramatic event, e.g. war, crisis, bankruptcy in which each side pushes the other towards the brink of disaster or war ever closer in order to force the other side to capitulate at the last second. Soviet-American interactions at several points during the Cold War manipulated this situation in order to extract favorable gains none so clearly as during the Cuban Missile Crisis. This situation is usually depicted with models or analogies with the game of Chicken, that was once observed by Russell (Schelling, 1966, p. 116).

Agency analogy

Debt management constitutes an important part of corporate finance management and corporate governance theory and practice.. Therefore it is understandable that agency relation, which is the key concept in corporate governance and corporate finance has become a source of inspiration for studies on sovereign debt management. Some of those studies aim at describing the entire sociopolitical structure.

An interesting example of searching for formal models of sovereign debt restructuring negotiation was developed by Gulati and Triantis (2007). They drew attention to an analogy between corporate debt and sovereign debt. The dominant idea is that of principal-agent: the lender is a principal and the borrower is an agent. In the above concept of sovereign debt there may be one principal and several agents (borrowers) (Gulanti, Triantis, 2007, p. 2). In a general form, which seems more relevant to reality of sovereign debt, there may be several lenders and several borrowers. The latter have the discretion to put the lender’s funds at risk. Four situations described already in part 2.2. of this paper can emerge, which constitute an extension of typical one

to one agency model drawn from corporate governance and corporate finance (Jensen, Meckling, 1976; Mesjasz, 2011).

This approach reflects a contractual relation. Although social and market pressures may influence the agents decisions, the lender disciplines the borrower's use of its funds by a contract that can be legally enforced. The principal-agent relation reflects also the similar tensions present in lending to sovereign countries, but the contractual approach must be extended due to the distinctive feature of international relations: the absence of a third party actor with coercive power.

The agency relation analogy between corporate debt and sovereign debt can be extended with the inspiration provided in the work of Gulanti and Tirantis (2007) as well as drawn from literature on agency theory and theory and policy of sovereign debt management.

As with corporate debt, the principal-agent model captures the basic tensions arising from the risk of sovereign default: the sovereign borrower has better information about its economic prospects than the lender (hidden information). It may occur before the contract is drawn – *ex ante* information asymmetry, and *ex post* information asymmetry when the sovereign can alter the risks of the loan after the funds are advanced (hidden action or agency problem). The first situation leads to a threat of negative selection and the second leads to moral hazard.

A question is thus arising what are the conclusions stemming from an analogy between agency problem in corporate debt management and sovereign debt management? Is it just another method of description of the problem or is it an appropriate methodological background for further considerations. The above arguments favour the second option.

4. Conclusion

The above considerations allow for drawing the following conclusions. First, it has been shown that research on negotiations of sovereign debt restructuring is at an early stage. It is conducted either in a framework of the studies of processes of debt restructuring or is dominated by formal, often simplified models referring to theoretical game models.

Second, insufficient level of applications of more universal models of negotiation in the studies of sovereign debt restructuring negotiations is the main reason for limited understanding of the processes restructuring.

Third, application of universal patterns of negotiating in theory of sovereign debt restructuring will help in elaborating policy making solutions more relevant to reality. The proposed patterns of debt negotiating can be used in the further studies and in preparation of applicable recommendations.

Fourth, the analogy between agency problem in corporate debt and agency structure of relationships in the sovereign debt restructuring negotiations seems to be one of most promising directions of further research.

Bibliography

1. Bulow J., Rogoff, K. (1988), Multilateral Negotiations for Developing Country Debt, *IMF Staff Papers*, Vol. 35, No. 4, <http://scholar.harvard.edu/rogoff/publications/multilateral-Negotiations-Rescheduling-Developing-Country-Debt-Bargaining-Theor> [12.05.2015].

2. Bulow J., Rogoff K. (1989a), Sovereign Debt: Is to Forgive to Forget?, *American Economic Review*, Vol. 79, No. 1.
3. Bulow J., Rogoff K. (1989b), A Constant Recontracting Model of Sovereign Debt, *Journal of Political Economy*, Vol. 97, No. 1, <https://faculty-gsb.stanford.edu/bulow/articles/A%20constant%20Recontracting%20Model%20of%20Sovereign%20Debt.pdf> [04.05.2015].
4. Bulow J., Klemperer P. (1996), Auctions Versus Negotiations, *The American Economic Review*, Vol. 86, No. 1.
5. Chambers J., Kraemer M. (2011), *Distressed Sovereign Debt Exchanges: Examples From the Past and Lessons for the Future*, Standard & Poor's, <http://siteresources.worldbank.org/INTDEBTDEPT/Resources/468980-1170954447788/3430000-1303758575737/DMFBerne-04Chambers.pdf> [07.05.2015].
6. Das U.S., Papaioannou M.G., Trebesch Ch. (2012), Sovereign Debt Restructurings 1950-2010: Literature Survey, Data, and Stylized Facts, *IMF Working Paper*, No. 12/203, Washington, D.C, International Monetary Fund, <https://www.imf.org/external/pubs/ft/wp/2012/wp12203.pdf> [25.01.2015].
7. Dao B.T., Viet Linh T.H. (2013), Game Theory in Vietnam Sovereign Debt Negotiation, <http://ssrn.com/abstract=2524224> [17.04. 2015].
8. Fernandez-Arias E. (1991), A Dynamic Bargaining Model of Sovereign Debt, *Working Papers*, WPS 778, Washington, DC, The World Bank, http://econ.worldbank.org/external/default/main?pagePK=64210502&theSitePK=544849&piPK=64210520&menuPK=64166093&entityID=000009265_3961002010923 [27.09.2013].
9. [ft.com/lexicon](http://lexicon.ft.com/Term?term=sovereign-debt), Definition of sovereign debt, <http://lexicon.ft.com/Term?term=sovereign-debt> [15.04.2015].
10. Gulati G.M., Triantis G.G. (2007), Contracts Without Law: Sovereign Versus Corporate Debt, *University of Cincinnati Law Review, Duke Law School Legal Studies Paper*, No. 152, <http://ssrn.com/abstract=973831> [04.10.2014].
11. Jensen M., Meckling W. (2006), Theory of the Firm: Managerial Behavior, Agency Costs, and Capital Structure, *Journal of Financial Economics*, Vol. 3, No. 4.
12. Kamlani S.D. (2008), *The Four Faces of Power in Sovereign Debt Restructuring: Explaining Bargaining Outcomes Between Debtor States and Private Creditors Since 1870*, Ph.D. Thesis, The London School of Economics and Political Science, <http://etheses.lse.ac.uk/2313/1/U615260.pdf> [11.06.2015].
13. Medeiros C., Polan M., Ramlogan P. (2007), A Primer on Sovereign Debt Buybacks and Swaps, *IMF Working Paper*, WP/07/58, <http://www.imf.org/external/pubs/ft/wp/2007/wp0758.pdf> [08.04.2015].
14. Mesjasz C. (2000), Reorganization of Commercial Debt: Negotiations between Poland and the London Club (1981-1994) [in:] *International Economic Negotiation: Models versus Reality*, (eds.) V.A. Kremenjuk, G. Sjöstedt, Cheltenham, Edward Elgar.
15. Mesjasz C. (2011), A Proposal of Comprehensive Typology of Theories of Corporate Governance [in:] *Knowledge – Economy – Society. Challenges of the Contemporary World*, (eds.) R. Oczkowska, B. Mikuła, Cracow, Cracow University of Economics – Foundation of the Cracow University of Economics.
16. Papaioannou M.G. (2009), Exchange Rate Risk Measurement and Management: Issues and Approaches for Public Debt Managers, *South-Eastern Europe Journal of Economics*, Vol. 7, No. 1, <http://www.asecu.gr/Seeje/issue12/Papaioannou.pdf> [17.03.2015].

17. Pitchford R., Wright M.L.J. (2010), Holdouts in Sovereign Debt Restructuring: A Theory of Negotiation in a Weak Contractual Environment, *NBER Working Paper Series*, Working Paper 16632, <http://www.nber.org/papers/w16632> [18.03.2014].
18. Sachs J. (1984), Theoretical Issues in International Borrowing, *Princeton Studies in International Finance*, No. 54, https://www.princeton.edu/~ies/IES_Studies/S54.pdf [03.11.2014].
19. Schelling T. (1966), *Arms and Influence*, New Haven, Yale University Press.
20. The Guardian (2015), *The Guardian View on Greece: Dangerous Brinkmanship*, 6 May, <http://www.theguardian.com/commentisfree/2015/may/06/guardian-view-greece-dangerous-brinkmanship> [15.05.2015].
21. Tomz M., Wright M.L.J. (2013), Empirical Research on Sovereign Debt and Default, *NBER Working Paper*, No. 18855, <http://www.nber.org/papers/w18855> [17.02.2015].

Chapter 15

Financial Sector Development in Ghana – Evolution of Capital Markets

Joseph Yaw Abodakpi

1. Introduction

With the introduction and implementation of the Structural Adjustment Program (SAP) proposed by the International Fund (IMF) in 1983, as part of Ghana's economic reforms, and eventual entry into the World Trade Organization (WTO) in 1995, massive political and economic reforms have been undertaken and continue to take place to meet Internationally accepted standards which induce investors to invest in Ghana and the West Sub-Regional corridor, and these reforms includes restructuring in the banking and financial Industry in Ghana (Antwi-Asare, Addison, 2000). These changes have been accompanied by an unprecedented rate of economic boost and growth which has seen Ghana to be major investment destination Centre, while maintaining stronger economic and trading ties with the rest of its trading partners like the United States, the European Union and African Union respectively.

The Financial Development Report of 2011 (World Economic Forum USA Inc., 2011, p. 3) defined financial development as the policies, factors, and the institutions that lead to effective financial intermediation and effective financial markets, as well as deep and broad access to capital and financial services. Others authors like Calderon and Liu (2003, p. 326) also defined financial development as "the improvement in quantity, quality and efficiency of financial intermediary service". Ghana's financial sector has since 1983 gone through series of restructuring and transformation. Reforms in the financial sector in 1983 under the Structural Adjustment Program, together with the Financial Sector Adjustment Program (FINSAP) in 1988 in two phases, financial liberalization in 1990 and the introduction of Universal banking in 2003, all aimed at building and creating a vibrant financial architectural framework which facilitated the transition to a market based economy. While (FINSAP) made gains in the banking sector it is also credited with the establishment of the Capital Market in Ghana. Among some targeted objectives of the reform was to fully develop an efficient financial sector which could facilitate the growing movements in the markets, and the introduction of standardized accounting reporting systems and procedures and finally also strengthening regulatory, supervisory Institutions respectively.

The Ghana Stock Exchange incorporated in July 1989 as a private company under the Companies code of 1963 (Act 179), changed status to a public company under the company's Code in April 1994. Pushing for full liberalization in the financial sector, "universal banking" was introduced by the Bank of Ghana in the first quarter of 2003, which allowed banks to embark on commercial, development, investment or merchant banking without separate requirements to operate in these new areas. The development in the financial sector did also occur during a period when the economy recorded substantial increase in growth. The Gross Domestic Product (GDP) growth increased from -7.5% in 1982 to 6.2% in 2006; per capita income increased from -10.2% to 4.3% over the same period (The World Bank, 2008¹, p. 14). These reforms brought about effectiveness and efficiency in the financial sector in Ghana, additional economic growth has been positive since the start of the economic adjustment and consistent since 1990 especially from 2001 to 2013 and also projected to grow 8.8% in 2015 as a result of oil production in commercial quantities.

Economies with developed and deep financial systems accelerate faster in economic growth and development than economies with weak financial systems (Levine, 1997). A well-developed Financial Sector of an economy with a vibrant capital market plays a crucial and significant role in the national economy of a country with reference to the function of efficient distribution and allocation of capital. In an effort to accelerate economic growth and sustain economic development there is the urgent need for a vibrant dynamic and resilient capital market which forms the bedrock of a nation's financial sector as a whole. Primarily capital markets help capital formation and also perform roles like the mobilization of funds from people and institution for the purpose of investment and production in productive channels of an economy. In the Financial sector of an economy it affords the chance to enhance the forces of demand and supply of equity capital and debt, which also helps channel resources from financial institutions to investors by way of shares, commercial papers, notes and bonds neither by corporate bodies or governments.

Macroeconomic indicators have continued to be positive and stable over a period of time between 2008 to present. With the ever growing influence and dominate on the African Continent, the Republic of Ghana possess the leverage in democracy, good governance and the rule of law and a good environment for doing business. Since the worst economic recession in 2008, economic growth in Ghana slowed down, but did continue to grow at 14.4% in 2011, 7.9% in 2012, and 8.5% in 2013. It is also projected to grow at 8% over the medium term in 2015, against the background and supported by improved political stability which drives investor interest, oil and gas production, increased private-sector investment participation, together with public infrastructure development and improvement (www.afdb.org/en/countries/west-africa/ghana/ghana-economic-outlook/) Ghana did embarked on some monetary and fiscal policies in the wake of the 2008 financial meltdown which spilled over globally and recorded some positive impacts in the areas of infrastructure and investment increasing; furthermore a strong export regime has also boosted the economy with major trading partners like South East Asia and the US, EU importing more.

2. Capital markets efficiency

The realization of savings in an economy can be achieved resource mobilization for the various sectors of the economy such as manufacturing, the agriculture industry and other vital sectors of the economy including the service industry (Banking and Insurance). Capital markets presents

¹ World Development Indicators, October 2008.

investors with financial Instrument such as bonds, equities, pension fund and mutual funds to invest and raise capital in the long term with guaranteeing attractive, stable and suitable interest rates to investors and individuals. Capital has been broadly defined “as accumulated wealth that is available to create further wealth” (Chisholm, 2002). The wealth is channeled into productive ventures in an economy and the place for those who require financial resources is the capital market.

For markets to be efficient Dyckman and Morse (1986) defined efficient markets to be “a securities market as efficient if 1) the prices of the securities traded in the market act as though they fully reflect all currently available information and 2) these prices react instantaneously, and in an unbiased fashion to new information”. The issue here is how one can measure the fullness of available information in the market place. For a capital market to be more reliable there is a three level category of efficiency that the market must fulfill and exhibit: firstly informational efficiency, then transactional efficiency and lastly allocative efficiency. Informational efficiency shows the relationship between information available and prevailing market prices, whereas transactional efficiency is about with the cost – benefit analysis of the cost and risks attached to the exchanged of economic resources of any kind. The last type of efficiency is in the form of allocative efficiency which asses the effects of equilibrium – market resources allocations (Ongkrutaraksa, 1996, p. 1).

The Efficient Markets Hypothesis (EMH) by Fama (1970, pp. 383-417 and 1976, pp. 143-145) relates to Informational efficiency and propounds that assets get their prices right in financial markets given the available information. Informational efficiency has also been referred to as market efficiency by Beaver (1981, pp. 23-37) and also by Jensen and Smith (1985) as prefect efficient market theory. The Rational market hypothesis also concerns itself with the relationship between prevailing markets prices and information available. The underlying assumptions of a perfect or efficient market includes firstly (a) perfect competition, (b) the absence of direct transactional cost, regulations or taxes and finally all assets are perfectly divisible, (c) perfect competition in market securities and (d) that all agents are perfectly rational and they pursue utility maximization.

The Perfect Capital Markets Model is represented by the equation below:

$$f_m(P_{t+1} | \Phi_{tm}) = f(P_{t+1} | \Phi_t) \tag{1}$$

where:

Φ_{tm} – information set actually used by the market at time t,

Φ_t – all relevant information set available at time t,

$f_m(\cdot)$ – true joint probability of the price vector P_{t+1} implied by F_t ,

$f(\cdot)$ – joint probability of the price vector P_{t+1} as assessed by the market (Ongkrutaraksa, 1996, p. 1).

The above components and assumptions of a perfect capital market also has some implications on the participants of the capital markets, a perfect example is the updating of prices to reflect with new information that has arrived.

3. Capital markets in Ghana: legal and institutional framework

The financial sector, for that market the capital markets is governed and regulated by two legal enactments namely the Provisional National Defense Council (PNDC) Securities Industry Law 1993, Act 333 and also the Securities Industry Amended Law 2000, Act 590. Under the auspices

of the Securities Industry Law, the Securities and Exchange Commission was also established with the sole responsibility of regulating and supervising the financial industry operations and activities in Ghana. The Legal Framework also makes provision for “functioning of the Commission, the establishment of stock markets, the licensing of Stockbrokers Dealers and Investment Advisers, Unit Trusts and Mutual Funds, registers of interest in securities, the mode of conduct of securities businesses, issues concerning Accounts and Audits, the establishment of fidelity funds and trading in securities” (Teye, 2011). Above all there is the need is also “to protect investors and maintain the integrity of the securities market some of the main responsibilities outlined for the commission are as follows:

- providing companies and the general public with guidance in interpreting the provisions of the securities laws, rules and regulations on the subject of listing of securities and handling any investor complaints;
- licensing and regulating all market operators such as Investment Advisors, Dealers and their representatives, including the regulation of the Ghana Stock Exchange;
- overseeing and regulating the fund management industry in Ghana and administering the securities laws affecting Collective Investment Schemes such as Unit trusts and Mutual funds;
- supervising mergers and acquisitions offers” (www.sec.gov.gh/web/guest#).

4. Ghana government’s bonds market

Government’s efforts of creating an efficient and effective securities market have shaped the countries fortune as an investment hub on the Sub-Saharan Continent. Financial reforms and restructuring has deepened the financial sector to a very large extent. Assets such as bonds are accorded a special status by their very nature of being a financial instrument due to some exceptional characteristic that they are low-risk based assets and also risks associated with them can be quantified with a precision that is not common among other assets, such as stocks and shares, thereby making more precise and predictable their yield. Furthermore bonds can be grouped into a few categories, more significantly the time to maturity and the order of payment. Several definitions for a bond do exist, but a bond has been defined as a contract that commits the issuer to make a definite sequence of payments until a specified terminal date. One special nature of bonds is that they are bought and sold in the secondary market which will represent some form of loan agreed upon by two parties, i.e. a borrower and a lender. Bonds as securities are issued by Sovereign governments and their representatives which also includes international bodies such as the World Bank, and other incorporated bodies (Bailey, 2005).

The equity market in Ghana since its introduction and after several decades of economic reforms has performed extra ordinarily in the face many global challenges, especially global external shocks experienced in 1999; where prices of it Gold exports plummeted and oil prices sky rocketed which affected Ghana’s balance of payment severely. In the early phase of the introduction of a 5 year bond issued, a foundation for more active bond trading on the Ghana Stock exchanged was created; this was followed up with the listing of the HFC dollar Housing Bond Series. Currently the bond market is characterized by various types of yields of bonds ranging from 2, 3, and 5 year bonds with market value worth of about (GH 1 billion). On the Sub-Regional Level the African Development Bank in its efforts to support financing of developmental projects it also issued a 2 year cedi (GH¢) denominated bond with market value of about 414.9 billion on

the Ghana stock exchange. This action reposed more confidence into the capital markets of Ghana and also laid the grounds for further listing (African Development Bank, 2007).

By the end of 2006 fiscal year total government bond amounted to GH 2,400 bn (US 260m). Furthermore the listing of Standard Chartered Bank three year medium term notes within the region of GH 350 billion was also a significant indicator with reference to the size and components of the market. Again in 2008, at the height of the current global recession the Ghanaian Government listed its 5 year Golden Jubilee Bond and this also made the market more attractive and prudent to investors (Bank of Ghana, 2007a). According to the Review report of the Ghana Stock Exchange, Market Capitalization in 2006 went up 22.38% to close at ₵112,415.68 billion from a previous value of ₵91,857.28 billion in 2005, at the same time the volume and value traded shares were 98.29 million shares and ₵476 billion respectively compared to the 81.40 million shares with market value of about ₵464 billion recorded in 2005. Furthermore bonds listed recorded a values of ₵1.6 billion compared to ₵1 billion in 2005. Also under the period under review, total shares traded increased from GH₵47.60 million to GH₵140.71 million. The Ghana Stock Exchange had 32 listed companies, with a market capitalization of approximately GHC 112 trillion (USD 12 bn) at March 2007 (Ghana Stock Exchange, 2006).

5. Derivatives market in Ghana

Not much attention had been paid to the derivatives markets which went largely unregulated before and during early stages of the recent financial crisis of 2008 which had its root causes among others mainly the derivatives market. It is against this backdrop that much regulation has been put in place to control and check the operations of financial institutions who indulge in risky assets management. The total amount of derivatives has grown more than 20 times more than the size of the global economy with a value Market size pegged at \$1,200 trillion (www.global-research.ca/financial-implosion-global-derivatives-market-at-1-200-trillion-dollars-20-times-the-world-economy/30944). For a well efficient and functioning derivatives market certain prerequisites are required, firstly the basic of derivatives must be well explained and developed among market and industry players and also the mechanism of spillover of effects of trading form this type of financial instrument.

One definition puts a derivative as an asset whose performance is based on (derived from) the behavior of the value of an underlying asset (usually referred to simply as the underlying) (Arnold, 1998, p. 546). Simply put is an agreement between a buyer and a seller to fulfill a contract at a future date. Most often these are financial instruments that derive their value from underlying assets that might include some of the following equities, interest rates, minerals (gold, diamond, oil, cereals (wheat) and grains (maize)). Derivatives comes in several forms such as futures, forward rate agreement and forwards, options and involves buying or selling an underlying asset at future date and time with an agreed price, quantity. These types of trading are done on an organized exchange and over the counter respectively to hedge against risk and also mitigate against losses on trade positions.

In Ghana, the Swap was introduced in 1997 and had only two major banks namely CAL merchant bank and Ashanti Goldfields Company Ltd using these operations of trading (Bank of Ghana, 2007b). But has increased recently and development due to the development of the banking and the insurance sector. With the massive discovery of oil deposits and sale of oil in commercial

quantities it has imperative on the part of government to develop the sector and make it more prudent. Natural resources such as Oil, gold and other minerals, which are traded on the world global stock exchange has made the derivative market in Ghana develop and also increased in size. The market of derivative is largely among government bonds and the sale of commercial oil and its related products.

6. The equity market

Since the introduction and final establishment of the stock exchange several gains has been made and keeps on improving. Government has done much needed reforms to increase the size and operations of the stock market in Ghana. An IMF Study in 2006 showed the stock market under performed in the first 4 years of its establishment but in the 1994 the stock market capitalization in proportion to GDP reached a record peak of 35 percent. This, the IMF stated was close to the world average of 38.2 percent (International Monetary Fund, 2006).

The equity market is largely dominated by governments and Institutional corporate bodies, larger proportions of government debts (bonds) listed on the Ghana Stock Exchange belongs to the government and the remaining parts belongs to the Home Finance Group. For example a study conducted in 2003 discovered that four bonds listed on the Ghana Stock Exchanged belonged to the Home Finance Company, whiles the remaining went to Government. And this trend has not changed its trajectory but has continued with the Government of owning larger portions of listed shares and bonds, typical examples being the Jubilee bonds listed in 2008, and also the recent 10-year Eurobonds the government listed in 2013 which was massively oversubscribe due to ever growing of investor confidence in the macroeconomic economic management of the economy. With the performance that made the Exchange one of the best in Africa and the current appreciation of the currency against the major trading currencies, there is no doubt about the positive performance in 2015 in spite of ongoing IMF bailout discussions due to huge budgetary deficits accumulated.

7. Challenges to capital market development

Largely sub-Saharan African countries, including Ghana which gained a lower middle income status can benefit enormously from accessing and tapping the International global capital market to finance government projects, debts and other economic agendas but inversely these borrowings come with its associated costs and risk respectively. Among some challenges that could affect these countries is Implementation risks, this type of risk arises as a result of not channeling the proceeds into productive economic ventures. Also a more serious risk could be a debt sustainability risk, where the spending of capital resources (funds) indiscriminately and the finally a countries inability to repay its principal and interest when bonds matures, further there is a roll-over risk where bonds issued and sold forms a significant proportion of external debt. Also countries can also suffer economic setbacks when maturities dates are shorter than stipulated projects to be financed (Te Velde, 2014). Furthermore larger amounts of capital inflows could also cause a great deal of macroeconomic risk which might lead to volatility, credit booms and inflation in the long run which will have negative impacts on other macroeconomic indicators of the borrowing country.

Currency or exchange-rate risk is another challenge posed to borrowing countries. Technically inflows of capital into an economy should lead to exchange-rate appreciation, but not “(...) when currencies devalue (which happened as a response to US Federal Reserve tapering of quantitative easing (QE) in some fragile emerging economies), interest payments on the Eurobond in dollar terms become relatively more expensive than repaying domestic debt. This could undo the benefits of lower interest rates on Eurobonds than on domestic bonds. A currency that is half the value will lead to double the interest-rate payments and bond repayments. The real risk, therefore, lies in the currency mismatch which could be reduced by foreign currency income, such as income from commodity exports. This, of course, is what happened earlier in 2014 in Argentina and Turkey and during the 1980s debt crisis” (Te Velde, 2014) and this is an experience which developing and emerging African countries must take into consideration when assessing global capital markets. A weaker currency also discourages secondary bond market trading. In 2013 the Ghanaian currency the Cedi (GHC) depreciated against some of major trading currencies due to massive fiscal indiscipline that occurred in 2012 and in 2013 respectively. This continued into the last quarter of 2014, where macroeconomic indicators stabilized moderately.

8. Conclusion

Against the backdrop of some positive international ratings by Standard and Poor’s and Fitch, grading the economy of Ghana B and B+, which has been recently downgraded to a B-, Ghana in 2007 issued some bonds internationally, with the access and tapping of the global capital with a 10-year sovereign Eurobond with value of USD 750 million, Ghana ranked second after South Africa, the first of a Sub-Saharan African Country to achieve that. In spite of the current global recession and internal institutional weakness together with efforts to deepen the financial sector and make it more vibrant and efficient, the Ghana Stock Exchange (GSE) currently has over 36 listed companies, with a market capitalization estimated over USD 12 billion and automated since 2008. Reforms in the Regulatory Framework paved way for foreign investment into the equity market of Ghana, including listed companies on the Ghana Stock Exchange, the minimal participation of local investors in the capital market of Ghana is a worrying scenario, since huge percentages of investment are foreign based with its negative effect of capital flight. From 2013 fiscal year to present, there exist only two corporate bonds being listed on the Ghana Stock Exchange which shows the lack of domestic participation in capital mobilization for economic and productive purposes.

Both the secondary and primary markets continue to make strides in various ways with listings of 2006, 2007, 2013 which have all deepened and made the capital market competitive for higher returns and yields on sovereign bonds. There has been a level of involvement on the part of local investors where “Ghanaian institutional investors and local investors hold \$16.5 million of the 2013 Eurobond” (Quartey, 2013) which signifies a good trend in local investment.

Although the banking sector and insurance market has improved significantly as a result of the recent the Banking Law enacted in 2003, the number of Banks operating has increased significantly and there is a positive trend of credit to the private sector. The Insurance industry on the other had has about 30 registered companies, both local and international operating. In addition to 3 State-owned banks, there exists over 30 licensed commercial banks with many well-developed branches country wide but this development has not translated into any posi-

tive effect on the development of the derivative market which remains largely undeveloped and utilized, which has negative impacts on both domestic and foreign transactions such as the futures, forwards contracts and swap agreements. With the intended listing of yet another 7 year domestic government bond in 2015 with market value USD 400 million, meant for restructure rising debts, this continues to expand and make the capital market more efficient, competitive and prudent.

Bibliography

1. African Development Bank (2007), *African Development Report*.
2. Antwi-Asare T.O., Addison E.K.Y. (2000), *Financial Sector Reforms and Bank Performance in Ghana*.
3. Arnold G. (1998), *Corporate Financial Management*, London, Financial Times Pitman Publishing.
4. Bailey R.E. (2005), *The Economics of Financial Markets*, Cambridge University Press.
5. Bank of Ghana (2007a), *Consultation Paper October 2007*.
6. Bank of Ghana (2007b), *Working Paper 2007*.
7. Beaver W.H. (1981), *Market Efficiency, Accounting Review*.
8. Calderon C., Liu L. (2002), The Direction of Causality Between Financial Development and Economic Growth, *Working Paper Central Bank of Chile*, No. 184, Central Bank of Chile.
9. Chisholm A.M. (2002), *An Introduction to Capital Markets Products, Strategies, Participants 2002*, John Wiley & Sons.
10. Dyckman T.R., Morse D. (1986), *Efficient Capital Markets and Accounting: A Critical Analysis*, Lebanon, Prentice-Hall.
11. Fama E.F. (1976), Reply to Efficient Capital Markets: Comments, *The Journal of Finance*.
12. Fama E.F. (1970), Efficient Capital Markets: A Review of Theory and Empirical Work, *The Journal of Finance*, Vol. 25, Iss. 2.
13. Ghana Stock Exchange (2015a), *Ecobank Research*.
14. Ghana Stock Exchange (2015b), *Market Review on Equity Update Q1 2015*.
15. Ghana Stock Exchange (2006), *Review*.
16. International Monetary Fund (2006), *Working Paper*.
17. Kpodo K. (2015), *UPDATE 1 (published on 8 January 2015) – Ghana to issue 400 mln cedi 7-year domestic bond in April*, (ed.) M. Mpoke Bigg, A. Crosby, www.africanbondmarkets.org/en/news-events/article/update-1-ghana-to-issue-400-mln-cedi-7-year-domestic-bond-in-april-68878/ [15.02.2015].
18. Levine R. (1997), *Stock Markets, Economic Development, and Capital Control Liberalization*, Investment Company Institute Perspective.
19. Ongkrutaraksa W. (1996), *Theory of Capital Markets: A Review of Literature, Working Paper Harvard University*.
20. Quartey L. (2013), *Ghana Lists 10 Year Eurobond*, www.theafricareport.com/West-Africa/ghana-lists-10-year-eurobond.html, [15.01.2015].
21. Te Velde D.W. (2014), *Sovereign Bonds in sub-Saharan Africa: Good for Growth or Ghead of Time?*, Odi, Briefing paper 87.

22. Teye S.K. (2011), *Investing in the Ghanaian Capital Market for The Future*, www.ghanaweb.com/GhanaHomePage/features/Investing-In-The-Ghanaian-Capital-Market-For-The-Future-204389 [16.02.2015].
23. The World Bank (2008), *World Development Indicators Report October 2008*, Washington, D.C. 2.
24. World Economic Forum USA Inc. (2011), *Financial Development Report 2011*.
25. new.edu/resources/understanding-international-capital-markets [16.02.2015].
26. www.afdb.org [16.02.2015].
27. www.globalresearch.ca [16.01.2015].

Chapter 16

A Review of Research on the Managerial Factors Influencing Mutual Fund Performance¹

Dariusz Filip

1. Introduction

The vast majority of empirical research concerning collective investment undertakings focuses on analyzing the effectiveness of mutual funds. It is assumed that the outperformance of funds may be linked, among others, to valuable managerial skills, the existence of which may be indicated in particular by the persistence of performance over time (Grinblatt, Titman, 1992; Hendricks et al., 1993; Goetzmann, Ibbotson, 1994; Carhart, 1997). The researchers attempted at discovering whether the rates of return, by which possible asset management skills are measured, indicate that these skills depend on the characteristics predisposing managers to run portfolios or result only from fund attributes managed by them. The literature of the subject relates the determinants of mutual fund performance to fund attributes and managerial characteristics. Hence, it seems justified to pay closer attention to the managerial characteristics that may influence fund performance and which are broadly discussed by theoreticians and practitioners with regard to the issue of the effectiveness of mutual funds.

The paper aims at a comprehensive presentation of financial literature concerning the determinants of mutual fund performance. Having reviewed more than 30 studies, we identified a few categories of analyzed factors that can be connected with acquired education, management tenure and socio-demographic profile of a manager. They consist of factors such as manager age and gender, tenure, seniority, acquired education and its quality.

The remainder of the present paper is organized as follows: Section II reviews the main managerial characteristics affecting mutual fund performance, while Section III presents research perspectives concerning the factors influencing fund performance in developing markets. The summary of our major findings constitutes the ending part of the article.

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2. Managerial characteristics

The characteristics that may indicate that a manager is competent are related to the acquired education, management tenure or total experience in the financial sector. The studies concentrate also on socio-demographic data determining the manager profile. According to the human capital theory, the factors such as education, experience, training or acquired certificates attesting professional qualifications improve specialized professional skills, which shall, on the one hand, be reflected in the obtained results, and on the other, in higher salaries. The agency models, in turn, show that the managerial choices concerning the design of an investment portfolio depend partly on the level of accepted risk. The variability of results obtained by a given fund that may be observed by the clients affects managerial salaries, which depend directly on the value of assets under management, and indirectly on fund performance. However, the financial literature analyzing mutual funds from the perspective of efficient markets theory draws different conclusions: performance shall be irrespective of managerial characteristics or fund attributes. Thus, specifying the determinants of performance seems to be of significance for clients interested in profitable mutual funds and may serve as a contribution to the theory of financial markets. The following managerial characteristics are frequently mentioned in the literature of the subject:

2.1. Manager age

The age of a manager is a demographic variable, the derivative of which is experience. The manager age variable may also affect the informal position within an organization and the degree of work commitment. The researchers dealing with human resources may claim that aging negatively affects the work results of an employee who is becoming less efficient and whose professional experience in the era of technological growth is not valuable anymore. Moreover, older managers are considered to be less educated than their younger colleagues. It should be noted, however, that the professional experience of a manager comes along with age and may contribute to better performance.

The literature of the subject rarely discusses this variable. At the same time, it often presents aging as a factor which negatively influences fund performance (Golec, 1996; Chevalier, Ellison, 1999a; Boyson, 2003). There are also studies that do not confirm the relation between manager age and fund results (Bliss, Potter, 2002; Andreu, Puetz, 2012). However, according to Chevalier and Ellison (1999b) as well as Avery and Chevalier (1999), young managers tend to represent herd behaviors and adopt more conservative strategies of managing portfolios with lower investment risk because they fear redundancy. Moreover, according to Boyson (2003) there is a negative relationship between manager age and the undertaken risk in the case of hedge funds.

2.2. Manager gender

Manager gender is also a demographic variable. The so far conducted research on the relation between gender and risk aversion (Bajtelsmit, Bernasek, 1996; Barber, Odean, 2001) has revealed that men and women differ as far as the perception of money, risk, and investment is concerned. Thus, it may be assumed that the tendency to undertake risk is gender-related.

Accordingly, the managers are expected to follow more or less extreme investment styles of different stability over time. Although the discussed segment of financial market has been employing women only since recently, the research on American funds (Niessen, Ruenzi, 2005) has revealed that the funds with female managers register significantly lower money inflow, which is a negative phenomenon with regard to fund companies. The papers by Andreu and Puetz (2012), Niessen-Ruenzi and Ruenzi (2011), Switzer and Huang (2007), or Bliss and Potter (2002) do not provide evidence for the influence of gender on the effects of asset management. It should be noted, however, that, according to the authors of the last two papers mentioned above, women tend to manage portfolios with higher systematic risk more often than male managers. Accordingly, the information on gender may indicate a particular management style, which investors may find helpful, the more so that this sort of data is easily accessible.

2.3. Manager tenure at the helm of a mutual fund

Professional experience may be understood as practice in the sector or work experience on a current position in a unit. Manager tenure is the number of months during which a manager runs a portfolio. Moreover, it may be treated as a measure of management quality and skills. According to the theory of human capital, managerial experience in running a given fund shall have positive impact on fund performance. At the same time, the supporters of the effective markets theory claim that this factor is negligible.

It has been argued that there is a direct correlation between fund results and manager tenure. If the performance of a mutual fund is good over a period of time, it may be expected that the tendency shall continue for as long as its manager remains in position. The positive impact of tenure in managing a given fund on its performance has been frequently confirmed in studies related to American market (Golec, 1996; Poole, Bianco, Giroux, 2006; Payne, Prather, Bertin, 1999; Philpot, Hearth, Rimbey, 2000) and Asian market (e.g. Lee, Yen, Chen, 2008 on Taiwanese funds). Moreover, the literature of the subject sometimes links the mentioned result to fund characteristics, the research by Ding and Wermers (2009) concerning large funds being an example. There are also studies – such as the ones by Philpot and Peterson (2006) or Porter and Trifts (1998) concerning mutual funds and by Boyson (2003) devoted to hedge funds – that confirm the negative relationship between manager tenure and fund performance. It is also noted that longer manager tenure lowers the investment risk for a portfolio (Lemak, Satish, 1996; Boyson, 2003).

2.4. Seniority in the sector

The other variable related to professional experience is seniority in the sector or experience on the capital market. Due to the specificity of the asset management sector, the managers obtain experience necessary for portfolio management and develop contacts with the representatives of issuers, such as analysts or CEOs (in order to keep themselves informed) from the moment they acquire professional qualifications or are granted licenses authorizing them to act as agents in securities dealings and commence the activities on the financial market.

In general, a person may run more than one fund while being employed as a manager and is able not only to gain knowledge concerning portfolio management but also to improve skills of dealing with changeable conditions. Therefore, the investors may treat managerial seniority

in the sector as an important factor while choosing a fund manager, the more so that professional experience may be linked to the ability of collecting informal data on the actual value of securities. However, the studies by Bliss and Potter (2002), Philpot and Peterson (2006) or Switzer and Huang (2007) do not confirm the relation between the discussed variable and fund performance. Interestingly, Lee, Yen and Chen (2008) claim that the relation exists and is negative. It should also be noted that the investors may view the employment instability of a manager as resulting from the mistrust of employers towards them or their past inefficiency in fund management.

2.5. A diploma or certification attesting qualifications

Obtaining a diploma or certification authorizing to practice a profession is a measure of education level. By obtaining appropriate education, an investor acquires abilities. This combined with psychological factors may result in prompt and wise investment decisions. In the US, an MBA degree holder is viewed as a person who demonstrates specialist knowledge of managing assets or at least as a person trained to manage them. The CFA certificate as the most popular and desired certification attesting the abilities to manage investment portfolios is also a reliable source of information about professional preparation and specialist competence of its holder. Moreover, the fund managers who additionally hold an academic degree, e.g. a PhD in economics in the field of finance, have better professional skills and specialist knowledge.

According to the theory of human capital, a manager demonstrating better skills should obtain above-average results at least over a long period. In other words, better professional skills of a manager should correspond with better investment results. This claim, however, is contrary to the assumptions of the effective market theory. Moreover, the literature of the subject provides equivocal results. The analysis of the relation between the fact of holding an MBA degree by a manager and fund performance has provided both positive (Golec, 1996) and negative conclusions (Switzer, Huang, 2007). As for the CFA certificate, the relation between professional skills and performance was positive (Switzer, Huang, 2007) or vague (Boyson, 2002). Interestingly, the MBA and CFA holders may differ in terms of investment portfolio management or the level of acceptable investment risk. This might suggest that MBA programs offered by universities encourage risk-taking to a greater or lesser extent or that the CFA holders consider it impossible to obtain higher rates of return with or without risk-taking. The authors of the two previously mentioned studies as well as Dincer, Gregory-Allen and Shawky (2010) or Chevalier and Ellison (1999a) claim that the performance of portfolios managed by the MBA holders is characterized by greater variability. However, the results are equivocal in the case of the CFA holders. For example, certified professional skills may contribute to reducing portfolio risk (Dincer, Gregory-Allen, Shawky, 2010) or to greater diversity and performance variability (Shukla, Singh, 1994).

2.6. Education quality

Acquiring appropriate professional training through education helps managers to develop their skills. However, a greater level of stock-picking ability may result directly from the quality of obtained education or indirectly from the net of social contacts in the financial sector. It may be assumed that selective institutions provide educational services at a higher level, which should be reflected in the performance of future managers. Moreover, their graduates easily find em-

ployment in asset management companies, which prefer to recruit applicants from well-known academic centers. The quality of universities discussed in the literature of the subject has been measured in several ways. Chevalier and Ellison (1999a) claim that there is a link between a high SAT score of American universities, from which the managers have graduated and the higher risk-adjusted rates of return. According to Gottesman and Morey (2006), the managers who have completed one of the top 30 MBA programs included in the Business Week ranking or received a high GMAT score demonstrate better performance than those who do not hold an MBA degree, received it at a university excluded from the rankings or received a low GMAT score. Poole, Bianco and Giroux (2006), in turn, measured the quality of universities by their membership to Ivy League associating the 8 elite and prestigious universities in the US.

In general, the managerial characteristics may be demographic or related to professional training. The characteristics mentioned above are analyzed in the countries with developed financial markets. In the countries whose financial markets are still developing this kind of research is hardly ever conducted due to the limited scope of data. Accordingly, this type of analysis has never been done in relation to funds operating in CEE countries. Thus, the analysis of relations between managerial characteristics and the effects of fund management in developing markets remains an open research field.

3. Research perspectives concerning the factors influencing fund performance in the CEE countries

The analysis of the factors affecting the results of collective investment institutions may have several important research effects. From the purely cognitive perspective, it enriches the existing financial literature by providing information about another experiences and sheds new light on the state of knowledge by addressing the issue of funds from developing markets that has not received attention at home so far. From the practical perspective, the empirical research on the determinants of mutual fund performance, especially managerial characteristics, shall be significant for asset management companies, future managers as well as investors for several reasons. First of all, the investors may take decisions based on managerial characteristics such as age, tenure or acquired education. This is possible because such data helps investors to choose funds whose managers may be predisposed to achieve better results. Second, the research in that area shall be of importance to investment fund companies with regard to recruitment procedures. Moreover, the asset management companies may use the fact of employing managers who demonstrate desirable characteristics to their advantage while undertaking activities on the market. Third, knowing the profile of a successful manager shall help students or other persons interested in pursuing their career on the capital market to make appropriate future choices.

The studies on determinants of mutual fund performance are practically nonexistent in the financial literature from CEE countries. There are, however, studies devoted to the effects of management by the mentioned financial intermediaries but they are limited to determining performance persistence (e.g. Jackowicz, Filip, 2009; Filip, 2013) or to methods of measuring the results (e.g. Erdős, Ormos, 2009; Sikora, 2010; Perez, 2012). This lack of academic discussion about the relation between managerial characteristics and investment results may stem from the fact that the functioning of mutual funds in our Region has taken place for a relatively short period of time and their amount seems fairly small, particularly when compared to the number

of mutual funds functioning on the most developed markets. However, the lack of empirical research in this area is mainly due to the lack of relevant databases containing information about the fund managers – managerial characteristics. Thus, the studies of fund performance's determinants in developing markets should fulfill the knowledge gap existing in this area by enriching the literature of the subject.

4. Conclusion

The author has reviewed more than 30 studies concerning the determinants of mutual fund performance. The identified categories of factors are connected with managerial characteristics understood as special skills of a manager that may result from the acquired education, management tenure and socio-demographic profile of a manager. They consist of determinants such as manager age and gender, tenure, seniority, acquired education and its quality. The factors influencing fund performance, discussed in this paper, are most frequently analyzed in the literature of the subject.

Because of the popularization and dynamic growth of funds observed at the beginning of the 21st century, these financial intermediaries have become of increased academic interest. The numerous studies on relations between managerial characteristics and the effects of asset management in developed financial markets may serve as a reference for analyses of developing markets. Furthermore, the empirical research on determinants of mutual fund performance shall be significant for asset management companies, future managers as well as investors. However, the analyses of the factors affecting the performance of collective investment institutions have never been done in relation to funds operating in the CEE countries. Thus, the findings concerning relations between managerial characteristics and the effects of asset management will be a contribution to the literature of the subject. Moreover, the lack of empirical research in this area concerning the countries of our Region allows the author to identify an open research field which should be successively fulfilled in the context of potential cognitive effects.

Bibliography

1. Andreu L., Puetz A. (2012), Are Two Business Degrees Better Than One? Evidence from Mutual Fund Managers' Education, *CFR Working Paper*, No. 12-01.
2. Avery Ch.N., Chevalier J.A. (1999), Herding over the Career, *Economics Letters*, Vol. 53, No. 3.
3. Bajtelsmit V.L., Bernasek A. (1996), Why Do Women Invest Differently Than Men? *Financial Counseling and Planning*, Vol. 7, No. 1.
4. Barber B.M., Odean T. (2001), Boys Will be Boys: Gender, Overconfidence, and Common Stock Investment, *The Quarterly Journal of Economics*, Vol. 116, No. 1.
5. Bliss R.T., Potter M.E. (2002), Mutual Fund Managers. Does Gender Matter? *The Journal of Business and Economic Studies*, Vol. 8, No. 1.
6. Boyson N. (2002), *How are Hedge Fund Manager Characteristics Related to Performance, Volatility, and Survival?*, (SSRN).
7. Boyson N.M. (2003), *Why Do Experienced Hedge Fund Managers Have Lower Returns*, (SSRN).

8. Carhart M. (1997), On Persistence in Mutual Fund Performance, *Journal of Finance*, Vol. 52, No. 1.
9. Chevalier J., Ellison G. (1999a), Are Some Mutual Fund Managers Better Than Others. Cross-Sectional Patterns in Behavior and Performance, *The Journal of Finance*, Vol. LIV, No. 3.
10. Chevalier J., Ellison G. (1999b), Career Concerns of Mutual Fund Managers, *The Quarterly Journal of Economics*, Vol. 114, No. 2.
11. Dincer O.C., Gregory-Allen R.B., Shawky H.A. (2010), *Are You Smarter than a CFA'er?*, (SSRN).
12. Ding B., Wermers R. (2009), *Mutual Fund Performance and Governance Structure. The Role of Portfolio Managers and Boards of Directors*, (SSRN).
13. Erdős P., Ormos M. (2009), Return Calculation Methodology: Evidence from the Hungarian Mutual Fund Industry, *Acta Oeconomica*, Vol. 59, No. 4.
14. Filip D. (2013), Returns and Persistence of Investment Fund Performance in the Czech Republic, *Prague Economic Papers*, No. 3.
15. Goetzmann W.N., Ibbotson R.G. (1994), Do Winners Repeat?, *The Journal of Portfolio Management*, Vol. 20, No. 2.
16. Golec J.H. (1996), The Effects of Mutual Fund Managers' Characteristics on their Portfolio Performance, Risk and Fees, *Financial Services Review*, Vol. 5, No. 2.
17. Gottesman A.A., Morey M.R. (2006), Manager Education and Mutual Fund Performance, *Journal of Empirical Finance*, Vol. 13, No. 2.
18. Grinblatt M., Titman S. (1992), The Persistence of Mutual Fund Performance, *Journal of Finance*, Vol. 47, No. 5.
19. Hendricks D., Patel J., Zeckhauser R. (1993), Hot Hands in Mutual Funds: Short Run Persistence of Relative Performance, 1974-1988, *Journal of Finance*, Vol. 48, No. 1.
20. Jackowicz K., Filip D. (2009), *Powtarzalność wyników funduszy inwestycyjnych w Polsce. Materiały i studia NBP nr 236*, Warszawa.
21. Lee J-S., Yen P.H., Chen Y-J. (2008), Longer Tenure, Greater Seniority, or Both. Evidence from Open-end Equity Mutual Fund Managers in Taiwan, *Asian Academy of Management Journal of Accounting and Finance*, Vol. 4, No. 2.
22. Lemak D., Satish P. (1996), Mutual Fund Performance and Managers' Terms of Service: Are There Performance Differences?, *The Journal of Investing*, Vol. 5, No. 4.
23. Niessen-Ruenzi A., Ruenzi S. (2011), *Sex Matters: Gender and Prejudice in the Mutual Fund Industry*, (SSRN).
24. Niessen A., Ruenzi S. (2005), *Sex Matters. Gender and Mutual Funds*, (SSRN).
25. Payne T.H., Prather L., Bertin W. (1999), Value Creation and Determinants of Equity Fund Performance, *Journal of Business Research*, Vol. 45, No. 1.
26. Perez K. (2012), *Efektywność funduszy inwestycyjnych. Podejście techniczne i fundamentalne*, Warszawa, Difin.
27. Philpot J., Hearth D., Rimbey J. (2000), Performance Persistence and Management Skill in Nonconventional Bond Mutual Funds, *Financial Services Review*, Vol. 9, No. 3.
28. Philpot J., Peterson C.A. (2006), Manager Characteristics and Real Estate Mutual Fund Returns, Risk and Fees, *Managerial Finance*, Vol. 32, No. 12.
29. Poole B.S., Bianco C.A., Giroux C. (2006), Mutual Fund Management and Fund Performance, *Journal of Business & Economics Research*, Vol. 4, No. 1.

30. Porter G.E., Trifts J.W. (1998), Performance Persistence of Experienced Mutual Fund Managers, *Financial Services Review*, Vol. 7, No. 1.
31. Shukla R., Singh S. (1994), Are CFA Charterholders Better Equity Fund Managers?, *Financial Analysts Journal*, Vol. 50, No. 6.
32. Sikora T. (2010), *Analiza wyników funduszy inwestycyjnych w Polsce z wykorzystaniem wnioskowania bayesowskiego. Materiały i studia NBP nr 248*, Warszawa.
33. Switzer L.N., Huang Y. (2007), How Does Human Capital Affect the Performance of Small and Mid-cap Mutual Funds?, *Journal of Intellectual Capital*, Vol. 8, No. 4.

Chapter 17

Influence of Debt in Capital Structure on Return on Equity

Paweł Olejnik

1. Introduction

In the subject literature there is an opinion that the most important aim for a company is to maximize its value for shareholders (Rojek, 2011, p. 243). There are many factors which have an influence on the shareholder value, one of them is a cost of capital (Rappaport, 1999, p. 37). Because, the main aim is to maximize the market value (Jaki, 2006, p. 108), there are many methods which enable to estimate the value of a company (Bojańczyk, 2011, p. 137), one of them is the method called Discounted Cash Flows (DCF). In this method the cost of capital is the discount rate (Cwynar, Cwynar, 2007, p. 22). Therefore, the capital structure should be created in the way which optimize the structure by minimize the weighted average cost of capital (Sierpińska, Jachna, 2013, p. 401). There are many sources of the capital, one of them is debt (Sierpińska, Jachna, 2004, pp. 286-287). One of the advantages of debt in the capital structure is that the cost of debt is often lower than the cost of equity. Moreover, debt may contribute to raise return on equity (ROE) because of financial leverage effect (Sierpińska, Jachna, 2013, pp. 400-401, 414). On the other hand, higher level of debt in the capital structure means higher risk. Therefore, maximize the level of debt in the capital structure is not the way to achieve the aim but the structure should be created in the way that minimize the weighted average cost of capital (WACC) (Sierpińska, Jachna, 2004, pp. 296-297).

NewConnect is the equities market established as an alternative trading system. This market has been in operation since 2007 and may be an intermediary step for those companies which would like to be listed on regular market (YOUR GUIDE..., 2013, p. 1). Moreover, in 2010 on the NewConnect market there was established market segment called NewConnect Lead “in order to promote best performing companies on the NewConnect market and to separate companies that have highest chance of being upgraded to the WSE Main List” (http://www.newconnect.pl/index.php?page=informacje_en&ph_main_content_start=show&ph_main_content_cmn_id=3411).

The aim of this paper is to research an influence of debt in the capital structure on ROE among companies qualified to NewConnect Lead segment. Moreover, the aim of the paper is to research a correlation between ROE and TSR (Total Shareholder Return). The research involves period since 2010 to the end of 2013.

2. Description of NewConnect Lead market segment

There are a few conditions that has to be met in order to shares of issuer could be classified into NewConnect Lead. One of them concern company's capitalization and free-float – “the issuer's average capitalisation is greater than the PLN equivalent of EUR 5,000,000 and at least 10% of the issuer's shares are free-float shares at the date of the classification” (http://www.newconnect.pl/index.php?page=informacje_en&ph_main_content_start=show&ph_main_content_cmn_id=3325). Another requirement which has to be met concerns number of transactions – “the average number of transactions in the issuer's shares exceeded five deals per a trading day, or the average turnover value exceeded PLN 5,000 per trading day” (YOUR GUIDE..., 2013, p. 12). The third condition concerns number of days in which there was transactions in the issuer's shares – “transactions in the issuer's shares have, within the past 6 calendar months (including the month of periodic verification), been concluded at least on one half of all days of trading in the shares” (http://www.newconnect.pl/index.php?page=market_segments). There is also requirement which concerns share price and its volatility – “the average share price in the last six months was higher than PLN 0.50 and the average volatility did not exceed 15%” (YOUR GUIDE..., 2013, p. 12). In addition, there is a condition concerns period how long shares of the company are listed – “the issuer's shares have been listed on the NewConnect market for at least 12 calendar months” (http://www.newconnect.pl/index.php?page=market_segments). Moreover, “the issuer perfectly fulfils the rules and adheres to the regulations of the Alternative Trading System, in particular with respect to mandatory disclosures, and applies best practices which have been delineated for NewConnect companies” (YOUR GUIDE..., 2013, p. 12). Four times a year there is the verification of the list of companies classified to NewConnect Lead segment, “three trading sessions before the end of the last month of each calendar quarter” (http://www.newconnect.pl/index.php?page=market_segments). So, there are a lot of requirements that has to be met but on the other hand, there are some advantages for the company because classification in the segment results in (http://www.newconnect.pl/index.php?page=market_segments):

1. “Special designation of the company in the Exchange's information services.
2. Separate presentation of companies in trading results”.

3. Profitability

Effectiveness indicators are used in order to measure and evaluate enterprise's effectiveness (Jaki, 2006, p. 113). In the subject literature profitability indices are described as the most synthetic indicators (Czekaj, Dresler, 2005, p. 216.). There are many profitability indices, one of them is return on assets (ROA) which can be calculated according to the equation below (Sierpińska, Jachna, 2013, pp. 102-104):

$$\text{Return on assets} = \frac{\text{Net profit}}{\text{Average level of total assets}} \cdot 100\% \quad (1)$$

Return on assets shows how big is the assets' ability to generate net profit in analyzed company. Higher level of ROA is interpreted that analyzed company is in better financial condition (Sierpińska, Jachna, 2004, p. 201).

Another profitability index is return on equity (ROE) which can be calculated according to the equation (2) (Sierpińska, Jachna, 2013, p. 104):

$$\text{Return on equity} = \frac{\text{Net profit}}{\text{Average level of equity}} \cdot 100\% \quad (2)$$

This profitability index is very important for shareholders because it measures benefits which are achieved by them (Czekaj, Dresler, 2005, p. 218). If ROE is higher there is also possibility that dividends and the value of shares will be higher as well (Sierpińska, Jachna, 2004, p. 204). The level of return on equity can be compared with others alternative investments in order to find out whether invest in that company was good or bad decision (Czekaj, Dresler, 2005, p. 218).

In the subject literature there is the method called Du Pont analysis which shows inter alia an influence of debt in the structure of the sources of financing on return on equity. The influence is shown by modified Du Pont equation (Czekaj, Dresler, 2005, pp. 221-223):

$$\text{ROE} = \text{ROA} \times \text{equity multiplier} = \frac{\text{net profit}}{\text{total assets}} \times \frac{\text{total assets}}{\text{equity}} \quad (3)$$

If there is no debt in the structure of the sources of financing return on equity is as high as return on assets (Czekaj, Dresler, 2005, p. 222). When level of the equity multiplier is higher, it means that the level of debt in the structure is higher and risk is higher as well (Sierpińska, Jachna, 2004, p. 208). In the subject literature a kind of risk which depends on the capital structure is called financial risk. If the level of debt is higher there is higher possibility that company may go bankrupt. The situation when the company go bankrupt entail costs. One of the costs is that company's creditors in the situation when it is risk that the company go bankrupt demand higher interest rate due to higher risk. Higher interest rate influences on higher level of the weighted average cost of capital and it contribute to decrease the company's value (Czekaj, Dresler, 2005, pp. 92, 102-103).

4. Total Shareholder Return

In the subject literature there is an opinion that the most aggregated enterprise's effectiveness indicator is a market value of a enterprise and how the value is changing (Jaki, 2012, p. 158). Total Shareholder Return (TSR) is a measure that shows benefits for shareholders. Those benefits consist of the share price changes and dividends (Sierpińska, Niedbała, 2003, p. 307). TSR can be calculated according to the following equation (Bojańczyk, 2011, p. 87):

$$\text{TSR} = \frac{c_1 - c_0 + d}{c_0} \quad (4)$$

where: c_0 – initial share price; c_1 – final share price; d – dividend.

5. The research method

The research involves period since 2010 to the end of 2013 and was divided into four one-year periods. In the research there was analysis influence of debt on capital structure among companies which were classified at the end of each analyzed year to NewConnect Lead segment. There was used equations (1) in order to calculate ROA and according to the equation used average level of total assets. Return on equity was calculated according to equation (2) and also used average level of equity but among analyzed companies many of them raised their equity capital by issued shares during the analyzed year. Therefore, in those cases there was not used average level of equity but weighted average level of equity, depending on the date when the raise of equity was registered by court. According to the equation (3) ROE is the product of ROA and the equity multiplier, in order to show an influence of debt, besides ROA and ROE, the equity multiplier was calculated as well. The multiplier was calculated as a quotient the average level of total assets and the average level of equity (or weighted average level of equity). In the TSR case, took into consideration changes in nominal value of shares (split and consolidation). TSR was calculated according to the equation (4). In addition, there was also calculated correlation coefficient between ROE and TSR. In the research there was used annual reports of analyzed companies available on Warsaw Stock Exchange and NewConnect Websites and other information published on those Websites. Moreover, there was used share prices downloaded from GPWInfoStrefa Website.

6. Research results

In Table 1 there are presented levels of ROA, equity multiplier, ROE and TSR among companies classified to NewConnect Lead segment at the end of 2010.

Table 1. ROA, Equity multiplier, ROE and TSR for companies classified at the end of 2010 to NewConnect Lead segment

Abbreviated name	ROA (in %)	Equity multiplier	ROE (in %)	TSR (in %)
ADV	17.5	2.1	36.4	570.3
ATO	2.2	1.5	3.2	-6.3
BGS	9.1	4.1	37.4	23.9
EUI	-17.8	1.3	-23.0	-44.5
GPH	58.5	1.1	66.4	60.2
ITL	-32.0	1.1	-34.4	-26.9
IQP	21.1	1.3	27.1	178.8
ORL	-0.2	2.9	-0.5	8.8
PHO	3.2	4.7	14.8	57.4
QRS	52.4	1.7	86.9	195.5
RDG	4.7	1.7	8.0	-0.5
WDM	4.1	1.3	5.3	14.3

Source: own work on the basis of data from GPWInfoStrefa, NewConnect and Warsaw Stock Exchange Websites.

Data in Table 1 shows that among analyzed companies in nine cases there are positive ROA and in three cases there are negative ROA. Moreover, levels of ROA are very various. In some cases ROA is very high like for example GPH (58.5%) or QRS (52.4%). On the other hand there are companies which are characterized by positive ROA but much lower, like ATO (2.2%). Very similar situation is in the negative ROA cases. Some of companies achieved very low ROA like ITL (-32.%) and some of them achieved the level very close to zero like ORL (-0.2%). Some of analyzed companies are characterized by low level of debt in the structure like for example GPH (1.1). On the other hand, there are also companies which has high level of equity multiplier like for example PHO (4.7). In PHO case, there is shown advantage of use debt, because the level of ROE is much higher than ROA. But this advantage can be also a disadvantage in case when there is negative ROA. In EUI case due to debt in the structure ROE is lower (-23%) than ROA (-17.8%). In Table 1 there are also presented data about levels of TSR which shows that in 2010 in eight cases investors gain positive returns and in four cases the return is negative. Furthermore, in 2010, some of analyzed companies are characterized by very big level of Total Shareholder Return like for example ADV (570.3%) or QRS (195.5%). But, there are also big negative levels of TSR like EUI (-44.5%). In many cases there are significant differences between TSR and ROE levels. Moreover, in some cases ROE is positive and TSR negative (ATO and RDG) or there is negative ROE and positive TSR (ORL).

In Table 2 there are presented measures achieved by companies classified to NewConnect Lead at the end of 2011.

Table 2. ROA, Equity multiplier, ROE and TSR for companies classified at the end of 2011 to NewConnect Lead segment

Abbreviated name	ROA (in %)	Equity multiplier	ROE (in %)	TSR (in %)
ATO	-18.3	1.3	-24.0	-64.6
EGB	10.1	1.7	17.4	-4.7
INT	10.1	2.5	25.0	-59.4
MAB	-5.4	1.2	-6.4	-32.3
ORL	3.5	2.6	9.0	-30.1
PHO	-5.9	5.2	-31.0	-69.5
TLS	26.2	1.3	34.4	2.9

Source: own work on the basis of data from GPWInfoStrefa, NewConnect and Warsaw Stock Exchange Websites.

In 2011 four of analyzed companies are characterized by positive ROA. There are various positive levels of the index, like between TLS (26.2%) and ORL (3.5%). In the analyzed period three companies are characterized by negative ROA. In the negative ROA cases, there is also a company (ATO) which achieved very low ROA (-18.3%) and companies which achieved much higher levels (MAB and PHO). Equity multipliers show that in 2011 levels of debt in the structure were very various. In some cases the level was very low, for example MAB (1.2) and in some cases very high (PHO 5.2). In PHO case, there is shown negative influence of debt in the structure, because the level of ROE is much lower than level of ROA. Moreover, if we compare lists of companies classified at the end of 2010 and 2011 presented in Table 1 and 2 there are three companies which are on both lists (ATO, ORL and PHO). In ATO and ORL cases, those

companies decreased in their equity multipliers (ATO from 1.5 to 1.3 and ORL from 2.9 to 2.6). The third company (PHO) increased their equity multiplier from 4.7 in 2010 to 5.2 in 2011. In 2011 there are positive ROE in four cases but investors only in one case gained positive TSR (TLS). Moreover, in this case the level of TSR is much lower than the level of ROE. In other cases, negative levels of TSR are very various. In some cases the level is very low like PHO (-69.5%) and in some cases it is much higher like EGB (-4.7%). Moreover, in many cases levels of ROE and TSR are very different like in TLS case. In addition, in some cases, similarly like in 2010, there is positive ROE and negative TSR like for example in ORL case which is characterized by positive ROE (9.0%) and negative TSR (-30.1%).

Table 3 presents levels of ROA, equity multiplier, ROE and TSR for companies classified at the end of 2012 to the NewConnect Lead segment.

Table 3. ROA, Equity multiplier, ROE and TSR for companies classified at the end of 2012 to the NewConnect Lead segment

Abbreviated name	ROA (in %)	Equity multiplier	ROE (in %)	TSR (in %)
BGD	5.1	1.9	9.6	-71.9
EGB	8.0	2.1	17.1	-25.0
EAH	6.8	2.7	18.4	-15.9
GRN	1.4	4.3	5.9	46.9
INT	5.2	2.4	12.4	-28.1
INV	61.1	1.3	80.1	140.0
LUG	4.0	2.0	8.1	28.7
MAB	-6.4	1.7	-11.0	41.6
PSW	40.6	1.7	67.5	198.9
PRG	21.8	3.9	85.0	-16.9
SMS	9.5	3.7	34.9	-16.7
SNT	-1.2	3.1	-3.6	-5.8
ZWG	36.3	1.5	54.3	454.7

Source: own work on the basis of data from GPWInfoStrefa, NewConnect and Warsaw Stock Exchange Websites.

Data in Table 3 shows that in 2012 only in two cases level of ROA is negative and in eleven cases the level is positive. Among companies which achieved positive ROA, levels are once again very various. Mostly, levels are lower than 10%, but there are also a few cases in which the level is very high like INV (61.1%) or PSW (40.6%). Levels of equity multiplier also are very various, but mostly they are higher than 2. The lowest level is in INV case (1.3) and the highest in GRN case (4.3%). In 2012 there are three companies classified to NewConnect Lead which were classified to the segment at the end of 2011 as well (EGB, INT and MAB). One of them (INT) decreased in equity multiplier from 2.5 in 2011 to 2.4 in 2012. EGB increased the equity multiplier from 1.7 in 2011 to 2.1 in 2012 and MAB from 1.2 to 1.7. If we compare levels of ROE in 2012 between INV (80.1%) and PRG (85.0%) there are very similar but levels of ROA of those companies are very various (INV 61.1% and PRG 21.8%). In spite of lower ROA, PRG achieved higher ROE than INV because PRG has much higher equity multiplier. In this case, there is presented influence

of debt in the structure. In 2012 in eleven cases there was positive ROE and in two cases negative. However, positive TSR is only in six cases and in seven cases TSR is negative. Differences between positive ROE and positive TSR in some cases are very high like for example GRN (ROE 5.9% and TSR 46.9%). There is only one situation when both ROE and TSR are negative (SNT). Among analyzed companies the highest TSR is in ZWG case (454.7%) and the lowest in BGD case (-71.9%).

In Table 4 there are presented measures achieved by companies classified at the end of 2013 to the NewConnect Lead segment.

Table 4. ROA, Equity multiplier, ROE and TSR for companies classified at the end of 2013 to NewConnect Lead segment

Abbreviated name	ROA (in %)	Equity multiplier	ROE (in %)	TSR (in %)
AGL	25.8	1.2	31.2	62.1
ATA	11.0	3.8	42.2	56.9
BRI	19.2	1.4	26.8	1.3
CCS	30.1	2.8	83.1	371.7
CLO	3.8	1.1	4.0	55.0
CPL	25.0	1.2	30.8	23.4
DTP	19.4	1.3	25.2	-27.0
EGB	8.9	2.2	20.0	7.3
EBX	6.9	1.5	10.6	41.8
FLD	-2.1	1.5	-3.1	382.5
GCI	0.0	3.3	-0.1	-32.9
IMS	15.9	2.2	35.6	101.3
IDT	5.1	1.7	9.0	62.2
LUG	1.5	2.2	3.2	-8.7
LZM	19.1	1.9	36.8	111.2
MOD	6.2	3.5	21.6	138.0
ORP	7.3	1.4	10.0	-10.2
PSW	61.7	1.3	77.8	34.7
PHR	-17.7	1.2	-21.0	184.6
PSM	8.9	2.1	18.5	21.6
PLI	0.1	1.7	0.1	-63.1
PRS	15.4	1.2	18.5	64.6
SCM	2.3	2.3	5.2	82.3
SLV	-14.3	3.8	-55.1	176.7
STK	-10.9	10.3	-112.1	1,733.3
SNT	9.9	2.7	27.1	52.9
TRR	-7.7	1.5	-11.4	1.2
TPH	6.5	2.6	16.6	-2.6
VVD	11.7	1.2	13.5	314.1
ZWG	20.0	2.8	56.8	82.0

Source: own work on the basis of data from GPWInfoStrefa, NewConnect and Warsaw Stock Exchange Websites.

In 2013, among companies classified to the segment levels of ROA are very various. The highest level achieved PSW (61.7%) and the lowest PHR (-17.7%). In some cases level of debt in the structure is very small like for example CLO (1.1) but there is also a company where the level of equity multiplier is very high (STK 10.3). This is not a mistake. In this case the average level of total assets is 11,716.5 thousand PLN and the average level of equity is 1,140.5 thousand PLN. Moreover, the net loss is -1,279 thousand PLN. Therefore, in this case ROE is so low (-112.1%). This case shows the negative result of high level of equity multiplier. In spite of, so low ROE, TSR is very high (1,733.3%). The share close price on the 2nd January 2013 was 1.5 PLN and share close price on the 30th December 2013 was 27.5 PLN. This case shows that for investors other information may be more important than the level of ROE. In other cases, the equity multiplier is much lower. If we compare list of companies classified to the segment at the end of 2012 and 2013 presented on Table 3 and 4, there are five companies which are on both lists (EGB, LUG, PSW, SNT and ZWG). Moreover EGB was classified to the segment at the end of 2011 as well. In EGB case, in 2012 equity multiplier was higher than in 2011 and in 2013 it is higher again (2.1 in 2012 and 2.2 in 2013). Higher level of the multiplier is also in LUG and ZWG cases. Then, there are two cases (PSW and SNT) in which the level of the multiplier is lower than in previous year. In 2013 among analyzed companies in six cases there is negative ROE and in 24 cases there is positive ROE. The highest ROE is achieved by CCS (83.1%). In analyzed year also in six cases there is negative TSR but only in one case there is negative ROE and TSR as well (GCI). In other five cases, there is positive ROE and negative TSR. Very similar like in previous years there are, in some cases, big differences between ROE and TSR like for example SCM (ROE 5.2% and TSR 82.3%).

In the research there was also calculated correlation coefficient between ROE and TSR including all analyzed cases. The correlation amount to -0.3. It means that between ROE and TSR in analyzed years (2010-2013) there is weak negative correlation. In analyzed period there was many cases in which level of ROE and TSR were very different or one of them was positive and the second negative.

7. Conclusion

In analyzed four periods there were very various levels of positive ROA as well as negative achieved by companies classified to the NewConnect Lead segment. There were also significant differences between levels of equity multiplier. Some of analyzed companies were characterized by very low level of the multiplier and in some cases the level was very high like for example STK (10.3). It means, that companies classified to the NewConnect segment use debt to a various degree. Among analyzed companies some of them benefited from equity multiplier by higher level of ROE than ROA. On the other hand, there were also cases where a company achieved negative ROA and because of equity multiplier the level of ROE was lower. Those cases show risk of use debt in the structure. Total Shareholder Return gained by investors were very various in analyzed periods. In many cases level of TSR was very different than level of ROE. There were also many cases in which ROE was positive and TSR negative or on the contrary. Relation between ROE and TSR is shown by correlation coefficient which is weak and negative. This result may means that for investors other information is are important when they make an investment decision.

Bibliography

1. Bojańczyk M. (2011), *Wycena i zarządzanie wartością przedsiębiorstwa w warunkach niestabilności rynku kapitałowego*, Warszawa, Oficyna Wydawnicza Szkoła Główna Handlowa w Warszawie.
2. Cwynar A., Cwynar W. (2007), *Kreowanie wartości spółki poprzez długoterminowe decyzje finansowe*, Warszawa–Rzeszów, Polska Akademia Rachunkowości, Wydawnictwo Wyższej Szkoły Informatyki i Zarządzania z siedzibą w Rzeszowie.
3. Czekaj J., Dresler Z. (2005), *Zarządzanie finansami przedsiębiorstw. Podstawy teorii*, Warszawa, Wydawnictwo Naukowe PWN.
4. Jaki A. (2006), Ocena efektywności a kreowanie wartości przedsiębiorstwa, *Zeszyty Naukowe nr 731 Akademii Ekonomicznej w Krakowie*, Wydawnictwo Akademii Ekonomicznej w Krakowie.
5. Jaki A. (2012), Mechanizmy procesu zarządzania wartością przedsiębiorstwa, *Zeszyty Naukowe Seria specjalna: Monografie nr 215*, Wydawnictwo Uniwersytetu Ekonomicznego w Krakowie.
6. Rappaport A. (1999), *Wartość dla akcjonariuszy. Poradnik menedżera i inwestora*, Warszawa, WIG-Press.
7. Rojek T. (2011), Analiza zmian wartości przedsiębiorstw [in:] *Restrukturyzacja. Teoria i praktyka w obliczu nowych wyzwań. Księga pamiątkowa dla uczczenia Jubileuszu 45-lecia pracy naukowo-dydaktycznej prof. zw. dr. hab. Ryszarda Borowieckiego*, (eds.) A. Jaki, J. Kaczmarek, T. Rojek, Kraków, Fundacja Uniwersytetu Ekonomicznego w Krakowie.
8. Sierpińska M., Jachna T. (2004), *Ocena przedsiębiorstwa według standardów światowych*, Warszawa, Wydawnictwo Naukowe PWN.
9. Sierpińska M., Jachna T. (2013), *Metody podejmowania decyzji finansowych. Analiza przykładów i przypadków*, Warszawa, Wydawnictwo Naukowe PWN.
10. Sierpińska M., Niedbała B. (2003), *Controlling operacyjny w przedsiębiorstwie. Centra odpowiedzialności w teorii i praktyce*, Warszawa, Wydawnictwo Naukowe PWN.
11. *YOUR GUIDE TO NEWCONNECT* (2013), Warsaw, The Warsaw Stock Exchange, http://www.newconnect.pl/pub/dokumenty_do_pobrania/Your_guide_NewConnect.pdf [03.03.2015].
12. http://www.newconnect.pl/index.php?page=informacje_en&ph_main_content_start=show&ph_main_content_cmn_id=3325 [03.03.2015].
13. http://www.newconnect.pl/index.php?page=informacje_en&ph_main_content_start=show&ph_main_content_cmn_id=3411 [03.03.2015].
14. http://www.newconnect.pl/index.php?page=market_segments [25.04.2015].

Chapter 18

Reliability of Financial Statements versus Creative Accounting¹

Artur Holda, Anna Staszal

1. Introduction

The reliability of financial statements is of paramount importance to their users, including potential investors (essentially focused on the return on their investment), lenders (focused on a company's ability to repay the borrowed funds), contractors and competitors (focused on a company's financial standing and its efficiency), employees (assessing the security of their employment) and above all to the key stakeholders: owners of the company who are interested in management quality and effectiveness, the company's economic situation and any information necessary to make decisions.

Historically, until the ownership function was separated from the management function, there used to be one main user of the information derived from the company's reports: the owner who was also the manager. Since the separation of these functions, it has been the final product of accounting, i.e. financial statements that has become one of the most important elements of corporate governance, constituting the main source of information on the company's financial situation, and also an invaluable source of information which could be used to create an early warning systems to help forewarn of the possibility of a crisis. For information coming from the accounting system to be useful, it should also be reliable and at the same time reflect the economic reality in the best way possible. Meanwhile, the accounting measurement process is marred by subjectivity and, because of its very nature, forced to remain under the influence of individual judgments.

This paper aims to outline the issue of reliability of financial statements in the context of creative accounting, as well as to present the results of a survey into the reliability and relevance of information provided by financial reporting, as conducted among chartered accountants and accountants.

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2. The information function of financial reporting

The primary objective of accounting relates to accurate measurement and subsequent presentation reflecting an entity's true status. Accounting is expected to provide information on an entity's performance, its liquidity, profitability and its very viability (Mikulska, 2012, p. 14).

Financial statements can be easily dubbed one of the main sources of economic intelligence in the economy. Financial reporting itself is defined as systematic collection of selected and summary information relating to an entity's past and present situation in order to allow stakeholders to draw conclusions about the future (Samelak, 2004, p. 109).

Information derived from financial reporting allows stakeholders to gain a quick and easy insight into an entity's financial and economic situation, as well as to (Edwards, Bell, 1961, p. 4):

- weight up the effects of financial decisions and the effects of past phenomena,
- predict the effects of future phenomena,
- make business decisions.

Additionally, such information allows estimating cash flows and assessing the capacity to generate them and ensuring compliance with debt repayment schedules. What is more, information derived from financial statements also facilitates a company's valuation. Furthermore, financial reporting is a goldmine of information that can forewarn of a possible crisis facing an entity (Dyczkowska, 2009, p. 5), and information gleaned from financial statements is used in models warning of the possibility of bankruptcy. Financial statements illustrate how an entity's management conducts the entity's affairs and is used to weigh up management's performance.

One can conclude that accounting's first and foremost objective is the information function (targeting a wide audience), secondly management's accounting to the entity's owners, and thirdly that it permits determining the entity's economic value which relates to accounting's analytical function (Grabiński, 2010, p. 74).

3. Accounting policy and the reliability of financial statements

The main piece of legislation underlying accounting regulation in Poland is the Accounting Act (AA), although some entities are required to use International Accounting Standards/International Financial Reporting Standards. However, the Accounting Act or the provisions of IAS/IFRS determine only the general framework of accounting, which is the same for all entities, whereas the delimitation of detailed guidelines and solutions is the realm of the entities involved themselves. In this way, the financial statements of each and every entity are comparable, because they contain certain items enforced by the law, and the principles of valuation are also similar for all entities, although detailed solutions are tailored to the specificity of each business entity. This is possible as the provisions of the Accounting Act and IAS/IFRS, apart from mandatory regulations, also contain numerous provisions that do not directly identify one specific solution, but indicate a whole range of acceptable options. Hence, each entity has the opportunity to choose a solution which in its case, given its characteristics, industry or size, will best reflect the economic reality. With this solution in place, accounting retains its flexible nature: it is precisely this flexibility that allows entities to present the economic reality in their books of accounts. Moreover, it is simply impracticable to define each and every possible scenario and detailed solutions applicable to each case. Therefore, pursuant to the provisions of the Accounting Act, each entity

sets up its own internal rules of operations which contain the specific measures it follows. Such an internal set of rules defining each entity's rules determining accounting activity is the accounting policy.

The accounting policy is a set of standards, rules, interpretations and opinions used by entities to prepare their financial statements (Kabalski, 2009, p. 11). All of these solutions have obviously been selected from among those that are permissible under the applicable accounting law. A particular entity's accounting policy is therefore a selection of rules of conduct which, in the opinion of an entity's management, are the most appropriate and best reveal the true picture of the entity in given circumstances (Hendriksen, van Breda, 2002, p. 250).

While designing its accounting policy, an entity should take into consideration the nature of its activities, the occurrence and repeatability of phenomena and further should choose those solutions that best fit its character, and that will allow for the best, true-to-fact presentation of the entity's economic reality (Holda, Staszal, 2015, p. 1).

On the one hand, the provisions of accounting policy are necessary to enable an entity to provide more reliable and relevant information in its financial statements, as these delineate specific rules that need to be used in keeping an entity's ledgers. The accounting policy should indicate how phenomena should be recognised and disclosed and what impact they will have on the individual items in an entity's statements. Thanks to that, by detailing the rules determining accounting activity applicable to a given entity, an entity's accounting policy curtails the room for data manipulation as it enforces specific solutions (cf. e.g. Skinner, 1993).

On the other hand, accounting policy itself may also serve the needs of manipulation, e.g. through such a deliberate change in accounting policies that will facilitate recognition of economic phenomena in a more "convenient" manner for data manipulators (Mance, Katunar, 2011, p. 4). Moreover, in practice it is difficult to determine whether accounting policy actually helps to enhance the credibility of financial statements, or whether it serves data manipulation (Fields, Lys, Vincent, 2001).

One of the measures allowed under accounting policy involves the right to determine, at the decision-maker's own discretion, between different methods of legally permissible treatment. This right of choice underpins creative accounting.

4. Creative accounting

Although English-language sources usually define creative accounting as a clever and legitimate way of manipulating accounting information (Holda, Staszal, 2014, p. 326), Polish literature on creative accounting often affords it a different meaning.

The meeting of requirements posed by accounting's main objective, namely the quantification of manifestations of economic life (Micherda, 2011, p. 5) is neither simple nor clearly defined as accounting measurement can never be considered to be fully objective (Surdykowska, 2004, p. 424). An accountant who wants to meet the requirements of a true and fair view and present economic reality in the books of accounts as faithfully as possible often has to resort to innovative and creative practices. Creative accounting should be construed to stand for exploitation of accountants' freedom and independence in the absence of appropriate practices, standards and rules that would underpin decision-making (Surdykowska, 2005, p. 77). As indicated by P. Gut (2006, p. 11 et seq.), creative accounting consists in such presentation of economic phenomena

that is both consistent with the law and, importantly enough, consistent with accounting principles which are adequately interpreted and which are not directly prescribed by regulations. Hence, creative accounting involves intentional and creative application of accounting principles and methods, given that a degree of freedom and flexibility permissible in the accounting system is necessary in order to give a true and fair view of an entity. Creative accounting should be synonymous with innovativeness which, rather than leading to a personal benefit, should result in the most accurate presentation of economic reality in books of accounts.

As indicated previously, the key to understanding the essence of creative accounting is that accounting measurement is not fully objective. Creative accounting, then, is freedom of choice, and as with any kind of freedom, it can be used either within the bounds of law as an expression of the wish to give a true and fair view of the entity in the financial statements, or, alternatively, it may be used unlawfully to deliberately mislead the users of financial statement. K. Sawicki (1998, p. 18) emphasises that entities are entitled to any use of accounting methods (permitted by law) so long as they act in accordance with the overriding principles of accounting and present a true picture of the entity.

The authors of this paper propose to define creative accounting as follows: creative accounting is making choices consistent with one's own discretion between different methods of accounting treatment in situations where the relevant standards do not offer a direct way to solve a problem or where they suggest alternative approaches. Creative accounting always means actions undertaken in accordance with the law and in itself is not an evaluative concept. Pursuant to the above definition, creative accounting assumes that the criterion of reliability of economic information is satisfied and in particular that its qualitative characteristics of accuracy, neutrality and completeness are adhered to.

5. Qualitative characteristics of financial statements

According to both the FASB and the IASB, provision of information that will be useful to stakeholders is the primary objective of accounting (Beest, Braam, 2006). However, for information contained in financial statements to be indeed useful, it must meet certain qualitative characteristics.

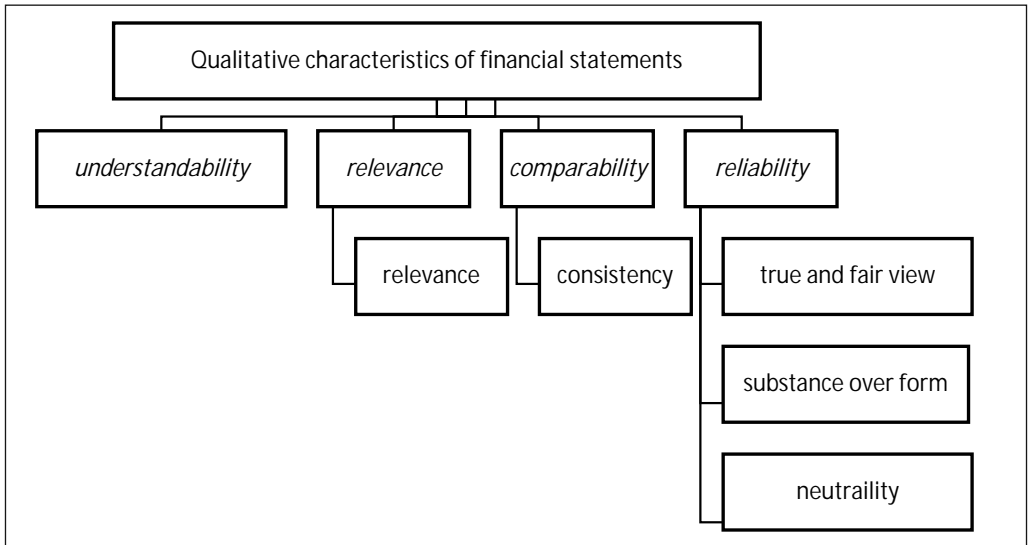
The Accounting Act identifies the purpose of reporting, which it defines as a "true and fair" presentation of the entity's status, but at the same time avoids accurately describing qualitative characteristics. Meanwhile, the conceptual framework of IAS both enumerates and describes the qualitative characteristics of financial statements, which include:

1. Understandability construed as a user's ease to read information contained therein as long as the user has the appropriate knowledge and wants to acquaint himself with the information.
2. Usefulness, which means the ability to influence users' economic decisions (Gos, Honko, Szczypa, 2010, p. 20).
3. Relevance (a characteristic related to usefulness). Phenomena are relevant if they can materially influence the decisions of users of reporting. Hence their absence affects the interpretation of phenomena, whereas irrelevant phenomena can obscure or even distort information. Interestingly, this principle could also be used to manipulate data (see e.g. Brennan, Gray, 2005).

4. Comparability, i.e. the ability to compare an entity’s situation, both in time and space, with that of other units. Comparability relates to other characteristics, such as consistency (consistent use of the same principles for a group of like phenomena).

On the other hand, particular importance is attributed to the reliability of financial statements, which is another qualitative characteristic of financial reporting (*International...*, p. 53 et seq.). Information is deemed to be reliable if it is free from material error, unbiased and ensures accurate representation of economic reality.

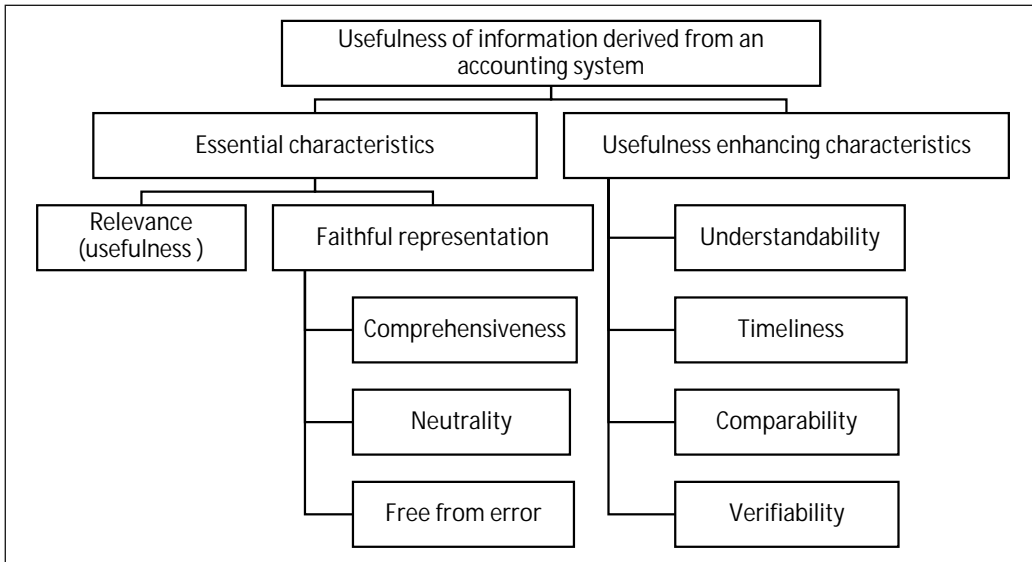
Figure 1. Qualitative characteristics of reporting information in accordance with the IFRS conceptual assumptions (hitherto)



Source: Micherda, 2014, p. 23.

Under the new approach, the usefulness of financial statements is determined by two basic characteristics of relevance and faithful representation (Jaruga et al., 2009), while understandability and comparability are relegated to a secondary tier of importance. Information is essential, as was already indicated, when it impacts the decisions made by users of reporting. On the other hand, true and fair representation depends on the comprehensiveness, neutrality, lack of material errors and compliance with the economic substance.

Figure 2. Qualitative characteristics under the Conceptual Framework of Financial Reporting (present)



Source: Hołda, 2013, p. 35.

A failure to meet the reliability requirement can result in irrational decisions being made by the users of reporting, which decisions they would not have taken if they had been aware of the true picture and equipped with reliable information.

6. The reliability of financial statements versus manipulation

Financial statement manipulation is a major problem of today's economy. Statements are falsified to paint an entity's financial position and earnings in a way that presents to the recipient a picture of the entity that differs from the true picture. Thus it involves a deliberate distortion of an entity's economic situation as disclosed in the financial statements. The term "falsification of financial statements" can involve the following practices:

- deliberate omission of phenomena and a failure to record them,
- erroneous recognition of business operations,
- intentional violation of accounting rules,
- falsification of data and documents.

Ultimately, users of financial statements may be beguiled to make a wrong decision by relying on a falsified picture of reality, a decision that they would not have taken if they had known the facts.

Falsification of financial statements should therefore be defined as abuse aimed at unreliable presentation of an entity's situation.

However, the fact that financial statements may be subject to manipulation does not constitute an argument powerful enough to justify the introduction of stringent regulation to the set of rules

determining accounting activity and to limit areas in which there is a choice between different rules of conduct. The potential for fraud in reporting should not be associated with inadequate regulations in the rules determining accounting activity, but rather with challenges facing entities' supervision and chartered accountants too (Holđa, 2013, p. last).

7. Opinion of Polish accountants, chartered accountants and accounting practitioners on the reliability of financial statements in the context of creative accounting – results of a survey

The authors of this paper have conducted a survey of accountants, chartered accountants and business practitioners aiming to sound out the opinion of accounting circles on the reliability of financial statements. The survey was conducted in 2013 and sampled the opinions of 187 people professionally associated with accounting, including accountants, chartered accountants and business practitioners and analysts.

More than half (54%) of the sampled accountants maintained that creative accounting always resulted in misleading statement users, and the same opinion was upheld by half of chartered accountants. However, despite a seemingly clear perception of creative accounting as a negative phenomenon (38% of the respondents), more than a half (54%) of the respondents indicated that creative accounting could be conceived to relate to both a group of negative and positive phenomena, and 33% of accountants dubbed as creative accounting innovative activities aiming to demonstrate the most effective and true-to-fact state of an entity. In addition, 48% of accountants and 35% of chartered accountants felt that the term "creative accounting" should be used to describe presentation of phenomena that accorded with their actual economic substance, but in a manner not directly regulated by the law.

These studies indicate, therefore, that at least one in three respondents was aware of the real, positive meaning of creative accounting. However, although respondents viewed creative accounting as activities that were not directly regulated by law and further agreed with the fact that it could involve both positive and negative phenomena, on the other hand, they also indicated that creative accounting in most cases unfortunately involved negative phenomena which misled users of financial statements.

In addition, only one in four respondents stated that accounting fulfilled its control function very well, while 15% of respondents felt that accounting in general did not meet this function at all. Meanwhile, a vast majority of respondents did not give a clear answer, and a half of the respondents believed that it was not possible to determine whether the current accounting system offered investors adequate assurance of the reliability of information disclosed in financial statements. According to one in five respondents, accounting guaranteed data reliability – however as many as a quarter of the respondents stated that the accounting system did not guarantee reliability of the data contained therein. In addition, as many as 15% of respondents indicated that even a clean opinion given by the chartered accountant did not guarantee investors reliability of the data contained in audited financial statements. Interestingly enough, this view was shared by as many as 10% of the surveyed chartered accountants. However, for 40% of respondents, the fact that statements were been audited by a chartered accountant was a guarantee of reliability of the data contained therein.

Respondents exercised great caution in expressing their views on whether accounting properly discharged its control function and whether it guaranteed quality and reliability of financial information. Yet it is also worth noting that a mere quarter of them had a positive perception of the existing accounting system. Likewise, the number of people for whom the auditing of financial statements by the chartered accountants constituted a real guarantee of integrity and reliability of the data contained therein was small, and it was interesting that even chartered accountants themselves did not place trust in financial statements that had been signed off.

73% of chartered accountants and accounting practitioners claimed that financial statements could be considered as reliable. Lower confidence levels in the quality of data was expressed by accountants, of whom 67% had trust in the reliability of financial statements. 22% of chartered accountants believed financial statements to convey an embellished image of the entity, an opinion shared by one in three accountants. According to chartered accountants, 7% of financial statements were completely unreliable and failed to reflect the existing economic reality, while accountants estimates put that number at 15%. The above figures indicate that in the opinion of accountants (who also placed considerably less confidence in the information contained in ledgers than chartered accountants did) as many as one in three financial statements might be deemed unreliable, or indeed mislead its user.

The most common reason for financial statements painting an image of an entity that was not true to fact was believed by respondents to originate in a desire to improve the entity's appearance (79% of respondents) and embellish financial ratios (75% of respondents). A quarter of respondents indicated that the incentive to manipulate reporting arose from the fact that chartered accountants' wages depended on the appearance of an entity's financial performance and 17% of respondents reported they had a fear of losing their commissions as the reason for such distortion.

Respondents were asked if they knew of the use of a degree of freedom in the rules determining accounting activity in a positive way, to make the most faithful presentation of economic reality in the accounts. 30% of respondents indicated that they had very often encountered such positive accountant behaviour in practice, yet, exactly the same number of respondents (30%) indicated that they had never witnessed such commendable practice. Meanwhile, as many as three in four respondents indicated that they had encountered counterfeit financial reporting, albeit not often.

At the same time, none of the chartered accountants, 21% of accountants and as many as 27% accounting practitioners admitted that they themselves had not adhered to the requirements of true and fair view and manipulated financial reporting. In 67% of cases, such manipulation involved inflated earnings and in 23% of incidents the understatement of the result, with a few cases involving a failure to recognise asset impairment. It is worth noting that these figures may be underestimated, since it is possible that a fair group of respondents did not want to admit in the survey that they had manipulated financial data. This assertion may be corroborated by the fact that in many cases respondents shunned answering this question, giving neither an affirmative nor a negative answer.

The results indicate that in most cases figure manipulation aimed to show a financial result other than the actual result (i.e. understated or overstated) (which can be done, e.g. by a changing in the level of liabilities, creation and reversal of revaluation of assets or a change in valuation principles), with other types of manipulation (e.g. a change in the structure of assets) having been few and far between.

In summary, accountants, chartered accountants and business practitioners are aware of the fact that the degree of freedom inherent to accounting is designed to ensure the most reliable picture of the entity, but they also indicate that this area is often used to manipulate financial reporting. A sizeable group of respondents admitted having been implicated in massaging figures to paint a better picture of the entity or because their fees depended on the entity's performance. As many as 62% of respondents stated that accounting rules should regulate reporting more accurately, without leaving items open to free interpretation, thereby indicating that in their view every third financial statement could be considered unreliable, and more than one in five respondents admitted having been involved in manipulative financial reporting.

8. Conclusion

One must not underestimate the role of financial reporting, either in the company (any economic entity lacking the knowledge of its expenditures and revenues, or the balance of its accounts would probably find it impossible to operate) or for external users of reporting, including capital market participants who make decisions based on financial statements) (Hořda, 2012).

However only those financial statements will be useful (with usefulness being construed as helpfulness in making economic decisions) that will have the right quality. One of the indicators of this quality is undoubtedly reliability.

A. Kamela-Sowińska states that rules-based accounting is becoming a thing of the past, giving way to principle-based accounting. However, in addition to knowledge (one kind of knowledge is needed to make calculations, and another to make a choice of methods and carry out an estimation) the latter requires mainly also a mental changeover. On the other hand, financial statements can be regarded as useful for their users when they give a true picture in a clear manner, one that does not cause doubt about interpretation, and reflects the true picture without undue obscurity. However, presenting the characteristics of financial reporting (focus on the true picture, completeness, neutrality and freedom from error) the conceptual framework (IFRS 1, CJ12) points out the critical importance of one fact of life: perfection is rarely attainable, if at all, but the maximisation of the quality of characteristics should be striven for in so far as possible.

Bibliography

1. Bell P.W., Edwards E.O. (1961), *The Theory and Measurement of Business Income*, California, University of California Press.
2. Van Beest F., Braam G. (2006), *Convergence Through Divergence. An Analysis of Relationships between Qualitative Characteristics of the Conceptual Frameworks of the FASB and IASB*, NiCE Working Paper 06-102, September.
3. Brennan N., Gray S.J. (2005), The Impact of Materiality: Accounting's Best Keep Secret, *Assian Academy of Management Journal of Accounting and Finance*, Vol. 1.
4. Dyczkowska J. (2009), Sprawozdawczość finansowa jako źródło informacji wspomagającej wykrywanie kryzysu w przedsiębiorstwie, *Zeszyty Teoretyczne Rachunkowości*, No. 51(107).
5. Fields T.D., Lys Z.T., Vincent L. (2001), Empirical Research on Accounting Choice, *Journal of Accounting and Economics*, 31(2001).

6. Gos W., Hońko S., Szczypa P. (2010), *ABC sprawozdań finansowych. Jak je czytać, interpretować i analizować*, Warszawa, CeDeWu.
7. Grabiński K. (2010), Zarządzanie zyskami jako jeden z kierunków rozwoju pozytywnej teorii rachunkowości, *Zeszyty Teoretyczne Rachunkowości*, t. 56(112).
8. Gut P. (2006), *Kreatywna księgowość a fałszowanie sprawozdań finansowych*, Warszawa, C.H. Beck.
9. Hendriksen E.A., van Breda M.F. (2002), *Teoria rachunkowości*, Warszawa, PWN.
10. Jaruga A., Frenzel M., Ignatowski R., Kabalski P. (2009), *Międzynarodowe Standardy Sprawozdawczości Finansowej (MSSF/MSR) 2009. Najnowsze zmiany*, Warszawa, Stowarzyszenie Księgowych w Polsce.
11. Hołda A. (2013a), *MSR/MSSF w polskiej praktyce gospodarczej*, Warszawa, C.H. Beck.
12. Hołda A. (2013b), Poznawcze aspekty wartości godziwej w rachunkowości w kontekście kulturowym [in:] *Nauka o rachunkowości na progu gospodarki opartej na wiedzy*, Warszawa, Wyd. Oficyna Wydawnicza SGH.
13. Hołda A., Staszal A. (2015), Polityka rachunkowości [in:] *Instrukcje księgowe i podatkowe 2015*, (ed.) A. Hołda, Warszawa, C.H. Beck.
14. Hołda A., Staszal A. (2014), Is It Creative Accounting, Risk Management, Manipulation or a Fraud? [in:] *Knowledge – Economy – Society. Managing Organizations: Concept of Their Applications*, (eds.) A. Jaki, B. Mięka, Cracow, Foundation of the Cracow University of Economics.
15. Hołda A. (2012), Rachunkowość jako system informacyjny zarządzania – ujęcie retrospektywne i prospektywne, *Zeszyty Naukowe WSEI*, No. 8.
16. Kabalski P. (2009), *Polityka rachunkowości w spółce stosującej MSSF*, Warszawa, Stowarzyszenie Księgowych w Polsce.
17. *Międzynarodowe Standardy Sprawozdawczości finansowej (MSSF) (2007)*, Warszawa, Stowarzyszenie Księgowych w Polsce.
18. Mance D., Kutunar H. (2011), *Influences on, and Consequences of Accounting Policy Choices*, 8th International Conference Economic Integrations, Competition and Cooperation.
19. Micherda B. (2011), Uwarunkowania kwantyfikacji w wartości godziwej, *Zeszyty Naukowe UEK*, No. 849.
20. Micherda B. (2014), Jakość informacji finansowych w teorii i w regulacjach rachunkowości [in:] *Teoria rachunkowości a jej współczesne regulacje*, Warszawa, Difin.
21. Mikulska D.A. (2012), Polityka rachunkowości jednostki w świetle obowiązujących przepisów prawnych [in:] *Polityka rachunkowości jednostki a jakość sprawozdania finansowego*, (ed.) D.A. Mikulska, Lublin, Wydawnictwo KUL.
22. Samelak J. (2004), *Determinanty sprawozdawczości finansowej przedsiębiorstw oraz kierunki jej dalszego rozwoju*, Poznań, Wydawnictwo Akademii Ekonomicznej w Poznaniu.
23. Sawicki K. (1998), *Polityka bilansowa i sprawozdawczość finansowa w zarządzaniu firmą*, Wrocław, EKSPERT.
24. Skinner D.J. (1993), The Investment Opportunity Set and Accounting Procedure Choice, *Journal of Accounting and Economics*, 16(4).
25. Surdykowska S. (2004), *Rachunkowość kreatywna a MSR/MSSF*, Warszawa, Wyd. SGH.
26. Surdykowska S. (2005), *Rachunkowość kreatywna a oszustwa księgowe*, Dąbrowa Górnicza, Wydawnictwo Wyższej Szkoły Biznesu w Dąbrowie Górniczej.

Chapter 19

Accounting in the Juridical Restructuring Proceedings: Theory and Practice

Kinga Bauer

1. Introduction

Accounting plays an important role in social development and culture. Its scientific nature is manifested through clarifying the rules governing the world and resolving problems of decision-making. The development of theory which has occurred in recent years, creates justified expectations for further positive impact of accounting on economic and social life (Dobija, 2013, p. 44, 56). The informative function which accounting plays, is emphasized in literature (e.g. Gmytrasiewicz, 2006; Burzym, 2008; Szycha, 2010). At the same time, its rules are criticized in case of a threat and loss of the ability to continue operations (e.g. Walińska, Jędrzejewski, 2009; Mączyńska, 2009). However, accounting is also indicated as an important source of information in the process of restructuring.

Literature refers to both the restructuring processes aiming at increasing the profits of thriving enterprises (e.g. Bitkowska, 2010; Baran, 2005; Sudarsanam, 2003) and to the repairing restructuring processes, including those performed in the case of a threat of bankruptcy (e.g. Altman, Hotchkiss, 2010; Gilson, 2010).

The restructuring of enterprises can have varied dimensions. It can be focused on the development or repair of a company. When the continuation of business operations is threatened, the restructuring should support not only the repair of an enterprise, but also its development after the completion of the restructuring process. Restructuring activities are intended to support the judicial process of bankruptcy and reorganization. For the purposes of implementing these processes, *The Bankruptcy and Reorganization Law (BRL)* (Ustawa z dnia 28 lutego 2003 *Prawo Upadłościowe i Naprawcze*) imposes obligations on the parties of the process to provide information, which in turn supplies the court's database of proceedings with accounting reports.

The purpose of this paper is to analyze and evaluate the accounting regulations in the judicial processes of restructuring, as elements that should support their effectiveness. This goal, having its support in literature (Smith, Strömberg, 2004) stems from the belief that the Bankruptcy Law may influence the effectiveness of the reorganization of companies and that insolvency laws should be considered on the basis of economics (Stiglitz, 2004, p. 9). The evaluation will also be focused on the practice of insolvency proceedings in regard to financial documents derived

from corporate accounting. Due to a very small number of recovery cases in Poland, the focus of the article is on the restructuring proceedings as part of bankruptcy with a possibility to make an arrangement.

The study method consisted of literature studies, analysis of legal acts concerning bankruptcy with a possibility to make an arrangement and empirical research. Empirical research has been carried out in four out of 46 district courts conducting insolvency and reorganization proceedings in Poland.

2. Specificity of the juridical restructuring proceedings

According to M. Dobija (2013, p. 54): “the pursuit of objectives while taking minimum action is a fundamental economic imperative. (...) No respect for the truth whose origins lie in this principle leads (...) organizations to a loss of competitiveness, lack of profitability, and often bankruptcy”.

Striving to maintain or regain competitiveness may associate with conducting the restructuring. In the literature, one may find its different definitions and divisions. Its complex and multifaceted nature has an impact on the definitions which emphasize both theoretical and pragmatic threads. The numerous approaches stem from a large diversity of processes which result in radical changes in individual enterprises, sectors and the economy (Borowiecki, Kaczmarek, 2014, p. 13). One of the approaches to restructuring is to look at the success factors and ways to restructure that are specific to particular types of enterprises or industries, e.g. mining (Dźwigoł, 2007; Baran, 2007a, pp. 170-179), metallurgy (Baran, 2007b, pp. 180-189), chemical industry (Baran, 2006, pp. 215-233) or the power sector (Szymła, 2014, pp. 89-140). Restructuring processes are also a common starting point for the analysis like case study (e.g. Garstka, 2006, pp. 217-247; Kolterman, 2010, pp. 209-216; Wójcik, 2010, pp. 217-222). Restructuring is also divided into the operational and financial one, but in fact they are both closely related (e.g. Garstka, 2006, pp. 27-28). Finally, from the point of view of conducting the restructuring, one can distinguish between repairing and development restructuring. It should be stressed that for businesses in crisis the repairing restructuring is the starting point.

The repairing restructuring can be conducted within the current or reduced potential of the company. It may refer to such aspects like streamlining the management and work processes, improving the quality and enhancing the system of motivation. It can also lead to elimination of inefficient parts of the business activity, downsizing, reduction of product range or sale of selected assets (Nalepka, 1999, p. 27).

Survival, the main objective of the company, does not mean acting in an unchanged way and within the same scope. If the company does not develop, it must consequently fail, since it is not capable of adjusting to the market changes. In the long run, in order to survive, it must seek to develop through investments, technology modernization, production of new products (Wędzki, 2003, p. 17).

In case of insolvency or a threat of one, the restructuring can be conducted in court within the scope of bankruptcy with a possibility to make an arrangement or reorganization proceedings. Principles of judicial conduct of restructuring processes are regulated by the *BRL*.

The basis for commencement of the reorganization proceedings is to determine the risk of insolvency. According to the article 492, paragraph 2: “An entrepreneur shall be deemed to

be threatened with insolvency even if he duly performs its obligations, when – based on a rational estimate of its economic condition – it is evident that the entrepreneur will become insolvent shortly”.

The main aim of the reorganization proceedings is to rescue the company. The restructuring is assumed to be comprehensive and to focus mainly on the performance of obligations to creditors. As a part of the reorganization proceedings, an entrepreneur submits a reorganisation plan to the court (Nowak, Zarzecki, 2012, pp. 85-86).

The reorganisation plan (with justification) should allow the ability to compete on the market and comprise of the restructuring of (article 503, *BRL*):

- obligations, which may be included in the arrangements,
- assets,
- the employment in the enterprise.

In case of an entrepreneur being insolvent, the restructuring may take place within the scope of bankruptcy with a possibility to make an arrangement. This type of bankruptcy proceedings does not mean the discontinuance of the business operations. After the completion of the process, the entrepreneur may continue them.

According to the Act (article 11, *BRL*), a debtor shall be deemed insolvent when he fails to perform his due financial obligations.

In bankruptcy proceedings, the restructuring actions may be limited to the liabilities repayment. However, if the company is to survive after making of the arrangement, it should also make profound changes of an operational nature.

The scope of justification of arrangement proposals contained in the article 280 of the *BRL* mostly refers to the restructuring of liabilities. This stems from the fact that the justification is to be one the foundations to decide whether the company is able to perform the arrangement and to satisfy the creditors' claims to a higher degree than in the case of liquidation of the insolvent debtor's assets. However, this article also refers to such aspects of the restructuring as identification of the current state of the business and of its position, not as an entity operating in isolation from other market participants, but also with regard to its external surrounding.

To sum up, although the provisions of *BRL* especially emphasise the restructuring of the liabilities of the insolvent debtor, they do not limit the possibilities to try to restructure the enterprise in a much broader, developmental way. Regardless of the scope of the changes, it is information that plays a key role in the bankruptcy and reorganization proceedings.

3. The role of accounting information in restructuring: literature and legal basis review

Corporate financial scandals and spectacular bankruptcies of recent years indicate that accounting and financial reporting may be treated as an instrument to create a false picture of a company. This means breaking the principles of accounting, which are to present reliable information about the financial situation. This is also a violation of the principles laid down in regulations and accounting standards (Szychta, 2010, pp. 254-255). A separate issue is the fact that, the proper application of legal regulations in accounting can cause the presented situation of a company to be far from sound, economic truth (Alexander, Nobes, 2007, p. 456; Mączyńska, 2009, p. 51; Szczesny, Valentincic 2013, pp. 285-317).

In addition, what bears problems to the bankruptcy process is marginalizing the need for information of those individuals who have lost their ability to continue business operations. Overriding accounting principles, like prudence or matching principles, are applicable in businesses that face the prospect of continuity. However, in the case of bankrupt enterprises, it is reasonable to apply the principle of *true and fair view* (Walińska, Jędrzejewski, 2009, pp. 165-166). Units undergoing the reorganization proceedings or bankruptcy with possibility to make an arrangement, are usually the ones continuing the business operations. However, in the process of bankruptcy proceedings, particularly in the case of an already existing state of insolvency, information on the actual, rather than the balance-sheet value of assets, is necessary. Since the overriding accounting principles do not allow for a full depiction of a real value of the assets, the balance sheet is an incomplete source of information on the debtor's situation. Courts depend on valuations prepared by the interim court supervisors or appraisers (Bauer, 2014a). The problem is particularly evident in the case of debtors with owner-occupied properties. In such cases, the difference between the balance sheet valuation and the market valuation is especially big, even bigger than an average cost of bankruptcy proceedings (Bauer, 2015).

In addition, research carried out by D. Wędzki (2012, p. 178) indicates that in Poland still there are problems with obtaining high quality financial information that could provide a basis for assessing the financial condition of a company at risk of bankruptcy. According to a study by I. Górowski (2014), companies on the verge of insolvency use the accounting tools even to bias the financial result.

Results of research conducted in Polish courts also show that judicial documents of restructuring proceedings contain references to actions aiming at implementation of new accounting procedures or at use of management accounting, such as: outsourcing of accounting services, cost-benefit analysis, estimating the cost of conducting business activities, the use of pricing, economic forecasting, budgeting (Bauer, 2014b, p. 169).

Accounting without any intentional distortion may be a source of information for the restructuring processes. The literature points to the usefulness of the financial analysis in the diagnosis of restructuring processes (e.g. Waściński, 2010). There are two basic approaches to the use of information derived from the financial statements of the restructuring proceedings.

The first one involves the use of accounting as a source of information for forecasting the needs for restructuring. The financial reports are commonly used in predicting the bankruptcy, which – according to D. Wędzki – means that they contain information useful for evaluating the financial condition of an enterprise (Wędzki 2013, p. 452). According to R. Borowiecki, A. Wysocka (2012, p. 119): “Analysis and assessment of financial condition of an enterprise can and should be an indication of the size and direction of changes (...) While conducting the evaluation of the enterprise to be restructured, one should focus on basic problems”. According to A. Hołda (2006, pp. 24-25), risks arising from the financial structure are the first type of threats that can lead to bankruptcy. These risks are reflected in the financial data or their interpretations at the time when these risks occur.

Thus, the first approach is to use the data from accounting to create models that warn about bankruptcy and those from financial analyses to help to diagnose the need for restructuring.

The second approach involves the use of information from financial reporting to determine the effects of the restructuring process. Accounting information can be used in assessing the financial effects of changes. According to W. Gabrusewicz (1999, p. 28), areas of change in repairing restructuring are: debt reduction, elimination of redundant assets, actions in terms of fi-

financial liquidity, minimization of costs and expenses. The effects of the restructuring will result in change in the value of the company, e.g. by an increase in profitability, productivity, efficiency or alterations in the value and structure of capital (Kaczmarek, 2014, p. 56).

This means that the assessment of the effects of restructuring can and should be based on financial ratios built on the basis of the financial statements.

To sum up, one can notice that both approaches employ the use of financial ratios created on the basis of data from the financial statements.

According to the Author, both of these approaches can be used in judicial restructuring processes. However, having a proper set of information allowing to make the necessary calculations and to interpret them is a prerequisite. Also a possibility to compare data collected for a given time is necessary.

The BRL instead of a financial statement, requires the submission of a balance sheet drawn up for the purpose of these proceedings, valid as at the day falling no earlier than 30 days prior to the day of filing the petition and in the case of the bankruptcy with possibility to make an arrangement: cash-flow statement.

If the debtor submits to the court only those elements of financial statement that are required by the *BRL*, the database of the information on bankruptcy process will not allow to carry out any financial analyses. As a result, neither a sufficient diversity of financial data will be provided, nor the possibility of comparing changes over time will be available.

However, the *BRL* does not forbid the submission of additional elements of financial statements. In addition, during an order proceedings, the judge has the right to require additional information, including those of a financial nature.

4. Practice of using accounting in juridical restructuring proceedings

The goal of empirical research is to identify practices related to financial reporting in juridical proceedings as a basis for assessing the legitimacy and feasibility of restructuring.

Empirical research has been carried out in four out of 46 district courts conducting bankruptcy proceedings in Poland (in Warsaw, Krakow, Katowice & Tarnow). Documentation of 16 judicial cases of bankruptcy with a possibility to make an arrangement was chosen in order to prepare this paper. Accounting documents filed in courts during the preliminary proceedings were analyzed and evaluated. Preliminary proceedings are especially important as at this stage the court decides on the type of bankruptcy proceedings, and thus the possibility of conducting the restructuring. The following factors were assessed in detail:

- compliance with the *BRL* requirements,
- aspects that go beyond the law and thereby allow to conduct an analysis of the financial condition of the debtor.

A quantitative summary regarding the elements of financial statements in juridical bankruptcy-restructuring proceedings is represented in the Table 1.

Table 1. Elements of financial statements in juridical bankruptcy-restructuring proceedings

Elements of a financial statement	Number of cases
Balance Sheet, including:	15
• drawn up on a day not later than 30 days prior to submission of petition	14
• drawn up at the end of the fiscal year (submitted with petition)	12
• drawn up on a different day	7
Statement of Cash Flows	8
Introduction to financial statements	2
Profit and Loss Account	13
Statement of Changes in Equity	0

Source: own work.

The results showed that:

- a case where the balance sheet was not submitted is correct from the point of view of the *BRL*, since the petition was filed by the debtor,
- in all cases where the petition was filed by the debtor, the documentation of each case contained at least one balance sheet,
- in one case, the submitted balance sheet had been prepared 2.5 month before the filing date of the bankruptcy petition (so the statutory obligation was not performed),
- in most cases, the debtors submitted additional profit and loss accounts and, in some cases, other elements of a financial statement,
- only in two cases the financial statements allowed to compare the data at a given time.

In summary, the documentation submitted to the court can in most cases be considered compatible with the requirements of the *BRL*. However, in most of the analyzed cases it is not possible to carry out a financial analysis based even on a small range of financial ratios. In most cases, there is also no possibility to analyze the changes that have occurred over time.

What can be noticed is that the debtors act in compliance with the *BRL* requirements. So, the situation should be considered satisfactory from the point of view of the law, however, it is unsatisfactory from the point of view of the possibility to conduct the analysis of the restructuring needs.

5. Conclusion

According to Prof. E. Burzym (2008, p. 25) “the needs of the economy, manifested in the pursuit of effective ways to measure the effects of economic activities of an entity, lie at the heart of development of accounting. Accounting development was thus inspired by the need for a causal link between relevant elements of input and output, which is necessary for solving specific cognitive and decision-making problems”. This theory should result in positive consequences for the development of the informative function of accounting and for judicial restructuring processes. The threat of the inability to continue business operations is higher during restorative restructuring. This increased threat should result in an increased effort to limit it or even eliminate it. These measures should be accompanied by transparent information, which supports the deci-

sion making process of court representatives, who should make sure that the restructuring process is conducted in an efficient, honest and just manner.

The current level at which opportunities offered by the accounting system are used in the judicial processes of restructuring has greatly decreased. Empirical studies have revealed an increased scope of financial records on file for bankruptcy processes compared to the requirements of *The Bankruptcy and Reorganisation Law*. The reason for this may lie in the characteristics of accounting, the perception of it as a source of reliable information about the financial condition of a company. An increased number of accounting documents in the bankruptcy proceedings database, may be due to the voluntary initiative of the debtor, or to the orders of judges in the proceedings by writ. At the current stage of research, this condition can be regarded as positive.

Bibliography

1. Alexander D., Nobes Ch. (2007), *Financial Accounting an International Introduction*, Essex, Prentice Hall/Financial Times.
2. Altman E.I., Hotchkiss E. (2010), *Corporate Financial Distress and Bankruptcy: Predict and Avoid Bankruptcy, Analyze and Invest in Distressed Debt* (Vol. 289), John Wiley & Sons.
3. Baran M. (2005), The Areas of Influence of the Success-determining Factors upon the Functioning of the Enterprise [in:] *Współczesne czynniki rozwoju przedsiębiorstw*, (ed.) A. Peszko, Kraków, Uczelniane Wydawnictwo Naukowo-Dydaktyczne AGH.
4. Baran M. (2006), The Key Success-determining Factors and Their Influence upon the Functioning of Enterprises in Chemical Branch Comparative Study [in:] *Funkcjonowanie gospodarki polskiej w warunkach integracji europejskiej* (ed.) M. Księżyk, Kraków, Uczelniane Wydawnictwo Naukowo-Dydaktyczne AGH.
5. Baran M. (2007a), Strategie restrukturyzacji branży górniczej w Polsce po roku 1989 [in:] *Zarządzanie rozwojem organizacji*, (ed.) S. Lachiewicz, Łódź, Wyd. PŁ.
6. Baran M. (2007b), Strategiczne programy restrukturyzacji polskiego hutnictwa wdrażane w latach 1989-2006 [in:] *Zarządzanie rozwojem organizacji*, (ed.) S. Lachiewicz, Łódź, Wyd. PŁ.
7. Bauer K. (2014a), Fixed Assets Valuation in the Condition of Bankruptcy Risk: The Role of Estimates, *Journal of Modern Accounting and Auditing*, 10(6).
8. Bauer K. (2014b), Restructuring Ventures in Companies at Risk of Bankruptcy [in:] *Competition and Cooperation in the Management Theory and Practice*, (ed.) P. Jedynak, Kraków, Jagiellonian University Press.
9. Bauer K. (2015), Impact of Owner-Occupied Property Valuation by Historical Cost on Fixed Assets Value at Bankruptcy Risk, *Management and Business Administration. Central Europe „MBA. CE”*, Vol. 24, 2/2015.
10. Bitkowska A. (2010), Wpływ technologii na proces restrukturyzacji przedsiębiorstw [in:] *Procesy restrukturyzacji warunkiem poprawy konkurencyjności przedsiębiorstwa*, (ed.) A. Bitkowska, Warszawa, Difin.
11. Borowiecki R., Kaczmarek J. (2014), Restrukturyzacja w procesie kreowania zmian w gospodarce [in:] *Zarządzanie restrukturyzacją przedsiębiorstw i gospodarki. Uwarunkowania-Procesy-Efekty*, (ed.) R. Borowiecki, Kraków, Fundacja Uniwersytetu Ekonomicznego w Krakowie.

12. Borowiecki R., Wysłocka A. (2012), *Analiza ekonomiczna i ocena ekspercka w procesie restrukturyzacji przedsiębiorstw*, Warszawa, Difin.
13. Burzym E. (2008), Rola i funkcje rachunkowości w roku 2000, *Zeszyty Teoretyczne Rachunkowości*, No. 45.
14. Dobija M. (2013), Fundamentalne zasady leżące u podstaw nauki rachunkowości. *Zeszyty Teoretyczne Rachunkowości*, No. 70.
15. Dźwigoł H. (2007), *Model restrukturyzacji organizacyjnej przedsiębiorstwa górnictwa węgla kamiennego*, Warszawa, Difin.
16. Gabrusewicz W. (1999), Restrukturyzacja przedsiębiorstw i metody oceny jej efektów, *Przeгляд Organizacji*, 3.
17. Garstka M. (2006), *Restrukturyzacja przedsiębiorstwa. Podział przez wydzielenie*, Warszawa, CeDeWu.pl Wydawnictwa Fachowe.
18. Gilson S.C. (2010), *Creating Value through Corporate Restructuring: Case Studies in Bankruptcies, Buyouts, and Breakups* (Vol. 544), John Wiley & Sons.
19. Gmytrasiewicz M. (2006), Dylematy współczesnej rachunkowości. Artykuł dyskusyjny, *Zeszyty Teoretyczne Rachunkowości*, No. 32.
20. Górowski I. (2014), Wpływ polityki rachunkowości w zakresie aktywów z tytułu odroczonego podatku dochodowego na wynik finansowy niewypłacalnych spółek giełdowych [in:] *Polityka rachunkowości a kształtowanie wyniku finansowego*, (eds.) A. Kostur, J. Paff, Katowice, Zeszyty Naukowe Wydziałowe Uniwersytetu Ekonomicznego w Katowicach.
21. Hołda A. (2006), *Zasada kontynuacji działalności i prognozowanie upadłości w polskich realiach gospodarczych*, Kraków, Wydawnictwo Akademii Ekonomicznej w Krakowie.
22. Kaczmarek J. (2014), Ocena efektów restrukturyzacji przedsiębiorstw w gospodarce Polski w latach 1990-2012 [in:] *Zarządzanie restrukturyzacją przedsiębiorstw i gospodarki. Uwarunkowania-Procesy-Efekty*, (ed.) R. Borowiecki, Kraków, Fundacja Uniwersytetu Ekonomicznego w Krakowie.
23. Kolterman K. (2010), Restrukturyzacja poprzez transfer technologii na przykładzie PHPU „Arkol” sp. z o.o. [in:] *Procesy restrukturyzacji warunkiem poprawy konkurencyjności przedsiębiorstwa*, (ed.) A. Bitkowska, Warszawa, Difin.
24. Mączyńska E. (2009), Zagrożenia w działalności gospodarczej. Dylematy ustrojowo – strategiczne [in:] *Meandry upadłości przedsiębiorstw. Klęska czy druga szansa?*, (ed.) E. Mączyńska, Warszawa, Oficyna Wydawnicza SGH.
25. Nalepka A. (1999), *Restrukturyzacja przedsiębiorstwa. Zarys problematyki*, Warszawa–Kraków, Wydawnictwo Naukowe PWN.
26. Nowak J., Zarzecki D. (2012), *Perspektywa finansowa restrukturyzacji z elementami prognozowania upadłości przedsiębiorstw*, Warszawa, Difin.
27. Smith D.C.I., Strömberg P. (2004), *Maximizing the Value of Distressed Assets: Bankruptcy Law and the Efficient Reorganization of Firm*, <http://www.sifr.org/PDFs/smithstromberg%28wb2005%29.pdf> [16.11.2013].
28. Stiglitz J.E. (2004), The Process of European Integration and the Future of Europe, *Discussion Paper Series*, No. 2004.1, Geneva, Switzerland, United Nations Economic Commission for Europe.
29. Sudarsanam S. (2003), *Creating Value from Mergers and Acquisitions: The Challenges: An Integrated and International Perspective*, Pearson Education.

30. Szczesny A., Valentincic A. (2013), Asset Write-offs in Private Firms – The Case of German SMEs, *Journal of Business Finance & Accounting*, Vol. 40(3) & (4) (April/May).
31. Szychta A. (2010), Współczesne kierunki zainteresowania teorii rachunkowości finansowej w świetle zarysu jej rozwoju, *Zeszyty Teoretyczne Rachunkowości*, No. 56.
32. Szymła W. (2014), Restrukturyzacja sektorów strategicznych na przykładzie sektora elektroenergetycznego [in:] *Zarządzanie restrukturyzacją przedsiębiorstw i gospodarki. Uwarunkowania-Procesy-Efekty*, (ed.) R. Borowiecki, Kraków, Fundacja Uniwersytetu Ekonomicznego w Krakowie.
33. Ustawa z dnia 28 lutego 2003 r. Prawo upadłościowe i naprawcze, Dz.U. 2003, nr 60, poz. 535, ze zm.
34. Walińska E., Jędrzejewski S. (2009), Bilans w warunkach utraty kontynuacji działalności – zasada ostrożności, czy treść ekonomiczna, *Zeszyty Teoretyczne Rachunkowości*, tom 51(107), Warszawa, SKwP .
35. Waściński T. (2010), *Finansowa diagnoza procesów restrukturyzacji przedsiębiorstwa w aspektach ekonomicznej wartości wiedzy*, Warszawa, Dom Wydawniczy ELIPSA.
36. Wędzki D. (2012), The Sequence of Cash Flow in Bankruptcy Prediction: Evidence from Poland, *Theoretical Journal of Accounting*, 68(124).
37. Wędzki D. (2013), Użyteczność w teorii sprawozdania finansowego [in:] *Nauka o rachunkowości na progu gospodarki opartej na wiedzy. Polski sondaż środowiskowy*, (ed.) A. Karmańska, Warszawa, Oficyna Wydawnicza, Szkoła Główna Handlowa w Warszawie.
38. Wędzki D. (2003), *Strategie płynności finansowej przedsiębiorstwa. Przepływy pieniężne a wartość dla właścicieli*, Kraków, Oficyna Ekonomiczna.
39. Wójcik G. (2010), Restrukturyzacja firmy szkoleniowej Centrum Edukacji EDUS [in:] *Procesy restrukturyzacji warunkiem poprawy konkurencyjności przedsiębiorstwa*, (ed.) A. Bitkowska, Warszawa, Difin.

Chapter 20

The Level of Depreciation in Cash Flows

Edyta Mioduchowska-Jaroszewicz

1. Introduction

The level of financing from depreciation in cash flows is an important aspect of the evaluation of cash flows. Depreciation is recorded in cash flow from operations (CFO) as a positive cash flow to lessen the impact of non-cash charges on a financial result. Depreciation of tangible fixed assets and other intangible assets takes the highest value. In some cases, depletion of natural resources such as mineral deposits or forests is also written off. This type of charges does not involve cash flow, and thus results in concealing part of cash generated as net profit. Therefore, if we want to go on to the cash flow statement these items need to be added back to the profit. It often leads to a serious misunderstanding as depreciation is treated as a source of cash. Depreciation itself does not represent cash inflow; this is only a record in account books lowering declared income, and thus decreasing the actual inflows. This record has a direct effect on the amount of income tax paid; but this positive effect is included in the difference between gross and net profit. Therefore, when analyzing cash flows it is crucial to pay close attention to where the generated operating activity's resources come from, and to what extent they come from depreciation.

The aim of the article is to present how the level of depreciation in CFO is shaped in the companies on the Polish capital market. The main thesis of this article is that the share of depreciation is constant in cash flow from operations of enterprises.

2. The essence, types and functions of depreciation

In the source literature, depreciation is mainly defined as (Grabowska, 2010, pp. 123-136; Iwin-Garzyńska, 2005, pp. 15-19; Głuchowski et al., 2001, p. 18; Eichhorn, Thiemeyer, 1979, p. 173):

- economic category generalizing the properties of fixed assets i.e., relocating the value of these assets from the sphere of production to that of distribution and circulation;
- an accounting operation which spreads the incurred expenditure over a period of time;
- spreading hard costs over the time of their use;
- gradual relocation of fixed assets' value to new products in the process of production;
- source of funding for the replacement of obsolete and worn out fixed assets.

Depreciation as a non-cash charge is added to net income when determining CFO, and thus it is an important value helping to determine the amount of financial resources that can be used by a company (Gackowska, 2003, pp. 9-12). It does not entail expenses in the current period and it is part of hard costs. In scientific publications the concept of depreciation is explained from the perspective of various methods of depreciation, depreciation rates and legal possibilities of their use. The concept of depreciation is defined neither by the Income Tax Act nor by the Accounting Act; it is only determined by the right of ownership and conditions that are to be met by material goods in order to be subject to depreciation (Bem, 2007, p. 35).

In economic practice, depreciation is defined as the totality of circular motion of fixed assets' value based on a gradual loss of value resulting from the wear and tear of fixed assets and collecting funds for their replacement (Bem, 2007, p. 35).

3. The influence of depreciation on the company's financial situation

Financial statements are the primary source of information about the financial situation of enterprises. However, "the picture of financial situation and performance of entities that is often presented is correct only from the point of view of the accounting principles, but it does not present economic reality, and thus inaccurately reflects the economic truth" (Mączyńska, 2009, p. 2).

The choice of particular methods of depreciation affects the shape of financial statements and influences the results obtained from the analysis of the financial situation of such an economic entity.

The most common methods of depreciation are: straight-line method, reducing method and annuity method. The latter most reliably reflects the actual use of tangible fixed asset (Kobiela-Pionnier, 2008, pp. 65-67) Table 1 presents depreciation methods and their influence on financial result.

Table 1. Depreciation methods and their influence on financial result

Straight-line method	Reducing/declining method	Annuity method
Straight-line method is the method of equal depreciation rates and it assumes that fixed assets during their useful life evenly lose their value	Reducing method belongs to the methods of uneven depreciation charges. This method assumes that fixed assets at the beginning of their useful life rapidly lose their value	This method also belongs to the methods of uneven depreciation charges. It is based on recording depreciation charges according to the natural use of fixed assets

Source: Takats, 2007, p. 18.

The value of depreciation is directly connected with the size of the financial result and the net value of fixed assets shown on the balance sheet. Due to these elements depreciation determines the total value of assets and liabilities (total assets). As it takes part in the creation of the above mentioned values of depreciation charges, it affects the results of ratio analysis. Additionally, the choice of the method of depreciation changes the structure of financial statements. Higher value of depreciation results in a smaller share of fixed assets in the company's capital and it re-

duces the share of profit in the sources of funding. Within the profit and loss account the higher value of depreciation lowers the financial result at all levels (Łukasik, 2010, p. 130).

The differences in calculating the value of depreciation influence the results of the analysis of the enterprise's financial situation. Depreciation determines fixed assets to equity ratio. The financial result, which creates the equity, is reduced by subtracting depreciation, and the value of fixed assets by the value of accumulated depreciation of fixed assets, which makes it possible to manipulate the value of this ratio in the analysis of liquidity. When the value of equity is higher than the value of fixed assets, increased depreciation charges will result in the rise of fixed assets to equity ratio. In a situation where the two values are equal, the change of depreciation charges will not affect the value of this ratio. In the entity whose equity does not exceed the value of fixed assets, increased depreciation will reduce the fixed assets to equity ratio. Therefore, the increase of depreciation cannot improve the enterprise's capital structure (Łukasik, 2010, p. 131).

4. Depreciation and cash flow

Depreciation is a cost but this is a non-cash expense, and thus this situation does not make it a factor affecting the value of cash flows in the enterprise. However, there is a relocation between the financial result and depreciation. Nevertheless, this simple relocation concerns taxable gross profit. The obligation to pay the income tax does not make the value of financial surplus (which is understood as net profit plus depreciation) equal to the sum of gross profit and depreciation. The size of financial surplus is sensitive to changes of depreciation charges. When an income tax is included in the analysis, it can be noted that the increase of depreciation to the level allowed by the tax law increases financial surplus. The changes caused by a different value of depreciation are included within cash flows from operating activities. There is only a relocation between depreciation, financial result and short-term tax liabilities (Łukasik, 2010, p. 130).

The calculation of depreciation in cash flows is made by the standard and common ratio of the share of depreciation to cash flows used in the analysis of the dynamic liquidity of the enterprise based on the cash flow statement.

The ratio (1) as the relationship between depreciation and cash flows is defined in various ways in the economic literature. The formula of this ratio is as follows:

$$WUAP = \frac{AM}{OP} \times 100 \quad (1)$$

WUAP – the ratio of the share of depreciation in cash flows,

AM – depreciation

OP – cash flows from operating activities.

E. Śnieżek and M. Wiatr emphasize that this ratio is used only in the case when there is a surplus of cash flows from operating activities. They claim that it is useful in entities owning machinery used in the operating activity. Its value presents what part of cash flows results from depreciation. The higher the share of depreciation, the greater the dependence of the operating activity result on the factor the company has no influence on. The way in which the value of this ratio is shaped is not clear. The vast majority of researchers claim that the value should take

the lowest level, whilst others state that the higher the share of depreciation in CFO, the better. The latter is explained by the fact that depreciation is treated as the cost which does not constitute the expense, and additionally it lowers the income tax, which allows to spend the unincurred expenses on different needs (Śniezek, 2011, p. 190).

Depreciation is essentially a programmed item, a cash flow assured by the accounting rules. The higher the percentage of cash flow derived from depreciation, the higher is the predictability of a company's cash flow, and the less dependent its financial flexibility on the vagaries of the marketplace (Fridson, 1995, p. 174).

5. Depreciation from the perspective of the sector and entity

Tables 2-11 present the share of depreciation in cash flow from operations calculated with the use of the above mentioned formula. The tables are divided into sectors and they list enterprises in a given sector. The research was based on the financial data of the listed companies obtained from Orbis database (<http://orbis.bvdinfo.com/IP>).

Table 2. Average level of depreciation in CFO

Sector	Average %				Median %			
	2013	2012	2011	2010	2013	2012	2011	2010
Chemicals, rubber, plastics, non-metallic products	48	52	-14	44	42	45	42	46
Construction	-24	36	21	37	22	35	-8	17
Food, beverages, tobacco	30	55	-3	20	41	39	31	43
Gas, Water, Electricity	63	32	40	40	40	46	50	40
Machinery, equipment, furniture, recycling	-2,626	7	101	53	38	29	50	47
Metals & metal products	83	47	395	12	34	34	37	54
Post & telecommunications	-60	103	78	41	26	102	65	54
Textiles, wearing apparel, leather	67	-10	123	129	28	32	42	82
Transport	-34	-12.085	76	150	-34	-12.085	76	150
Wood, cork, paper	49	48	146	-16	38	51	56	70

Source: own elaboration based on the financial data obtained from Orbis database.

The analysis of the share of depreciation in CFO in terms of sectors is quite diverse. The studied periods of time often do not allow to draw conclusions about the average and stable level of supply of operating cash from depreciation. On the basis of Table 2, it can be concluded that in enterprises operating on the Polish capital market the level of depreciation most often accounts for 30-50%. This level occurs in operating cash in the following sectors:

- chemicals, rubber, plastics, non-metallic products,
- food, beverages, tobacco,
- gas, water, electricity,
- machinery, equipment, furniture, recycling,

- metals & metal products,
- textiles, wearing apparel, leather.

In the remaining sectors this level is varied and is characterised by the lack of stability over time. In these sectors the level of depreciation in cash flow from operations is often above 50%.

Table 3. The share of depreciation in CFO in the companies of chemicals, rubber, plastics, non-metallic products

Company name	Value of ratios			
	2013	2012	2011	2010
Chemicals, rubber, plastics, non-metallic products				
Polski Koncern Naftowy Orlen S.A.	38%	73%	313%	40%
Grupa Lotos S.A.	46%	49%	67%	44%
Grupa Azoty S.A.	56%	44%	-113%	80%
Synthos S.A.	23%	22%	20%	30%
Farmacol S.A.	83%	7%	6%	-23%
Ciech S.A.	74%	242%	-812%	75%
Zakłady Chemiczne Police S.A.	39%	57%	62%	-49%
Firma Oponiarska Debica S.A.	42%	21%	42%	63%
Stomil Sanok S.A.	33%	45%	70%	54%
Ergis S.A.	89%	57%	80%	46%
Krakchemia S.A.	7%	-27%	14%	-10%
Fabryka Farb I Lakierów Śnieżka S.A.	29%	20%	28%	37%
Bioton S.A.	37%	25%	-188%	142%
Ceramika Nowa Gała S.A.	47%	98%	64%	78%
Mo-Bruk S.A.	74%	46%	138%	48%

Source: own elaboration based on the financial data obtained from Orbis database.

Table 3 compiles the values of ratios showing the level of depreciation in enterprises from the sector of chemicals, rubber, plastics, non-metallic products. This ratio has a significant impact on the level of cash generated from operating activities in this branch, which is very common given the high immobilisation of this type of activity.

There is no uniformity in the shaping of the share of depreciation in cash flow from operations in this sector. The lowest level of depreciation in cash from operating activities occurs in Krakchemia over the whole studied period and it amounts to approximately 30%. It should be noted that the negative value of the ratio results in negative cash flow from operations, which in turn adversely affects the financial situation of the enterprises.

Table 4. The share of depreciation in CFO in companies of construction

Company name	Value of ratios			
	2013	2012	2011	2010
Construction				
Budimex S.A.	9%	-115%	9%	2%
Polimex – Mostostal Siedlce S.A.	162%	-28%	151%	236%
Pbg S.A.	-153%	-20%	-12%	11%
Erbud S.A.	-14%	8%	-11%	35%
Mostostal Warszawa S.A.	-6%	-5%	-8%	14%
Mirbud S.A.	25%	31%	-37%	20%
Elektrobudowa SA	23%	40%	284%	86%
Mostostal Zabrze – Holding S.A.	-51%	132%	-21%	63%
ZUE S.A.	78%	57%	31%	-16%
Stalexport Autostrady S.A.	30%	35%	37%	39%
Abm Solid S.A.	-461%	97%	-161%	-58%
Pozbud S.A.	22%	152%	49%	–
Mostostal Płock S.A.	24%	85%	-34%	8%

Source: own elaboration based on the financial data obtained from Orbis database.

In the construction sector, the level of cash flow from operations funding from depreciation is also quite diversified – and more often it is negative. This proves to be unfavourable financial situation for this sector due to generating negative cash flows, which leads to a deficient activity in terms of cash.

Table 5. The share of depreciation in CFO in companies of food, beverages, tobacco

Company name	Value of ratios			
	2013	2012	2011	2010
Food, beverages, tobacco				
Grupa Zywiec S.A.	38%	32%	31%	29%
Zakłady Tłuszczowe “Kruszwica” S.A.	17%	39%	-133%	
Colian S.A.	26%	25%	39%	53%
Zakłady Przemysłu Cukierniczego Mieszko S.A.	70%	30%	75%	67%
Otmuchow S.A.	72%	102%	28%	65%
Sfinks Polska S.A.	123%	83%	-265%	-266%
Makarony Polskie S.A.	-183%	32%	183%	154%
Pepees S.A.	66%	70%	-34%	34%
Mex Polska S.A.	41%	84%	51%	21%

Source: own elaboration based on the financial data obtained from Orbis database.

In the sector of food, beverages and tobacco, the level of CFO from depreciation is often above 100%, which suggests a low ability to generate cash from operating activity.

Table 6. The share of depreciation in CFO in companies of gas, water, electricity

Company name	Value of ratios			
	2013	2012	2011	2010
Gas, water, electricity				
Polskie Górnictwo Naftowe i Gazownictwo S.A.	32%	81%	59%	40%
PGE Polska Grupa Energetyczna S.A.	37%	40%	39%	40%
Tauron Polska Energia S.A.	42%	48%	64%	54%
Enea S.A.	45%	60%	50%	51%
Kogeneracja S.A.	29%	44%	46%	31%
Polenergia S.A.	32%	-102%		49%
Elektrociepłownia Będzin S.A.	227%	53%	51%	
Tesgas S.A.	59%	30%	-32%	14%

Source: own elaboration based on the financial data obtained from Orbis database.

In the sector of gas, water, electricity, the share of depreciation in CFO is most often a constant value and ranges from 40-60%. The stable level of this ratio is a sign of a good financial situation of the entities from this sector.

Table 7. The share of depreciation in CFO in companies of chemicals, rubber, plastics, non-metallic products

Company name	Value of ratios			
	2013	2012	2011	2010
Chemicals, rubber, plastics, non-metallic products				
AB S.A.	1,084%	-663%	-143%	320%
Boryszew S.A.	61%	73%	85%	143%
Amica Wronki S.A.	54%	21%	40%	269%
Famur S.A. Fabryka Maszyn	58%	31%	69%	18%
Alchemia S.A.	70%	67%	50%	62%
Apator S.A.	50%	19%	41%	
Fabryki Mebli Forte S.A.	21%	22%	90%	144%
Seco/Warwick S.A.	83%	13%	24%	-32%
Zpue S.A.	31%	47%	31%	61%
Tim S.A.	-56%	29%	50%	-268%
Benefit Systems S.A.	13%		6%	3%
Introl S.A.	34%	33%	243%	98%
Toya S.A.	6%	7%	34%	38%
Intersport Polska S.A.	134%	67%	165%	39%
Zamet Industry S.A.	103%	16%	-64%	46%
Es-System S.A.	58%	66%	43%	98%
Ursus S.A.	-92%	-78%	114%	-85%
Chemoservis-Dwory S.A.	26%	-42%	90%	-38%
Telforceone S.A.	15%	28%	22%	47%

Cd Projekt S.A.	14%	10%	1069%	15%
Elzab S.A. Zakłady Urządzeń Komputerowych	18%	25%	54%	46%
Patentus S.A.	98%	34%	-23%	
Fabryka Obrabiarek Rafamet S.A.	-83,563%	112%	56%	-182%
Relpol S.A.	55%	30%	333%	93%
Wandalex S.A.	74%	115%	65%	163%
Aplisens S.A.	26%	23%	29%	28%
Sonel S.A.	54%		81%	70%
Variant S.A.	56%	29%	349%	
Zakłady Automatyki Polna S.A.	38%	43%	81%	147%
Unima 2000 Systemy Teleinformatyczne S.A.	34%	-28%	31%	129%
KCI S.A.	-67%	66%	4%	1%

Source: own elaboration based on the financial data obtained from Orbis database.

The sector of chemicals, rubber, plastics, non-metallic products covers the widest field of research conducted on one sector in terms of the number of companies of the sector. Most often the value of the ratio is constant and low, which reflects a good quality of cash flows. However, there are also cases where the level of this value is substantially above 100%.

Table 8. The share of depreciation in CFO in companies of machinery, equipment, furniture, recycling

Company name	Value of ratios			
	2013	2012	2011	2010
Machinery, equipment, furniture, recycling				
Kghm Polska Miedz S.A.	32%	31%	10%	15%
Arctic Paper S.A.	818%	74%	79%	107%
Stalprodukt S.A.	58%	21%	53%	32%
Impexmetal S.A.	37%	142%	44%	60%
Grupa Kety S.A.	41%	65%	34%	92%
Mennica Polska S.A.	59%		90%	26%
Konsorcjum Stali S.A.	34%	32%	10%	-8%
Stalprofil S.A.	34%	35%	16%	66%
Ntt System S.A.	-3%	7%	14%	-220%
Bowim S.A.	11%	10%	89%	
Energoinstal S.A.	7%	101%	6058%	132%
Przedsiębiorstwo Modernizacji Urządzeń Energetycznych "Remak" S.A.	-15%	38%	35%	-53%
Polska Grupa Odlewnicza S.A.	26%	32%	37%	171%
Yawal S.A.	73%	83%	56%	105%
Mercor S.A.	171%	10%	24%	48%
ZBM Zremb Chojnice S.A.	-49%	17%	25%	-496%
Odlewnie Polskie Spółka Akcyjna	77%	48%	46%	107%

Source: own elaboration based on the financial data obtained from Orbis database.

In the sector of machinery, equipment, furniture and recycling, the share of depreciation in cash generated from operating activity is quite high, which is connected with the high level of fixed assets in company's total assets, due to the type of business. Financial condition of the companies in this sector, taking into consideration the positive value of cash flows and ability to generate cash from basic activity, is very good.

Table 9. The share of depreciation in CFO in companies of post & telecommunications

Company name	Value of ratios			
	2013	2012	2011	2010
Post & telecommunications				
Orange Polska S.A.	94%	175%	72%	84%
Netia S.A.	76%	89%	74%	104%
Wasko S.A.	-278%	21%	35%	122%
Mni S.A.	109%	224%	101%	44%
Investments S.A.	-21%	115%	107%	147%
Eurotel S.A.	14%	17%	6%	31%
Cam Media S.A.	37%	73%	-44%	-13%
Mediatel S.A.	274%	149%	331%	-207%
Grupa Nokaut S.A.	-905%	36%	38%	–
Mit Mobile Internet Technology S.A.	1%	133%	59%	54%
LPP S.A.	29%	0%	38%	49%

Source: own elaboration based on the financial data obtained from Orbis database.

The share of depreciation in cash flow from operations in companies of post & telecommunications services sector is high. Quite often in this sector the level of depreciation is above 100%. This ratio indicates a low level of operating cash generated from the operating activity.

Table 10. The share of depreciation in CFO in companies of textiles, wearing apparel, leather

Company name	Value of ratios			
	2013	2012	2011	2010
Textiles, wearing apparel, leather				
Lentex S.A.	15%	38%	36%	97%
Monnari Trade S.A.	11%	27%	111%	201%
Solar Company S.A.	28%	81%	19%	19%
Novita S.A.	71%	51%	46%	66%
Sanwil Holding S.A.	250%	-257%	487%	343%

Source: own elaboration based on the financial data obtained from Orbis database.

There is little uniformity of the share of depreciation in cash flow from operations in companies of textiles, wearing apparel and leather. The value of the ratio varies within one company, but it is also different over time. Certainly, the enterprises which have the negative value of the ratio or when the value is above 100% are characterised by the unfavourable financial situation.

Table 11. The share of depreciation in CFO in companies of transport, wood, cork and paper

Company name	Value of ratios			
	2013	2012	2011	2010
Transport				
Trakcja parki S.A.	-97%	34%	135%	21%
Pekaes S.A.	29%	-24,204%	18%	280%
Wood, cork, paper				
Pfleiderer Grajewo S.A.	38%	34%	44%	87%
Ulma Construction polska S.A.	80%	60%	56%	70%
Przetwórstwo tworzyw sztucznych Plast-Box S.A.	29%	51%	337%	-206%

Source: own elaboration based on the financial data obtained from Orbis database.

In the transport sector, the share of depreciation in cash flow from operations is quite varied and corresponds to the financial condition of the company. The sector of wood, cork and paper is characterized by a more stable situation, because the level of the share of depreciation in cash flows is constant and mostly positive.

6. Conclusion

Depreciation as a specific category in companies' finances has an impact on the operating activity and investment of entities. It plays a crucial role as it is part of balance law policy (Fellis, 2007, p. 73), and it should present a reliable picture of the activities of enterprises and their financial situation (in this case we mean a reliable information about the level of wear and tear of fixed assets).

The level of depreciation in cash flow from operations is an important aspect of the analysis of the cash flow statements as it shows where companies' resources come from. The level of operating cash higher than 50% is so significant that it may bother analysts due to the fact that depreciation is treated as a primary source of generating cash from the basic activity.

The level of depreciation in CFO should take into consideration the conclusions drawn from the analysis of the expenses incurred to purchase fixed assets. The level of these expenses should be as high as the level of depreciation in a given period.

The aim of this article has been fulfilled and the thesis about a constant level of depreciation in cash flow from operations negatively verified. It cannot be concluded that the level of depreciation in CFO is a constant value of the share for a particular sector, enterprises or time.

Bibliography

1. Bem D. (2007), Amortyzacja podatkowa środków trwałych oraz wartości niematerialnych i prawnych jako źródło finansowania wewnętrznego, metody amortyzacji, problemy, *Studia i Prace Kolegium Zarządzania Finansów*, No. 82, (ed.) K. Kawerska, Warszawa, Szkoła Główna Handlowa.
2. Eichhorn P., Thiemeyer T. (1979), *Finanzierung öffentlichen Unternehmen*, Baden-Baden, Verlagsgesellschaft Nomos.

3. Felis P. (2007), Wybrane problemy wpływu amortyzacji podatkowej na finanse przedsiębiorstw, *Rachunkowość Bankowa*, No. 10.
4. Fridson M.F. (1995), *Financial Statement Analysis a Practitioner's Guide*, second edition, New York, Published Wiley&Sons.
5. Gackowska W. (2003), Ekonomiczne znaczenie amortyzacji, *Prawo Przedsiębiorcy* 2003 nr 36.
6. Grabowska M. (2010), Rola amortyzacji w kształtowaniu majątkowej strategii gospodarowania kapitałem zasobowym przedsiębiorstwa, *Folia Oeconomica*, No. 236, (ed.) J. Duraj, Prace z zakresu ekonomiki i zarządzania przedsiębiorstwem, Łódź, Acta Universitatis Lodzianis.
7. Hanisz N.R. (1993), Amortyzacja jako źródło samofinansowania podmiotów gospodarczych, *Zeszyty Naukowe Akademii Ekonomicznej w Katowicach*, No. 129, Katowice.
8. Iwin-Garzyńska J. (2005), *Kapitał amortyzacyjny w zarządzaniu finansami*, Warszawa, PWE.
9. Jaruga A., Turzyński M. (2004), Środki trwałe oraz wartości niematerialnych i prawne w prawie bilansowym i podatkowym, Warszawa, Difin.
10. Jin-Sang, Lee Alemu, Aye Mengistu (2014), Examining the Effects of Currency Depreciation on Trade Balance in Selected Asian, *International Journal of Global Business*, 7(1), June.
11. Kobiela-Pionnier K. (2008), Wpływ metody amortyzacji na wynik finansowy, *Prawo Przedsiębiorcy*, No. 9.
12. Król U. (2011), Wpływ polityki amortyzacyjnej na wyniki finansowe przedsiębiorstw, *Zeszyty Naukowe*, No. 200, Uniwersytet Ekonomiczny w Poznaniu.
13. Łukasik K. (2010), Wpływa polityki rachunkowości w zakresie amortyzacji na sytuację finansową przedsiębiorstwa, *Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, No. 816, Prace z zakresu rachunkowości finansowej, Kraków.
14. Mączyńska E. (2009), Siła tradycja i grzechy rachunkowości, *Rachunkowość*, No. 10.
15. Micherda B., Szulc M. (2007), Prawo bilansowe i podatkowe we współczesnej rachunkowości, *Problemy rachunkowości*, No. 3.
16. Patterson R. (2015), *Compendium of Accounting in English & Polish*, Warszawa.
17. Singh N., Sharma R.D. (2015), Use of Depreciation as a Tax Policy Device to Control Inflation, *Review of Business and Finance Studies*, Vol. 6, No. 1.
18. Śnieżek E., Wiatr M. (2011), *Interpretacja i analiza przepływów pieniężnych, ujęcie sprawozdawcze i menedżerskie*, Warszawa, Oficyna na Wolters Kulwers business.
19. Takats G. (2007), *Infor Rachunkowość Organizacji Non-Profit*, No. 5.
20. Wasilewicz M. (2004), Wybór metody amortyzacji podatkowej środków trwałych, *Ekonomika i Organizacja Przedsiębiorstwa*, No. 1.

Chapter 21

Insurance as a Tool for Limiting Financial Losses Resulting from Environmental Damage

Ryszard Pukała

1. Introduction

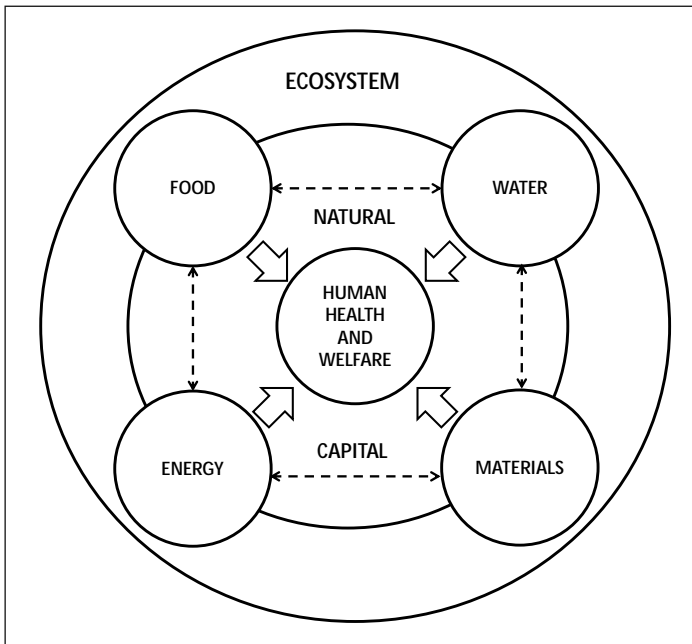
Contemporary global economy undergoes constant changes related to globalization processes, internationalization of production and services, elimination of borders, increasing financial flows and migration of resources. All these factors influence an increased economic activity, which is necessary for a gradual increase in the social welfare and, consequently, for a reduction of ubiquitous inequalities. At the same time, we need to stress that under changing economic conditions the economic growth should be tightly related to ecology. Durability of economic growth, understood as a capability of satisfying growing material and non-material needs and aiming at safeguarding social welfare, is based on available natural resources. Protection of the environment and activities that promote rational management of available resources are becoming a very important factor that should be taken into account by businesses and in the process of consumption. It is particularly significant given the limitedness of environmental goods and values, which results from the exploitation of natural resources and environmental components that are essential for maintaining the quality of life. In this context, the protection of the environment and undertaking measures intended to minimize losses that lead to environmental destruction is an immensely vital aspect. The objective of this study has been defined following this very frame of reference, which focuses on issues related to the protection of the environment and the use of insurances as a tool for minimizing financial losses resulting from environmental damage and for the restoration of the environment to its original state.

2. Environmental safety

Contemporary global economy is characterized by profound structural and market changes. The significance of emerging markets with a simultaneous appearance of new production and exchange centres is growing. New products and services are coming out, which is related to a technological progress and new forms of implementing a production cycle by businesses operating on the market. Liquidity of financial markets is growing, which urges institutions to look for

new forms of competition that take account of potential risks. All these processes are embedded in the environment that has been intensely exploited for the last decades. It is worth recalling a description of this process: a man-made introduction of substances or energies to the environment that are hazardous to human health, live species and ecosystems, destroy non-living structures or the natural beauty and make a justified use of the environment more difficult (Mizera, 2006). Therefore, the environmental protection constitutes a key challenge for the economy, businesses and humans. Activities undertaken in this scope can be related to the broadly understood environmental safety, which can be described as a desired environmental status free of risks that disturb the balance of ecosystems and the biosphere. The safety understood this way includes two levels: in the negative aspect it is limited only to eliminating threats to the environment. In the positive sense though, it is identified with a number of ideas and concepts devoted to preventing the emergence of such threats. The latter aspect, instead of eliminating threats, postulates such a reorientation of previous socio-economic relations that would eventually cease to lead to the outbreaks of environmental crises (Hull, 2008, p. 28). Both levels assign the key role to the human being – a participant to processes taking place in the ecosystems (see Fig. 1 below).

Figure 1. Key resources that support human health and welfare

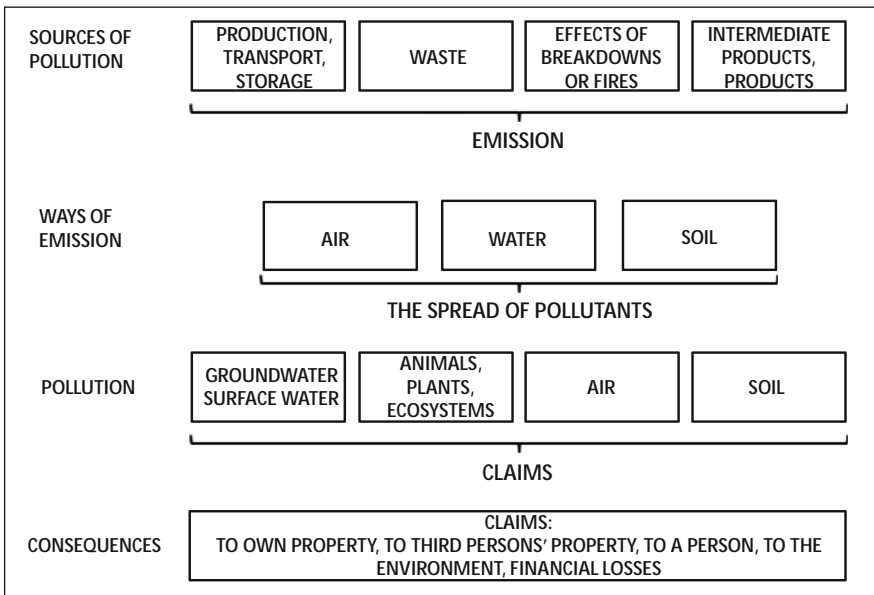


Source: *Stan środowiska w Polsce. Raport 2014*, 2014, p. 21.

All abovementioned factors reflect broadly understood aspects of the safety of human functioning in the natural environment. We need to emphasize that the process of restoring the degraded environment, understood as an economic one, can lead – particularly in short and medium term – to slowing down the welfare growth dynamics. This is due to the need to allocate a part of production resources to protective investments. It does not have to mean either the growth's screech-

ing halt, or the decline in the social welfare, though. In the long run, especially if accompanied by environmentally non-intensive technological progress, the share of these alternative costs of ecological balance in the growth can decrease, also owing to a positive impact on the increased quality of the environment on labour and capital productivity. The share of protective investments in the production can only rise to such a level at which the economic growth that results from residual production investments at least provides a fixed level of material consumption per capita (Pezzey, Toman, 2002). Therefore, sources of pollution and ways of its emission to the environment need to be analysed in this context – see Figure 2.

Figure 2. Sources of pollution and ways of its emission to the environment



Source: Tomaszewska-Pesta, Górny, Sosnowska-Serek, 2012, p. 9.

Multitudinous effects of environmentally destructive factors bring about far-reaching consequences that are reflected in damage to own property of natural persons and business entities, to third persons and to the environment. They also contribute to considerable financial losses suffered by all participants directly and indirectly exposed to the effects of environmental pollution.

We can talk about the pollution through the prism of economic growth as well, if (Dobrzański, 2011):

- the amount of emissions – and in consequence – imissions of specific agents reaches the levels that dangerously influence the human health, climate, live nature, soil and water;
- pollution of particular environmental components caused by emissions of various agents prevents or makes further economic growth highly difficult as a result of a decline in an overall economic efficiency.

Environmental pollution means an existence of an ecological growth barrier when it generates losses in the social welfare to such an extent that its increment triggered by the growth in consumption of goods and services (including material services that constitute a standard in to-

day's reality of economic growth) is lower than a decline in welfare resulting from a lowering quality of the environment.

We need to stress, looking at this angle, that the environmental safety can be recorded on:

- an individual scale: results of the relation between humans and nature;
- a social scale: consequences of relations between the society and its elements (e.g. family, social groups, communities) and the natural environment;
- a national (state) scale: environmental problems related to local and interior pollution and risks;
- an international (regional) scale: effects of the pollution of seas, borderline rivers, transborder flow of polluted air (and other environmental components), migration of animal and plant species, industrial and transport breakdowns;
- a global scale: consequences of global risks to the biosphere (e.g. dilution of the ozone layer, greenhouse effect, climate change, etc.).

As we can see, threats to the environmental safety are a consequence of a dynamic economic growth and, in particular, an increased pace of executed investments that can influence a decline in the quality of natural resources.

3. Environmental risk

The term risk' is ambiguous and hard to define, for it depends on the field of science. For the purposes of this study we can assume that an environmental risk is a probability of an event that degrades the environment and entails certain consequences. A special type of risks occurring in the environment includes natural disasters, floods, hurricanes, earthquakes, technology and product-related disasters and accidents (release of hazardous chemical substances, explosions, traffic accidents) characterized by uniqueness, randomness, multi-causality and diversity of direct effects. They can bring about threats to human life and health, environmental degradation or serious economic losses (Dołęga, Biernat, 2009). Such an open approach allows us to define risks in the area of potential catastrophic and environmental damage, although the difference between these terms is elusive. We need to note that damage caused by natural catastrophic phenomena, such as floods, windstorms or hail generate losses in the amount of hundreds of billion dollars in the global scale every year. One example of the events bringing about greatest consequences can be the hurricane Sandy that affected the eastern coast of the United States in 2012, generating damages worth over 50 billion dollars (an estimate). Throughout the year 2012, ranked as the most tragic from the point of view of the volume of environmental damage, 318 catastrophic events took place, out of which 168 constituted natural disasters and 150 were man-made disasters. 14 thousand persons were affected by these events and the economic losses totalled USD 186 billion. Such events that strongly influenced the environment took place in our country as well. The Millennium Flood of 1997 was one of the greatest ever recorded. According to the data collected by the International Commission for the Protection of the Odra River against Pollution, this event took 54 lives, flooded 47 thousand buildings and 465 thousand hectares of agricultural land. The damage also encompassed technical infrastructure, industrial plants and hospitals as well as culture, science and other centres and institutions. The value of losses generated by the flood was estimated at USD 3.5 billion. In this context the arising question is not so much about our capabilities to counteract environmental damages that are impossible to avoid

in many cases, but about the minimization of financial losses ensuing from an environmental event. One of the most popular methods applied in such cases is the use of insurance – a very effective tool for minimizing financial losses. In the year 2012 we discussed above, a part of costs of environmental events was covered by insurers who paid the total of USD 77 billion of compensation (*Natural Catastrophes*, 2013, p. 1). As we can see, the environmental insurance market is broadly used in the environmental risk management process. However, we need to stress that the development of this market, due to great difficulties in risk estimation, is proceeding very slowly and depends on numerous factors concerning on the one hand the risks themselves, but on the other hand, a demand for insurance products that can be incorporated into the process of environmental risk management. We also need to accentuate the fact that this market depends not so much on the law of the free market, but to a great extent on the activities of the state and international organizations, such as the European Union. The key role in this regard is played by legislative activities that encourage insurers to get involved in activities broadly understood as the environmental protection. It lies within the public entities' interest to create a framework for insurance activity that allows relieving the budget and limiting state aid in this scope (Maśniak, 2014).

4. Risk outsourcing

Outsourcing, viewed from a strategic perspective of business activity, is recognized as one of the most important and beneficial business methodologies. It is confirmed by a common use of this method in business operations. Representatives of nearly all branches of the economy benefit from outsourcing. A multitude of functions outsourced to third parties is also visible, for example, human resources management, information technologies, client service, marketing, accounting, administration and many more. This diversity also refers to relations linking the parties to outsourcing relationships. And so, commissioned work can take a form of informal agreements on the provision of services if necessary as well as formal contracts that precisely set cooperation rules. The following reasons for corporate outsourcing are listed among the most important ones (*Survey of...*, 1998):

- reduction and control of operational costs,
- enhanced focus on a company's basic activity,
- access to top quality production capacity,
- release of own resources for other purposes,
- gaining resources that are not at an organization's disposal,
- acceleration of benefits resulting from the restructuring,
- coping with functions that are difficult to perform or impossible to control,
- gaining capital,
- risk-sharing,
- inflow of cash.

A broad spectrum of possibilities offered by outsourcing is reflected in an optimization of the management process by a business entity. Therefore, we are going to focus on the issues related to risk-sharing, which is an inseparable element of each activity. The obligation to determine a scope of acceptable risk lies within the domain of the managing staff of a business entity. Two types of activities can be undertaken. They concentrate on:

1. Causes of risk and efforts undertaken to limit its scale, particularly consisting in avoiding risk-burdened transactions, diversifying risk or transferring it to other entities – this is the so-called active risk addressing strategy.
2. Effects and efforts undertaken to limit a negative impact on the company status, particularly consisting in increasing the capital, provisions in stock or participating in insurance systems – this is the so-called passive risk addressing strategy.

A choice of activities depends on decisions of the managing staff, while the simultaneous application of both active and passive corporate risk management methods is optimal.

Enterprises that decide on the use of external entities' resources in business operation face the inevitability of duly managing the ensuing relations, including in particular the related risk. It requires the use of instruments that provide the highest possible security of their operations. Among these measures, we can distinguish the ones required by the provisions of the law and the ones that take on a form of good practices applied in trade. However, in each case there is a need for efforts to provide security of activities aimed at limiting the effects of corporate risk materialization, in particular:

- treating an undertaking in strategic terms,
- careful selection of a partner,
- a versatile and precisely formulated outsourcing contract as a basis of proactive relation management,
- a clear specification of responsibilities of the outsourcing institution,
- exercising control over a service provider in the scope of the executed contract.

The abovementioned requirements aim at shaping the relation with the outsourcing entity in such a way that they provide security of business operations and contribute to the increase in the company's value and its significance on the market under volatile economic conditions.

5. Environmental insurances

The term “environmental insurance” – referring to issues related to the environmental protection – has appeared only recently, along with the increasing environmental awareness and care for the environment. Beyond doubt, a comprehensive view of the environmental protection results in the search for solutions that would limit the risk of damage that adversely influences the environment and would use available tools, such as insurance, to minimize financial losses generated by an event covered by an insurer's liability. However, the analyzed field observes substantial problems resulting from considerable differences in understanding risk and damage, their evaluation and capability of limiting or eliminating the effects of undesired events. These problems include the following:

- more often than not, environmental damage neither concerns a property of a perpetrator, nor of any other person, but environmental components treated as a common good;
- it is frequently impossible to restore the environmental status to the one preceding the damage, since alterations are irreversible or restitution is thwarted by technical conditions or costs of an undertaking.

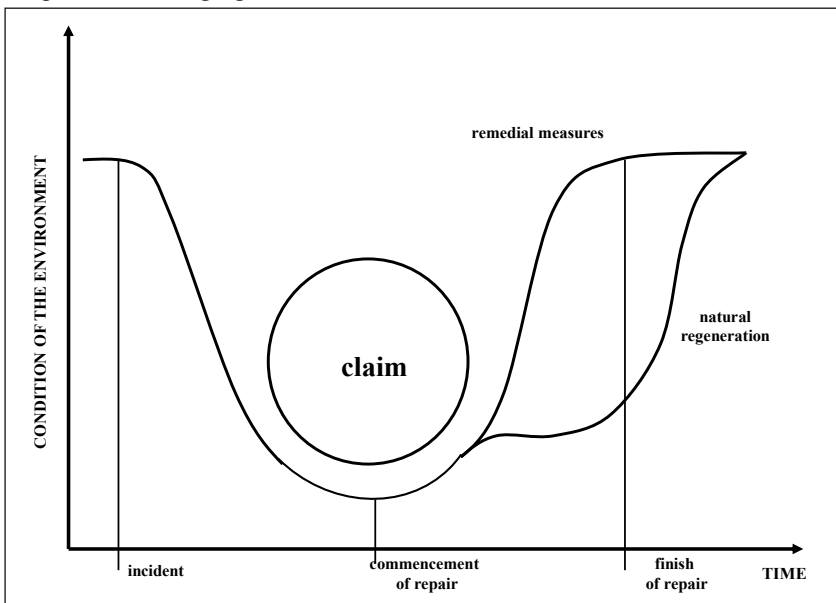
Then public claims come to the surface. The State Treasury or local government units are entitled to formulate them, whereas a payment made by a perpetrator constitutes an administrative compensation. It is hard to talk about insurances here, therefore let me concentrate solely

on issues related to events covered by insurance and the materialization of damage that causes detriment to the natural environment. We need to point out here that a damage to the environment is an adverse, measurable change of status or functions of natural elements, evaluated in comparison to the original status. A definition of environmental damage contains three significant parametres. These are:

- a state of the environment,
- a function of the environment,
- an original state.

All these three aspects can deteriorate as a result of an event that adversely affects the surroundings. Duration of this event is an important factor in this context – Figure 3.

Figure 3. Impact of a damaging factor on the environment



Source: Tomaszewska-Pesta, Górny, Sosnowska-Serek, 2012, p. 17.

We need to note that in recent years more emphasis on more restrictive legal regulations as regards the environmental protection has been placed, particularly on new Community concepts related to the protection of biodiversity and strict requirements concerning remedial measures. In practice, this means the increased level of responsibility for environmental damage also for entities operating under market conditions.

Pursuant to the Act of 13 April 2007 on the Prevention and Remedying of Environmental Damage, an entity liable for an environmental damage is obliged to restore the environment to the original state. Complexity of this process is linked to the need to draw up expert opinions, execute remedial measures and monitor the post-damage environmental state. It is a long-term process that requires, above all, extensive financial outlays, full involvement and expert knowledge. Therefore, it seems optimal to make use of environmental insurances as part of risk outsourcing, which provide comprehensive protection as individualized products. Apart from a full coverage of damage

caused to third persons, they cover the costs of decontamination of own area as well as compensate for operational interruptions resulting from the impossibility to use own facilities. Currently, environmental insurances are offered to all entities regardless of them being international companies or small and medium-sized enterprises. Their flexibility allows them to be adjusted to the needs of various sectors of the economy, so that they covered all aspects of business operation that entail the risk of environmental damage. The scope of benefits for an insured party can be really broad and includes, among others (http://www.aig.pl/_3953_560381.html):

- full legal protection, particularly civil as well as legal and administrative protection in case of environmental risks and damages, in accordance with requirements resulting from, among others, the Act on the Prevention and Remedying of Environmental Damage and taking account of unremitting legal changes;
- coverage of sudden and gradual events – as part of the full coverage of damages resulting from sudden events and slow activities or historical pollution;
- protection not only in the scope of multiannual remedial measures, but also resulting from the need to monitor the post-event state of the environment, throughout the period of execution of remedial measures;
- flexible solutions, in particular a broad scope of protection with the possibility of adjustment to particular types of activity and reflecting the needs of enterprises regardless of their size;
- enhancing the standard and scope of protection, which results from the fact that environmental policies offer a previously unavailable coverage based on standard civil liability insurance policies or property insurance policies;
- protection in the case of no emission as a collateral from an adverse impact of operation on the environment not resulting from an environmental contamination.

In order to efficiently use the insurance protection as part of the environmental policy, it is vital to broadly define the coverage of a policy that includes (http://www.aig.pl/_3953_560381.html):

- costs of decontamination, as part of the full coverage of costs related to decontamination and compensation for material damage, both to own and third party property as well as the coverage of expenses related to measures aimed at avoiding or minimizing the effects of an environmental damage;
- damage to biodiversity, in particular the full coverage of environmental damage in the scope of basic, supplementary and compensatory remedial measures related to the earth, water, natural settlements and protected species;
- interruptions in operation through covering financial losses resulting from the said interruptions;
- third party claims concerning the damage to body or property as part of the coverage of costs related to third party claims concerning the damage to body or property resulting both from sudden and gradual events;
- costs of legal defence including the coverage of costs of defence and legal assistance, taking account of any changes in regulations that take place in the legal environment throughout the period of insurance protection;
- transport risks as part of a comprehensive coverage of effects of an adverse impact of transport on the environment.

It is clear that the environmental protection is an economic and financial tool for environmental protection aimed at improving the state of the environment and influencing the corporate management process and, in consequence, the state's economic growth.

6. Conclusion

An ever faster economic growth in the global and local scale contributes to an ever profounder exploitation, pollution and devastation of the natural environment. That is why the pressure exerted on the broadest possible spectrum of market organizations as regards their environment-friendliness is becoming an important factor under these conditions, and hence the greater pressure on business entities that accentuates the need for the environmental protection through the increased responsibility for environmental damage. In this regard, the process of environmental risk management and the use of insurances as a tool for minimizing financial losses resulting from events that influence the degradation of the environment, is gaining particular importance. Insurance companies to a greater extent satisfy the demands of business entities through extending their insurance offer by new products and improving their quality. We are observing a gradual departure from an extensive use of insurance protection only as a tool for compensating for environmental damage in favour of supporting market expansion of entities participating in ecological development by insurers. In order for organized activities (including insurances) to reach their target, they require a precise risk identification and analysis, taking account of the specificity of threats posed to human beings, their lives, property and environment. Striving to maximize profit forced corporate managers, not only insurers, to reach for a professional, planned and organized prevention to counteract losses resulting from the occurrence of environmental disasters (Przybytniowski, 2011). Therefore, the use of environmental risk management mechanisms should include a broad spectrum of internal and external factors related to business operation under the changing market conditions. The use of an efficient risk management system will allow the determination of an acceptable risk level and will help choose appropriate tools related to the risk of environmental damage. Certainly, these measures will contribute to the improved environmental protection by all ecosystem users and to the improved living standards in a symbiotic relation with the surroundings.

Bibliography

1. Dobrzański P. (2011), *Wzrost zrównoważony a ochrona środowiska. Podstawowe aspekty polityki gospodarczej*, http://www.bibliotekacyfrowa.pl/Content/37110/02_Pawel_Dobrzanski.pdf.
2. Dołęga M., Biernat K. (2009), Procesy zarządzania ryzykiem ekologicznym, *Studia Ecologiae et Bioethicae*, 7(2009)1, <http://seib.uksw.edu.pl/sites/default/files/Marta%20Do%C5%82%C4%99ga,%20Krzysztof%20Biernat,%20Procesy%20zarz%C4%85dzania%20ryzykiem%20ekologicznym.pdf>.
3. Hull Z. (2008), Bezpieczeństwo ekologiczne (hasło) [in:] *Słownik bioetyki, biopolityki i ekofilozofii*, (ed.) M. Cizek, Warszawa, Wyd. PTF.
4. Maśniak D. (2014), Ubezpieczenia jako instrument zarządzania katastrofami spowodowanymi przez człowieka – perspektywa unijna, *PRAWO ASEKURACYJNE*, 3/2014(80).
5. Mizera A. (2006), *Człowiek i środowisko naturalne. Wzajemna symbioza czy destrukcja?* http://www.greenworld.serwus.pl/download/Czlowiek_i_srodowisko_naturalne.pdf.
6. Natural Catastrophes and Man-made Disasters in 2012: A Year of Extreme Weather Events in the US (2013), *SIGMA No. 2/2013*, Swiss Re Ltd, Switzerland.

7. Pezzey J., Toman M. (2002), *The Economics of Sustainability, A Review of Journal Articles, Resources for the Future DP*.
8. Przybytniowski J. (2011), Znaczenie ubezpieczeń ekologicznych, jako instrumentu ekonomiczno-finansowego, *Przegląd prawno-ekonomiczny*, No. 15, Stalowa Wola, Katolicki Uniwersytet Lubelski Jana Pawła II.
9. Pukała R. (2012), Risk and Insurance Management in an Enterprise [in:] *Knowledge – Economy – Society. Dilemmas of the Contemporary Management*, (ed.) A. Malina, R. Oczkowska, T. Rojek, Cracow, Foundation of the Cracow University of Economics.
10. Pukała R. (2012), Ubezpieczenie jako element wsparcia ciągłości działania przedsiębiorstw [in:] *Zarządzanie podmiotami gospodarczymi i instytucjami. Wybrane zagadnienia*, (ed.) R. Pukała, Jarosław, Wydawnictwo Państwowej Wyższej Szkoły Techniczno-Ekonomicznej w Jarosławiu.
11. Stan środowiska w Polsce. Raport 2014, Biblioteka Monitoringu Środowiska, Główny Inspektorat Ochrony Środowiska, Agencja Wydawniczo-Reklamowa MAGIC, Warszawa, 2014, p. 21.
12. Sułkowska W. (2011), Przyczynek do rozważań nad kwestią ubezpieczeń ekologicznych, *Zeszyty naukowe nr II*, Kraków, Polskie Towarzystwo Ekonomiczne, pp. 425-435.
13. *Survey of Current and Potencial Outsourcing End-Users* (1998), The Outsourcing Institute Membership, after: Ch.L. Gay, J. Essinger, *Outsourcing...*, pp. 16-17 and The Joint Forum, *Outsourcing...*, p. 6.
14. Tomaszewska-Pesta M., Górny M., Sosnowska-Serek A. (2012), *Ekoszkody. Krótki przewodnik po ryzyku*, Sopot, Ergo Hestia.
15. http://www.aig.pl/_3953_560381.html.

Chapter 22

Mechanism of Professional Sport Clubs Risk Management Based on Insurance Practice

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1. Introduction

National sport is currently in transition to market relations. Growing trend of commercialization and professionalization, on the one hand, as well as the budget deficit – on the other, evidences that sport should independently derive profits from its available resources and learn to use the existing market mechanisms to attract capital. This step will make professional sport independent on the factors and risks associated with budget financing schemes common in Russia. In search of new sources of financing of their activities, in the near future our sports clubs may draw attention to capabilities of the stock market to mobilize temporarily free funds, which will cause the appearance of the tool with specific investment characteristics in the Russian market. This is a consequence of the features of sports activity, because professional sport is a highly risky business. However, we should understand that Russian clubs will be able to draw attention of professional investors only after they learn to properly manage the risks inherent in their activity.

So along with the general risks, which include all possible probability events related to business activities (natural risks, credit risks, information risks, social risks, property risks, civil liability risks, political risks, etc.), specific risks are inherent in sports activity that are proposed to be divided into three groups (see Tab. 1).

Financial results of a professional club is directly or indirectly affected by track record of the team, but the outcome of a separate game or tournament depends on many factors subject to limited control by the club management. In addition, the risk does not exist by itself, often causing a chain reaction that can ultimately lead to the club bankruptcy as a whole.

The aim of the paper is to analyze the main specific risks faced by the subjects of professional sports and to propose methods to minimize losses based on insurance practice.

2. The risk associated with changes in physical and psychological state of a player

Since most sports are contact and require the sportsman work at maximum level of his capabilities. Clubs may lose players because of serious injury, death or disciplinary penalties, including those related to doping. It is obvious that such event entails various types of losses: starting with the fact that the costs of the player simply do not pay off and ending with the fact that his retirement from the team affects the team game, level and morale. The situation is more complicated if retired player is the captain of the team, its formal or informal leader both at the playground and beyond. In addition to sporting complications, this may lead to a sharp decline in the market value of the sportsman and impact on a substantial reduction in the club assets. With ever-rising cost of acquiring high-class players, replacing the retired sportsmen and women can lead to high costs.

Table 1. Specific risks of professional sports

	Risk factor	Consequences	Risk mitigation events
1	2	3	4
Risks associated with the personality of the player, coach, referee	Changes in the physical and psychological state of the player	<ul style="list-style-type: none"> • Decline in the market value of the sportsman • Decline in the results of the team 	<ul style="list-style-type: none"> • Increased penalties for serious violations of rules • Insurance of the players • Hiring a sports doctor for the team • Acquisition of the sportsmen and women capable of playing at several positions in the field • Development of a protective equipment • Rotation of the starting team composition • Payment of compensations to the clubs by the sports federations in case the players are injured in the game for the national team • Improving the quality of covering at sports venues • Transfer of the sportsmen and women under lease conditions • Payment of the part of transfer cost the player in the form of bonuses for successful performance in the season
	Lack of the player's skill		
	Coaching staff unprofessional performance, adverse affect of the human qualities	Unsuccessful performance of the team in the season	<ul style="list-style-type: none"> • Setting out in the contract of the possibility of early termination of the contract with the coach without paying forfeit • Conducting preliminary negotiations with potential candidates for the coach • Training of coaching staff
	Possible referee mistakes of intentional and unintentional nature	Failure to reach sports performance	<ul style="list-style-type: none"> • Introduction of video replays and electronic goal detection systems in referee practices • Increased penalties for preconceived refereeing

Cost risks	Loss of popularity of sporting events	Decrease in income from all sources	<ul style="list-style-type: none"> • Increasing the entertainment of sporting events • Providing discounts, incentives, special stimulation programs
	Steep demands of the agents under the contract	Financial instability/bankruptcy of the sports club	<ul style="list-style-type: none"> • Introduction of restricting measures (salary cap, luxury tax, rules of financial “fair play”) • Establishing the club children’s school • Concluding long-term contracts
	Change/loss of reputation	<ul style="list-style-type: none"> • Loss of income from sponsorship and advertising contracts • Loss of income from sales of the rights to broadcast games 	<ul style="list-style-type: none"> • Unity of entertainment and accompanying activities • Imposition of penalties on sportsmen and women for conduct detrimental to the club brand • Formation non-insurance pool • Developing of broadcast channel in DTH system by the league
Regulatory risks	Changes in terms of use of home stadium	Decline in attendance, the lack of fan support at the games	Construction of developed club infrastructure
	Changes in legislation and rules governing the activity	<ul style="list-style-type: none"> • Imposition of penalties • Elimination from the tournament 	Implementation of measures to provide the clubs with opportunities to reorganize their activities

Source: own work.

Equally, important type of risk in professional sports is a low level of the player skill. Investments in the purchase of a sportsman can just bring no return if it turns out that he does not have the skill level estimated by the management. A situation is particularly difficult with young sportsmen and women; evaluation of their level of skill is possible only on videos taken by agents working in the market of young football players.

Another important risk factor is adaptation of the player to a new club, team, coaching staff. This is due to the fact that the representatives of different countries and many different styles of play are joined in one team, there is a certain atmosphere within the team, there are its own leaders. There is a risk that expensive football player will not be able to adapt to a new team, a new style of play for himself and different mentality of the country. In such circumstances, he will not be able to reveal his full potential.

Large clubs spend tens of millions Euros for the purchase of new players, which amounts up to 20% of their annual income. These risks no longer exist in any type of business. Even in venture capital funds, such a large proportion of the total investment portfolio does not fall to a single project, as have football clubs for the purchase of sportsmen and women.

The next type of specific risk in professional sports is unprofessional performance of coaching staff, adverse effect of human qualities. A specialist who trains and leads the team throughout the season, must be a professional not only de jure but also de facto in the eyes of his players, he must be able to contact with different people, must be able to demonstrate stiffness at the right moment, and come to terms in some issues. Most coaching failures happen not because of incorrectly chosen tactical scheme or incorrectly defined team line-up, but due to the fact that the coach had not conducted enough psychological work with the players, did not create an atmosphere of unity and team spirit.

3. The risk associated with possible referee mistakes

Modern dynamics of a sporting event, a significant amount of technical and tactical actions of players, constantly changing situation, active movement of the persons involved (including the referee and his assistants) often lead to a difficult situations, the decision on which the referee may not make or it is difficult to make for him, and sometimes performs and erroneous action. A serious referee mistake may significantly affect the outcome of the game and the whole tournament.

4. The risk associated with a decline in popularity of sporting events

A large part of the club income is directly or indirectly connected with the popularity of sport in general and the team in particular. Decline in popularity due to a lack of interest in national and European competitions, as well as competition with other sports is also able to have a negative impact on the club incomes.

In recent years, a trend has become noticeable in Europe of sharp division of sports teams in almost every sport for the rich and the poor. Millionaire teams provide the best conditions for their sportsmen and women conclude multimillion-dollar contracts with them, buy the most talented young players. Thus, there virtually is not sports intrigue in many championships because of the obvious leader and undoubted outsiders, and the outcome of a single game or even the championship as a whole can be predicted with high probability. Thus, commercial success of each team is largely dependent on the success of the other teams in the league. Interrelation of commercial success of the clubs that make up the league, and the importance of team balance are the fundamental features that distinguish professional sport from common business.

5. Risks associated with steep demands of the agents under the contract

Together with increased commercialization and professionalization of sports, as well as with increased incomes of the clubs, wages of the sportsmen and women increase as well. Thus, over the past 30 years, the average salary of the Premier League footballer increased approximately 154 times (from £220 to £33,868 per week), which is absent in any other sector of the economy. Currently, labor costs are on the average 64% of the total expenditure of European football clubs.

It should also be noted that since the beginning of the 90s, the amount of transfers of sportsmen and women in the world market of sports industry grew exponentially. If at the beginning of the XX century, the compensation for the sportsman transfer from one club to another amounted to just a few hundred US dollars, now its amount is estimated in millions. This has particularly affected the European and South American football. The biggest football clubs are willing to spend huge amounts of money for the purchase of the “stars” and payment of their salaries. Partly it is justified by the fact that these players alone can determine the outcome of a single episode, and the game as a whole. However, these actions lead to inevitable race of wages and transfer fees of the sportsmen and women, which has a significant negative impact on the organization profitability.

6. The risk of loss of income from sponsorship and advertising contracts

Europe’s leading football clubs receive more than 20 million Euros per year from sponsorship and advertising. The contracts are signed for a certain period, and there is the risk that due to a number of reasons, they may be revised, early terminated or not renewed after their expiration. In many contracts, most part of income depends on sporting achievements of the club, which naturally cannot be accurately predicted. For the last year, there have been some cases where the media coverage of personal life of sports stars has led to unforeseen reputational risks. In Australia, incidents involving the players of different teams due to their inappropriate behavior have damaged the brand of the club and the whole sport that led to the decision of the sponsors to terminate or refuse to renew sponsorship contracts.

Legislation can be a risk factor in interrelations between sponsors and clubs. The main sponsors of many Formula-1 teams before the 2006 season were the largest tobacco companies. In 2006, the Law “On prohibition of tobacco advertising in the European Union” came into force. Most teams had to abandon reliable business partners.

7. The risk of loss of income from the sale of rights to television and radio broadcasting of games

Due to possible changes in economic, competitive, political environment, as well as the overall strategy of media activities along with interest of the audience, and sports results (the team fails to play in international competitions or loses at the early stages of the tournament according to the cup system) and many other factors, the income from this source can be reduced.

The downturn in the advertising industry has accelerated the beginning transition to wider use of subscriber pay-TV. The growing number of broadcasts on pay television promotes competition and increase in the cost of the rights to broadcast sporting events, as the increase in profits of the broadcasters working under subscription agreements allows them to acquire more new rights to broadcast sporting events, and thus gain competitive advantages over traditional free broadcast networks. Today in France, 97% of sports programs are broadcasted on paid channels and only 3% – on free channels. In recent years, a huge impact on the market was caused by the development of new data transmission technologies, in particular – the spread of fixed and

wireless broadband access. These channels have opened the way for new formats including formation of an additional stream of income from the sale of rights to broadcast via the Internet and mobile phones, and combining them into a single package. In some countries, successful practice of acquiring the rights to broadcast major sporting events by pay-TV operators has initiated bitter disputes about whether the Olympic Games or the FIFA World Cup games are the events of national importance, which must be shown on free television.

In the UK, at the end of 2009, as part of the program of analysis of the state of affairs in the national sports industry initiated by the government, there was a proposal to assign free TV the rights to broadcast a number of sporting events, in particular some of rugby, cricket and football games. In case of implementation of this initiative, Sky TV channel directly affecting the market of rights to broadcast sports events in the UK will be deprived of the exclusive rights to cover a number of events. This will lead to a change in the competitive environment and will cause delay in the growth or even lead to a decline in some sectors of sports market.

8. Risks associated with the terms of use of home stadium

Competitions with the team are visited by a large number of viewers throughout the season. As a result, the club is at risk of various incidents at the stadium: racism, bullying, or an act of terrorism. Allowing such incidents can have a serious impact on financial and economic activities of the club: decline in attendance of the games, disciplinary actions to the club in the form of games without audience or games at a neutral field, as well as penalties and other sanctions, including technical defeat to the team. Hooliganism and racism manifestations may also damage the club image, which will affect the main sources of income. An additional risk for the clubs is the fact that only 19% of European clubs directly own their stadium, the rest use the arena for home games under leasing or rental terms from the state or private organizations.

9. Risks associated with changes in legislation and regulations governing the activities of clubs

In 2010, the new “UEFA Regulations on Club Licensing” were developed which appeared in connection with the introduction of the rules of financial “fair play” in May 2010, intended to limit the growth in staff costs of the club. These rules govern the rights, duties and responsibilities of the organizations involved in UEFA tournaments. Each year, the clubs passing to these tournaments according to sports performance, have no possibility to participate in them because they had received the denial in a license. Having missed the opportunity to participate in the tournaments, the clubs lose huge income sources. Such changes in regulations also require the clubs to spend additional costs to make their activities correspond to the new standards.

Probability of the consequences described in the wordings of the risks inherent to the activities of sports clubs, as well as a potential threat, which is a measure of severity of the negative effects, the level of losses or evaluation of potential opportunities associated with the risk can vary significantly depending on the country, sport and the club status (small, medium, large).

It is determined that not all specified risks are insurance risks.

Insurance risk has inherent common characteristics of risk category and specific elements due to the mechanism of insurance protection. Fundamental criterion will be a clear definition of insurance risk in the insurance contract for sports risks.

As of today, risks of personal and material nature shall be subject to insurance, namely:

1. As part of personal insurance, the object of insurance is the property interests associated with life and health of the sportsman (death, temporary and permanent disability due to an accident or injury, illness).
2. As part of property insurance, the object is the property interests associated with possession, use and disposal of personal property and real estate (damage or loss), the risk of revenue shortfalls, occurrence of unforeseen expenses, and associated with causing harm to life and health, and the property of third parties.

The most demanded types of insurance are insurance against accidents and diseases as well as the use of compulsory health insurance for trips in Russia or foreign travel insurance, if it is requested to receive a visa when entering another country. Let us consider arrangement of insurance against accidents and diseases in details (see Tab. 2).

Insurance is conducted according to one of the following options: insurance coverage during trainings and competitions or 24-hour insurance coverage, including trainings and competitions. As the table shows, the insured event is an injury, disability or death in an accident.

Insurance sum according to the choice of insured person varies from 30,000.00 1,500,000.00 rubles.

Insurance rate is from 0.2 to 8% depending on the chosen insurance sum and depends on the sport, insurance period, as well as the number of insured persons.

Table 2. Products of insurance companies for sportsmen and women

Name of insurance company	Name of the program	Insurance event	Insurance sum	Insurance rate
Priority Insurance*	“Sportsman”	Injury, disability or death in an accident	From 150,000.00 to 1,500,000.00 rub.	From 1.1 to 8%
Ingosstrakh**	“Sports”	Injury, disability or death in an accident	To 1,000,000.00 rub.	From 0.5 to 1.5%
MAKS***	“Ready!”	Injury, disability or death in an accident	30,000.00 –50,000.00 rub.	From 0.2 to 3.8%

Notes: *Priority Insurance Agency, <http://priorityins.ru/>, **Ingosstrakh Insurance Agency <http://www.ingos.ru/ru/>, ***MAKС Insurance Agency, <http://www.makc.ru/>.

Source: own work.

Currently, the need for this insurance is confirmed by insufficient methodological provision of insurance organizations with a comprehensive program of sports risk insurance that meet the needs of potential policyholders, the lack of objective evaluation methods of the insurance value of sports activity items.

Thus, the classification of risks inherent to commercial sports was proposed, which includes two types of them: general (financial risk, the risk of default of the counterparty, etc.) and specific risks. The latter can be divided into three groups: risks associated with the personality of the player, coach, referee, cost and regulatory risks. Specific risks determine the sports efficiency of the club activity and as a consequence the amount of its income and efficiency of investment in professional sports.

An important area to manage the risk (losses) is implementation of the strategy based on diversified business model by professional clubs, when there is a combination of entertainment (sports) events and associated goods and services within the area of commercial sports. Due to this, the clubs generate more stable income, which is associated with the activity that is less prone to risks inherent to the sport practice. Increase in the efficiency occurs as a result of integration of separate parts into a single system and takes place due to doing business under the brand of a popular sports club.

10. Conclusion

Professional sports in our country is gradually commercialized. Perhaps in the near future sports clubs becoming full-fledged market economy actors turn their attention to the mechanisms of raising capital, which suggests the stock market. However, for the successful placement in the primary capital market data of the issuer should be able to identify and assess the risks inherent in their activities, and to manage them correctly. In this paper authors have analyzed the main specific risks faced by the subjects of professional sports, as well as the proposed methods to minimize losses.

Bibliography

1. Fuller C., Drawer S. (2004), The Application of Risk Management in Sport, *Sports Medicine*, 34(6).
2. Hoyer R., Smith A.C., Nicholson M., Stewart B. (2015), *Sport Management: Principles and Applications*, Routledge.
3. Li H. (2015), Discussion on Insurances Selection of Professional Sports Clubs, *Sports Engineering and Computer Science*, 1.
4. Spengler J.O., Connaughton D., Pittman A.T. (2006), *Risk Management in Sport and Recreation*, Human Kinetics.

PART III

INTELLECTUAL CAPITAL IN THE CREATION OF WEALTH RESULTING FROM KNOWLEDGE



Chapter 23

Recent Developments in Human Capital Theory from the Perspective of Knowledge-based Economy¹

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1. Introduction

Contemporary economics, especially macroeconomics pays attention on human capital (HC) as the production factor of production function in creation of added value. This position of HC is still arising. The paper presents new advances in human capital theory. The analysis starts from the retrospective perspective then the author presents position of neoclassical theory of economic growth and the theory of endogenous economic growth including human capital in this consideration. While the models of endogenous accumulation of knowledge well explains the reasons for the increase for a single, abstract economy there is little talk in terms of leveling the economic, beyond the obvious conclusion that would increase the growth rate of capital and knowledge in the countries lagging behind. The questions arise: Why this postulated the increasing growth of underdeveloped countries encounter difficulties in practice? Why diffusion of high-tech capital and expertise proceeds with difficulty in poor countries? The paper explains these research problems paying attention on the specific meaning of national intellectual capital supporting human capital in the process of GDP (wealth) accumulation.

2. Contemporary human capital theory – retrospective approach

Traditional approach within the history of economic thought treated the HC as the labor, beside the capital and land inputs. This approach was lasting quite long when the productive force of others factors became not sufficient to create new added value in contemporary economies especially driven by knowledge and technological progress.

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As Ehrlich and Murphy (2007) noticed human capital theory has evolved into one of the most universally accepted concepts in economics and other social sciences especially as a driving force in the “new information economy”. Much of the original work that led to the “human capital revolution” of the late 1950s and early 1960s followed an earlier revolution in economic thought spawned by the neoclassical growth Solow model (Solow, 1956) attempted to provide a systematic and quantitative assessment of the sources of economic growth in market economies. While the neoclassical model focused on the contribution of conventional measures of labor and physical capital as the basic reproducible inputs early implementations of the model (Solow, 1957; Denison, 1962) recognized the existence of a large unexplained residual (Solow residual) which was generally ascribed to the unaccounted role of technology.

The quality of labor input as measured by education, skill and entrepreneurship was one obvious missing link in this experiment and this may have set the stage for turning attention to investment in human beings. Also, while the neoclassical model accounted for the “functional” distribution of income, it did not address the sources of wage disparity and the personal distribution of income. Indeed, the pioneering work of Schultz (Schultz, 1959, 1961) on the role of knowledge and ability in accounting for productivity growth and Mincer (Mincer, 1958) on investment in human capital as a determinant of personal earnings can be seen as attempts to fill the gap.

A major contribution to contemporary human capital theory was Becker paper (Becker, 1962) which set the concept on solid theoretical principles using concepts from capital theory. The paper was followed by Mincer’s discussion of on-the-job training (Mincer, 1958, 1974); Weisbrod and Mushkin’s (1963) separate analyses of education and health, respectively as inputs into the formation of HC; Sjaastad’s analysis of human migration as another channel of human capital formation (Sjaastad, 1962); and Denison’s account of education and information as quality components that contribute directly to increases in aggregate earnings and economic growth (Denison, 1962). It is this tour de force that also alluded to the definition of “human capital” as an intangible asset, best thought of as a stock of embodied and disembodied knowledge, comprising education, information, health, entrepreneurship, and productive and innovative skills, that is formed through investments in schooling, job training, and health, as well as through research and development projects and informal knowledge transfers.

The concept of HC thus established was not immediately accepted. Critics inside economics questioned its importance and relevance compared to physical capital. Some scholars, inside and outside economics, were hostile to the term human capital on the grounds that it likened humans to slaves or machines. Becker (1993) offered comprehensive analytical foundations for understanding investments in human capital.

Understanding of the personal distribution of schooling attainments and earnings was bolstered by the parallel development of Jacob Mincer’s “human-capital-earnings-function” (Mincer, 1974). This literature had a profound impact on the measurement of private and social rates of return to schooling and training. It also offered important insights concerning a variety of observed labor market outcomes including wage differentials, occupational choice, “general” and “specific” training, bonding between employers and employees, optimal wage contracts, and the sources of inequality in the distribution of labor income. The overarching importance of human capital as demonstrated in these works made human capital theory relevant for a variety of different areas in economics.

In 1974 Schultz organized and edited the symposium “Marriage, Family Human Capital, and Fertility” which focused largely on the family as the primary avenue through which human

capital – captured mainly as education – is generated. The symposium included as a major theme Becker's theory of marriage, with derivative themes concerning family investments in children, (Leibowitz, 1974) the effects of child care programs on women's work effort (Heckman, 1974) the benefits of women's education within marriage (Benham, 1974), the impact of family investments in HC on the earnings of women (Mincer, Polachek, 1974) and the relation between households and the economy through trends in population and economic growth (Nerlove, 1974). The contribution of the family to HC and to the economy in general was later examined comprehensively in Becker's "Treatise on the Family" (Becker, 1981).

Other developments from the late 1960s through the 1970s and 1980s greatly expanded former issues. One line of expansion concerned equilibrium models of investment in HC that recognize the simultaneity between lifetime earnings patterns and optimal investments in schooling and job training. Becker and Chiswick's (1966) and Mincer's (1974) methodology of estimating rates of return to education treated schooling and postschooling investments as statistically exogenous. Extensions to this approach, such as Ben-Porath (1967), Heckman (1974), Rosen (1976) and Willis and Rosen (1979), explicitly treated investment decisions over the life cycle or across different schooling levels as the result of optimizing behavior, either independently or jointly with consumption and labor supply decisions. Numerous empirical extensions also sought to isolate the effect of investment in HC from latent variables such as ability and family background.

The earlier literature on health as HC was bolstered by the work of Grossman (1972) treating HC and health investment over the life cycle as parallel concepts. Another important strand of the literature focused on the market for HC as a mechanism for understanding changes in income inequality and wage differentials. Katz and Murphy (1992) and Murphy and Welch (1992, 1993) sought to explain shifts in wage disparity by education and across race and gender as a result of changes in the supply and demand for human capital. Their work indicates that changes in the demand for HC and the resulting supply responses account for the higher estimated rates of return to education and the significant increases in wage inequality.

The next turning point in the evolution of HC theory is Lucas paper (1988) on the mechanics of economic growth. He ascribed persistent, long-term growth in per capita income and consumption to continuous investments in HC. The model thus replaced the neoclassical model's reliance on exogenous shifts in "technology" with endogenous optimal investment in HC. In particular, Becker, Murphy, and Tamura's contributions identified dynamic changes in fertility along with HC accumulation as key factors that characterize the development process. These human capital-based endogenous growth models induced interest in derivative themes. Ehrlich and Lui (1991) examined the role of longevity as well as fertility in inducing HC formation, demographic transition, and growth. Recent applications include studies of capital mobility, trade and growth, economies in transition, innovation, and hierarchical knowledge structures.

Previous themes in HC theory have also been experiencing transformations and expansions in recent years. One of the most dramatic changes in human societies occurring over the last 150 years of persistent growth and development has been the continuous increase in age-specific life expectancies at all age levels. Ehrlich and Chuma (1990) reformulated Grossman's model (1972) by viewing longevity as a choice variable reflecting the demand for the "quantity" of life as a distinct choice variable.

The economics of mortality avoidance, and especially the value of life saving, originally addressed in the work of Thaler and Rosen (1976) and Rosen (1988), have received renewed attention in recent years with a wide range of work analyzing the role of human and nonhuman capital

as determinants of the demand for life protection and the value of life saving, as well as the contribution of longevity and health to growth in individual welfare.

Presented illustrations of numerous new and old channels of inquiry in the literature on HC attest to the increased importance of HC in the “new information economy”, especially knowledge economy which has gathered momentum with the advance of new information and communication technologies and the globalization of commerce and industry. The main intellectual impact of this approach has been in the way it has affected the thinking of economists and other social scientists about a variety of diverse economic and social phenomena. Human capital theory (HCT) has provided a unified way to tie together observed empirical evidence on wage disparities by schooling and training, gender, race, and occupation at a point in time and over the life cycle. It has given us new insights into current trends in family formation, fertility and life expectancy, and the impact of these trends on innovation and economic activity.

As Ehrlich and Murphy noticed (2007) HCT also provides a unified approach for understanding growth in emerging markets and advanced economies, as well as the impact and development of institutional and organizational structures, labor and marriage contracts, participation in illegitimate activities, and the effectiveness of government policies intended to enhance education and welfare. Perhaps, above all, it provides insights into the process of knowledge formation and knowledge transfer in school, on the job, and through immigration, foreign direct investment, and research and development efforts.

3. Contemporary economic growth theory requirements related to human capital (HC)

The question posed by contemporary economics consider the main relationship linking the HC as one of inputs besides the capital and the land with economic activity to create economic added value.

At the beginning the human factor was limited to the workers labor. Then when technological progress was included to the production function the economists started to model economic growth distinguishing between physical work and human capital.

Cognitive utility models in this category due to their ability in explaining the geographical dispersion of prosperity. While the models of endogenous accumulation of knowledge well explain the reasons for the increase for a single, abstract economy there is little talk in terms of leveling the economic, beyond the obvious conclusion that would increase the growth rate of capital and knowledge in the countries lagging behind. The questions arise: Why this postulated the increasing growth of underdeveloped countries encounter difficulties in practice? Why diffusion of high-tech capital and expertise proceeds with difficulty in poor countries? Is it merely the result of developed countries to protect against the effects of external harm to the company when the developed countries want to run out to the end the rent from the operation of outdated technology?

However if we accept the premise that in most cases knowledge is not absolutely disengageable which means that the technology leaders are willing to license their ideas on respective, real conditions of underdeveloped countries then appropriate theoretical knowledge becomes available. It is enough that workers and poor country managers familiarize themselves with the relevant literature, implement appropriate computer programs, and the government of this country will abide respect for property rights (protection against piracy, illegal imitators, etc.). While fulfilling the last

condition is relatively simple (adoption of relevant laws, etc.) it arises in the case of other fundamental problem of a lack of ability to use advanced technology due to insufficient human capital.

This category of models make a fundamental conceptual distinction between abstract knowledge and HC. HC includes the abilities, skills and knowledge of individual employees. It can be considered as economic good assigning it the qualities of competitiveness and undividedness. Recognition of HC implies uplift estimates of income paid to all types of capital. As a result HC occurs in the system of national accounts in the quantitative and monetary form. The accumulation of HC increases product possible to generate in the future as is in the case for physical capital in Solow model. This important characteristic makes ensuring an adequate level HC in the countries lagging behind economically can be a contribution to above-average economic growth, ensuring convergence with developed countries. Another issue is the problem if developed countries will slow down the dynamics of expenditures on HC development.

Therefore a nation's wealth cannot be measured only in economic terms, as it is necessary to consider other factors such as the real abilities of citizens, the chance of attaining sustainable development and a country's technological potential. In this sense, two contributions have attempted to disclose the non-measurable elements of economic growth. In a neoclassical framework, the Solow residual (Solow, 1956) considers that long-term growth depends exogenously on technological progress and population growth, whereas another strand of literature has focused entirely on investment in R&D, human capital, knowledge spillovers, and their impact on growth. As a result, a debate has arisen regarding endogenous and exogenous growth, with different interpretations insofar as how to reach the stationary state. Paul M. Romer (1986) and Robert E. Lucas (1988) determine that capital investment and the accumulation of knowledge or human capital are a source of endogenous growth, both indicating that growth diverges. However, in response, Abramovitz and Baumol, among others, defend unconditional convergence using these studies as a basis, thus renovating the exogenous growth theory (Abramovitz, 1986; Baumol, 1986).

The theory of endogenous economic growth assumes the management of intellectual capital turning out to be a diverging factor for economic development. That is, the richer countries are more efficient in the management of their intangibles, earning from them a multiplier effect that avoids the convergence to a stationary space (Yeh-Yun Lin, Edvinsson, 2010) and (López Ruiz et al., 2011).

The importance of intellectual capital or some of its components (e.g. human capital) in economic development was confirmed by some important works. Capello and Nijkamp (2009) used human and knowledge capitals; Filipović, Devjak, and Putnik (2012) analyzed human talent as factor of sustainable wealth. Then Simões estimated a positive relationship between higher education level and growth to OECD countries (Simões, 2011) and research group of Philip Cooke et al. used mainly knowledge (Cooke, Laurentis, Tödting, Trippel, 2007). Then research of Acs, de Groot, and Nijkamp applied innovation (Acs, de Groot, Nijkamp, 2002).

Currently many studies that compare the economic development of different countries have either considered GDP to measure economic development or made comparisons, taking into account factors such as HC, industry and foreign trade (Jayachandran, 2002), while other papers talk about the creation of a Eurasian supercontinent therefore requiring a better understanding of development factors in both continents or institutions (Linn, Tiomkin, 2006). However, there are approaches which have begun to use and to quantify the intellectual capital of each country so as to facilitate analysis, improve policy development and anticipate future crises (Lin, Edvinsson, 2010).

4. Economic growth in knowledge – based economy from human and intellectual capital perspective

The next question consider if only GDP should be the main economic welfare measure or should we looking for the others indicators especially those relating to the well-being. Then what are the connections between the accumulation of human capital and intellectual capital and well-being in such kind of economy.

The theoretical model (Navarro, Ruiz, Pena, 2014) used to measure national intellectual capital (NIC) is based on models of firms on intellectual capital management and competitiveness analysis, under the theoretical and conceptual view of national intangible capital as an “invisible value”.

Let’s consider the following equation in order to define the wealth (W) in per capita terms (pc) of a nation (n) in period (t) as economic production (GDP) plus (NIC):

$$W_{pcnt} = GDP_{pcnt} + NIC_{pcnt} \quad (1)$$

Following this method, two large groups of capital are identified as intangible within national intellectual capital (NIC): human capital (HC) and structural or non-human capital (SC). Structural capital, due to its nature, will undergo the most changes in the case of nations.

$$NIC_{pcnt} = HC_{pcnt} + SC_{pcnt} \quad (2)$$

HC encompasses knowledge, skills, and personal development toward achieving objectives (that is, qualifications – QHC). It also includes cultural values, national labour market conditions, and resource inflows from workers abroad (that is, the labour market MHC).

$$HC_{pcnt} = QHC_{pcnt} + MHC_{pcnt} \quad (3)$$

On the other hand, structural capital covers several intangibles related to the socio-economic framework of a country, namely, the non-human structure that enables a country to generate future benefits. It includes: business structure, bureaucracy, image, international market share, technology, innovation, and sustainability.

The structural capital has been divided into:

1. *Process capital (PC)*, which focuses generally on a country’s private sector structure. More specifically, it measures information and management systems, bureaucracy and also organizational structures. In this case, the information available makes difficult its estimation².
2. *Relation or trade capital (RC)*, which captures the quality of the balance of trade with positive information about high technologies exports and negative information about development aids.

² It’s used capitalisation or market value of resident firms as absolute terms and as variables to build efficiency indicator: time of start a business and ICT conditions (mobile and Internet use).

3. *Marketing or image capital (MC)*, which contemplates a country's domestic as well as foreign image and international relations. In this case, we use a relevant complex index built by the World Economic Forum about "tourism and travel possibilities" as variable for efficiency indicator.
4. *Research, development and innovation capital (RDC)*, which explicitly measures innovation, research and development possibilities through investment and how efficiently existing resources are exploited with the information available for the countries considered that it has been reduced to mobile and land connections as well as Internet users.
5. *Social and environmental capital (SEC)*, which is determined by the social commitment of the social welfare state in relation to the quality of life of its inhabitants, together with action related to the environment and sustainable development.

Finally, the international model of wealth, in per capita terms (pc), proposed for (n) countries, in period (t), is according to the following equation:

$$W_{pcnt} = GDP_{pcnt} + \left[(QHC_{pcnt} + MHC_{pcnt}) + (PC_{pcnt} + RC_{pcnt} + MC_{pcnt} + RDC_{pcnt} + SEC_{pcnt}) \right] \quad (4)$$

This equation allows us to determine the value of wealth using GDP and other important elements for wealth not considered in the GDP. All of these elements are calculated in per capita terms and constant monetary unit in order to be able to compare different countries and times.

5. Conclusion

In the economics HC was always one of main production factor besides the capital and the land. At the beginning the human factor was limited to the workers labor. Then when technological progress was included to the production function the economists started to model economic growth distinguishing between physical work and human capital. The quality of the labor input, as measured by education, skills and entrepreneurship, was one obvious missing link and this may have set the stage for turning attention to investment in human beings including: job training, education and health, then human migration as another channel of human capital formation. This tour de force also alluded to the definition of "human capital" as an intangible asset, best thought of as a stock of embodied and disembodied knowledge, comprising education, information, health, entrepreneurship, and productive and innovative skills, that is formed through investments in schooling, job training, and health, as well as through research and development projects and informal knowledge transfers.

The concept of HC thus established was not immediately accepted. Critics inside economics questioned its importance and relevance compared to physical capital, partly because of definitional and measurement problems. Some scholars, inside and outside economics, were hostile to the term human capital on the grounds that it likened humans to slaves or machines.

Human capital theory provides a unified approach for understanding growth in emerging markets and advanced economies, as well as the impact and development of institutional and organizational structures, labor and marriage contracts, participation in illegitimate activities, and the effectiveness of government policies intended to enhance education and welfare. Perhaps, above all, it provides insights into the process of knowledge formation and knowledge transfer

in school, on the job, and through immigration, foreign direct investment, and research and development efforts.

The questions arisen at the beginning of this analysis were: Why the postulated the increasing growth of underdeveloped countries encounter difficulties in practice? Why diffusion of high-tech capital and expertise proceeds with difficulty in poor countries?

The paper explained these research problems paying attention on the specific meaning of national intellectual capital (NCI) supporting HC in the process of GDP (wealth) accumulation. Intellectual capital includes both human capital and structural capital. The structural capital has been divided into: process capital, relation or trade capital, marketing or image capital, research, development and innovation capital and social and environmental capital. It allows us to determine the value of wealth using GDP and other important elements for wealth not considered in the GDP in knowledge economy.

Bibliography

1. Abramovitz M. (1986), Catching Up, Forging Ahead and Falling Behind, *Journal of Economic History*, 46(2).
2. Acs Zoltan J., de Groot Henri L.F., Nijkamp P. (2002), *The Emergence of the Knowledge Economy: A Regional Perspective*, Berlin, Springer Verlag.
3. Baumol W.J. (1986), Productivity Growth, Convergence and Welfare: What the LongRun Data Show, *American Economic Review*, 76(5).
4. Becker G.S. (1962), Investment in Human Capital: A Theoretical Analysis, *Journal of Political Economy*. (Supplement), 70.
5. Becker G., Chiswick Barry R. (1966), Education and the Distribution of Earnings, *American Economic Review*, 56(May).
6. Becker G. (1981), *A Treatise on the Family*, Cambridge, MA, Harvard Univ. Press.
7. Becker G. (1993), *Human Capital*, 3rd ed. Chicago, Univ. Chicago Press.
8. Benham L. (1974), Benefits of Women's Education within Marriage, *Journal of Political Economy*, 82, 2.
9. Ben-Porath Y. (1967), The Production of Human Capital and the Life-Cycle of Earnings, *Journal of Political Economics*, 75(August).
10. Capello R., Nijkamp P. (2009), *Handbook of Regional Growth and Development Theories*, Cornwall, Edward Elgar.
11. Clark J.M. (1923), Overhead Costs in the Modern Industry, *Journal of Political Economics*, 31(October).
12. Cooke P., De Laurentis C., Tödting F., Trippel M. (2007), *Regional Knowledge Economies*, Cornwall, Edward Elgar.
13. Denison E.F. (1962), *The Sources of Economic Growth in the United States*, Washington, DC, Comm. Econ. Development.
14. Ehrlich I., Chuma H. (1990), A Model of the Demand for Longevity and the Value of Life Extension, *Journal of Political Economics*, 98(August).
15. Ehrlich I., Lui Fr.T. (1991), Intergenerational Trade, Longevity and Economic Growth, *Journal of Political Economics*, 99(October).

16. Ehrlich I., Murphy K.M. (2007), Why Does Human Capital Need a Journal?, *Journal of Human Capital*, Vol. 1(January).
17. Filipović J., Srečko D., Goran P. (2012), Knowledge Based Economy: The Role of Expert Diaspora, *Panoeconomicus*, 59(3).
18. Grossman M. (1972), On the Concept of Health Capital and the Demand for Health, *Journal of Political Economics*, 80(March).
19. Heckman J.J. (1974), Life Cycle Consumption and Labor Supply: An Explanation of the Relationship between Income and Consumption over the Life Cycle, *American Economic Review*, 64(March).
20. Heckman J.J. (1974), Effects of Child-Care Programs on Women's Work Effort, *Journal of Political Economy*, 2.
21. Jayachandran U. (2002), Socio-Economic Determinants of School Attendance in India, Centre for Development Economics, *Delhi School of Economics Working Paper*, 103.
22. Katz L.F., Murphy K.M. (1992), Changes in Relative Wages, 1963-1987: Supply and Demand Factors, *Quarterly Journal of Economics*, 107(February).
23. Leibowitz A. (1974), Home Investments in Children, *Journal of Political Economy*, Vol. 82, No. 2.
24. Linn J.F., Tiomkin D. (2006), The New Impetus towards Economic Integration between Europe and Asia, *Asia Europe Journal*, 4(1).
25. Lucas R.E. Jr. (1988), On the Mechanics of Economic Development, *Journal Monetary Economics*, 22(July).
26. Mincer J. (1958), Investment in Human Capital and Personal Income Distribution, *Journal of Political Economics*, 66(August).
27. Mincer J. (1974), *Schooling, Experience, and Earnings*, New York, Columbia Univ. Press.
28. Mincer J., Polachek S. (1974), Family Investments in Human Capital: Earnings of Women, *Journal of Political Economy*, Vol. 82, No. 2.
29. Murphy K.M., Welch F. (1992), The Structure of Wages, *Quarterly Journal of Economics*, 107(February).
30. Murphy K.M., Welch F. (1993), Inequality and Relative Wages, *American Economic Review*, 83(May).
31. Mushkin S.J., Weisbrod B.A. (1963), Investment In Health-Lifetime Health Expenditures On The 1960 Work Force, *Kyklos*, Vol. 16, Iss. 4.
32. Navarro A., Ruiz L.V., Pena N. (2014), Economic Growth and Intangible Capitals: Europe versus Asia, *Panoeconomicus*, Vol. 61, No. 3.
33. Nerlove M. (1974), Household and Economy: Toward a New Theory of Population and Economic Growth, *Journal of Political Economy*, Vol. 82, No. 2.
34. Romer P.M. (1986), Increasing Returns and Long-Run Growth, *Journal of Political Economy*, 94(5).
35. Rosen S. (1976), A Theory of Life Earnings, *Journal of Political Economy*, 84(August).
36. Rosen S. (1988), The Value of Changes in Life Expectancy, *Journal Risk and Uncertainty*, 1(September).
37. Schultz Th.W. (1959), Investment in Man: An Economist's View, *Social Service Review*, 33(June).
38. Schultz Th.W. (1961), Investment in Human Capital, *American Economic Review*, 51(March).

39. Simões M.C.N. (2011), Education Composition and Growth: A Pooled Mean Group Analysis of OECD Countries, *Panoeconomicus*, 58(4).
40. Sjaastad L.A. (1962), The Costs and Returns of Human Migration, *Journal of Political Economy*, 5.
41. Solow R.M. (1956), A Contribution to the Theory of Economic Growth, *Quarterly Journal of Economic Growth*, 70(February).
42. Solow R.M. (1957), A Technical Change and the Aggregate Production Function, *Review of Economics and Statistics*, 39(August).
43. Thaler R., Rosen Sh. (1976), The Value of Life Savings [in:] *Household Production and Consumption*, (ed.) N. Terleckyj, New York, Columbia Univ. Press.
44. Willis R.J., Rosen S. (1979), Education and Self-selection, *Journal of Political Economics*, 87, No. 5, pt. 2(October).
45. Yeh-Yun Lin C., Edvinsson L. (2010), *National Intellectual Capital: A Comparison of 40 Countries*, New York, Springer.

Chapter 24

The Management of Intellectual Capital in the Russian Industrial Networks

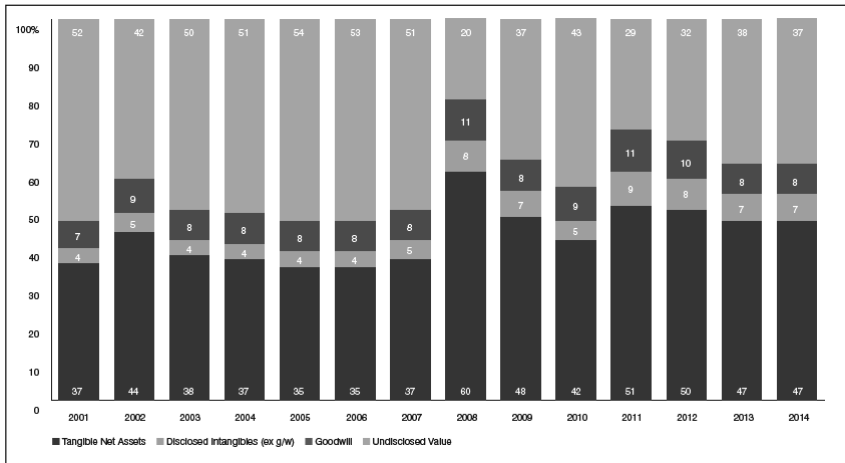
Ekaterina Kudrina

1. Introduction

Intellectual capital is a relatively recent area of research that has attracted the interest along with the development of a global knowledge economy. Knowledge, intangible assets in the knowledge economy are gradually becoming a new factor of production along with the classical factors – labour, land and physical capital. Intellectual capital (IC) becomes the main key driver of innovation and competitive advantage by participating in the creation of company value.

The term “intellectual capital” was first used in the publication of John Kenneth Galbraith in 1969, but its further development he received in the 80-90-ies of the 20th century, helped by the “digital evolution” (Frolov, Shelestova, p. 172), the growth of non-material sphere of production and services, the increasing complexity and the increasing knowledge-intensity of production, the gap between book and market value of the company, and the consequent inability of the balance sheet adequately reflect the value of intangible assets. Dynamics of changes shows that 1982, tangible assets accounted for 62% of the market value of the company on average. Recent research conducted by Brand Finance with CIMA (The Chartered Institute of Management Accountants) on the basis of a survey of more than 58,000 companies whose shares are quoted in 120 countries and stock exchanges, tell us about the decline in the share of tangible assets to 47% in 2014 (Fig. 1).

Figure 1. Global Enterprise Value Breakdown (%)



Source: Global Intangible Finance Tracker (GIFT™) 2015, p. 7.

2. The concept of intellectual capital

In 1991 Tom Stewart, in the article, *Fortune* wrote: “All companies increasingly depend on knowledge – patents, processes, management skills, information about customers and suppliers, and old-fashioned experience (...). All these names together and make up intellectual capital” (Roos, 2007, p. 38). Following this, various authors have proposed taxonomies of intellectual capital, while not denying the importance of intellectual capital (IC). And still there is considerable disagreement regarding the definition of the concept of intellectual capital, there is no unambiguous definition of “IC” is clearly documented in legal documents recognized by all researchers of this issue. Intellectual capital “can be qualified as ‘assets’ (i.e. brand, trademark, contracts, knowledge base) or ‘skills’ (i.e. know-how of employees, organizational culture)” (Marr, Schiuma, Neely, 2003, p. 554) or “the value of the aggregate of its existing intellectual assets, including intellectual property, its natural and acquired intellectual abilities and skills staff, as well as the accumulated knowledge base and useful relations with other entities” (Leont’ev, 2002, p. 101) or “is a system of capitalized intellectual knowledge, creative use of which enables the production of new intellectual goods and the receipt of income” (Salikhov, 2008, p. 58).

As you can see, all the above definitions in varying degrees, in the structure have the concept of knowledge, i.e. knowledge is the basis for intellectual capital. “The concept of intellectual capital as capitalized knowledge allows you to proceed to an economic assessment of knowledge possessed by the organization” (Gaponenko, Orlova, 2008, p. 3). IC is a new kind of equity as a potential source of income from the increment of knowledge at the expense of the mental and cognitive abilities in combination with specific factors as communication with customers, business processes, databases, brands and IT systems.

Intellectual capital includes much more than patents, copyrights and other forms of intellectual property. This is the sum and synergy of knowledge, experience, relationships, processes, discoveries, innovations, company presence in the market and its relationships, the totality of intangible assets or “dematerialize”.

Intellectual capital consists of 3 components: human capital, structural (organizational) capital, and customer capital. Human capital is the motivation, competence, skills, abilities, creativity, and capacity for innovation, experience and expertise, individual personal characteristics, knowledge, efficiency of employees which are used for profit organization or individual. Organizational capital (structural) includes the culture (corporate law), specialized software, information systems/networking, intellectual property (brands, copyrights, intellectual resources, patents, research projects, trademarks), administrative processes, management processes, the process of operation and organizational structure (management philosophy, strategy, mission/vision). Relational capital is a system of sustainable linkages and relationships with clients and customers (contracts and agreements, customer loyalty, reputation, brand, trademarks, distribution channels, product portfolio). Consumer capital provides consumers, customers the possibility of productive, satisfying their needs of communication and interaction with the staff of the organization.

The components of intellectual capital is not a new thing in the life of the enterprise, innovation is the grouping of resources having an intellectual nature, for the purpose of mobilizing them as a factor of economic development and identification of this factor. The increment of intellectual capital occurs at the intersection of 3 main elements – human, relational and organizational capital. In other words, the different components of intellectual capital should be in the harmonious development and strengthening one of its components does not give the full development of the entire IC. This means that the increment of intellectual capital occurs at the intersection of all its components, produces a synergistic effect. Since the intellectual resources are the integral part of the company uses resources in modern conditions creation benefits resource (which gives a strategic advantage) in a large part based on the advantage intellectual resources. Therefore, the most important now it is becoming a strategic asset intangible assets. Due to the fact that in modern conditions the competitive advantages of the organization depends not only on its market position, but also on how difficult it is to play competitors based on knowledge assets and whether the organization is capable of producing new forms of competitive advantage with intelligent device resources of the organization to the changing external condition.

3. Industrial networks and cluster

Industrial networks and cluster basically constitute a network. The easiest and most productive is a representation of the network as a model ARA, where A-Activities-actions, R-Resources-Resources, A-Actors-organizations or people in the network (Haakansson, 1990, p. 372). “The economy is understood as a way to regulate the network of interdependence participants in a single technological process (characterized by coordinating their activities through market mechanisms), based on a cooperative ‘game’, and the special relationship” (Asaul, Skumatov, Loktev, 2004, p. 106). The network has a number of characteristics:

1. The presence of at least three of the counterparty.
2. Approval of the functions of partners, without their union.
3. The presence of a common goal, attitudes, understanding.
4. Independence and the beginning of the voluntary association of partners.
5. Multi-integration and interdependence of partners.
6. The duration of the relationship and the presence of relational contract with indefinite lives.
7. No de jure transfer of property rights.

Cluster is a system of interrelated technological and territorial community of businesses, organizations, infrastructure, financial institutions, research, promotional and investment firms, provides optimal functioning of all structural elements based on innovative products and technologies (Rogova, Tkachenko, Proskura, 2009). The cluster as a sustainable partnership of related enterprises and organizations has the potential to exceed the simple sum of the individual components of the potentials. This increment occurs as a result of co-operation and effective use of the capacity of partners, it is possible to speak of a certain synergistic effect of clusters, when companies win by sharing positive experiences and reduce costs by using the same services and suppliers. The cluster or network is the most promising kind of business organization in modern conditions due to the presence of high innovation potential, permanent transfer of knowledge, information and resource flows, reducing costs and duplication of a number of functions, expand market reach and create new markets, maximize customer satisfaction, distribution of risk the process of production and management with a total flexibility, adaptability and agility.

“The job of management”, explains Stewart, “used to be to plan, organise, execute and measure – POEM”. In the networked organisation, the manager’s job is best described in organic terms – indeed, in terms of the fundamental material of life. The manager’s job is DNA: Define, Nurture, Allocate. Defining who the organisation is and what it is doing; Nurturing the human, structural and customer capital which makes up the organisation; and, Allocating resources, work and measuring the results. It would appear that in the “webbed” or “wired” world the flat, networked organisation will ultimately be the successful one. UNI and its affiliates have seen much evidence in support of this theory. Big corporations are breaking up, creating smaller business units which are either quasi-independent or independent companies, outsourcing of various services is on the increase, internal hierarchies are being dismantled and there is an increase in the number of Small and Medium-sized Enterprises (SMEs) (Material of UNI World Conference for Professional and Managerial Staff Singapore, 2000, p. 21).

An important difference between the intellectual capital in the network by the intellectual capital of the company is its dimension (to be many times more than that of the company) – at the expense synergies and exponentially, but more severe stage of its formation due to the difference of the member firms in the network. “One of the most significant problems of intellectual capital development management is to build a model of interaction between the separate elements of the industrial complex that contributes to the transformation of the intellectual capital into the result of the industrial companies’ activities” (Tkachenko, Bodrunov, 2013, p. 441).

4. The activity analysis and development St. Petersburg innovation territorial cluster of radio electronics, engineering, communications, and information and telecommunication

According to the Center for Cluster development in St. Petersburg, a geographical location of the city there are about 21 different cluster profiles-automotive, plastics, transportation equipment, medical, IT, shipbuilding, etc. In urban analysis of the potential clustering of the relevant industries on the St. Petersburg innovation territorial cluster of radio electronics, engineering, communications, and information and telecommunication in the top three priority for potential clustering and market attractiveness. Businesses and organizations in the cluster contribute significantly to the overall results of economic development of the country. For example, electronic

complex is 11.0% of the total Russian volume, and production in the IT industry of St. Petersburg is about 60% of the total for the North-Western region of Russia.

The cluster is organized in 2008 on the basis of enterprises and organizations of St. Petersburg Association of enterprises of radio electronics, engineering, communications, and information and telecommunication Companies and RUSSOFT.

The cluster includes 85 organizations, among them: leading production company GK “Ros-tehnologii”; higher and secondary educational institutions; research institutes; marketing and sales organizations; design organizations, engineering and service companies; experimental design Bureau, etc. The structure of the cluster represented 32% of small businesses, 52% of medium enterprises and 16% of large enterprises. The strategic focus of cluster development for the period until 2020 are presented in Table 1.

Table 1. Potential indicators of the development of radio electronics Cluster in St. Petersburg

Indicators	2011	2016	2020
Production, billion rubles.	16.76	44.5	98.0
The market share of the world market, %	Less than 1%	1.1	3
The share of innovative products, %	35.0	55.0	70.0
The growth of small organizations.	16	30	65
Expenditure on R&D, billion rubles	4.15	7.1	12.0
Output per employee, RUB mln.	0.758	1.5	3.0
The total number of jobs with wages that exceed 100% of the average level in the region, thousand persons	5.5	9.0	15.0

Source: data management innovation territorial cluster “Development of information technologies, electronics, engineering, communications, and information and telecommunication St. Petersburg”.

Held in 2014 the leadership cluster survey (excluding the 14 institutions of higher and secondary education) gives a fairly complete picture of what is happening in the industrial network processes. Because of the dispersed nature of the questionnaires, the systematization of the information obtained will not always be 100. Consider and analyze the figures on the cluster, obtained by the author, some of the indicators shown in Tables 2-12.

Table 2. The degree of cooperation

The coefficient of co-operation enterprise	The members of the cluster	The St. Petersburg organization – no members of the cluster	Russian organizations from other regions	Foreign organization
The estimated proportion of the cost of products obtained from other companies in order of cooperatives, in total value of production, companies (%)	7.16%	35.4%	33%	0.3%

Source: own source based on the data management cluster.

Table 3. Origin technical and technological developments used in the production

	Own technical and technological developments	The development of third-party developers, including:			
		The members of the cluster	The St. Petersburg organization – no members of the cluster	Russian organizations from other regions	Foreign organization
The estimated proportion of the total volume used, %	93%	4%	1%	1%	1%

Source: own source based on the data management cluster.

Table 4. The origin of the equipment used in the enterprise

	Own equipment	Third party equipment, including:			
		The members of the cluster	The St. Petersburg organization – no members of the cluster	Russian organizations from other regions	Foreign organization
The estimated proportion of the total cost of equipment (%), incl.:	32%	0%	9%	23%	57%

Source: own source based on the data management cluster.

Table 5. The presence of development in enterprises

	Yes	No
If Yes, specify infractions according to the degree of readiness:		
readiness 10%	11%	
readiness 50%	35%	
readiness 90%	19%	

Source: own source based on the data management cluster.

Table 6. The sales structure

	In St. Petersburg	In the northwestern Federal district (except St. Petersburg)	In other regions of the Russian Federation	Europe and the United States
The estimated proportion, % of total	53%	2%	43%	2%
Including the members of the cluster	41%	-	-	-

Source: own source based on the data management cluster.

Table 7. The structure of customers

	Government customers	Customers			
		The members of the cluster	The St. Petersburg organization – no members of the cluster	Russian organizations from other regions	Foreign organization
The estimated proportion of total orders %	44%	18%	17%	35%	2%

Source: own source based on the data management cluster.

Table 8. The degree of security personnel and to the satisfaction of staff by category

Categories	% probability	The level of satisfaction of existing staff (1 to 10)
executives	97	8.6
middle managers	87	7.6
engineering and technical personnel	91	7.9
other specialists	85	7.54
employees	81	6.9
working	76	6.5

Source: own source based on the data management cluster.

Table 9. Education

	Own the company	In St. Petersburg	In other regions of the Russian Federation	Abroad
The average share in the total number of trainees of employees, %	68%	34%	3%	1%

Source: own source based on the data management cluster.

Table 10. The degree of automation of business processes

Automation	Yes	No
financial accounting	87%	13%
document flow	56%	44%
production planning	59%	41%
control of technological processes (ACSTP)	34%	66%
the management of production processes (MES)	34%	66%
resource management (ERP)	53%	47%
strategic management (OLAP)	15%	85%
in total	48%	52%

Source: own source based on the data management cluster.

Table 11. The orientation of the long-term development of the cluster

	Organizational issues	Innovation, initiative workers	Good relations with the authorities	Market orientation, customer
The estimated proportion, % of total	22%	41%	16%	21%

Source: own source based on the data management cluster.

Table 12. Priority projects of the cluster in the future

	Infrastructure projects (science Park, R&D center, KB, CCU, technology transfer Center, etc.)	Cooperative projects	Innovative projects	Joint sales and distribution (delivery of integrated solutions, General trading house cluster, etc.)	Joint procurement (savings at the expense of wholesale)
The estimated proportion, % of total	37%	26%	27%	9%	1%

Source: own source based on the data management cluster.

In analyzing the data provided top-managers of the cluster and adding a personal interview results, the following conclusions:

In general, a cluster rather developed some elements of intellectual capital: human through its own system of training and staff development (5 and 5 colleges retraining centers, the target reception) and fairly high satisfaction with staff, Organizational capital (structural) due to

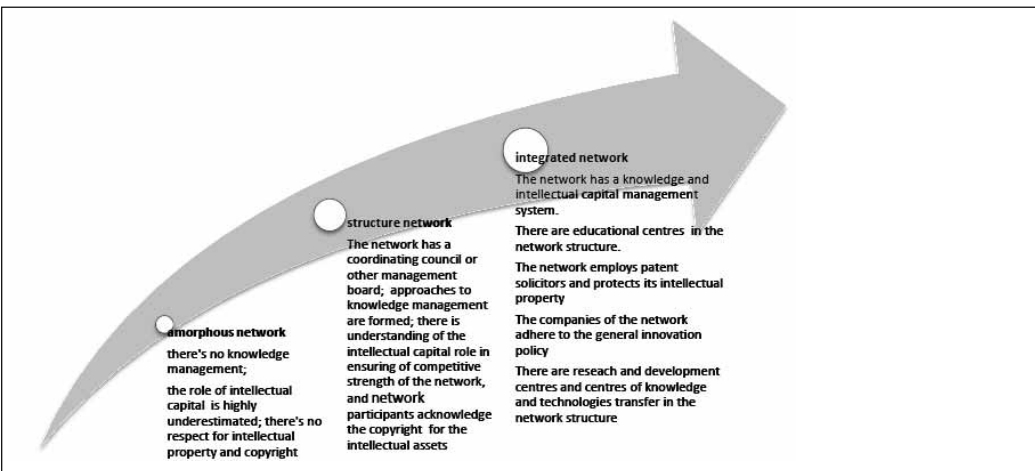
the presence of a high percentage automation equipment and research projects/developments Relational Capital by having a trusting relationship between the participants and the rich geography of customers.

Despite the fact that there is a cluster board and general meetings are held, as it is not available a common strategic and operational management, there is no general picture of the entire cluster as a whole.

There is a common purpose and direction for the future development of the cluster – Create innovative products, the development of qualified personnel, the establishment of centers for collaboration and knowledge sharing, expansion of market share.

According to the presented below (Fig. 2) model of the evolution of the models of the knowledge management within networks, the cluster is in the position “Structure Network” and to go to a higher level he needed a model or system of intellectual capital, which would allow to reach the planned and the above plans and directions of development.

Figure 2. The development process of the knowledge management system in networks



Source: Rogova, Tkachenko, Bodrunov, 2014, p. 6.

5. Recommendations for the management of intellectual capital for St. Petersburg innovation territorial cluster of radio electronics, engineering, communications, and information and telecommunication

Intellectual capital management (Intellectual Capital Management-ICM) expresses a chain of successive actions – “identification of intellectual capital, the development of policy in relation to intellectual capital, intellectual capital audit, documented design IR and entering it into a knowledge base protection of intellectual capital” (Brooking, 2001, p. 195). He stressed that the process is continuous and for its development it is also necessary to apply Knowledge Management (Knowledge Management-KM) as the basis for the future of intellectual capital.

Authors Marr, Gray and Neely (2003) (Fragouli, 2010, p. 6) see the purpose of control and management of intellectual capital as follows:

- help organizations formulate their strategy;
- assess strategy execution;
- assist in diversification and expansion decisions;
- use these as a basis for compensation; and finally;
- communicate measures to external stakeholders.

There are more than 60 methods of evaluation of intellectual capital, their determination can take place on different grounds (for valued object – holistic and atomistic, the intensity of use of the monetary unit – monetary and non-monetary, etc.), But the most common classifications is the technique developed K.-E. Sveiby which, in accordance with the general principles of assessment identified 4 groups – Market capitalization, Return on assets, Direct intellectual capital, Scorecard. “The principal intellectual capital models include: the Balance Scorecard (Kaplan, Norton, 1992), the Skandia Value Scheme (Edvinson, Malone, 1997), the Intangible Asset Monitor (Sveiby, 1997), the Intellectual Capital Index (Roos, Roos, 1997), the digital IC-landscape (Edvinson et al., 2000), and the Holistic Value Approach (Pike, Roos, 2000)” (Papula, Volná, 2014, p. 137).

B. Marr, O. Gupta, S. Pike, G. Roos (2003, p. 772) emphasized that the most visualize and meet the needs of enterprises to manage intellectual capital were 2 ways – Strategy maps (Strategic Maps) by R. Kaplan, D. Norton and developed on the basis of a balanced scorecard and Navigator (Skandia Navigator).

On the basis of interviews with the management representative cluster, it was concluded that the Navigator (Skandia Navigator), less convenient tool for managing the intellectual view of the complexity of mathematical calculations. Therefore, the most appropriate is the balanced scorecard and strategy map. Strategy Map visualization is a process for transmitting and validation of, the correct “history” of the company’s strategy so that the stakeholders of the company would be able to follow, understand and assist in the implementation of this strategy. Strategic map by Kaplan and Norton was the logical element 5 pyramid smart governance, after the mission, values, vision, strategy. It is understood as a way of translating strategy at the visual, more intuitive level for executives, the reason for which the company became a previously developed and successfully implemented in hundreds of companies Balanced Scorecard (Balanced Scorecard – BSC). BSC acts as a translation strategy to operational and tactical level by using key performance indicators (KPI), their performance and plan of action.

Using this method for intellectual capital management as well as strategic planning has some pros and cons: The benefits of this method can be called usability, the ability to see the big picture goals and the opportunity to bring their staff functions and tasks. This method will be adopted for different company’s issues.

6. Conclusion

Davenport et al. (2003) predict intellectual capital to be the new wealth of organizations. However, for intellectual capital to live up to the new wealth predictions executives must first recognize a benefit in and then secondly identify methods for identifying, measuring, managing, and rewarding their organization’s intellectual capital (Carrell, 2010, p. 23). Nowadays many

corporations around the world have found that measuring and managing intellectual capital can provide them with a competitive advantages. In industrial networks and clusters, management of intellectual capital is even more important due to the increased flow of information than in normal organizations. Main reason that the network exceeds the firm is in a wide variety of knowledge within the network firms than the firm itself, and, in addition, aid cooperation (transfer of knowledge) among the participants and knowledge flows across borders have multiple benefits networks, especially the production of knowledge through cooperation. The analysis indicates the need for St. Petersburg innovation territorial cluster of radio electronics, engineering, communications, and information and telecommunication of intellectual capital management in order to achieve the main objectives in the development of cluster. Indicated method development, evaluation, and management of intellectual capital will continue to be tested and put on this cluster.

Bibliography

1. Asaul A.N., Skumatov E.G., Loktev G.E. (2004), *Methodological Aspects of Formation and Development of Entrepreneurial Networks*, St. Petersburg, Humanistica.
2. Brooking E. (2001), *Intellectual Capital: The Key to Success in the New Millennium*, St. Petersburg [etc.], Peter.
3. Carrell J. (2010), *An Epistemology of Intellectual Capital and its Transition to a Practical Application. Strategic Intellectual Capital Management in Multinational Organizations: Sustainability and Successful Implications*, IGI Global.
4. Fragouli E. (2010), *Intellectual Capital and Organizational Advantage: An Economic Approach to Its Valuation and Measurement*, Paper presented at 9th Annual Meeting of the EEFS International Conference, Athens, Greece, <http://www.eefs.eu/conf/athens/papers/626.pdf>.
5. Frolov D.P., Shelestova D.A. (2013), Knowledge Economy: Conceptualization of the Theory, Institutionalization Practices, *Journal of Economic Theory*, No. 4.
6. Gaponenko A.L., Orlova T.M. (2008), *Knowledge Management. How to Turn Knowledge into Capital*, M., Eksmo.
7. Haakansson H. (1990), Technological Collaboration in Industrial Networks, *Engineering Management Journal*, Vol. 8, No. 3.
8. *Intellectual Capital People First in the Information Age Economy* (2000), UNI World Conference for Professional and Managerial Staff Singapore, August, <http://www.ine.otoe.gr/UplDocs/diethneis%20sxeseis/2000/3.pdf>.
9. Leont'ev B.B. (2002), *Price Intelligence: Intelligent the Capital Grew. Business: Assessment. Guidelines. Modeling. Protection of Rights*, Moscow, Shareholder.
10. Marr B., Gupta O., Pike S., Roos G. (2003), Intellectual Capital and Knowledge Management Effectiveness, *Management Decision*, 41(8).
11. Marr B., Schiuma G., Neely A. (2003), Intellectual Capital: Defining Key Performance Indicators for Organizational Knowledge Asset, *Business Process Management Journal*, Vol. 10, No. 4.
12. Papula J., Volna J. (2014), *The Level of Intellectual Capital Management in Slovak Companies*, Proceedings of the 6th European Conference on Intellectual Capital, Reading, Academic Conferences and Publishing International Limited.

13. Rogova E.M., Tkachenko E.A., Proskura D. (2009), *Formation of Regional Cluster Policy in St. Petersburg: The Theoretical Basis and Practical Approaches. Problems of Development of Innovative and Creative Economy*, Mon. Scientific Articles on the Results of the International Scientific Conference, St. Petersburg, 19-20 May 2009, ed. by prof N. Gorelova, Professor O.N. Melnikov, M., Publishing house of the "Creative economy", <http://old.creativeconomy.ru/articles/21112/>.
14. Rogova E., Tkachenko E., Bodrunov S. (2014), The Evolution of the Models of the Knowledge Management within Networks (Cases of the Industrial and Construction Networks in St Petersburg) [in:] *Proceedings of the 11th International Conference on Intellectual Capital, Knowledge Management and Organisational Learning ICICKM 2014*, Reading, Academic Conferences and Publishing International Limited.
15. Roos G. (2007), *Intellectual Capital: Management Practices* [per. s angl.: M.P. Akkaya under the scientific. edited by V.K. Germanova], St. Petersburg, Ed. House of St. Petersburg University.
16. Salikhov B.W. (2008), *Intellectual Capital of the Organization: The Nature, Structure and Management Framework*, M., Publishing and Trading Corporation "Dashkov and Co".
17. Tkachenko E., Bodrunov S. (2013), The Management of the Intellectual Capital in the Russian Industrial Networks [in:] *Proceedings of the 10th International Conference on Intellectual Capital, Knowledge Management and Organisational Learning Vol. 2*, Reading, Academic Conferences and Publishing International Limited.
18. Turova E.J. (2010), Intellectual Capital as the Basis for Creating Sustainable Competitive Advantage of the Firm, *The Problems of the Modern Economy*, No. 2(34).

Chapter 25

Development and Evaluation of the Investments in the Corporate Intellectual Capital Development in the Conditions of Cyclic Dynamics

Elena Tkachenko, Elena Rogova, Albina Rasskazova, Ekaterina Kudrina

1. Introduction

Intellectual capital represents a special type of capital. Specifics of the intellectual capital consist in high sensitivity of each its element to external and internal dynamics. Our research is devoted to studying of functioning of the intellectual capital within a paradigm of the nonlinear development. Traditionally time in the social and economic systems is considered as a linear function. We used the assumption of nonlinearity of time in the development of the social and economic systems. The phases or cyclic model of time is reliable only within one cycle of development. If we consider the long-term period, we observe change of the speed of passing of phases. Thus, duration of a cycle of development social and economic systems reflect the speed of dynamics of basic elements of system, including intellectual capital. The intellectual capital, thanks to its nature, not only itself changes in development, but also has direct impact on the speed of development of system. This is the fundamental difference of the intellectual capital from other resources of development. It is obvious that each company develops according to the own speed. The company will be successful only if the speed of its development is equal or surpasses the speed of the development of the branch. How it is possible to provide the advancing development of the intellectual capital in the objective operating conditions of the company? Any development has to be measurable. It is a key factor of success.

2. The theoretical base of the intellectual capital performance measurement research

The modern technological mode and the modern economy show the decisive role of knowledge and intellectual capital for competitive advantages and the income of a company in comparison with traditional factors of manufacturing. “Ability to learn faster, than competitors, is, undoubtedly, unique steady competitive advantage” (Melichovskiy, 2014, p. 53) replaced Post-

er's ideas about the main role of structure of functioning area and firm's position in it. There are several reasons for that: increase in information streams and speed of data transmission, growth of intangible sphere of manufacturing and services, complication and increase of research intensity of manufacture, reduction of life cycle of products and speed of an entrance to the market, etc.

Both the break between the balance value and the market value of the company and inability of the accounting-based balance to reflect the cost of intangible assets well enough (up to 80% of cost of the company), and as a result absence of the high-quality information for the management caused the development of the term "the intellectual capital" as a step toward a greater volatility and a transparency of intangible assets. In 1975 17% of the parameter S&P500 related to the intellectual capital, now this figure is already equal to 80%. Despite the fact that the intellectual capital was mentioned for the first time in 1969, a real attention to this term appeared only in 1990, after a string of publications by K.E. Sveiby, P. Sullivan, T. Stewart and other researchers, whose various formulations of "the intellectual capital" represent the modern variety of commenting for this term.

It should be noted that any division of the intellectual capital into elements is conditionally enough, because they are not isolated in reality, but exist in common, generating the synergy effect. The structure of the intellectual capital usually varies from two-componential model (L. Edvinsson, 1999) to four-componential model (E. Brooking, 2001). The monograph by M. Manzari, M. Kazemi, S. Nazemi, A. Pooya (2012) is the most generalizing research regarding the components of the intellectual capital and the factors of their estimation.

If transformations of the intellectual capital are considered as stages of an innovative cycle, we come to conclusion, that the most important element is knowledge based on the data and the information. The compulsory condition for successful transformation of data – information – knowledge is presence of the developed and professionally prepared human capital. The human capital represents knowledge and skills of employees, their creative abilities, the initiative and loyalty, which can help transformation of knowledge into the capital. Only 20% of knowledge are obvious (formalized), i.e. possible for documenting and the further transfer and use, and the others of 80% (8) remain in minds of employees in the form of personal experience and reflect their views, moral values, opinions and represent latent or not formalized knowledge. Of 20% not all the knowledge is valuable for the organization and turns into intellectual resources (set of various forms of the objectified knowledge, having commercial value (Lukicheva, 2007, p. 95) of the organization, some part remains an intellectual capacity of the organization along with the latent and not formalized knowledge in minds of employees. The latent knowledge is turned into the formalized one with help of IT-decisions, creating of culture for the knowledge exchange of corresponding business-processes, that is the functional area of knowledge management. The term knowledge management means a process or a system of organization of management decisions for revealing, saving, updating, increasing and an effective utilizing the knowledge inside the organization, using a set of technological tools and organizational-psychological methods.

Intellectual resources, in turn, as the most valuable knowledge for the organization can have a form of scientific reports, projects, new technologies, discoveries, inventions and represent intellectual products, which can turn into the intellectual property (inventions, industrial models and samples, know-how, trademarks, company names etc.) after corresponding procedures of acquiring property rights. The intellectual property is a component of the structural (organi-

zational) capital of the intellectual capital and belongs to firm (except for cases of the private person's copyright).

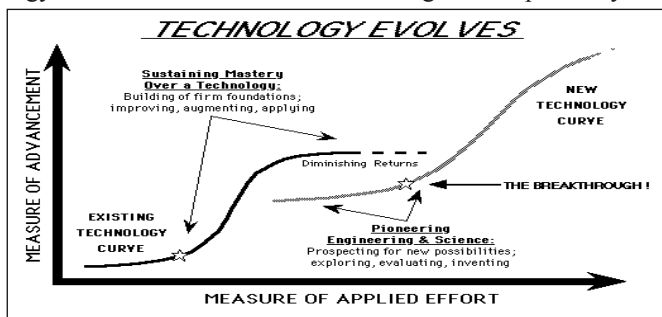
Unlike intellectual property, the human capital belongs to the employees of a firm and can degrade in case of mass reduction or if the employees leave the organization. The client capital, being connected with consumers and external agents of firm – suppliers, customers etc., belongs to the firm and directly associates with it.

The intellectual capital differs from other kinds of capital, despite of the general principles of investment and storage. The intellectual capital can be called “invisible assets”, as it often has no tangible form – knowledge, company image, its goodwill, competence, creative abilities of employees have no tangible embodiment. The intellectual management is aimed at the future, even its value is formed regarding expected opportunities of its use in the future. The physical capital is a result of certain actions in the past. The intellectual capital is not addictive, i.e. it is formed not by addition of its separate parts, but arises owing to synergetic effect, when these parts collaborate. Therefore development and investment into the elements of the intellectual capital should be balanced.

It should be noted, that the intellectual capital value increases when connected with other forms of the capital: with the financial and the material ones, being embodied in the goods, services and business-processes. Its cyclic ability to connect all opportunities, all resources (capitals) of the organization brings a significant result which is shown as innovative transformation of economy. The intellectual capital is unique for each managing subject, process of its formation is individual-stochastic.

The complete realization of all the intellectual capital functions brings to a generating cycle accumulated knowledge (knowledge as a source and a product of intelligence) – a process of generating of new knowledge (through intelligence and thinking) – new knowledge (as a source and a product of intelligence) (Fig. 1).

Figure 1. Technology evolves us a result of the knowledge development cycle.



Source: <http://www.digitaltonto.com>.

The theoretical and practical importance of the intellectual capital management is illustrated with the constantly increasing quantity of empirical researches, which prove the presence of correlation between the intellectual capital and companies' performance.

1. Companies' investments into the intellectual capital provide the growth and productivity. Researches of the European Union and the USA highlight that the contribution of intellectual

investments in the average growth of labour productivity composes from 20% to 34% (the Organization of economic cooperation and development 2013).

2. Complementary influence of separate components of the intellectual capital at the company value is empirically proved. For the hi-tech companies influence of the intellectual capital on corporate value is positive and expressed more strongly, than for other sectors of economy (Tseng, Goo, 2005; Bykova, Molodchik, 2011, p. 51).
3. Positive correlation of the intellectual capital level with market cost of the company is revealed (Pulic, 2000; Bykova, Molodchik, 2011; Garanina, 2006, 2013).

The importance of the intellectual capital management is recognized by both heads and managers of companies. In 2004 (research by Economist Intelligence Unit) 94% of respondents thought, that the intellectual capital management was important, whereas only 5% informed, that their companies used an adequate system of the intellectual capital management (Molnar, 2004, pp. 2-3). For the Russian economy at the same period the situation was even worse – most of the interviewed businessmen in 2005 could not define precisely, what the intellectual capital was like. An understanding of the subject of the intellectual capital and presence of any purposeful administrative decisions were marked extremely rarely. According to an interview in 2014 the importance of the intellectual capital management at one's own enterprise was recognized by more than 88% of respondents, and 44% percent of the enterprises had a IC management system. These results show changes in attitudes of heads, and, hence, their subordinates, for skills, abilities, knowledge and talents of employees and other intangible resources, united in the intellectual capital.

According to E. Bruking, the intellectual capital management (Intellectual Capital Management-ICM) expresses a chain of consecutive actions – “identification of the intellectual capital, development of policy concerning the intellectual capital, audit of the intellectual capital, documentary registration of the intellectual capital and its registration in the data base, protection of the intellectual capital” (Brooking, 2001, p. 195). The researcher emphasizes, that process is incessant and it is also necessary to apply the knowledge management for its development as the basis of the future intellectual capital.

According to the concept of Comprehensive Intellectual Capital Management (CICM) by Nermien Al-Ali (2003) the intellectual capital management should use 3 kinds of management: knowledge management (KM), innovation management (IM) and intellectual property management (IPM) for various strategic purposes and various intellectual capital components, using tools and strategic objects, specific to each kind of management.

J. Ervin and G. Schlag (2002) consider that the intellectual capital management must be used in the field of technologies, processes and people. This consideration actually repeats the concept of the knowledge management and its three basic components.

“The intellectual capital management represents placing and use of the intellectual capital resources, as well as managing it and its transformation (into other resources of the intellectual capital or traditional economic resources) in order to increase its current value of the organization from the point of view of interested parties” (Ruus, Payk, Fernstem, 2007, p. 34) or “the intellectual capital management should be considered as a management of its creation, transformation, escalating and realization, that is in the best way carried out in the organizations, which go in for intellectual-innovative activity” (Bagov, 2006, p. 108). Among some scientists the intellectual capital management is presented as a certain sequence of procedures forming a cycle of transformation of intellectual resources of the enterprise (Platonov, Vorobiev, Tikhomirov, 2012, p. 15). This cycle consists of commercialization of knowledge in ready-made goods or products.

According to Bernard Marr the intellectual capital management includes a number of steps:

1. Identifying the key factors, which are drivers of strategic parameters of the organization.
2. Visualization of ways to create the cost and key factors of the intellectual capital.
3. Measurement of productivity and, in particular, dynamic transformation.
4. The development/“cultivation” of key factors of the intellectual capital, using the knowledge management.
5. Organizing the internal and external reporting.

Bernard Marr (2003, p. 772) emphasized that, that the most visualized and satisfying needs of the enterprise for the intellectual capital management were 2 ways – Strategic maps (Strategic Maps) by R. Kaplan and D. Norton, developed on the basis of the Balanced Scorecard and the Navigator (Skandia Navigator), based on the work by Edvinsson and Ruus during work in Skandia.

In most cases the intellectual capital management is used only to define the level of the intellectual capital and introduce the given parameter in the reporting of the enterprise (Bürkland 2009, p. 48) (e.g., Edvinsson, Sullivan, 1996; Edvinsson, Malone, 1997; Roos, Roos, 1997; Roos et al., 1997; Sveiby, 1997; Sullivan, 1998; Bontis, Keow, Richardson, 2000; Lev, 2001; Viedma, 2001; Andriessen, 2004b). It is explained this way: the theory of management knows a phrase, according to which the only object, which is able to change, can be managed. Therefore the size of the intellectual capital is static and strictly factual. Regarding the fact that the intellectual capital “represents a storage of knowledge, which exists in the organization at a certain moment of time” (Choo, Bontis, 2002, p. 15) such an approach to management of the intellectual capital seems to be really logical. The recommendation of the Lithuanian authors seems to be logical, who thoroughly researched 60 most widespread methods of measurement of the intellectual capital, and assert, that among the methods of the intellectual capital measurement they found out disadvantages of financial estimation methods and insignificant quantity of methods, using monetary units (Ramanauskait, Rudžionien, 2013). Any development has to be measurable. It is a key factor of success. The understanding of the nonlinear nature of time in social and economic systems gives us new tools for an assessment of dynamics of the intellectual capital of the company.

3. The problem of the IC performance measurement in the conditions of the life cyclic dynamic of the enterprise

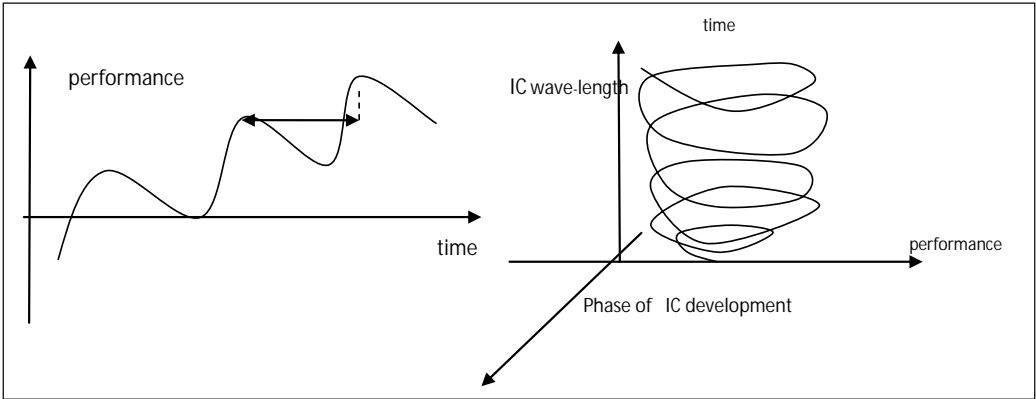
Besides, the key factor, determining size of resultant indicators, is the time factor. In our opinion, time problem in management is of high importance. All disadvantages of the methods of the results measurement appear, because the basis measurement process is based on the linear model of the current of time. Therefore, all results are attached to the conditional scale, accepted for the measurement of time intervals. This approach does not consider specifics of business – enterprise processes, as well as does not take into account the extent of a full financial cycle, duration of a production cycle, rates of moral obsolescence of equipment and technology, the speed of changing of market conditions and many other significant factors.

A number of researchers, for example B.H. Kruchkov, suggest using phase model of time for the description of cycles of development of economic systems. This model offers to correlate developed strategy and results of the activity of the enterprise in accordance with the phase of its development. According to the concept of nonlinearity of time current in economic systems,

the S-curve, describing a set of cycles of the enterprise development of the enterprise, is non-uniform, depending on the speed of modernization processes. In the case with the project management the manager has at his disposal only one cycle with which the highest efficiency should be provided. It is the main difference between the project management and the regular one.

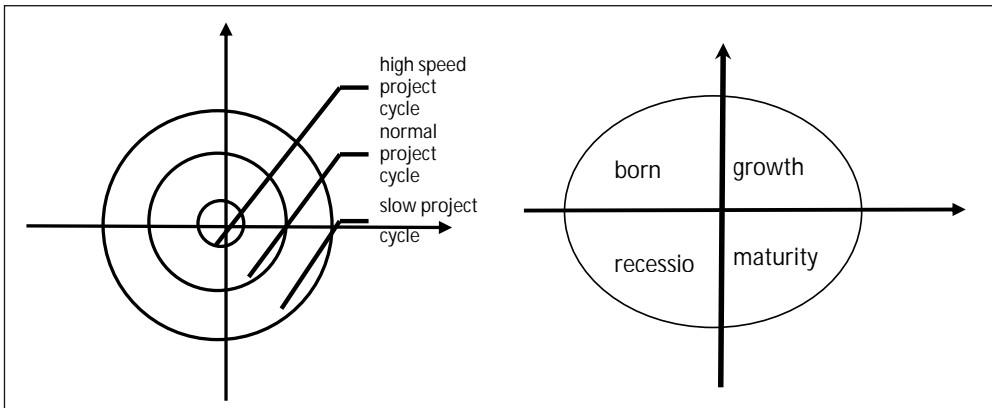
Wave is a change of an environment or a field, moving in a space with a certain speed. Every wave has a length, which is a distance between two peaks of the wave.

Figure 2. The cycle of the enterprise development in multi-dimensional space time-efficiency



A projection of a project live cycle and an enterprise cycle on a phase plane are presented in the Figure 3.

Figure 3. The projection of the spiral of the enterprise development on the phase plane



Source: Kruchkov, 2009.

In our opinion, the phase model has a one serious disadvantage – the traditional ways of the results assessment are correlated to a development phase. But there is a paradox – the result often depends on the fact of its supervision. Differently, the result arises only in case of its calculation, and with use of strictly certain methods. The most striking example of such “result” is the account-

ing profit. According to accounting reports, at the end of fiscal year the enterprise can have good financial results, without having any money at all. Therefore, the approach is preferable, in which:

- there is the nonlinear current of time for economic systems,
- there is not only one last condition, but a set of future conditions for each current state. These future conditions become the only present at the time of the observation.

4. The investment mechanism of IC performance measurement

The problem of the estimating of the IC efficiency may be solved on the base of investment analysis. Let us suppose, that the IC development cycle is a length of the wave of the enterprise development cycle.

During many years one of the most popular methods to describe investment attractiveness of projects have been the classical dynamic methods based on discounting of cash flows (Levy, Marshall, 1978; Williams, 1990; Damodaran, 1996).

The method of simulated (statistical) modeling is used to solve certain purposes. The modeling of dynamics of value *MVA* is based on investment activity of the company which keeps in mind ideas as follows.

Investment activity shows a number of features, typical for systems with many subsystems, cooperating with each other and having a feedback with operational and financial activity. The amplitude of business cycles of the firm, measured according to the absolute value, shows correlation by the exponential law with a constant tendency to change (Bendikov, 2003). Thus, the rules, regulating distribution of investments, are quite constant, and a temporary evolution of the investment activity system of an enterprise can incessantly be monitored (Volchkova, Rasskazov). Therefore the model allows to use the market added value of the capital *of the company MVA* as a tool for estimation.

The key factors of the value are current parameters of the economic added value *EVA*, return on equity *ROE*, profitability of investments *PI*, based on the cash flow *CFROI* (or annual internal rate of return of the firm profitability).

From the point of view of the theory of the finance it is necessary to use economic concept of the income to define the market value *of the company MVA*. Investment activity of firm is modeled regarding the features and properties of analyzed parameters. As was stated above, among them are *EVA*, *EVAR*, *ROE* and *CFROI*. The internal rate of overturn of profitability *IRR* is used in order to calculate *CFROI*.

Real investment projects provide discrete realization of charges and getting of incomes. In this case it is accepted, that all payments within each month, quarter or year are made at the same moment of time (for example, in the beginning of the corresponding period). The sources of financing of investments are not considered, as the project is estimated as a whole. The main principle of the financial realizability of the model is based on it – availability of means of financing reinvestment concerning the chosen strategy of growth.

As a result, in this financial model the parameter “annual *IRR*” is used as a current indicator of the firm profitability (or profitability of combined investment projects which is generated by initial investments, reinvested on each following step according to equation $I_0 (1 + g)$, where *g* – rate of growth of capital investments.

The term “reinvestment” means the reinvesting of the profits without any additional incomes, which is an element of the financing scheme of the “big” project. That is to say, during the modeled investment period T it is planned to realize the “big” project, which needs its annual duplicating for its realization. As a result the cash flow is generated from reinvestment CF which is formed during amortization period of assets N .

Based on the research of influence of key financial risks on behavior MVA it is necessary to choose the best strategic decision, realizing creation of an increase in value of the company in the future.

Stochastic processes of investment changes are characterized by the certain features. In particular, when the Gaussian likelihood of the investments distributions is observed, the root-mean-square deviation of capital investments is considered, and it allows to model normally distributed stochastic variable z , reflecting “investment noise” and accepting value $(0, 1)$.

Then the time-series of capital investments at the moment of time t regarding business cycles, “noise” and “shock” components is described by following equation:

$$I_{n,t} = I_{n,0}(1 + g)^t \quad (1)$$

$$\left[1 + A \sin \left(\frac{2\pi t}{T_\varepsilon + \varphi} \right) \right] \left[1 + \sigma(Z_n) \right] \left[1 + \delta(t, \tau Y) \right] \quad (2)$$

where:

$I_{n,0}$ – quantity of initial investments;

g – rate of growth of capital investments;

t – *current* time in an interval of integers $[1, T]$ with step 1;

T_ε – duration of business cycles;

φ – initial phase of business cycles (if business cycles are absent, $A = 0$);

σ – parameter setting fluctuations of investments;

$(z_{n,t})$ – normally distributed random variables with individual root-mean-square deviation and zero average value (if there is aprioristic data about the law of distribution, it can be replaced with another);

n – number of experiment in a series of statistical tests;

δ – Kronecker delta;

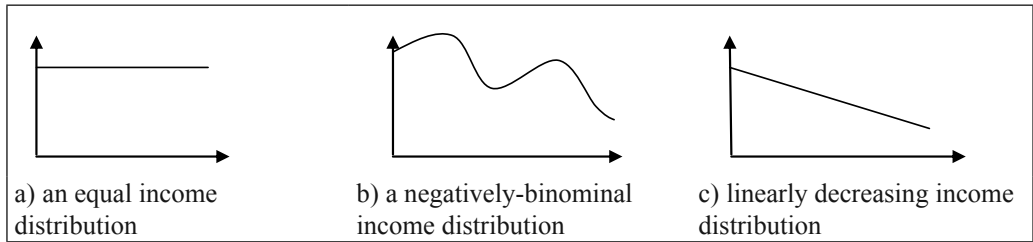
τ – shock year (at $\tau = 2$, T shock is absent);

Y – amplitude of a shock component. Current value of factor of reinvestments, k_i or share of reinvestment means is defined by the ratio of cash inflows from reinvestments cf_{ii} to investments of last period I_{t-1} , т.е.

Where $i = 1 \dots \min(t, N)$, here N is amortization period of one investment (or of capital active). The minimum between sizes N and t is taken to account investments, done in the past. Then modeling of a cumulative flow cf_n from reinvestments is defined by discrete convolution with the kernel k_i .

To reflect the real business in the simulated model of investment activity it is possible to use three laws of the income distribution (change of factor of reinvestments k), it includes an equal, a negatively-binominal (which corresponds the business cycle of the company: the growth, the maturity and the recession) and a linearly decreasing ones.

Figure 4.



5. Conclusion

This model helps to build the schedule of creation (destruction) in time the market added value *MVA*, which apparently shows the results, demonstrating, whether the offered strategy of development corresponds the interests of owners.

Moreover, the model allows to choose the best values of rate of growth, the structure of the capital, demanded profitability and other parameters from a set of alternative opportunities. With the smallest changes it helps to track the influence of various variants of amortization policy, durations and depths of business cycles. To start the calculations, a small number of initial data is needed, that defines qualitative and preliminary character of the conclusions, which can be analyzed more profoundly, if necessary.

Bibliography

1. Akpinar A.T., Akdemir A., *Intellectual Capital*, <http://www.opf.slu.cz/vvr/akce/turecko/pdf/Akpinar.pdf>.
2. Bellman R.E., Kalaba R., Zadeh L.A. (1966), Abstraction and Pattern Classification, *J. Math. Anal. and Appl.*, 2.
3. Bendikov M.A. (2000), Investicionnaja strategija i jekonomi-cheskaja bezopasnost' promyshlennogo predpriyatija [in:] *Ocenka jeffektivnosti investicij: sb. Statej*, (ed.) V.N. Livshica, Vyp. 1. M., CJEMI RAN.
4. Booker J.M., Parkinson W.J., Ross T.J. (2004), *Fuzzy Logic and Probability Application: Bridging the Gap, 2nd Edition*, New York, John Wiley and Sons.
5. Brennan M.J., Schwartz E.S. (1985), Evaluating Natural Resource Investments, *Journal of Business*, Vol. 58, Iss. 2.
6. Bürkland S. (2009), *Managing the Development of Valuable Intellectual Capital. The Role of Management Control: Monograph*, Vaasa, University of Vaasa.
7. Bykova A.A., Molodchik M.A. (2011), Influence of the Intellectual Capital on Results of Activity of the Company, The Bulletin C. Peterb. un-that. It is gray, *Management*, Vol. 1.
8. Copeland T.E., Keenan P.T. (1998), *How Much is Flexibility Worth?*, McKinsey Quarterly, Vol. 2.
9. Cox J., Ross S., Rubinstein M. (1979), Option Pricing: A Simplified Approach, *Journal of Financial Economics*, Vol. 7, Iss. 3.
10. Cox R.T. (1961), *The Algebra of Probable Inference*, Baltimore, Johns Hopkins Press.

11. Damodaran A. (1996), *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset*, University Edition, New York, John Wiley and Sons.
12. Dixit A.K., Pindyck R.S. (1994), *Investment under Uncertainty*, New Jersey, Princeton University Press.
13. Erwin J., Schlag G. (2002), Knowledge Management – Why and How, *ICSTI Forum-2002*, No. 40.
14. Gaponenko A.L., Orlova T.M. (2008), *Management of Knowledge. How to Turn Knowledge into the Capital*.
15. Kasayev T.T. (2007), Intellectual Capital as Factor of Innovative Development of Economy, *Bulletin of NSU. Series: Social and Economic Sciences*, Vol. 7.
16. Klokov V.I., Rasskazova A.N. (2003), Sistema kontrol'ja i uprav-lenija stoimost'ju, osnovannaja na dohodnosti investici-onnogo potoka, *Finansovyy menedzhment*, No. 6.
17. Kruchkov V.N. (2009), *Nonlinearity of Time in Management (or Is Strategic Planning Differs from the Long-term One?)*, Omsk, OMGU.
18. Kudryavtsev D.V. (2010), *Control Systems of Knowledge and Application of Ontologies: Studies. Grant*, SPb., Publishing house Politekhn, un-that.
19. Lee R.C.T. (1972), Fuzzy Logic and the Resolution Principle, *J. ACM*, Vol. 19, No. 1, Jan.
20. Levy H., Marshall S. (1990), *Capital Investment and Financial Decisions*, New Jersey–London, Prentice-Hall, Englewood Cliffs.
21. Lukicheva L.I. (2007), *Management of the Intellectual Capital: Studies. Grant*, Moscow, Omega-L.
22. Manzari M., Kazemi M., Nazemi Sh., Pooya A. (2012), Intellectual Capital: Concepts, Components and Indicators, *A Literature Review Management Science Letters*, 2(2012), http://www.growingscience.com/msl/Vol2/msl_2012_185.
23. Marr B., Gupta O., Pike S., Roos G. (2003), Intellectual Capital and Knowledge Management Effectiveness, *Management Decision*, 41/8.
24. Melikhovsky V.M. (2014), Critic of the Concept of Forces of the Competition of Michael Porter and an Assessment of their Functioning in the Market of Knowledge, *Theoretical Economy*, No. 4.
25. Milner B.Z., Rumyantseva Z.P., Smirnova V.G., Blinnikov A.V. (2006), Management of Knowledge in Corporations: An Educational Grant, *Under the Editorship of the Dr. the House-keeper. Sciences*, prof. B.Z. Milner, M., Prod. "BUSINESS".
26. Molnar M.J. (2004), Executive Views on Intangible Assets: Insights from the Accenture Economist Intelligence Unit Survey, *Research Note "Intangible Assets and Future Value" (1)*, April 13.
27. Myers S.C. (1977), Determinants of Corporate Borrowing, *Journal of Financial Economics*, Vol. 5, Iss. 2.
28. Nermien A.-A. (2003), *Comprehensive Intellectual Capital Management*, New Jersey, John Wiley & Sons Inc.
29. Platonov V.V. (2012), *Intellectual Capital: Assessment and Management: Studies. Grant*, SPb., Publishing House SPbSUEF.
30. Popov D. (2003), Evolution of Indicators of Strategy of Development of the Enterprise, *Company Management*, No. 2.

31. Ramanauskaitė A., Rudžionienė K. (2013), Intellectual Capital Valuation: Methods and Their Classification, *EKONOMIKA*, Vol. 92(2), <http://www.vu.lt/leidyba/dokumentai/zurnalai/EKONOMIKA/Ekonomika%202013%2092%202/79-92.pdf> [15.10.2014].
32. Sugeno M., Yasukawa T. (1993), *A Fuzzy-Logic-Based Approach to Qualitative Modeling*. *IEEE Trans. on Fuzzy Systems*, 1:7 H.
33. Tkachenko E.A. (2007), *Theoretical and Methodological Bases of Management of Complex Development of the Industrial Enterprises*, SPb., Publishing House SPbSUEF.
34. Vilenskij P.L., Smoljak S.A. (1998), *Pokazatel' vnutrennej normy dohodnosti proekta i ego modifikacii*, M., CJEMI RAN.
35. Volchkova L.T., Rasskazov S.V. (2009), "Narodnye" investicii v obshhestvennoe proizvodstvo, *Sociologicheskie issledovaniya*, No. 2.

Chapter 26

Mnemonics in the Development of the Intellectual Capital of the Organization

Marzena Wójcik

1. Introduction

In today's economy, an economy based on knowledge of the enterprise value is largely determined by intangible resources of the enterprise, especially intellectual capital. The concept of a knowledge-based economy (KBE) appeared in the early 90s in the US. KBE is a market economy in which economic growth and structural changes are the result of technological advances primarily in the field of information technology and telecommunications. KBE is based on a comprehensive use of knowledge and information. It is characterized by a high degree of development in fields that are related to the processing of information and the development of science. An important feature of KBE is the increasing importance of globalization, science and knowledge, which are the basis of contemporary transformations (Skrzypek, 2009, pp. 148-149).

This article presents one of many possibilities of development of intellectual capital, which is very important in a knowledge-based economy. This proposal lies in enhancing the learning skills of employees through knowledge of mnemonics – quick memorization techniques.

2. Determinants of competitiveness of enterprises in KBE

The competitiveness of businesses in the new economy, their present and future successes are primarily related to the possession and efficient management of intangible assets. Mainly it comes to knowledge management and intellectual capital management. The increasing complexity and dynamics of the environment, globalization of the economy, constant changes in the market, the emergence of new technologies, new products, new competitors – these are the challenges for today's businesses to take new action.

In the constant uncertainty conditions only knowledge can be a source of competitive advantage. I. Nonaka argues that the only reliable source of competitive advantage is knowledge. When markets change, exploding new technologies, competitors multiply, and products age almost overnight, companies that achieve success are those that consistently create new knowledge, disseminate it throughout the organization and quickly introduce new technologies and products.

Such actions are defined as “enterprise created by knowledge”, whose only business is innovation (Skrzypek, 2009, p. 146).

K.E. Sveiby points out that the knowledge-based organizations do not have a huge amount of material resources, mainly based on intangible resources. Very important it is that the above-mentioned organizations primarily employ highly qualified professionals who are called knowledge workers. According to K.E. Sveiby the work of these people mainly consists in transforming information into knowledge, which will allow the company to build a competitive advantage in the market (Beyer, 2012, p. 14).

3. Intellectual capital

In addition to knowledge management KBE is very important to manage intellectual capital of organization. When B. Lev analyzed the ratio of market value to book value, he noted that in the 70s of the twentieth century for the companies included in the list of 500 Standard & Poor’s ratio was as one-to-one, while in the modern economy, the knowledge economy, the ratio is an average of the six to one. For example, for Intel this ratio is fifteen to one, and for Microsoft twenty to one (Kasiewicz, 2006, p. 56). This difference between the market value and the book value gives the company an advantage over its competitors it is the intellectual capital of the company.

The following are selected definitions of intellectual capital:

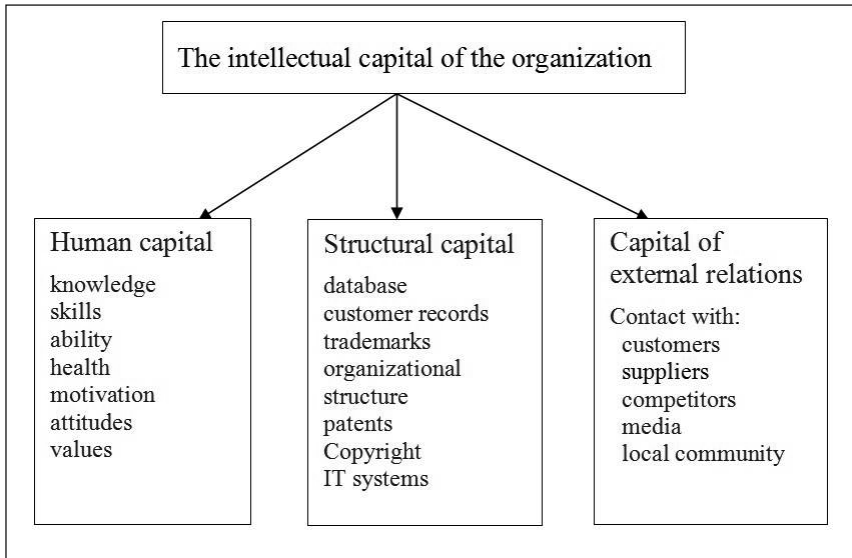
1. G. Urbanek: Intellectual capital is an invisible resource of company which produces visible results. It is associated with knowledge and experience of employees, with customer relationship management, as well as technologies used in the organization and procedures. Intellectual capital is both a knowledge in itself, and a result of its transformation on intangible assets (Urbanek, 2008, p. 31).
2. T. Steward: ...this is the “intellectual material” – knowledge, information, intellectual property, experience that can be used to create value (...) intellectual capital is the sum knowledge of all employees of the company that gives a competitive advantage in the market (Urbanek, 2008, p. 31).
3. L. Edvinsson, M.S. Malone: Intellectual capital is the knowledge, experience, organizational technology, customer relationships and professional skills that allow company to achieve a competitive advantage (Rogowski, 2006, p. 71).
4. Pietruszka-Ortyl: ...is the sum of knowledge among the people creating the organization, and enabling transformation of its resources on a measurable financial value of the company (Pietruszka-Ortyl, 2007, p. 79).

Literature on the subject often presents three key components of intellectual capital, which are: human capital, structural capital and relational capital. Human capital is the knowledge, skills, abilities, competences, values, etc. Of employees. Human capital is considered to be basic and yet most important component of intellectual capital, and thus the whole organization. Such importance owes to the fact that it is the people who are carrier specific, unique knowledge that distinguishes the company on the market. Structural capital, also called organizational capital, is composed of knowledge organization, procedures, systems, databases, organizational culture, etc. Relational capital¹ (relationship capital) are all kinds of relationships with customers, suppli-

¹ Relational capital by some authors is called social capital or clients capital, but this is a narrower approach this issue.

ers, co-operators and other stakeholders (Beyer, 2012, p. 18). The above-mentioned components of the intellectual capital of the organization are presented in the diagram below.

Figure 1. The intellectual capital of the organization



Source: Golemski, Wojtkowiak, 2012, p. 40.

Intellectual capital can be developed through the development of its individual components, namely human capital, structural capital and relationship capital. In particular, we can develop intellectual capital, among others, through such measures as, for example (Beyer, 2012, p. 18):

- investing in education of employees,
- protection of intellectual property rights,
- investing in new information and telecommunication technologies,
- an increase in spending on research and development sphere, etc.

4. Human capital

When analyzing the structure of intellectual capital, you may notice that the key component is human capital. Human capital is the basis of intellectual capital, among other reasons, that the knowledge, experience, skills and abilities of people are necessary to create two other elements of intellectual capital – structural capital and relational capital. Human capital plays a very important role in creating for example. The organizational structures, databases, as well as in shaping relationships with customers. This quality of human capital determines how they will look the other elements of intellectual capital. Can therefore say that human capital is the cornerstone of building the intellectual capital of the organization, which in turn has a significant impact on the market value of the company (Golemski, Wojtkowiak, 2012, pp. 39-41).

In many definitions of human capital highlights the learning skills (Gierszewska, 2011, p. 125; Urbanek, 2008, p. 56; Walas-Trębacz, 2012, p. 97). One of them is the definition of a Nobel laureate – T. Schultz. Human capital is the knowledge and skills that are acquired by humans through education and various training. This capital is a product intended investments characterized by a specified rate of return (Walas-Trębacz, 2012, p. 97). Human capital (human capital – HC) is a combination of, among others, factors such as:

- qualities brought by man – intelligence, energy, character;
- ability to learn – imagination, capacity of mind, creativity;
- motivation – goal-oriented, and cooperation.

In this article we want to draw attention to the learning skills of people, as one of the ways to develop human capital.

5. Lifelong learning

In today's economic reality as already mentioned characteristics are highly competitive and increasingly rapid changes in technology, and even change the business environment in which businesses operate today. The KBE there is a high rate of depreciation of the knowledge acquired during the formal education process and the need for learning throughout life, lifelong learning. Therefore, the new reality requires not only having a certain body of knowledge and its use but also the skills of its constant updates and continuous learning. Employees perceive upgrading their skills and acquire knowledge as a continuous process.

One of the reasons to take up the topic of this paper is that a lot of talk about investment by employers in the development of human capital, which in turn is expected to increase the value of the intellectual capital of the organization. Efforts are even calculate the effectiveness of different types of training for staff, incentive payments or other forms of financing development workers. But rarely we hear about what employees themselves are doing to increase the value of their human capital, what they are doing to learn as much as possible with training and courses offered, how they use themselves available for self-development opportunities.

What is the meaning of paying for an expensive, multi-day, guided by the best specialists training, fund postgraduate studies or other types of training courses for employees if the employees themselves are very few of them remember, too little will use in their work, forget quickly learned new things or assimilated information. Often the reason for this situation is not a lack of ability of individual workers, but lack the skills quickly assimilate a large amount of knowledge, lack of prompt, effective memorizing the most important things. Just as we take care of our health, good physical condition, nice, healthy appearance, through appropriate nutrition and exercise is all the more reason to exercise and take care of our most important, most valuable organ – the brain.

According to the lots of scientific research – the ability of the human brain through specific exercises are enormous. It is good to learn the principles that help keep our mind in good shape. As a result, we will learn more efficiently, faster, and better, and the information will be stored in our memory for a long time. The principles, techniques and various exercises on learning and memory efficiency also allow you to keep your mind and good memory for a long time.

6. Mnemonics – short characteristics

There are a lot of rules on self-learning. These principles are related to, for example, the preparation place to study, prepare notes for example using mind mapping, disseminated by T. Buzan, etc. The individual learning one of the most important issues is the systematic work – J.W. Goethe wrote: “The genius lies in the fact to settle down to work at the same time” (Osmelak, 1984, p. 67). It is important to get into the habit and needs of everyday learning. From the point of view of the effectiveness of the activity is very important regularity. It is said that the famous ancient maxim *Nulla dies sine linea* (literal meaning: “Not a single day without a line”), not a single day without productive work. The individual learning should not be even a single day’s break, not a single day without reading at least a few pages of reading, or do planned short notes. Systematic work is the basis of every success in every field of human activity.

It is however important not only to learn but also to learn how to learn. Good help in learning are mnemonics – quick memorization techniques. Mnemonics not only help you remember various information and faster to learn, but above all, develop the ability to learn. Learning to learn skills is very important, because in fact there is evidence that, for example, the cause of poor academic performance is not only taking too little time for learning, but the use of inefficient methods of learning (Locke, 2004, p. 3).

In many cases, students who have not passed the exam given used the inappropriate, improper and inefficient methods of learning. The result of this is that few understand the learning material and remembers little of it. Knowledge and application of rapid memorization is extremely important in college, but also in many situations of private and professional life.

According to the definition of mnemonics are:

1. Mnemonic – any device for aiding the memory. Named for Mnemosyne, the goddess of memory in Greek mythology, mnemonics are also called *memoria technica* (Latin: “memory technique”). The principle is to create in the mind an artificial structure that incorporates unfamiliar ideas or, especially, a series of dissociated ideas that by themselves are difficult to remember. Ideally, the structure is designed so that its parts are mutually suggestive (Encyclopedia Britannica online).
2. Mnemonics – strategies or methods using the already known elements in the process of encoding new information, in order to streamlining the process of extracting this information later from memory (...) Another way of strengthening the memory is based on a special mental strategies called mnemonics (from the Greek word meaning “to remember”). Mnemonics are ways to encode a long series of facts through binding them with previously known and encoded information. Many mnemonics provide ready guidance for the extraction, which help organize a collection of random information (Gerrg, Zimbardo, 2009, p. 224, 604).

So we can say that mnemonics are ways to help you remember and remind previously stored content from memory. By using mnemonics is stored more quickly and for a longer period of time. It is also easier is recalled a variety of content from memory. In addition, mnemonics exercise our mind – so it stays a long time in good condition. It also mentions T. Buzan, who says: Mnemonics support and develop the innate (natural) forces memory. Mnemonics are a basic tool for creative thinking, improve the mind, develop creative opportunities and creative intelligence (Jaworska-Jamruszkiewicz, 2008, p. 7). In addition, construction of is very simple mnemonics, and their use is pleasant and even fun – so unless you do not have to convince anyone that worth getting to know mnemonics and try to apply them in different situations.

Design of mnemonics involves mainly two principles, namely: imaginings and associations. The ability to visualize, create visual images and associations brings two-fold benefit. First of all, it allows for faster and more efficient memorizing and recalling information from memory, and second supports the development of our imagination and memory. Next to the imaginings and associations mnemonics also based on: visualization, orderings, the use of rhyme, rhythm and music, the ability to focus on the activity. It is remarkable that in ancient times was known relationship, that to have a good memory, memorize quickly and for a long time, you should use all the possibilities of the brain. The ancients proclaimed that the basis for the perfect memory is the creation of so-called “live” images and associations. These “live” images and associations are characterized by such qualities and recommendations as:

- associations and ideas should be positive, because the pleasant images are easily reminded by the mind, our subconscious blocks the memory of negative associations and images;
- generated image should be colored, use the whole palette of colors, because color images are easier to remember;
- in imaginings and associations should be movement, images should be dynamic;
- you must create funny pictures, funny, associations during which you often laughed out loud, also thanks to faster and for a longer time memorize;
- what we want to remember should be connect to something familiar, steady, already encoded in our mind;
- in the creation of “live” images and associations also should be guided by an exaggeration, because a lot easier to memorize images containing exaggerations relating to the size – a very large or very small, as to the quantity, shape (deformation), and even sound – very loud or very quiet;
- imaginings and associations should be unusual, even bizarre, these common, ordinary, typical images and connections are quickly forgotten;
- imaginings and associations should be very detailed – the more detailed the easier later to recall these images from memory.

Apart from the above-mentioned principles while practicing your memory – through the use of mnemonics, remember that memory formation requires sensitize all the senses: sight, hearing, taste, smell, touch and movement. In addition, it may be helpful also various types of classification, scheduling, for example, breakdown by category, color, etc. Such arrangement also create a very effective memory connection. The created associations and images should be included your person, because such an operation wakes emotions, and emotions remembers very quickly.

7. Mnemonics – an example – Method of loci, The Roman Room System

This method due to its ancient origin is also called “The Roman Room System”, although its creators and propagators came from ancient Greece, but it was also used by the ancient Romans. A single number of “loci” is “locus”, which means “place”, sometimes even the method of loci is said to be “locating method”. This method allows you to memorize any amount of information and in the order in which we want to remember them. The method of loci is a way of remembering the order lists of names or objects – or in the case of speakers – individual parts of a long speech – by linking them with a certain sequence of places that a person knows well. In the meth-

od of loci we use the capabilities of both brain hemispheres: the left hemisphere is responsible for sequence and order, and the right for the visualization of images.

In order to use this method we start from choice of place – “loci”. This may be flat, room, favorite restaurant, classroom, garage etc. – it comes to a place that we know very well where we remember many details. The method of loci can be used not only to ‘closed’ room. You can also use your well-known route for example – from home to school or from college to your favorite park etc. Subsequently precisely remind ourselves the place, whether a route and the things we want to remember, for example, a shopping list. And then we put in mind of these things along the selected route.

Suppose we have to buy the following products: bread, milk, bananas and ice cream. We apply the method of loci using known to us route home from university. We remind ourselves that before the university is a large monument (and we make the association) on which from the sky is falling a lot of ruddy, fragrant loaves of bread. We go further, and instead a pedestrian crossing we see wild river of milk, after which we have to go on our toes, bouncing up and down very quickly. Then we pass by the playground. We see that on the swings swinging a huge yellow bananas. Then we enter the building where we live, check the mailbox, and there instead of mail bobbing up and down multicolored ice creams. And done. Now just repeat in my mind the route and contrived associations to no longer have to worry about a shopping list. Somebody can say why the right preoccupy the memory of such trivial things like shopping list, if you can write a shopping list and have with you in the store. Firstly, such exercises – as we have seen in the above example – are playing with memory, our mind is not charged, on the contrary – such fun they practice our mind and help him to be in good condition. Secondly, quite often we hear, and perhaps we ourselves have such an experience, that after long studies on a piece of shopping list we forgot to take it with us to the store, head and our memory is always with us.

8. Conclusion

This article presents the mnemonics – quick memorization techniques in the context of the development of the intellectual capital of the organization. In the knowledge-based economy it has a very large significance knowledge management and intellectual capital of organization management. One of the elements that make up the intellectual capital is human capital. Human capital is the most important component of the intellectual capital of the organization, creates and unites the other – structural capital and relational capital. The specificity of human capital is also expressed, among others, in fact it is unique and difficult to imitate by competitors. Among the factors that make up the human capital is learning skills. Changes around us forcing us continuous replenishment of our knowledge and acquire new skills. This lifelong learning is now a key condition for the active and creative participation in the changing realities of the modern world. The ability to learn you can develop, among others, by mnemonics. Mnemonics – quick memorization techniques – are based on the invention of such a method of encoding information that will help in memorizing and recalling them from memory. Mnemonics have very many applications. Mnemonics can be used both while you are learning in school, every day, for example, by remembering shopping lists, to-do lists, phone numbers, PIN code to the card or phone, etc. As well as at work-to-remember passwords, logins, codes and ciphers – that, often for security reasons they should not be stored anywhere etc. Most of mnemonics is based on the use of associations and imaginings. The more created imagine

and associations will be weirder, more colorful and dynamic that we get better effect at remembering. Simple or common associations are quickly disappearing from memory.

The use of mnemonics is very easy and even enjoyable, because often during the creation of associations and imaginings we laugh out loud with constructed images. Cheerful mood and positive attitude also affects a better memory effect. Mnemonics not only help you remember various information and faster to learn, but primarily develop the ability to learn. With the ability to quickly memorize and learning employees are evolving their human capital, which increases the value of intellectual capital of the organization and consequently an increase in the value of the organization. Mnemonics are first and foremost a way to increase the capacity of our mind, and efficient mind is the key to success today.

Bibliography

1. Beyer K. (2012), Współczesna organizacja – organizacja oparta na wiedzy, *Zeszyty Naukowe Uniwersytetu Szczecińskiego*, No. 55.
2. Gerrg R.J., Zimbardo P.G. (2009), *Psychologia i życie*, Warszawa, Wydawnictwo Naukowe PWN.
3. Gierszewska G. (2011), *Zarządzanie wiedzą w przedsiębiorstwie. Modele, podejścia, praktyka*, Warszawa, Oficyna Wydawnicza Politechniki Warszawskiej.
4. Gołembski M., Wojtkowiak G. (2012), Znaczenie pomiaru kapitału ludzkiego w kreowaniu wartości przedsiębiorstwa, *Zeszyty Naukowe Uniwersytetu Szczecińskiego*, No. 56.
5. Jaworska-Jamruszkiewicz J. (2008), *Kurs doskonalenia pamięci*, Katowice, Videograf II.
6. Kasiewicz S. (2006), Zmiana warunków konkurencyjności przedsiębiorstw [in:] *Kapitał intelektualny. Spojrzenie z perspektywy interesariuszy*, S. Kasiewicz, M. Kicińska, W. Rogowski, Kraków, Oficyna Ekonomiczna.
7. Locke E.A. (2004), *Jak uczyć się efektywnie. Metody i motywacja. Praktyczny poradnik*, Poznań, Wydawnictwo „RK”.
8. Osmelak J. (1984), *Jak uczyć się samodzielnie*, Warszawa, Instytut Wydawniczy Związków Zawodowych.
9. Pietruszka-Ortyl A. (2007), Kapitał intelektualny organizacji [in:] *Podstawy zarządzania przedsiębiorstwami w gospodarce opartej na wiedzy*, (eds.) B. Mięka, A. Pietruszka-Ortyl, A. Potocki, Warszawa, Difin.
10. Rogowski W. (2006), Kapitał intelektualny jako generator nowych czynników produkcji [in:] *Kapitał intelektualny. Spojrzenie z perspektywy interesariuszy*, S. Kasiewicz, M. Kicińska, W. Rogowski, Kraków, Oficyna Ekonomiczna.
11. Skrzypek E. (2009), Wiedza jako czynnik sukcesu w „nowej gospodarce” [in:] *Zarządzanie kapitałem ludzkim w gospodarce opartej na wiedzy*, (eds.) E. Skrzypek, A. Sokół, Warszawa, Instytut Wiedzy i Innowacji.
12. Urbanek G. (2008), *Wycena aktywów niematerialnych przedsiębiorstwa*, Warszawa, Polskie Wydawnictwo Ekonomiczne.
13. Walas-Trębacz J. (2012), Kapitał ludzki jako podstawowy zasób kształtujący wartość przedsiębiorstwa [in:] *Współczesne tendencje w zarządzaniu zasobami ludzkimi*, (ed.) M. Tyrańska, Warszawa, Difin.
14. <http://www.britannica.com/EBchecked/topic/386631/mnemonic> [15.05.2015].

Chapter 27

Knowledge Management and Dynamic Capabilities

Antonio Mihi-Ramírez, Gitana Valodkienė

1. Introduction

The world tends to increasing globalization, in which the fate of the modern organization is tied more than ever to factors that go far beyond their sphere of control. Any significant event in any strategic point, brings multiple effects on all elements of modern society. The impact of the wave of innovation is fundamentally changing the way goods and main services are produced, marketed, distributed and consumed. Advances in multiple sectors, including information technology and communications, make obsolete prevailing technological matrices and have substantial effects on markets and organizational structures. Currently, the competitive advantage lies not only in tangible assets or natural resources, but how the company actually manages knowledge as capability (Lee, Sukoco, 2007).

Intensification of global competition forces companies to innovate and improve or update their skills frequently to maintain it's competitive in the edge of global market (Lee, Sukoco, 2007). In general, this requires fast exploration and acquisition of critical information and knowledge about the market and how it is organized (Zahra, George, 2002). Wiklund and Shepherd (2003) suggest that future opportunities can be discovered by combining an entrepreneurial orientation to knowledge management. When this combination can effectively keep in organizations, innovation and development of new skills tend to increase (Burstein, Linger, 2003). Therefore, organizations have to learn to cope with the problems generated by intangible resources.

This research analyzed the link between dynamic capabilities and knowledge with the purpose of better understanding the importance of theses intangibles for the company. Thus, literature about such constructs and their interaction was analyzed in the following sections.

2. Resource-based view perspective. Dynamic Capabilities

From the viewpoint of the theory of resources and capabilities, companies seeking sustainable competitive advantages in their resources and capabilities, analyzing and empowering them.

Knowledge is an important intangible resource for any company since it is a source of competitive advantage.

Resource-based view theory focuses the source of sustainable competitive advantage of the firm and how it is based on the set of “core competencies” (Prahalad, Hamel, 1990) or “resources and capabilities” that the organization possesses and are difficult to imitate.

Capabilities represent ways of doing things, to use resources (Grant, 1996a). The term capacity refers to the “ability of the firm to deploy resources, usually in combination, using organizational processes to accomplish the desired end” (Amit, Schoemaker, 1993, p. 35) and emphasizes “the key role of management strategic adapt, integrate and properly reconfigure organizational skills, resources and internal and external functional competencies” (Teece et al., 1997, p. 515).

Among the main differences between resources and capabilities could be noted that resources are often more affordable and separable from the organization than capabilities, what are normally developed within it, that means a capacity is usually specific to the company because it is embedded in the organization and its processes, while generally it does not happen for resources (Amit, Schoemaker, 1993; Brush, Artz, 1999; Makadok, 2001).

With regard to noteworthy contributions to literature on the resources, Wernerfelt (1989) analyzed resources according to their potential for use.

Montgomery (1943) and Thomas (1994) studied how company resources determine market entry and the generation and sustainability of competitive advantage.

Amit and Schoemaker (1993) examined static and dynamic aspect of resources.

Collins and Montgomery (1995) analyzed characteristics that must have the resources to be inimitable.

Barney (2001) studied substitution and resource classification.

Galbreath and Galvin (2004) found the strength of some resources are in their combination or relationship to other resources and therefore any independent resource, intangible or otherwise, becomes the most important business performance.

Regarding the relation between resources and the competitive advantage, Nelson and Winter (1982) found capabilities are developed by combining and utilizing resources and/or other capabilities across organizational routines. These routines are deposit of “know how” that is the knowledge of the organization acquired through learning.

Mahoney and Pandian (1992) showed that achieving competitive advantage involves the appropriation of the income generated by various resources and capabilities available in the organization, due to the existence of distinctive competencies and top competitors in the value chain organizational routines.

Peteraf (1993) studied how basic conditions for resources and capabilities can generate a competitive advantage.

Grant (1996a) pointed up the first company that initially occupies a strategic position, gains access to resources and capabilities that the follower cannot get.

Teece et al. (1997) confirmed internal and external management competence involving dynamic capabilities.

Lieberman and Montgomery (1998) analyzed how resources reside primarily on the level at which customers decide in favor of pioneering products, while companies may favor its development.

Eisenhardt and Martin (2000) designated dynamic capabilities that achieve sustainable competitive advantage, and its relationship with organizational routines.

Griffith and Harvey (2001) showed performance of the company is affected by the dynamic capabilities.

Helfat and Peteraf (2003) established dynamic capabilities are complex routines that are unique to each company dependent processes historical conditions.

Zott (2003) analyzed performance of companies through dynamic capabilities.

With regard to remarkable contributions to literature on capabilities Mahoney and Pandian (1992) showed resources have the character of stock while capabilities are like a flow, so that might be considered as ways of using resources.

López-Sintas (1996) addressed capabilities have a collective nature, requiring collaboration and coordination between persons carrying out an activity, compared to the individual character of resources.

Teece et al. (1997) confirmed capabilities that really count are the dynamics. They referred to these capabilities as those skills allowing an organization to learn, adapt, change and renew itself over time.

There are several approach including both concepts: resource and capability. Prahalad and Hamel (1990) showed core competencies of the organization are difficult to imitate. Cooper et al. (1991) made an empirical study that tests a model to predict the growth and survival of the company based on its own resources and capabilities.

Ghemawat (1991) showed the imitation usually increase the supply of these resources while substitution tends to reduce their demand.

Grant (1991, 1996a) pointed up that along the optimal deployment of resources, the firm must develop resources as basis for the future.

Barney (1995) analyzed how firms use their internal forces to exploit opportunities and neutralize environmental threats.

Brush and Artz (1999) studied the specific context that makes valuable resources.

Camisón (1999) made a literature review focusing on strategic assets.

Hoopes et al. (2003) examined the differences between resources and capabilities, and differences between each company involved.

Miller (2003) analyzed how the company can grow based not only on resources and capabilities, but based on asymmetries, which are typically skills, processes, or assets that competitors of a firm cannot copy at a cost that produces economic rents. According to this analysis resources and capabilities are rare, hard or impossible to imitate and are not substitutable.

Resources can be exogenously provided or created by varied activities undertaken within the firm, while capabilities usually arise from the integration and combination of these resources, with the main purpose to increase the productivity of the resources that the company own. Organizational capacities have a collective character that does not have the resources. In this way, resources would be the source of the capabilities of the firm, while capabilities would be the main source of competitive advantage (Grant, 1991).

In this sense Barney (1991) and Hall (1992) denoted the resources with a very general sense, including both assets and capabilities. Mahoney and Pandian (1992) noted that resources have character of stock while capabilities might be considered as ways of using resources. Grant (1996a) considered that at a first level would be the resources or individual assets and a second would be the level skills, competences or collective organization skills that allow it to properly develop activities from the combination and coordination of individual resources. Finally, for Eisenhardt and Martin (2000) resources are those specific physical, human and organizational

assets that can be used to carry out value creating strategies and skills are the ability of the firm to deploy resources using organizational processes.

Considering this, the perspective of dynamic capabilities (Eisenhardt, Martin, 2000; Helfat, 2000; Madhok, 2000; Teece et al., 1997) discussed how organizations develop their specific capabilities and regenerate its core competencies to address existing changes in the environment, for instance, focusing on identifying the basis on which the firm can create, maintain and increase distinctive advantages what would be difficult to replicate.

The concept dynamics designates the ability to renew competences achieving correspondence with the changing business environment (Teece et al., 1997, p. 515). Thus dynamic capabilities are the “ability of the firm to integrate, build and reconfigure internal and external competences to address rapidly changing environment” (Teece et al., 1997, p. 516) that is the ability to bring new ways of competitive advantage (Teece et al., 1997, p. 515).

3. Knowledge

Knowledge is the result of an evolutionary process data into information and from there to knowledge.

With regard to notable contributions to literature on the knowledge Quinn (1993) delimited this concept in the cognitive element (how to do something), skills (how to do something good) and attitude (the desire to do something good).

Nonaka and Takeuchi (1995) defined knowledge as a true and justified belief.

To Grant (1996b) it is a strategic resource or key factor creating company value, which leads to the need of identifying what knowledge is available and understand, and how to acquire, apply, store and classify it.

Grant (1997) addressed knowledge is the resource that incorporates added strategic value to the production process.

Davenport and Prusak (1998) pointed up knowledge is the result of a mixture of experience, values, information and “know how” that constitutes the framework for incorporating new experiences, useful information for action.

Moreno-Luzón et al. (2001) defined knowledge as information that has been contextualized and interpreted subjectively, assimilated or learned by an individual, group or organization.

Hargadon and Fanelly (2002) presented knowledge as an empirical phenomenon that resides in action, and in the acquisition, dissemination and replication of these actions throughout the organization. Plus, knowledge would be a latent phenomenon, representing the potential to build strong organizational actions.

For García (2004) knowledge is explicit, it means structured, unambiguous and easy to improve, objective, rational, theoretical, systematic knowledge, which can be captured, encoded, expressed and shared easily (less costly transmission, easier and faster), which occurs in individual areas and organizational, generated through logical deduction and formal study.

And for Polanyi (1967) and Nelson and Winter (1982) knowledge is also tacit, that means a set of rules learned by contact with those that we have been indoctrinated, and help develop a capacity for perception of reality.

In sum, knowledge is a valuable resource that combines experience, information and ideas for action.

4. Dynamic capabilities and knowledge

The increasing importance of specific resources and capabilities of the firm highlights the key role of intangibles in achieving competitive advantage. And among all the intangibles, for its highly strategic role, it is noteworthy the knowledge.

Dynamic capabilities can be explained through the epistemological dimension of tacit knowledge (cognitive and technical). Planning, coordination and control of knowledge flows produced by the company allows the creation of core competencies that provide value to the organization.

In this creative process of core competencies is particularly relevant the perspective of dynamic capabilities (as approach to analyze how to develop specific capabilities to regenerate, renew and revitalize, in line with the rates of change in the competitive environment, skills essential to the company).

Thus, the firm is based on knowledge (as a set of processes that identify, create, develop, renovate and apply knowledge flows to create core competencies) and dynamic organizational learning capacity (as configurator factor and driving force behind the creation of knowledge).

Zollo and Winter (2002) argued that one way to create distinctive competencies would be through the process that articulates implicit knowledge through group discussions, realizing processes evaluation. Thus, to share individual experiences and compare them could improve the level of understanding of the causal mechanisms involved in the relationship of certain tasks (Liebowitz, Beckman, 1998).

Knowledge is recombined through internal and external learning, leading to combinative capabilities. Through these capabilities, the organization creates new applications that will lead to better technological and organizational opportunities and, consequently, better market opportunities (Kogut, Zander, 1992).

In turn, the strength of the ability to assimilation of external knowledge depends on the internal capabilities of the company and how the organization structures their relationship with the environment.

Therefore, the skills and competencies required of internal accumulation of knowledge, such as learning and acquisition of external sources, for the creation, maintenance or improvement (Zollo, Winter, 2002).

Learning and knowledge are two different and complementary (mutually reinforcing) dimensions of a superior dynamic competition: innovation (Helfat, Raubitschek, 2000).

Learning mechanisms (e.g. repeated practice, small errors, crisis, speed of experience, etc.) guide the evolution of dynamic capabilities. When there are different dynamic capabilities, execution order may be essential because some capabilities could be necessary before than others, so it must be previously learned (Eisenhardt, Martin, 2000).

The focus on the firm and its principles and their implementation in practice or techniques associated with them generates a relevant environment for the development of certain distinctive competencies (Beckman, 1997).

5. Conclusion

This research reviews from a theoretical perspective the relations between dynamic capabilities and knowledge as important intangibles enabling superior competitive advantages.

From the perspective of resource-based view theory, dynamic capabilities are a relevant source of competitive advantages. These capabilities are specific for each organization since they were developed within it. Knowledge is a valuable intangible that combines and generated dynamic capabilities. Simultaneously the firm applies knowledge flows to create core competencies.

In a context of increasing global competition and uncertainty, the interaction of intangibles such as dynamic capabilities and knowledge are crucial for the success of the company.

Bibliography

1. Amit R., Schoemaker P. (1993), Strategic Assets and Organizational Rent, *Strategic Management Journal*, No. 14.
2. Barney J.B. (1995), Looking Inside for Competitive Advantage, *Journal of Management Executive*, Vol. 9, No. 4.
3. Brush T.H., Artz K.W. (1999), Toward a Contingent Resource-based Theory: The Impact of Information Asymmetry on the Value of Capabilities in Veterinary Medicine, *Strategic Management Journal*, No. 20.
4. Burstein F., Linger H. (2003), Supporting Post-fordist Work Practices: A Knowledge Management Framework for Supporting Knowledge Work, *Information Technology & People. Special Issue on Organizational Implications of Knowledge Management Systems*, Vol. 16, No. 3.
5. Camisón C. (1999), *Sobre cómo medir las competencias distintivas: un examen empírico de la fiabilidad y validez de los modelos multi-item para la medición de los activos intangibles*, First International Conference of the Iberoamerican Academy of Management: Management Related Theory and Research: An Iberoamerican Perspective, Madrid.
6. Davenport T.H., Prusak L. (1998), *Working Knowledge: How Organizations Manage What They Know*, Boston, Massachusetts, Harvard Business School Press.
7. García Morales V.J. (2004), *Aprendizaje organizacional: delimitación y determinantes estratégicos*, Universidad de Granada.
8. Ghemawat P. (1991), *Commitment – The Dynamic of Strategic*, New York, The Free Press.
9. Grant R.M. (1991), The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation, *California Management Review*, Vol 33, No. 3.
10. Grant R.M. (1996a), *Dirección Estratégica. Conceptos, Técnicas y Aplicaciones*, Madrid, Civitas.
11. Grant R.M. (1996b), Toward a Knowledge-Based Theory of the Firm, *Strategic Management Journal*, Vol. 13.
12. Grant R.M. (1997), The Knowledge-bases View of the Firm: Implications for Management Practice, *Long Range Planning*, Vol. 30, No. 3.
13. Griffith D.A., Harvey M.G. (2001), A Resource Perspective of Global Dynamic Capabilities, *Journal of International Business Studies*, No. 32.
14. Hall R. (1993), A Framework Linking Intangible Resources and Capabilities to Sustainable Competitive Advantage, *Strategic Management Journal*, No. 14.
15. Hargadon A., Fanelli A. (2002), Action and Possibility: Reconciling Dual Perspectives of Knowledge in Organizations, *Organization Science*, Vol. 13, No. 3, (May-June).

16. Helfat C.E., Peteraf M.A. (2003), The Dynamic Resource-based View: Capability Lifecycles, *Strategic Management Journal*, No. 24.
17. Hoopes D.G., Madsen T.L., Walker G. (2003), Why is There a Resource-Based View? Toward a Theory of Competitive Heterogeneity, A Guest Editors' Introduction, *Strategic Management Journal*, Vol. 24.
18. Kogut B., Zander U. (1992), Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology, *Organization Science*, Vol. 7.
19. Lee L.T., Sukoco B.M. (2007), The Effects of Entrepreneurial Orientation and Knowledge Management Capability on Organizational and Knowledge Effectiveness in Taiwan: The Moderating Role of Social Capital, *International Journal of Management*, Vol. 24, No. 3.
20. Lieberman M.B., Montgomery D.B. (1998), First-mover (dis)Advantages: Retrospective and Link with the Resource-based View, *Strategic Management Journal*, Vol. 19.
21. López Sintas J. (1996), Los recursos intangibles en la competitividad de las empresa: un análisis desde la teoría de los recursos, *Economía Industrial*, No. 307.
22. Mahoney T.A., Pandian J.R. (1992), The Resource Based View within the Conversation of Strategic Management, *Strategic Management Journal*, Vol. 13.
23. Makadok R. (2001), Toward a Synthesis of the Resource-based and Dynamic-capability Views of Rent Creation, *Strategic Management Journal*, No. 22.
24. Miller D. (2003), An Asymmetry-based View of Advantage: Towards an Attainable Sustainability, *Strategic Management Journal*, Vol. 24, No. 10.
25. Moreno-Luzón M.D., Balbastre F., Escribá M.A., Lloria M.B., Martínez J.F., Méndez M., Oltra V., Peris F.J. (2001), La generación de conocimiento en la organización: Propuesta de un modelo integrador de los distintos niveles ontológicos de aprendizaje, *Quadern de Treball*, No. 126, Facultad de Economía, Universidad de Valencia.
26. Nelson R.R., Winter S.G. (1982), *An Evolutionary Theory of Economic Change*, Cambridge, MA, Belknap Press and Harvard University Press.
27. Nonaka I., Takeuchi H. (1995), *The Knowledge-creating Company*, New York, Oxford University Press.
28. Peteraf M. (1993), The Cornerstones of Competitive Advantage: A Resource-Based View, *Strategic Management Journal*, No. 14.
29. Polanyi M. (1967), *The Tacit Dimension*, London, Routledge and Keoan Paul.
30. Prahalad C., Hamel G. (1990), The Core Competence of the Corporation, *Harvard Business Review*, Vol. 68, No. 3.
31. Quinn J.B. (1993), Managing the Intelligent Enterprise: Knowledge and Service-based Strategies, *Planning Review*, Vol. 13, No. 1.
32. Teece D., Shuen A., Pisano G. (1997), Dynamic Capabilities and Strategic Management, *Strategic Management Journal*, No. 18.
33. Zahra S.A., George G. (2002), Absorptive Capacity: A Review, Reconceptualization, and Extension, *Academy of Management Review*, No. 27.
34. Zollo M., Winter S. (1999), *From Organizational Routines to Dynamic Capabilities*, Working paper of the Reginald H. Jones Center, Philadelphia, The Wharton School, University of Pennsylvania.
35. Zott C. (2003), Dynamic Capabilities and the Emergence of Intraindustry Differential Firm Performance: Insights from a Simulation Study, *Strategic Management Journal*, Vol. 24.

Chapter 28

Education as a Direct Entrepreneurial Condition

Božidar Leković, Slobodan Marić

1. Introduction

This is a topic that stands out attracting considerable attention within the entrepreneurial environment but also in a number of studies such as the GEM project in the part of the expert assessment section of the entrepreneurial environment. After ten years of continuous research in all the countries participating in the project, an expert report gives a general impression that the program of education and training within the education system is inadequate. Also, in most countries, this report emphasizes that education and training for entrepreneurs in the informal part of the system is very poor. Taking into account that many other studies investigate the link between education and training and entrepreneurship, GEM model identifies entrepreneurship education and training as a direct entrepreneurial conceptual framework conditions that affect the level and nature of entrepreneurial attitudes, aspirations and activities which are all manifested in the volume new entrepreneurial ventures/companies within an economy.

One of the dilemmas present in the area of entrepreneurship, which has no firm basis, exists in the question whether entrepreneurs are born or bred, that is, whether knowledge and skills for entrepreneurial behaviour can be learnt. This is not only characteristic of the general public, but also present in the scientific community, in the form of dilemma whether entrepreneurial knowledge and skills can be taught and learnt. Entrepreneurial knowledge only is not enough for a successful implementation of entrepreneurial ventures; it must also be built on with knowledge in the area of management. As education in the management sphere is reified and confirmed, that is, essential for achieving entrepreneurial success, the doubt remains over entrepreneurial education, its structure, content, and especially manner of implementation.

2. Education and its impact on entrepreneurship – theoretical background

2.1. Possibilities of acquiring entrepreneurial knowledge and skills

In view of the above facts, successful conceiving of the answer to the above asked question vitally requires defining the outcome of the education process in the field of entrepreneurship,

that is, what kind of knowledge and skills are offered to potential students within the given programme. This requires distinguishing between the concepts of entrepreneurship management, so that the knowledge acquisition process itself can be distinguished and defined precisely. By analysis of the available literature, entrepreneurship is defined as functional management skills and abilities required for establishing and developing small enterprises, while managing small enterprises was presented with personal abilities of (an) individual(s) to run a business. Entrepreneurial behaviour is stated as the development of learning skills, which will enable learning to become adapted to the individual and a job, which would be continued after the education and training programme, with the participation of enterprises in this process.

In the highly developed countries, where awareness is present of the need for entrepreneurial education primarily confirmed by numerous programmes spread throughout universities in the area of business economic has lately been extracted from this environment and is present in the current offers of informal educational institutions. Admittedly, interest in the area of entrepreneurial education, both by scholars and the business community, is not diminishing. All of this is resulting in the fact that the topic of entrepreneurial education and training is continuously gaining importance in literature, whereas research into this area is also growing. These trends are not only present within academic literature, but the growth has extended to printed and professional publications such as consultancy reports. It is no surprise that the results from the studies presented in the report point out that entrepreneurship can be learnt, or, if not learnt, then at least developed at the minimum level through entrepreneurial education.

However, regardless of everything, the conduct of the evaluation of the training programme can be very complex. First of all, what is it that we mean by success of entrepreneurial education? Furthermore, Wyckham (1989) noted that it was problematic to identify the appropriate measurements of program results in the form of causal relations. Storey (2010) argues that the best way to evaluate training is a direct relationship between program results and objectives. In accordance with this, Mc Mullan points out in advance that the objectives of entrepreneurial training should be primarily economic, such as appropriate measures in the form of launched ventures or savings, achieved income and growth, opened and maintained jobs, achieved financing and profitability. Rather than the majority of measures of entrepreneurship program evaluation, such as variables of instructor's knowledge, preparation and presentation style are just as present as the degree of complexity and the degree of interest in the programme itself. Wyckham (1989) confirms that most entrepreneurship education programmes were measured in three ways. It is very interesting that none of the approaches he presented aims to establish the financial consequences of course development. The first definitely implies that students' knowledge and skills are established through an examination. Secondly, courses and teachers are evaluated through a student evaluation questionnaire. After the course, when data is completed on the employment and income levels of graduate participants, it can be captured and evaluated. What is essentially pointed out by the same author is that universally accepted criteria that can be used for assessment of entrepreneurial programmes still have not been identified. Westhead (2001) draws attention to the fact that precise and careful methodologies are necessary for the evaluation of the training programs. He elaborates that, initially, the researchers tried to establish the results of the training programmes, surveying participants for their opinions. Admittedly, this approach is not usual, and as Mc Mullan (2001) points out, this is similar to most evaluations of entrepreneurship programmes that try to make use of this practical methodology. He advises that this type of subjective assessment should be limited to determination of satisfaction of participants, and cannot be used as a sub-

stitute for measuring the performance of program results. When we attempt to assess the impact or effectiveness of the course, he suggests the use of objective measures instead of the above mentioned ones. Westhead (2001) pointed out very obviously the limitations of purely subjective approaches to evaluation. First, there are situations when participants in practical courses are the representatives of the target population as a whole. Secondly, respondents can be directed within the research to give replies that the evaluator wants, rather than providing sincere replies. Thirdly, the impact of the programme can only be accessed by comparing the above with what respondents, who were not participants, wanted to happen. Also, ascribing the failure to personal characteristics of the individual may lead to increasing the effectiveness of the programme. Next, researchers must be aware that participants, in most cases, chose themselves for the program which can, in the case of evaluation process, lead to incorrectly performed evaluation. Sixthly, some forms of respondents' behaviour are currently more important than reports on their opinion.

2.2. Entrepreneurial education

Entrepreneurs can participate in entrepreneurial education and training at different points of their lives and in different forms. In educational programs throughout Europe, more precisely in Scotland, participants may attend programs in most elementary schools in the form of "enterprise education", which is not specifically training in launching new business ventures, but rather in entrepreneurship within a general approach to the fact stated within the GEM report. Also, at some universities, they can attend education on entrepreneurship, which is also not designed to provide training on start-up. Creating new business ventures is the context of academic education rather than a goal by itself. In GEM report (2008), entrepreneurial education is defined in a broader sense as building knowledge and skills on entrepreneurship in general, as a part of an educational programme that is to be found in elementary, secondary and higher education institutions, whereas entrepreneurial training is defined as building knowledge and skills in preparation for launching a new business venture. Thus presented, entrepreneurial training is very specific and narrowly oriented and, as such, cannot be compared with the proposal of entrepreneurial programme, which is a far broader notion. Furthermore, individuals may attend entrepreneurship education and training for start-up at elementary and secondary schools, but also during the studies at the university. These courses can be a part of the formal system of education, which implies gaining certain certificates or diplomas. Some informal training functions outside elementary educational system, including courses, seminars or other types of training organised by local economic organisations, employers or government agencies. Some point out that people who were previously exposed to entrepreneurship become entrepreneurs of some sort in their lifetime. "Facts in favour of this say that a predominantly high level of entrepreneurial activities exists in individuals whose parents were self-employed or have a business of their own (Henley, 2007). In a nutshell, we can say that children of entrepreneurs develop a practical perception and skills by observing their parents and participating in family business activities. What remains a doubt is whether some educational and training programmes can substitute this form of learning" (GEM, 2008). This opens the subject on which type of entrepreneurial education is the best, which can depend on the educational framework itself, for instance, whether it is learning in elementary, secondary schools or universities, or it is a programme outside this context. "Most authors agree that experimental learning or learning by doing is much more effective for the de-

velopment of entrepreneurial skills and attitudes than traditional methods such as lectures” (European Commission, 2008; Walter, Dohse, 2009). But, likewise, entrepreneurial education results in more than the development of practical business skills. It can all make an impact on the motivation of individuals to strive towards something that may seem simply impossible or very risky, and which is, we can agree, in the final instance an impact on the individual’s perception and his view of the environment in which he lives through the prism of the market. Entrepreneurship is by nature multidisciplinary, so that entrepreneurial education and training require learning numerous business skills. The European commission asks whether business schools are still predominantly places for teaching entrepreneurship, giving their view that the most innovative and most realistic ideas come from technical and creative disciplines. Similarly the cited positions of Katz (2003) in this report confirm that the growth in entrepreneurial education and training came from outside business schools. Demands for entrepreneurship education are recognised in the question of usefulness of the traditional practices, heralding a need for a change in the understanding of the current education and training routine, as concluded by WEF (2009): “New teacher pedagogy and interdisciplinary framework represent a challenge for teachers and institutions. Sorgman and Parkinson (2008) opine that many schoolteachers are unprepared for these new challenges. As seen in WEF report on Global educational initiatives (WEF, 2009), a change in the existing school system will require time”. The conclusion of this document is that “training of trainers” can be the best way for developing programmes.

In addition to numerous demands and challenges of entrepreneurial education and training, there are also numerous possibilities of influencing the perception and development of skills and ambitions of current and potential entrepreneurs.

3. Data and methodology

3.1. Data and observed features

The basic data source of analyzed variables in the work represents the results of the GEM project in 2011. The criterion for choice of countries was the availability of data for every country per selected variables, i.e. countries participants in the GEM project, 2011. The countries were grouped into three stages of economic development according to the WEF methodology, as explained in GCI (Global Competitiveness Report 2009-2010; Schwab, 2009) according to the Factor – driven economies as countries of the lowest development degree, Efficiency – driven economies as the countries of the medium development degree and Innovation – driven economies as the group of the most developed countries. The source of data for the features of economic development degree is International Monetary Fund, World Economic Database, October, 2011.

To satisfy research intentions, the following features were selected, which would represent observed appearances. The category variable of group of countries classified towards the WEF methodology (COUNTRY GROUP GCR REPORT 2009-2010 – 3 CAT) is used for the development degree, as well as GDP per capita in US\$ on PPP Basis. The volume and structure of entrepreneurial activities per the grades of entrepreneurial process is represented by variables of Suboan09 (% 18-64 pop [7/09] START-UP/NASCENT (SU): active past year, (part) owner, no wages yet), Babybu09 (% 18-64 pop [7/09] BABY BUS OWNER (BB): owns-manages business with income < 3.5 years), TEA09 (% 18-64 pop [7/09] TEA involvement: setting up firm or owner of young firm (SU or BB)) and Estbbu09 (% 18-64 pop [7/09] ESTABL BUS OWNER

(EB): owns-manages business with income > 3.5 years), while the education of entrepreneurs were reported by next variables: TEA1WS3 (% 18-64 pop [7/10] Students/retired: % involved in TEA), TEA11ed1 (% 18-64 pop [7/10] some secondary degree: % involved in TEA), TEA11ed2 (% 18-64 pop [7/10] secondary degree: % involved in TEA), TEA11ed3 (% 18-64 pop [7/10] post-secondary degree: % involved in TEA), TEA11ed4 (% 18-64 pop [7/10] graduate experience: % involved in TEA), EB_11ed1 (% 18-64 pop [7/10] some secondary degree: % involved in EB), EB_11ed2 (% 18-64 pop [7/10] secondary degree: % involved in EB), EB_11ed3 (% 18-64 pop [7/10] post-secondary degree: % involved in EB) and EB_11ed4 (% 18-64 pop [7/10] graduate experience: % involved in EB).

3.2. Hypotheses of researching

The main aim of the analysis is oriented towards economic system conditions of the environment, i.e. at the stage of favourableness of specific entrepreneurial context expressed in three stages of economic development according to the specification of WEF methodology. The aim is to represent the measure in which the economic environment of different degree of development can show different level of entrepreneurs education in different phase of entrepreneurship process. As a contribution to this analysis, we define this hypothesis:

H1, there is a statistically significant difference between defined groups of countries of different development degree according to level of entrepreneurs education.

4. Analysis of the research results and discussion

Appreciating the theoretically accepted starting point that the main entrepreneurial resource is knowledge, which undergoes transformation like any other resource, but this time into economic knowledge, which is reflected in recognising business opportunities on the market, whereas the power of perception of those is determined by the amount of the entrepreneur's original knowledge. The entrepreneur's knowledge acquisition itself, that is, his process of education, viewed by volume and structure, is the key factor of entrepreneurial ventures and the positive outcome, that is, the success of the entrepreneurial venture. Also, what was pointed out in the theoretical part of this article is the development of entrepreneurial education, the level of awareness of the need itself, like the results of the educational process, is determined by the degree of development of the country. The analysis of the level of the entrepreneur's education depending on the degree of economic activity is presented in Table 1. The table identifies two clearly separated groups of observed variables, with statistical significance and without. The variables of education level with a statistically significant difference in relation to the defined groups of countries of different degree of development were identified in the initial stages entrepreneurial process within index TEA (Total Early Stage Entrepreneurial Activity). These results indicate that level of the economic development determines level of education of the entrepreneurial activity. These differences are visible in the initial stages of the entrepreneurial process, determined by the conditions of the business environment. Preliminary conclusion based on the details arising from the following analysis.

With the features % 18-64 pop [7/10] Students/retired: % involved in TEA, statistically significant difference is perceived at the level $p < 0.05$ between three groups of countries $F(2, 189.219) = 7.987, p = .001$. The real difference between the medium values of groups is at

the level of small expressed by means of the indicator eta square is 0.25. The subsequent comparison by means of Tukey HSD test point to that the group of countries named as Innovation Driven Economies differ differently from Efficiency Driven Economies and Factor Driven Economies by previous variable.

With the features % 18-64 pop [7/10] some secondary degree: % involved in TEA, statistically significant difference is perceived at the level $p < 0.05$ between three groups of countries $F(2, 1708.827) = 11.29, p = .000$. The real difference between the medium values of groups is at the level of medium expressed by means of the indicator eta square is 0.30. The subsequent comparison by means of Tukey HSD test point to that the group of countries named as Innovation Driven Economies differ differently from Efficiency Driven Economies and Factor Driven Economies by previous variable.

Table 1. ANOVA analysis of entrepreneurial education by level of country development

		Sum of Squares	df	Mean Square	F	Sig.
% 18-64 pop [7/10] Students / retired: % involved in TEA	Between groups	62.973	2	31.486	7.987	.001
	Within groups	189.219	48	3.942		
	Total	252.192	50			
% 18-64 pop [7/10] some secondary degree: % involved in TEA	Between groups	742.103	2	371.051	11.29	.000
	Within groups	1,708.827	52	32.862		
	Total	2,450.930	54			
% 18-64 pop [7/10] secondary degree: % involved in TEA	Between groups	915.537	2	457.768	21.35	.000
	Within groups	1,093.329	51	21.438		
	Total	2,008.865	53			
% 18-64 pop [7/10] post- secondary degree: % involved in TEA	Between groups	891.649	2	445.824	10.37	.000
	Within groups	2,233.845	52	42.959		
	Total	3,125.494	54			
% 18-64 pop [7/10] graduate experience: % involved in TEA	Between groups	658.219	2	329.109	7.652	.002
	Within groups	1,720.448	40	43.011		
	Total	2,378.667	42			
% 18-64 pop [7/10] some secondary degree: % involved in EB	Between groups	9.167	2	4.583	.154	.858
	Within groups	1,337.077	45	29.713		
	Total	1,346.243	47			
% 18-64 pop [7/10] secondary degree: % involved in EB	Between groups	23.585	2	11.792	.522	.596
	Within groups	1,152.145	51	22.591		
	Total	1,175.729	53			
% 18-64 pop [7/10] post- secondary degree: % involved in EB	Between groups	38.642	2	19.321	1.426	.249
	Within groups	704.370	52	13.546		
	Total	743.012	54			
% 18-64 pop [7/10] graduate experience: % involved in EB	Between groups	58.343	2	29.172	.773	.468
	Within groups	1,586.004	42	37.762		
	Total	1,644.347	44			

Source: author's calculation.

With the features % 18-64 pop [7/10] secondary degree: % involved in TEA, statistically significant difference is perceived at the level $p < 0.05$ between three groups of countries $F(2, 1,093.329) = 21.35$, $p = .000$. The real difference between the medium values of groups is at the level of medium expressed by means of the indicator eta square is 0.46. The subsequent comparison by means of Tukey HSD test point to that the group of countries named as Innovation Driven Economies differ differently from Efficiency Driven Economies and Factor Driven Economies by previous variable. With the features % 18-64 pop [7/10] post-secondary degree: % involved in TEA, statistically significant difference is perceived at the level $p < 0.05$ between three groups of countries $F(2, 2,233.845) = 7.652$, $p = .002$. The real difference between the medium values of groups is at the level of small expressed by means of the indicator eta square is 0.28. The subsequent comparison by means of Tukey HSD test point to that the group of countries named as Innovation Driven Economies differ differently from Efficiency Driven Economies and Factor Driven Economies by previous variable. With the features % 18-64 pop [7/10] post-secondary degree: % involved in TEA, statistically significant difference is perceived at the level $p < 0.05$ between three groups of countries $F(2, 1,720.448) = 10.37$, $p = .000$. The real difference between the medium values of groups is at the level of small expressed by means of the indicator eta square is 0.28. The subsequent comparison by means of Tukey HSD test point to that the group of countries named as Innovation Driven Economies differ differently from Efficiency Driven Economies and Factor Driven Economies by previous variable. In the more mature stages of the entrepreneurial process, after the early stage entrepreneurial activity, differences depending on the level of education of holders of entrepreneurial activity were absent. Not existence the mentioned differences depending on the level of economic development of a country, as a determinant of the business environment, are the consequence of the circumstances in which entrepreneurs a higher level of education come to a more mature phase of the entrepreneurial process when the differences are not visible depending on the level of economic development.

5. Conclusion

The entrepreneur's knowledge acquisition process itself, that is, his education process, viewed by volume and structure, is the key factor of entrepreneurial ventures and positive outcome. What we were able to conclude is that specific entrepreneurial education is directly conditioned by the quality and efficiency of exclusively entrepreneurial education and training processes, which are often dislocated from the usual education system, as they require great dedication and expertise aimed at achieving the adequate and efficient outcome.

The variables of education level with a statistically significant difference in relation to the defined groups of countries of different degree of development were identified in the initial stages entrepreneurial process within index TEA (Total Early Stage Entrepreneurial Activity). These results indicate that level of the economic development determines level of education of the entrepreneurial activity. These differences are visible in the initial stages of the entrepreneurial process, determined by the conditions of the business environment.

In the more mature stages of the entrepreneurial process, after the early stage entrepreneurial activity, differences depending on the level of education of holders of entrepreneurial activity were absent. Not existence the mentioned differences depending on the level of economic development of a country, as a determinant of the business environment, are the consequence

of the circumstances in which entrepreneurs a higher level of education come to a more mature phase of the entrepreneurial process when the differences are not visible depending on the level of economic development.

Bibliography

1. Aronsson M. (2004), Education Matters – But Does Entrepreneurship Education? An Interview with David Birch, *Academy of Management Learning & Education*, 3(3).
2. Bertrand Y. (1995), *Contemporary Theories and Practice in Education*, Madison, WI, Atwood Publishing.
3. Block Z., Stumpf S.A. (1992), Entrepreneurship Education Research: Experience and Challenge [in:] *The State of the Art of Entrepreneurship*, (eds.) D.L. Sexton, J.D. Kasarda, Boston, MA, PWS-Kent Publishing Company.
4. European Commission (2008), *Entrepreneurship in Higher Education Especially within Non-Business Studies: Final Report of the Expert Group*, Brussels.
5. Garavan T.N., O’Cinneide B. (1994), Entrepreneurship Education and Training Programmes: A Review and Evaluation – Part 1, *Journal of European Industrial Training*, 18(8).
6. GEM Global Report 2011.
7. Gibb A.A. (1994), Do We Really Teach (Approach) Small Business The Way We Should?, *Journal of Small Business & Entrepreneurship*, 11(2).
8. Gibb A.A. (2000), SME Policy, Academic Research and The Growth of Ignorance, Mythical Concepts, Myths, Assumptions, Rituals and Confusions, *International Small Business Journal*, 18(3).
9. Henley A. (2007). Entrepreneurial Aspiration and Transition into Self-employment: Evidence from British Longitudinal Data, *Entrepreneurship & Regional Development*, 19(3).
10. Jack S.L., Anderson R. (1998), Entrepreneurship Education within the Condition of Entrepreneurology, *Proceedings of the Conference on Enterprise and Learning*, Aberdeen.
11. Kantor J. (1988), Can Entrepreneurship be Taught? A Canadian Experiment, *Journal of Small Business & Entrepreneurship*, 5(4).
12. Katz J.A. (2003). The Chronology and Intellectual Trajectory of American Entrepreneurship Education: 1876-1999, *Journal of Business Venturing*, 18(2).
13. Lazear E.P. (2005), Entrepreneurship, *Journal of Labor Economics*, 23(4).
14. Levie J. (2006), *From Business Plans to Business Shaping: Reflections on an Experiential New Venture Creation Class. WP040/2006*, London, UK, National Council for Graduate Entrepreneurship.
15. Levie J., Autio E. (2008), A Theoretical Grounding and Test of the Gem Model, *Small Business Economics*, Vol. 31, Iss. 3.
16. Miller A. (1987), New Ventures: A Fresh Emphasis on Entrepreneurial Education, *Survey of Business*, Vol. 23, No. 1.
17. Porter M.E., Schwab K. (2009), *The Global Competitiveness Report 2008-2009. In World Economic Forum*.
18. Shepherd D.A., Douglas E.J. (1996), Is Management Education Developing or Killing the Entrepreneurial Spirit?, *Proceedings of the Internationalising Entrepreneurship Education and Training Conference*, Arnhem, June.

19. Solomon G. et al. (2002), The State of Entrepreneurship Education in the United States: A Nationwide Survey and Analysis, *International Journal of Entrepreneurial Education*, 1(1).
20. Sorgman M., Prakison K. (2008), The Future is Now: Preparing K-12 Teachers and Students for an Entrepreneurial Society, *Journal of Entrepreneurship Education*, 11.
21. Storey D.J. (2000), Six Steps to Heaven: Evaluating the Impact of Public Policies to Support Small Business in Developed Economies [in:] *The Blackwell Handbook of Entrepreneurship*, (eds.) D. Sexton, H. Landstrom, Oxford, Blackwell.
22. Vesper K.H. (1982), Research on Education for Entrepreneurship [in:] *Encyclopedia of Entrepreneurship*, (eds.) C.A. Kent, D.L. Sexton, K.H. Vesper, NJ, Prentice-Hall, Englewood Cliffs.
23. Walter S.G., Dohse D. (2009), The Interplay between Entrepreneurship Education and Regional Knowledge Potential in Forming Entrepreneurial Intentions, *Kiel Working Paper*, No. 1549.
24. Westhead P., Storey D.J., Martin F. (2001), Outcomes Reported by Students Who Participated in the 1994 Shell Technology Enterprise Programme, *Entrepreneurship & Regional Development*, 13(2).
25. Wyckham R.G. (1989), Ventures Launched by Participants of an Entrepreneurial Education Program, *Journal of Small Business Management*, Vol. 27, No. 2.

Chapter 29

An Influence of the Qualities of the Knowledge-based Economy on the Development of Network Relations¹

Karolina Orzel

1. Introduction

The multiplication of resources, interpreted as raw materials and materials, were the major goal of the functioning of traditionally understood economy. However, as a result of the transformations which took place in the 20th century, the significance of knowledge as a factor of the economic growth increased rapidly. The way of its identification also changed – knowledge was no longer identified with the sphere of research and development or the knowledge of scientists only (Sroka, 2012, p. 20) but it was perceived as a strategic asset which, in addition to other intangible assets, must be skillfully used by market players. We can claim that in the traditional economy, the “bigger and heavier” the products manufactured by a firm were, the bigger profit it made (Obłój, 2002, p. 125), because they contained more tangible resources. However, in the contemporary economy we can observe a complete reversal of this relation, namely “the smaller and lighter” the product is, the bigger profits the firm achieves because its price is determined by intangible resources contained in it (Łobejko, 2010, p. 143).

2. The knowledge-based economy – literature overview

The term *knowledge* is understood as flexible and dynamic non-material substance being an effect of the mental processing of the sets of information possessed and acquired by the man (Mikuła et al., 2007). Recognizing knowledge as a new developmental factor, as a new form of capital leads to a necessity of adequate discovering, locating, collecting and creating, as well as – which is most important – implementing it on the level of an individual, a team, a firm,

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a group and the regional system (Szromnik, 2010). The significance of knowledge in the contemporary economic life is described by two notions (Beliczyński et al., 2009, p. 169):

1. The economy of knowledge – which concerns creating and managing knowledge in the society.
2. The knowledge-based economy (KBE) – a broader and more frequently used notion being a basic element of the information society or the knowledge society.

The notion of the knowledge-based economy appears in various forms in papers of numerous authors analyzing changes undergoing in the contemporary society. Both scientists and practitioners in management, economics or sociology wrote about it. We can mention here, among others, Peter Drucker (1999), Alvin Toffler (1997), Don Tapscott (1998), John Naisbitt (1997) or Manuel Castells (2003). The first explanation of the KBE goes back to 1996, when OECD defined the term as “economies directly based on the production, distribution and use of knowledge and information” (OECD, 1996). Then it was completed by APEC with the issue that “the production, distribution and use of knowledge is the main driver of growth, wealth creation and employment across all industries” (APEC, 2000). We should stress here that every economy, both agrarian and industrial one, was based on knowledge adequate to contemporary needs and capabilities of those economies (Siuta-Tokarska, 2012, p. 121).

Due to a broad scope of the notion “knowledge-based economy” it should be considered that it is a kind of a metaphor and therefore it is not necessary and possible to give its general and univocal definition. What is more, in the literature of the subject it is hard to find a universal definition of the KBE. The majority of available papers focus on the isolation of features characteristic for this type of economy, which, when operating jointly, create a picture of a certain whole.

Thus, A. Koźmiński, within the framework of the micro-economic approach, observes that the KBE stands for an economy in which a lot of enterprises operate which base their competitive advantage on knowledge (Koźmiński, 2001). According to the quoted author, the basic qualities of the KBE can include (Koźmiński, 2002):

- high share of expenditure on education, scientific research, intellectual services, as well as on information and communications products and services, the result of which is a high level of education and the common use of modern information techniques;
- well-developed structure, particularly the information one;
- high level of transaction safety and mutual trust of entities operating on the market, which arises from the legal order and the efficient system of the enforcement of law;
- global character, which concerns both products and the basic factor of production, which is knowledge;
- the development of products and firms based on knowledge to a great extent is an effect of entrepreneurship.

On the other hand, in the macro-economic approach, the KBE means an economy in which knowledge (codified and tacit) is simultaneously created, assimilated, passed and used more effectively by enterprises, organizations, natural persons and communities, fostering fast development of economy and the society. According to A. Kukliński, a definition constructed in this way builds a framework for the analysis of the whole range of options in both educational policy and information infrastructure and the system of innovations which popularize the development of the KBE (Kukliński, 2007).

On the other hand, in J. Kleer’s (2003) opinion, the features which are characteristic for the KBE include, among others:

- adequately high level of economic development (income per capita);
- proper structure of economy, adjusted to the market requirements and the world trends;
- considerable share of the society with higher education – at least half of the working population;
- high share of expenditure on R&D;
- innovativeness understood as a function of at least three variables: creative people, demand for innovation and adequate pro-innovative climate;
- open character of the society and economy;
- clear modification of the function of the public sector with regard to the growth of activeness in at least four areas: education, research and development, natural capital (ecology) and local government.

We can see the biggest number of qualities of the knowledge-based economy when we compare it with the traditional economy (see Tab. 1). We can notice that in the new economy everything focuses on the man, his skills, knowledge, the whole process of acquiring it, and expenditure related to it are most important. It is even more relevant since alongside the globalization processes human capital becomes more and more mobile, as it takes place with regard to financial capital (Pawluczuk, 2008, p. 49).

Table 1. Traditional economy versus knowledge-based economy

Qualities of the economy	Type of economy	
	Traditional economy	Knowledge-based economy
Basic asset (factor of production)	Capital	Knowledge, information
Prevailing sector	Heavy industry, traditional branches of industry (asset-intensive) prevail, enforcing a large scale of production	Services prevail. Production changes fast – small series
Strategy of operation	Orientation to competition	Orientation to cooperation
Production relations	Organization of production vertically integrated in the whole national economy	Disintegration, permanent cooperation bonds with small firms, joint ventures and strategic alliances in various spatial cross sections prevail vertically
Market value	Depends on possessed financial and tangible assets	Depends on intellectual capital (intangible assets)
Perceiving the volatility of the environment	Lack of acceptance for volatility – threat	Acceptance of volatility – opportunity
Development	Linear, foreseeable,	Chaotic, difficult to foresee
Organization of labour	Subject to the philosophy of mass production and standardization arising from the economies of scale	Flexible approach prevails to which production apparatus is subordinate
Perceiving the workforce	The source of costs	Investment

Motivations of the workforce	Mainly financial incentives	Inner satisfaction
Relations with suppliers and customers	One-way through the market	Interactive through cooperation
The use of modern technologies	Important	Indispensable
Organizational structure	Hierarchical (most often bureaucratic and centralized)	Network (virtual), flat, ad-hoc for a specific venture
Management style	Orders and control	Participative
Sources of power	Organizational hierarchy	Skills, knowledge and goodwill
Ground-breaking invention	Production line	the Internet
Organizational culture	Based on obedience	Based on trust
International economic relations	Cooperation between individual countries, protectionism	Globalization of economy, cooperation on the regional and local level

Source: Siuta-Tokarska, 2012, p. 124.

It is commonly believed that the basic carriers of the KBE are: science, high-tech industries, knowledge intensive services and education (Płowiec, 2007), and among distinguishing features of the KBE we can indicate (Różga-Luter, 2004): acceleration of knowledge creation, the growth of the significance of non-financial and intangible capital, adopting innovativeness as a priority activity and revolution in knowledge resources – which considerably differentiates this type of economy from so-called traditional one.

3. An influence of the qualities of the knowledge-based economy on the development of network relations

In the economic literature, in addition to the notion of the knowledge-based economy, also the following terms occur: the new economy, the digital economy, the knowledge driven economy, the network economy and the knowledge economy. Most often, the terms are used as synonyms but in a more careful analysis we can discover some differences.

K. Perechuda (2013, p. 16) thinks that the network economy (virtual electronic, the knowledge economy, etc.) is the space of reference for contemporary businesses and it can be defined as the vibrating economy, which means that “starting vibrations” in any node of the network triggers immediate resonance in the whole system of economic relations.

Significant features of the economy defined in such a way are (Perechuda, 2013):

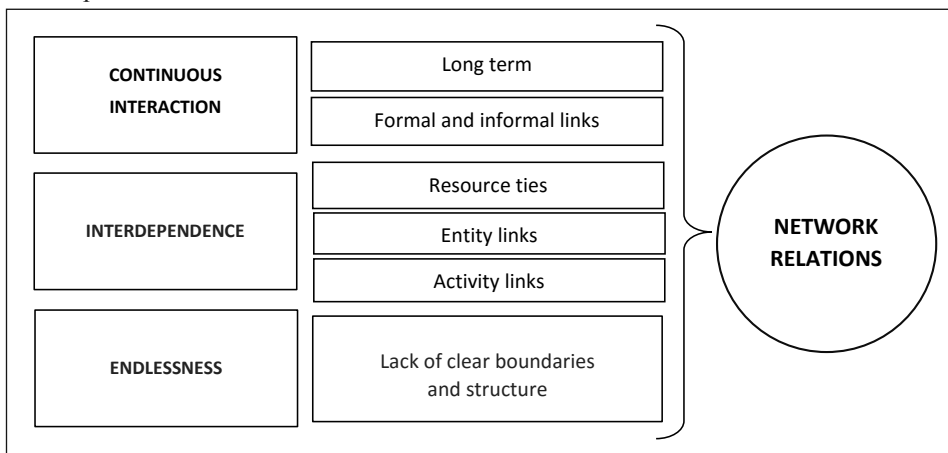
1. Prevalence of dynamics over statics.
2. Reorientation from events to processes.
3. Advantage of information and knowledge over tangible assets.
4. Overlapping of the fields of influence of economic organizations.
5. Creating mental barriers of entry to the network.
6. Vagueness of intra-network relations.

- 7. Large, hidden barriers of entry to the network.
- 8. Multi-layer maps of processes.
- 9. Chaos created by low-signal impulses.
- 10. Relationship marketing, superseding traditional marketing instruments.

The outlined picture of the network as a structure not possessing a centre, orbits or permanent relations, and being an endless web of causes, which represents “any connections, any intelligence, mutual relations of economic and social issues, any communications, systems, almost everything which is perceived as interesting and important” (Kelly, 2001, p. 1) has become the symbol of the next century. Adopting the perspective of the network approach, to some extent we can have an impression that “everything is a network”. Through established contacts, undertaken joint activities and mutual adaptation of resources, every enterprise creates its own networks of relations which connect with networks of other entities, creating an unlimited quasi-structure (Ratajczak-Mrozek, 2011, p. 9).

According to M. Ratajczak-Mrozek, we can designate 3 basic distinguishing features which, occurring jointly, prove that a specific relation is a network relation. They are: continuous interaction, interdependence and infinity (see Fig. 1).

Figure 1. Specific character of network relations



Source: Ratajczak, 2008, p. 197.

Continuous interaction with other market entities is the most fundamental activity of a firm (Ratajczak-Mrozek, 2009, p. 77) and as a result, becomes the central idea of the network approach. When analyzing this phenomenon, we have to reject the two-dimensional view of the relations and look at it as a whole, considering the fact that all links existing among entities in the network and the reactions undergoing among them give the basis for the full understanding of the operation of a contemporary enterprise. When discussing the interactions within network relations, it is necessary to pay attention to two issues characterizing them, namely the long term of interactions and the co-existence of formal and informal links. The long term constitutes an imminent feature of the interactions, inseparably connected with the historical development of network relations in time (Ratajczak-Mrozek, 2009, p. 78) and although finding a more attractive offer often

results in severing the relation, in principle, entities are oriented to their continuation, long-term cooperation. The specific character of network relations shows that in addition to classic formal links established as the outcome of technological, commercial or financial exchange, links of informal character (forming as a result of social exchange) take on great significance, their occurrence facilitates the flow of information among the entities and fosters the process of knowledge sharing.

Turbulent environment in which market actors operate brings about almost complete disappearance of entities which can meet their needs on their own, this is where strong focus on establishing network relations and the consent on correlations related to them comes from.

This type of interdependence can be discussed in three perspectives (Ratajczak-Mrozek, 2009, p. 197) as:

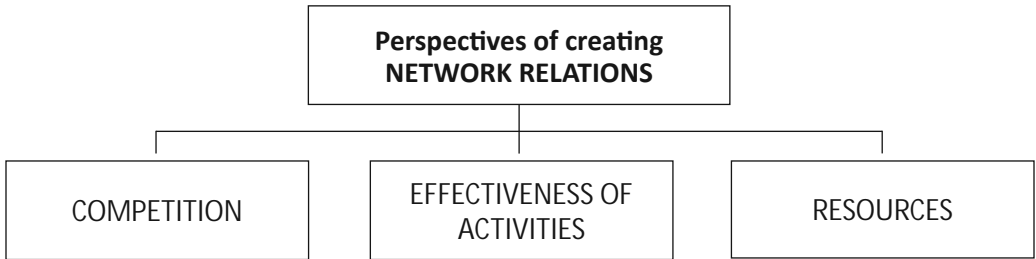
- resource ties – mean mutual exchange, adaptation and dependence on the resources controlled by other entities (Forsgren et al., 1995, p. 22) and are most important of the three discussed;
- entity links (actor bonds). The entities which are connected by network relations are all market participants. The relationships connecting the relation partners are based on experience, deepened knowledge (for example concerning production processes and necessary solutions) and mutual trust built with time;
- activity links – are based on undertaking joint activeness by partners exchanging resources. Each enterprise being a participant of a business network is enabled to fulfill only a part of tasks traditionally performed by one organization.

To sum up, we can observe that entities control resources and perform actions which in turn connect resources. On the other hand, on the level of resources, actions and entities interaction occurs. At the same time, it is the interdependence which enables the mobilization of a large part of a business network and conducting fast changes in response to changes in the economic environment (Ratajczak-Mrozek, 2009, p. 79).

The third of the identified features – infinity of relations and networks means that it is not possible to univocally and clearly determine the limits or the structure of a business network. In this context, the lack of clear limits means the lack of limits and categories imposed by traditional organizational structures. It must be emphasized that infinity is a result of infinite potential number of direct and indirect links among entities, and not infinity of resources in the world. Designating limits of the network is possible only via arbitrary judgement. Therefore, the picture of the network outlined by various entities is different because numerous firms do not know a full list of the business network participants in which they function (particularly with regard to non-direct relations).

In the contemporary economy, we can discern a lot of reasons for the occurrence of network relations, starting from the globalization of markets fostered by the liberalization of the world economy and the standardization of products, through “accelerated” technological transformations which even make it impossible to keep up with the next novelties necessary to keep the firm on the surface, and ending with an attempt to struggle with strong competition in the industry, which stops being sufficient on its own. According to W. Sroka, (2012) there are three motives for which entities on the market connect in network structures (see Fig. 2) – competition, effectiveness of activities and access to resources.

Figure 2. Reasons for the creation of network relations



Source: own study based on W. Sroka, 2012, p. 27.

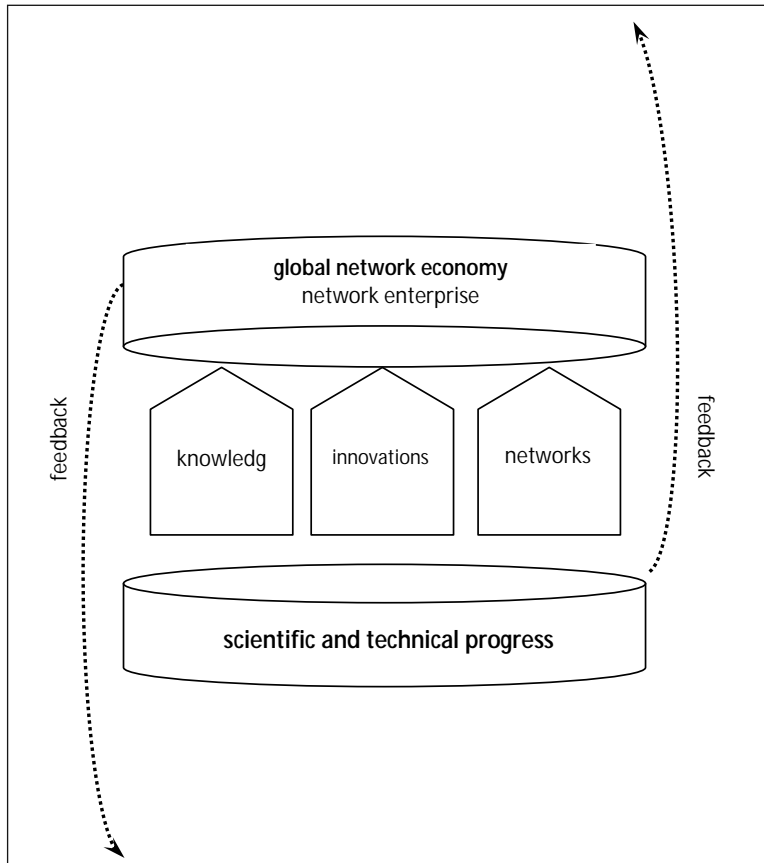
Each of the aforementioned perspectives of creating network relations derives from the knowledge-based economy:

- operating within a network enables to avoid direct rivalry with other businesses and influences the structure of the competition;
- operating within a network enables to decrease risk and costs of production; it influences the growth of flexibility and accelerates organizational learning;
- operating within a network enables to extend the existing resources of the firm and obtain an access to external resources possessed by other members of the group.

4. Conclusion

To sum up the above discussion, we can claim that changes currently undergoing in economy, both the ones characteristic for the KBE and the ones being the basis of the network approach, lead to the transformation of the contemporary economy towards global network economy based on three pillars: knowledge, innovation and networks (see Fig. 3).

Figure 3. Knowledge, innovations and networks as the pillars of the network economy



Source: Łobejko, 2010, p. 11.

The contemporary economy is characterized by running in parallel and mutually overlapping processes with various directions and power of the relations occurring in them. Part of them are major processes, evoking fundamental changes and setting the speed and the directions of the economic development, as well as changes undergoing in the organizational structures of enterprises, and management methods and ways. Others are processes accompanying the major processes, appearing on a specific stage of development and influencing its dynamics, usually in the character of an accelerator. The processes with fundamental significance for the development of the contemporary economy are: scientific and technical progress, the development of knowledge, the development of information and communications technologies, innovativeness and networking of the society and the economy.

Bibliography

1. Beliczyński J., Mesjasz C., Stabryła A. (2009), Podstawy teoretyczne gospodarki opartej na wiedzy [in:] *Doskonalenie struktur organizacyjnych przedsiębiorstw w gospodarce opartej na wiedzy*, (ed.) A. Stabryła, Warszawa, Wydawnictwo C.H. Beck.
2. Castells M. (2003), *Galaktyka Internetu: refleksje nad Internetem, biznesem i społeczeństwem*, Poznań, Dom Wydawniczy Rebis.
3. Czakon W. (2011), Paradygmat sieciowy w naukach o zarządzaniu, *Przegląd Organizacji*, No. 11.
4. Drucker P. (1999), *Spółczesność pokapitalistyczna*, Warszawa, PWN.
5. Forsgren M., Hägg I., Håkansson H., Johanson J., Mattson L.G. (1995), *Firms in networks. A New Perspective on Competitive Power*, Uppsala, Uppsala University.
6. Kelly K. (2001), *Nowe reguły nowej gospodarki. Dziesięć przełomowych strategii dla świata połączonych siecią*, Warszawa, WIG+Press.
7. Kleer J. (2003), Czym jest GOW [in:] *Gospodarka oparta na wiedzy*, (ed.) A. Kukliński, Warszawa, KBN.
8. Korenik S. (2010), Kształtowanie się nowych realiów gospodarczych na początku XXI wieku, *Biblioteka Regionalisty*, No. 10.
9. Koźmiński A.K. (2002), Jak zbudować gospodarkę opartą na wiedzy? [in:] *Rozwój polskiej gospodarki*, (ed.) G. Kołodko, Warszawa, Wyd. Polico-Art.
10. Koźmiński A.K. (2001), Jak stworzyć gospodarkę opartą na wiedzy? [in:] *Strategia rozwoju Polski u progu XXI wieku*, Kancelaria Prezydenta RP, Warszawa, Komitet Prognoz „Polska 2000 Plus” PAN.
11. Kukliński A. (2007), Gospodarka oparta na wiedzy (GOW) jako nowy paradygmat trwałego rozwoju [in:] *Rozwój, region, przestrzeń*, G. Gorzelak, A. Tucholska, Warszawa, Ministerstwo Rozwoju Regionalnego.
12. Łobejko S. (2010), *Przedsiębiorstwo sieciowe. Zmiany uwarunkowań i strategii w XXI wieku*, Warszawa, Szkoła Główna Handlowa w Warszawie-Oficyna Wydawnicza.
13. Miłkowska B., Pietruszka-Ortyl A., Potocki A. (2007), *Podstawy zarządzania przedsiębiorstwami w gospodarce opartej na wiedzy*, Warszawa, Centrum Doradztwa i Informacji Difin.
14. Naisbitt J. (1997), *Megatrendy*, Wrocław, Wydawnictwo Zysk i S-ka.
15. Oblój K. (2002), *Tworzywo skutecznej strategii*, Warszawa, PWE.
16. Pawluczuk A. (2008), Charakterystyka gospodarki opartej na wiedzy, *Zeszyty Naukowe Politechniki Białostockiej. Ekonomia i Zarządzanie*, No. 13.
17. Perechuda K. (2013), *Dyfuzja wiedzy w przedsiębiorstwie sieciowym. Wizualizacja i kompozycja*, Wrocław, Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu.
18. Płowiec U. (2007), *Innowacyjność polskiej gospodarki w ocenie uczestników VIII Kongresu Ekonomistów Polskich*, www.pte.pl/pliki/2/12/U_plowiec_innowacje08.pdf [10.01.2012].
19. Ratajczak-Mrozek M. (2008), Powiązania sieciowe jako czynnik przewagi konkurencyjnej przedsiębiorstwa, *Studia Doktorantów Akademia Ekonomiczna w Poznaniu*, No. 3.
20. Ratajczak-Mrozek M. (2009), Główne cechy relacji sieciowych przedsiębiorstw (podejście sieciowe, network approach), *Organizacja i Kierowanie*, No. 4.
21. Ratajczak-Mrozek M. (2011), Wykorzystanie podejścia sieciowego do analizy międzynarodowej działalności przedsiębiorstw, *Zeszyty Naukowe Uniwersytetu Ekonomicznego w Poznaniu*, No. 198.

22. *Republic of Korea. Transition to a Knowledge-Based Economy* (2000), Report No. 20346-KO, World Bank.
23. Różga-Luter R. (2004), Gospodarka oparta na wiedzy a rozwój regionalny na przykładzie regionu środkowego Meksyku, *Studia Regionalne i Lokalne*, No. 1(15).
24. Siuta-Tokarska B. (2012), Gospodarka oparta na wiedzy a polskie realia, *Zeszyty Naukowe Uniwersytetu Szczecińskiego. Ekonomiczne Problemy Usług*, No. 87.
25. Sroka W. (2012), *Sieci aliansów. Poszukiwanie przewagi konkurencyjnej poprzez współpracę*, Warszawa, PWE.
26. Stabryła A. (ed.) (2009), *Doskonalenie struktur organizacyjnych przedsiębiorstw w gospodarce opartej na wiedzy*, Warszawa, Wydawnictwo C.H. Beck.
27. Szromnik A. (2010), Regiony wiedzy – marketingowa koncepcja międzyregionalnych przepływów jako współczesnego czynnika rozwojowego, *Samorząd Terytorialny*, No. 10.
28. Tapscott D. (1998), *Gospodarka cyfrowa: nadzieje i niepokoje Ery Świadomości Systemowej*, Warszawa, Business Press.
29. *The Knowledge-based Economy* (1996), OECD, Paris.
30. Toffler A. (1997), *Trzecia fala*, Warszawa, Państw. Instytut Wydawniczy.
31. *Towards Knowledge-based Economies in APEC* (2000), APEC Secretariat, Singapore.

Chapter 30

The Potential of Social Media Use in Sports Clubs – Fan Communication and Knowledge Management

Agnieszka Chwiałkowska, Mateusz Tomanek

1. Introduction

The motto of the Catalan club “Més que un club” meaning “sport is more than just business and sports clubs are more than enterprises” well reflects that sport fans are not just customers, games are not just products (for the fans) and commitment to the club cannot be bought.

The role of sports organizations is to foster the creation of the positive history shared by the team and its fans. The prove of how unique is the relationship between the two is that even the failures of the team (or in more economic terms “product defects”), do not cause the recipient (fan) to change his emotions or give up on the shared history, and become a fan of the opponent team.

As noted by Cialdini in case of defeat fans refer to the situation as “THEY lost”, and in case of victory “WE won”, but they still remain loyal to the team (Cialdini, 2010, p. 216). Another issue, which demonstrates the strength of this fan-club relationship is hooliganism at stadiums – customers buying their favorite products do not fight for the good name of their favorite brands of products. Additionally, positive fan behaviors, are also not typically imitated by customers – no one chants “Lipton” or paints the logo of the brand on the face.

The issues presented above give an insight into the behavior of fans. Therefore, the main activities undertaken by the sports clubs should result in building, maintaining and enriching relationship with them. When discussing the use of social media and knowledge management, one cannot forget the fans who usually remain the followers of the team much longer than do presidents, coaches, and players of the respective clubs, what every company can envy.

The article consists of three parts, which are (1) social media in sports clubs, (2) knowledge management in sports clubs, and (3) the use of social media in knowledge management. The article is based on the review of the scientific and sports literature as well as long-term observation of the practice of sports clubs and collaboration with them.

2. Types of sports clubs

Football Club Barcelona, Urban Athletics Club Torun, Asseco Resovia Rzeszow SA – three sports clubs, and each of them differs in size, organizational and legal structure, as well as, number of disciplines practiced in the club. This Catalan team, is a multi-sections club, with rugby being equally strong discipline as football (the club's rugby team won sixteen Spanish King's Cups). Moreover, FC Barcelona has very interesting membership structure, as the club is owned by more than 170 thousand stakeholders.

Located in Torun, City Athletics Club is different from the aforementioned in every aspect. City Athletics Club is an Association of Physical Culture focused on promotion of sports.

Asseco Resovia SA, is another a one-section club. It should be remarked that while Torun's club is an association, the organization based in Rzeszow (Asseco Resovia SA) is already a commercial entity and more specifically a joint-stock company.

These three sports organizations described above differ in many aspects. In Poland, Associations of Physical Culture are in majority (currently there are more than 13,000 of them (GUS, 2012). The clubs operating as limited liability companies (about 90 units) were obliged to accept this form of entity due to the current legislation, and more specifically by the Act of 25 June 2010 on Sport (Ustawa o sporcie, 2010). While Associations of Physical Culture are supposed to be based on social activities of its members (Górna, Szopa, 2009, p. 61), sports clubs in the form of a company must be profit-oriented. Therefore, the latter, which participate in the top league games most often, are the subject of this article.

3. Communication on social media in the context of sport clubs

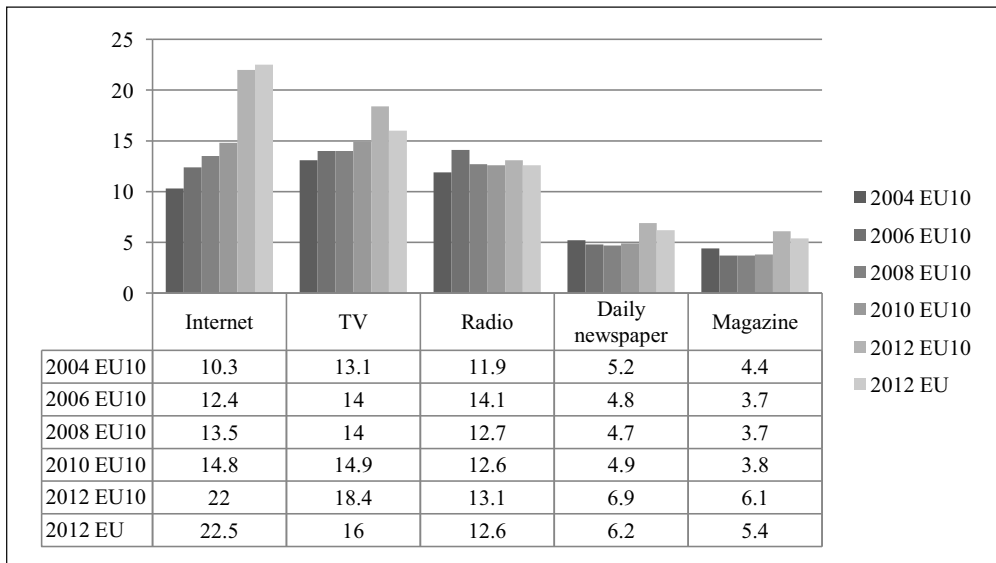
The availability of the Internet and the possibilities of communication provide by social media, as well as the development of mobile devices, result in rising interest in new media.

Social media can be characterized by unprecedented potential for customization and personalization, and are much more flexible than limited and rigid television program. This allows fans to customize wide scope of online services offered by range of sports clubs to their own needs and schedule (Levinson, 2010, p. 14). By creating their YouTube channel, Facebook profile, Twitter and Google+ accounts, sports clubs continuously attempt to earn fan's trust through providing a regular dose of information, and more importantly, receiving feedback from fans. Reading blogs referring to sport clubs' activities gives them the possibility of observing what fans have to say about a certain team or club (Li, 2009, p. 44). As a result, the negative opinions should initiate the improvement of the current state of affairs. On the other hand, the positive comments may serve as a roadmap showing the right direction in which the sports organization should strive (Hastings, 2010, p. 266).

The Figure 1 below presents the results of the research conducted by IAB Europe. The study related to the weekly number of hours fans spend on browsing the sports information. Over the years (2004-2012). In 2012 the research was extended to all the countries within European Union. The chart below depicts that over the years 2004-2012 the number of hours spent on browsing the sport-related information on the Internet increased over two times (from 10.3 to 22.5 hours in the whole EU). No other medium has recorded such increase in popularity. Therefore, it can be concluded that also sports clubs should actively promote their activities with the use

of tools available on the World Wide Web. They must also keep in mind that communication there must be interactive, which means that both sport organizations and fans exchange the information and the clubs' role is not only limited to providing information but they also need to listen to their fans and respond to the comments and enquires from their followers on a regular basis (IAB Europe, 2012, p. 8).

Figure 1. The number of hours spent by the fans on browsing sport-related information weekly



Source: IAB Europe, 2012, p. 8, <http://www.iabeurope.eu/files/2713/6852/2685/iab20europe20sport20and20the20shift20to20interactive20media20report1.pdf> [01.01.2014].

The responsibility for administering social media channels in Sports Federations (such as the International Olympic Committee) has been usually delegated to a special unit, whereas in sports clubs, this is a bottom-up process initiated by club supporters. It starts with citizen journalism (referred to also as a participatory or public journalism), which is fairly widespread in the area of sport. Articles are enhanced by photos uploaded by amateur photographers, who are fans of the club. The events during the game are recorded and uploaded on YouTube. At the same time, there exists the official website of the club or fan club, where the data such as the results of the games played, games schedule and the information of what is going on in the club is published (Drzymała, 2009, p. 147).

A few people involved in running a fan blog, or a website dedicated to a particular sporting club think about profit, most of them are enthusiasts infected with love for their team. It should be considered a success when a club (the coaching staff, players, management) constantly collaborates with the club's supporters involved in building its presence on social media (for example giving away free tickets to a game, being available for the interviews, sharing current information about players, etc.) (Parus, Cieślicka, Napierała, 2013, pp. 55-62). It can be observed that even the largest organizations (sports clubs such as Manchester United, Real Madrid) delegate the administration of social media channels to their fans.

Fans satisfy their own needs by creating a fan page or administrating an official profile on social media platform, running a blog for their favorite team – it was found that creation of websites, blogs or active involvement in online groups and discussion forums satisfy the traditional need for recognition and being respected (Mazurek, 2008, p. 133).

5. Social media for knowledge management

The intellectual capital is recognized as the most valuable asset of any organization (Quin, 1992) and same applies to the sports clubs.

The technologies related to social media allow companies to create a unique environment and organizational culture which supports collaboration. The online knowledge management tools are not limited to e-learning platforms, as Threderick remarks “the biggest benefit related to social media technologies does not lie in its novel technologies but in the participatory nature of knowledge creation” (Threderick, 2006, pp. 228-234). The available tools should not be therefore treated as tools itself but as facilitators enabling the utilization of collective intelligence (Maguire, 2008, p. 16).

6. Knowledge management in sports clubs

The manager’s knowledge about the opponents’ disposition, their favorite output composition, tactics; scout’s knowledge about promising juniors; and service technician’s knowledge about weather conditions are all important elements of the sports club’s knowledge base and effectively managing all this information contributes, to a great extent, to the success of sport organization.

While the collection and storage of knowledge is important in sports clubs, Fulda says that “the foundation of an efficient knowledge system is the ability to acquire and analyze sources of information” (Latusek-Jurczak, 2012, p. 220). Aspect of knowledge management in health clubs aptly described Kowalczyk and Nogalski, who write that “the organization should be able to ‘think’ – by listening to, seeing and feeling the environment and their own knowledge resources” (Kowalczyk, Nogalski, 2007, p. 10). So should it be in sports organizations, which are influenced by the external environment to greater extent than the internal relations.

Knowledge management in sports clubs can be divided into two areas – internal and external, and each of them can be divided further in relation to the role each department plays. Naturally, the importance of different departments increases in proportion to the size of the club and its success. When the inside of the organization is considered, in addition to the standard administration department, the club should consist of a sports division that gathers information on both coaches and players’ skills, and all kinds of related statistics (explicit knowledge) – (this knowledge is used by organizations dealing with widely understood subject of measurement in sports, as well as the broadcast media). The tacit knowledge such as the knowledge acquired by the coaches on the current disposition of players, which they acquire during the talks, training and sparring, is also of significant importance. However, it is not often archived outside of the circle coach–assistant–player. This knowledge, in spite of usually heavily relying on experience, intuition and the coach’s abilities is essential while designing the strategy on how to compete with a rival (Kaczmarek, Walczak, 2009, p. 33).

Another important group that should be managed by the club are volunteers. Although it is very often an overlooked group, it plays a very important role in achieving success of the organization, which is often emphasized by external observers, delegates of the international federation, fans, players and the organizers themselves (Marchel, 2013, p. 187). Sport volunteering during the games (e.g. Football) is an event volunteering, and during the event itself, there is a need for more than 50 volunteers. Recruiting so many people who do not receive salary, and assigning them tasks appropriate to their skills requires prior reading of their skills profiles. A well-chosen group of volunteers is the strength of the organization. Therefore, more and more event organizers prefer to pay for a database of volunteers rather than carry out all the recruitment tasks by themselves.

As people cannot be programmed to always work the same way, the human factor knowledge management faces challenges in how to quantify their knowledge. This was showed by the response of Shigeo Nagashima, one of the greatest baseball players of all time and is referred in Japan to as, “Mr. Baseball”, who asked how he can so effectively embrace opportunities and conduct daring raids, in response used the language of symbols and gestures, but was not able to explain exactly what he meant. Finally Nagashima simply said, “you have to feel it” (Nonaka, Takeuchi, 2000, p. 25).

In this chapter, the authors focused mainly on the role the coach plays in the process of knowledge management. However, it should be remembered that the sports club does not consists only of the coaching staff. All the employees within the organization should be a resource, which all the time increases its value and is not only an asset limited to implementing the current tasks which they were entrusted with (Stosik, Morawski, 2009, p. 58).

Therefore, the role of the coach, who bears the burden of responsibility for the success of his charges, is to holistically interpret the knowledge about the external conditions (knowledge about the tactics of opponents, the composition of output), and the knowledge gained within the organization (information about the preparation of athletes).

The necessary skills of a coach can be therefore compared to the skills of knowledge manager (Wróblewska, 2008, p. 295):

- possessing excellent communication and interpersonal skills, while not being too dominant;
- being familiar with the issues of modern technology (e.g. Internet, intranet, groupware);
- knowledge of building positive and stimulating organizational culture;
- demonstrating the ability to empathize;
- having basic knowledge of financial accounting;
- having the ability to formulate mental models, for the creation of new concepts;
- having the ability to use various methods of knowledge creation and encourage employees to express their ideas.

After analyzing the skills of knowledge manager listed above, it can be concluded that the coach and his assistants might only have problems with issues concerning accounting and financial aspects of running a club. This indicates that a coach has to be a specialist in knowledge management (ironically, even when he is not familiar with the knowledge management concept).

As mentioned above, knowledge management in sports clubs does not relate only to the internal aspects of the organization. The institutions working for the popularization of the physical culture also have to focus on acquiring information about the fans who participate or will participate in the events. The bigger number of the event’s participants, the larger revenues for the club – not only from the ticket sales, but also sponsoring or media rights. Therefore, it is important for the sports organization to realize the importance of relationship management with clients-fans.

This process should also involve managing specific information on the individual client (fan) and careful administering of all the points of contact with him in order to increase his loyalty (Kotler, 2005, p. 72). One of the components of acquiring the knowledge about fans is taking advantage of the data included in the personalized tickets to the sports events. By having the information about sex, age or place of living of the ticket holder, it can be determined what group of the recipients is interested in certain kind of events. Another element, based on which a database about the clients and their needs can be created is the use of social media and more specifically the comments posted there.

Nowadays, technological progress provides us with new opportunities to communicate, what contributes to the continuous exchange of knowledge regardless of one's location.

While a lot is said about the use of social media for external communication, not much attention is paid to the internal communication within organizations. According to Krok any computer program used in the company supports knowledge management process in some way, for example by facilitating the processes such as collection, creation, sharing of knowledge and using it for the benefit of the organization. In the area of sport Collaboration Support Systems and e-learning platforms are used most commonly (Krok, 2011, p. 53). As previously mentioned, the sporting event is organized by more than a dozen people (some of which are employees and some volunteers).

The popularity of social media gives sports clubs a chance to use them in their knowledge management efforts. Creating profiles on social media platforms for volunteers, or community who share the common interest in a specific event (e.g. a race, a conference, or a festival) opens up another channel of communication. Thanks to these channels, people interested can keep track of the situation concerning for example the number of event participants who are already on-site, or access the messages from the organizer's office through smartphones, tablets, laptops.

It should not be forgotten that the effectiveness of the knowledge management in sports clubs can be assessed by evaluating its final effects. Treacy, Wiersema and Zack (Guszczyńska-Malec, Rutkowska, 2013, p. 76) draw attention to three main areas: (1) trust in the relationship with the customer, and thus ensuring that the fan will receive the experience he had expected (not only in the terms that were asserted by the club), (2) product, which is related to the experience of exciting sporting spectacle, (3) operational excellence, referring to the efficiency of organization of the sports event.

Most often, sports clubs (organizational staff) focus on how the event maintains and strengthens the relationship with their fans. Therefore, the knowledge management strategy should (but does not always) involve the acquisition of knowledge about the customer (here a fan), in order to effectively utilize this knowledge later on. An example of this is the game in the top Polish league in men's volleyball, where most clubs organize a separate area for children during the games (the idea came from the demand for this kind of facilities indicated by fans) where children are supervised by trained volunteers, while parents enjoy the exciting volleyball tournament.

7. Conclusion

The use of social media in fan communication and knowledge management in sports clubs is a result of technological progress. Sports clubs have to continually adapt their systems to meet the market needs for the convenience of direct customers (fans). Assuring the effective

flow of information and its simplicity is an important factor contributing to the competitiveness of the club's offer. Because of the specificity of the sport environment (as previously noted in the context of the failure of one's favorite team) which is very different from the companies operating in the food or transport industry, sports clubs need to show that they are a viable source of alternative leisure activities.

Increasing the knowledge about people, who should be the target clients of the sports.

Not without a reason fans are referred to as the twelfth player (in football) – as they can both improve and spoil the atmosphere of the match. That is why sports clubs should treat their fans not only as guests, but more as household members. Providing with the possibility of downloading applications related to the league on smartphone, or purchasing online memorabilia for fan is not enough. "The twelfth player" should be able to constantly contact the club. Social networking sites facilitate this process and looking at the profiles of Polish clubs one can see that they are much more frequently updated than the official clubs' websites.

The second aspect of knowledge management is the ability to harvest the information about volunteers and efficiently analyze these data, in order to enable the best possible organization of the event. There is no single correct model of this process – it depends on the size of the event and the experience of those participating in its organization. One thing is certain – knowledge management through the use of social media fosters efficient communication, what should be appreciated in this world moving at increasingly rapid pace.

Bibliography

1. Cialdini R. (2010), *Wywieranie wpływu na ludzi. Teoria i praktyka*, Gdańsk, Wyd. GWP.
2. Drzymała J. (2009), Internet w marketingu klubów piłkarskich [in:] *Przedsiębiorczość w zarządzaniu sportem. Studium przypadków*, (eds.) M. Bednarczyk, J. Batorski, Kraków, Fundacja dla UJ.
3. Górna J., Szopa J. (2009), Problemy zarządzania stowarzyszeniem sportowym na przykładzie Stowarzyszenia TKKF-Omega w Częstochowie [in:] *Wybrane aspekty zarządzania w kulturze fizycznej i turystyce cz. I*, (ed.) P. Halemba, Katowice, AFW.
4. Guszczńska-Malec G., Rutkowska M. (2013), *Strategie zarządzania wiedzą*, Warszawa, Polskie Wydawnictwo Ekonomiczne.
5. Hastings G. (2010), Critical Social Marketing [in:] *Social Marketing and Public Health, Theory and Practice*, J. French, C. Blair-Stevens, D. McVey, R. Merritt, New York, Oxford University Press.
6. Kaczmarek B., Walczak W. (2009), *Zarządzanie wiedzą we współczesnych przedsiębiorstwach. Ujęcie multidyscyplinarne*, Łódź, Wyd. Uniwersytetu Łódzkiego.
7. Kotler Ph. (2005), *Marketing*, Rebis.
8. Kowalczyk A., Nogalski B. (2007), *Zarządzanie wiedzą. Koncepcja i narzędzia*, Warszawa, Wyd. Difin.
9. Krok E. (2011), Media społecznościowe elementem systemu zarządzania wiedzą w firmie, *Zeszyty Naukowe Uniwersytetu Szczecińskiego, Studia Informatica*, No. 28/2011.
10. Latusek-Jurczak D. (2012), Pozyskiwanie wiedzy z otoczenia. Wywiad gospodarczy. Relacje z partnerami oparte na wiedzy [in:] *Zarządzanie wiedzą*, (eds.) D. Jemielniak, A.K. Koźmiński, Warszawa, Oficyna a Wolters Kluwer business.

11. Levinson P. (2010), *Nowe, nowe media*, Kraków.
12. Li Ch., Bernoff J. (2009), *Marketing technologii społecznych, Groundswell czyli jak wykorzystać Web 2.0 w twojej firmie*, (GROUNDSWELL. Winning in a world transformed by social technologies), Warszawa, MT Biznes Sp. z o.o.
13. Maguire T. (2008), Social Media and Talent Management, *Canadian HR Reporter*, November 17.
14. Marchel P. (2013), Potencjał ludzki w biegach masowych [in:] *Stan, perspektywy i rozwój ratownictwa, kultury fizycznej i sportu w XXI wieku*, (eds.) M. Napierała, A. Skaliy, W. Żukow, Bydgoszcz.
15. Mazurek G. (2008), *Blogi i wirtualne społeczności – wykorzystanie w marketingu*, Kraków.
16. Nonaka I., Takeuchi H. (2000), *Kreowanie wiedzy w organizacji. Jak spółki japońskie dynamizują procesy innowacyjne*, Warszawa, Poltext.
17. Parus S., Cieślicka M., Napierała M. (2013), Zdrowy styl życia w świadomości sportowców [in:] *Uwarunkowanie zdrowotne i rekreacji ludzi w różnym wieku*, (eds.) R. Muszkieta, M. Napierała, M. Cieślicka, W. Żukow, Bydgoszcz–Poznań.
18. Quin J.B. (1992), *Intelligent Enterprise: A Knowledge and Service Based Paradigm for Industry*, New York, The Free Press.
19. Stosik A., Morawski M. (2009), *Zarządzanie kapitałem ludzkim dla menedżerów w sporcie*, Wrocław, Wyd. AWF.
20. Threderick L. (2006), Web 2.0 and Business. A Pointer to the Intranets of the Future?, *Business Information Review*, Vol. 23, No. 4.
21. Ustawa o sporcie (2010), Dz.U. 2010, No. 127, poz. 857.
22. Wróblewska V. (2008), Rola członków organizacji w zarządzaniu wiedzą [in:] *Nowe trendy i wyzwania w zarządzaniu. Koncepcje zarządzania*, (eds.) E. Weiss, M. Godlewska, A. Bitkowska, Warszawa, VIZJA PRESS & IT.
23. IAB Europe (2012), *Sport and the Shift to Interactive Media Report*, <http://www.iabeurope.eu/files/2713/6852/2685/iab20europe20sport20and20the20shift20to20interactive20media20report1.pdf> [01.01.2014].

Chapter 31

Differentiation in Remuneration for Work of Women and Men¹

Paweł Ulman

1. Introduction

The differentiation of reality around us is its immanent feature. This is a result of the complexity of the natural world, which undoubtedly includes the human being. On the other hand, in this multitude of spheres of inequality (differentiation), there are determined areas in which all people are equal or should be equal. This was stated in a particular way in the Universal Declaration of Human Rights adopted in 1948, which says that “All human beings are born free and equal in dignity and rights” in Article 1. The following articles of this declaration reaffirm the equality of men pointing to different human rights. The Article 23 states that everyone has the right to work and freedom to choose his or her work, the right to an equal pay for the equal work and that everyone who works has the right to just and favourable remuneration (www.un.org/en/documents/udhr/).

The idea of equality is inextricably linked to the concept of discrimination, because if the equality in this sphere of life and human functioning, in which it should unquestionably exist, is denied, this means that the people are divested of their rights, which is associated with a worse treatment of them. The discrimination can be considered in a narrow or broad sense. In the first case, discrimination is a “process, during which members of the same, recognisable (identifiable) population act in order to close the access of another recognisable population to valued goods such as money, power, prestige, civil rights, employment and other valued goods” (Turner, Musick, 1985, p. 217). This definition assumes that there is a deliberate action by one group against the other. In turn, the wide approach of discrimination assumes a differentiation in the situation of individuals or social groups where there should be no differentiation. In connection with the subject of this paper, in the later part, there will be discussed the problem of discrimination in relation to gender. The issues of the labour market are a particular area of potential presence of discrimination. Based on the definition in the 111th Convention of the International Labour Organisation of 25 June 1958, Zwiech (2011, p. 17) defined discrimination in the labour market

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as a “differentiation of women and men in the professional sphere, resulting from the restriction or deprivation of equal rights and opportunities and the use of different assessment criteria for people with similar socio-occupational and demographic characteristics, leading to an illegitimately worse position of women”. This definition combines both approaches: narrow and broad, it says that the source of differentiation is the unequal (inferior) treatment of women in relation to men. The inferior treatment of women in relation to men is shown by the definition of economic discrimination. It states that the discrimination on grounds of gender is a situation when women with the same abilities, education and experience as men are treated worse than them, in terms of the employment opportunities, access to jobs, promotion, opportunity to multiply human capital and wage (Kot, 1999, p. 225; McConnell, Brue, 1992, p. 346). The problem of discrimination in the overall approach, as well as in the economy is a complex issue. In fact, there is the discrimination because of the nature of the discriminatory entity, because of its preferences, because of the transparency of proceedings, because of the degree of connection of a person with the labour market and because of the guaranteed rights of women (Zwiech, 2011). Concluding this brief overview of the problems of discrimination, it should be pointed out that in the literature, there is a definition of discrimination presenting it as a situation in which we have to deal with an unequal treatment of employees with comparable socio-occupational and demographic characteristics only because of the gender (Kalinowska-Nawrotek, 2004, p. 232). This approach to identify discrimination opens up room for discussion on the scope of discrimination in Poland and other countries in the context of the “sameness” of individual employees. More on this topic will be said later in this paper.

The aim of the article is to compare the situation of women and men working in the labour market in Poland in terms of the level of their remuneration. Commonly available statistics show that on average, women earn less than men. This general statement is often a basis for conclusions about the wage discrimination of women. This article will attempt to develop a more accurate statistical description of the wage disparities based on gender, which may, in turn, allow to look broader at the problem of the wage discrimination.

2. Statistical data and test method

The statistical data on wages of men and women were taken from a CSO (GUS) publication titled *The Structure of Wages and Salaries by Occupations in October 2012*. The publication contains aggregated data obtained under the sample survey on the structure of wages by occupation. This study covers national economy entities employing more than 9 people. The number of entities that have positively responded to the proposal to participate in the study was 17,700, while the total number of surveyed employees fluctuated around 725,000. The employees were surveyed that have worked full-time and part-time a whole month. After generalisation of the study results, there have been obtained collectivity of approx. 8.1 million employees. In the case of the part-time employed, wages were converted into full-time work. The data collected in that publication allow for an analysis of disparities in wages as well as their structure and distribution according to the selected feature, including gender.

The wages can be described by analysing the empirical distribution or using a wage distribution model. In the latter case, there are applied appropriate density functions that model the empirical distribution. The use of empirical distributions and theoretical distributions for the description of wages has its advantages and disadvantages that have been presented in (Ulman, 2015a, p. 100).

In this paper, as a model of wage distribution, there has been used the Burr Type III distribution², of which the probability distribution function can be noted with the following formula:

$$F(y) = [1 + \exp(-a)y^b]^{-c} \tag{1}$$

where: y is the wage and a, b, c – distribution parameters.

These parameters are usually estimated using maximum likelihood method (ML). In the publication about the remuneration, there have been presented data on different wage deciles according to gender and occupation held. The information about the values of particular deciles enables to construct decile distributions, which can be the basis for estimating the theoretical wage distribution models. In this case, the likelihood function takes an appropriate form according to the use of grouped data. In general, this form is expressed by the following formula:

$$L = \frac{n!}{n_1!n_2!\dots n_k!} \prod_{j=1}^k p_j^{n_j}(\Theta), \tag{2}$$

where: $\sum_{j=1}^k n_j = n$, and the theoretical probability calculated as the difference of the theoretical distribution function value in the upper (c_j^+) and lower (c_j^-) j class (wage range) limit, i.e. $p_j(\Theta) = F(c_j^+, \Theta) - F(c_j^-, \Theta)$. Using estimates of the parameters, the values of individual characteristics can be easily calculated. Appropriate formulas can be found in (Ulman, 2015a, pp. 104-105).

The measure of wage disparities between men and women is the income (wage) gap ratio. In the standard version, it is defined as a quotient of the difference in the average wage between men and women and the average wage of men. It informs on the percentage of women earning less than men³. But not all the earnings of women are lower than the men’s wages. Therefore, the wage gap can be noted in a way that wages of particular women are compared to the wages of different men. This will allow to decompose the wage gap to the part in which men have higher wages than women and to the part in which women receive higher wages than men. This method is presented by the following formula:

$$L_p = \frac{1}{n_M \cdot n_K} \sum_{i=1}^{n_M} \sum_{j=1}^{n_K} \frac{x_i - x_j}{\bar{x}_M} = \frac{\bar{x}_M - \bar{x}_K}{\bar{x}_M}, \tag{3}$$

where: n_M, n_K are, respectively, the numbers of men and women, x_i, x_j are, respectively, the wages of men and women while \bar{x}_M, \bar{x}_K are, respectively, average wages of men and women. Positive differences in wages ($x_i - x_j$) speak for the surplus of the wages of men over the wages women, negative differences – reflect the reverse situation. This decomposition allows to

² In the literature, there is a lot of results of empirical research on the application of theoretical distributions in the analysis of wages and income. They show that the Burr distributions are ones of these wages distribution models that reflect the empirical wages distributions in a proper way. This subject has been expanded in (Kleiber, Kotz, 2003).

³ Negative values of the income gap show higher wages of women than men.

specify how the remuneration of women in relation to men are differentiated; what the surplus of the men's wages in relation to the women's wages is and what the surplus of the women's wages in relation to the men's wages is.

Using wage distribution of women and men, there can also be developed another measure of diversity of these distributions. We assume that we have the male wage distribution (distribution of reference). Knowing the distribution we also know the distribution function. Using the female wage distribution and its distribution function, we calculate its values for the male wages. In other words, we rank (place) the wages of men in the area of the women's wages. Then, we just compare the values of the distribution function for men and women, which can be done using the following formula:

$$O = 1 - \sum_{i=1}^k (G(p_i) + G(p_{i-1})) w_i \quad (4)$$

where: $G(p_i)$ is the value of the "female" distribution function for the i -th wage of men, for which the "male" distribution function is p_i , and $w_i = p_i - p_{i-1}$. In the case of the decile distribution of men's wages, p_i values are every 0.1 starting at 0 and ending with a value of 1. The measure (4) is in the range [-1; 1]. Its sign indicates only the direction of movement of the distribution (wages of women) in relation to the distribution of reference (wages of men). Negative values indicate the distribution for women diverges from the distribution for men towards lower values of wages; positive values show that women have a better wage situation than men. This means that the indicator (3) is a measure of displacement (overlap) of the distributions. In extreme situations (for the values of -1 or 1), the distributions of both compared employee groups would not overlap each other.

3. Results

As previously mentioned, the wage distribution can be presented in an empirical or theoretical form. In order to present the empirical distribution, there will be used wage deciles, but as a theoretical distribution model, there will be applied the Burr Type III distribution. The deciles of the total wages of men and women of 2012 have been included in Table 1.

Table 1. Deciles of wages of all women and men in Poland in 2012 and the wage gap for the subsequent deciles

Sex	Deciles								
	1.	2.	3.	4.	5.	6.	7.	8.	9.
Women	1,609.68	1,932.76	2,240.79	2,582.01	2,950.67	3,362.36	3,872.19	4,549.66	5,755.16
Men	1,590.55	2,051.17	2,488.09	2,885.42	3,301.27	3,782.85	4,432.49	5,416.75	7,407.31
Income gap	-1.19	6.13	11.04	11.75	11.88	12.51	14.47	19.06	28.71

Source: own calculations based on *The Structure of Wages...*, 2014.

Apart from the first one, the values of the deciles are higher for men than for women and, as the wage gap indicator shows, the difference between the wages of men and women increases with the increase of wages. This is particularly apparent in the case of the last two deciles.

The situation of women is worse primarily in the area of high wages. Table 2 shows the evaluation of the Burr Type III distribution parameters for the wages of women and men, which allowed to determine the characteristics of the distribution. The corresponding results of the calculations are presented in Table 3, which also includes the values of these characteristics for the data from the years 2006, 2008 and 2010.

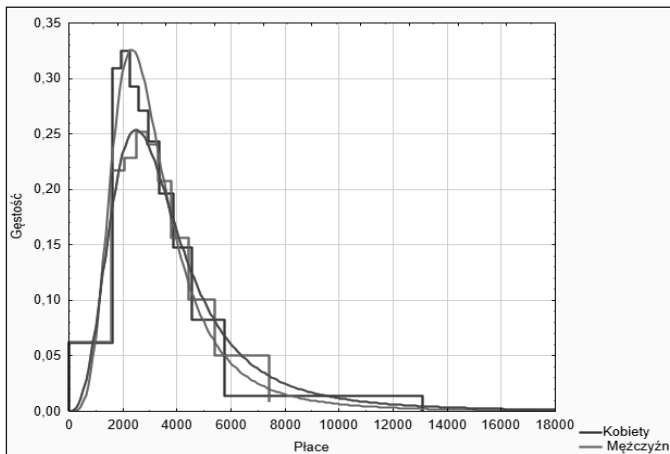
Table 2. The results of the the Burr Type III wage model parameter estimation

Parameter	Women		Men	
	Estimate	p-value	Estimate	p-value
a	-23.0012	0.0000	-21.1117	0.0000
b	2.9546	0.0000	2.6502	0.0000
c	1.5565	0.0000	1.3078	0.0000

Source: own calculation based on data from table 1 using econometric analysis package GRETL.

Figure 1 shows total wage distributions of women and men in the empirical and theoretical form. The distributions are characterised by unimodality and right-sided asymmetry, and their position is confirmed by the displacement of the wage distribution of women towards lower wages compared to men wage distribution. This is confirmed by the distribution characteristics (Tab. 3).

Figure 1. Empirical and theoretical wage distributions of women and men in 2012



Source: own study based on data from Table 1 and 2.

Both in 2012 and earlier, the values of measures of the distribution position (mean, median and mode) are lower for women than for men. The women's wages are also characterised by lower levels of inequality in the distribution of wages as indicated by the coefficient of variation and the Gini coefficient. The abbreviated measure of wellbeing, which is the Sen index, indicates that the wellbeing generated by the distribution of the wages of men is higher than the wages of women, although its diversity is less than in the case of average wages. This results from the idea of a simplified measuring of wellbeing, which assumes combining of the average level of income (wages) and the level of inequality in the wage distribution in such a way that the high-

er level of inequality the lowers the level of wellbeing. Therefore, the difference of the Sen index values for men and women is less than the difference of average values.

Table 3. Characteristics of distributions of women and men wages for year 2006-2012

Year	Sex	Mean	Median	Mode	V	Gini	Sen
2012	W	3,538.00	2,923.49	2,328.52	78.27	0.312	2,434.73
	M	4,191.57	3,298.17	2,484.88	100.21	0.359	2,686.46
2010	W	3,253.46	2,770.34	2,279.36	69.76	0.302	2,270.49
	M	3,752.54	3,015.82	2,322.78	90.97	0.346	2,453.09
2008	W	2,880.66	2,435.69	1,987.94	71.76	0.306	2,000.44
	M	3,430.15	2,834.02	2,244.60	81.58	0.337	2,273.59
2006	W	2,380.57	1,983.71	1,591.94	76.91	0.318	1,623.96
	M	2,836.98	2,261.97	1,722.47	94.79	0.357	1,823.25

Source: own calculations.

Table 4 shows the values of the key measures characterising the wage distribution of employees in 2012 according to gender and workplace. People employed as farmers, gardeners, foresters and fishermen have not been included. Their participation in the total number of employed people is negligible, and the small size of the sample raises doubts as to the reliability of the statistical inference.

Table 4. Characteristics of distributions according to gender and occupation

Occupation	Sex	Mean	Median	Mode	V	Gini	Sen
Total	W	3,538.00	2,923.49	2,328.52	78.27	0.312	2,434.73
	M	4,191.57	3,298.17	2,484.88	100.21	0.359	2,686.46
Managers	W	6,769.23	5,326.39	4,018.03	100.05	0.357	4,355.96
	M	9,790.20	6,733.23	4,407.86	232.33	0.446	5,422.68
Professionals	W	4,285.85	3,846.97	3,360.89	48.76	0.228	3,309.89
	M	5,836.31	4,765.46	3,749.97	82.46	0.317	3,984.62
Technicians and associate professionals	W	3,419.64	3,079.12	2,703.22	49.11	0.232	2,626.55
	M	4,446.46	3,898.56	3,323.38	62.06	0.286	3,172.82
Clerical and support workers	W	3,142.59	2,893.24	2,616.90	45.10	0.223	2,441.39
	M	3,141.30	2,870.65	2,573.67	47.79	0.234	2,406.14
Service and sales workers	W	2,138.43	1,934.08	1,690.28	38.82	0.232	1,641.70
	M	2,447.33	2,082.60	1,706.95	60.34	0.243	1,853.78
Craft and related trade workers	W	2,201.11	1,956.06	1,676.85	44.88	0.198	1,765.65
	M	3,305.67	2,965.66	2,607.39	58.10	0.282	2,373.41
Plant and machine operators	W	2,633.44	2,435.53	2,207.30	40.21	0.198	2,111.63
	M	3,367.98	2,969.01	2,548.13	60.31	0.281	2,422.51
Elementary occupations	W	2,009.53	1,868.15	1,687.47	30.15	0.145	1,718.54
	M	2,651.56	2,232.28	1,812.14	65.62	0.260	1,962.62

Source: own calculations.

For almost every position, on average, women receive lower wages than men, as indicated by the mean, median and mode. The most similar wage distributions are observed for office workers (clerical and support workers). It is worth noting that the most common wages (mode) are less differentiated by gender than the average wage (mean). Accordingly, it is confirmed that the level of the wage gap is determined mainly by large wage differentials between men and women in the field of high earnings. Therefore, the robust measure of location of the distribution (median and mode) show smaller differences between genders in wages than the average, which is sensitive to high levels of wages. In each case, men have a higher level of differentiation (inequality) in the wage distribution. Relatively, the employees (both women and men) employed as managers differ the most, as indicated by high values of the coefficient of variation and the Gini coefficient. The large wage differentiation supports the significant risk associated with obtaining low wages⁴, especially if we consider the right-sided asymmetry of the wage distribution. It turns out that men receive higher average wages than women, which are accompanied by a relatively high risk of receiving low wages, as experienced by many men. Therefore, it can be concluded that averagely higher wages of men may in part be due to the risk premium. This is undoubtedly linked to the study of attitudes of men and women on the various aspects of economic activity. It turns out that women are more likely to value job security than men and they value income from work more rarely (Ulman, 2015b, p. 126). The direction of the search for causes of the unequal wages of men and women seems to be interesting, but it requires a special survey.

Table 5 presents the results of calculations of the level of income (wage) gap in total and in division to the part stemming from higher wages of men and part resulting from the higher wages of women. There are also shown is the results for the overlapping distributions index.

Table 5. The wage gap and overlapping index according to occupation

Occupation	Wage gap	Wage gap – men	Wage gap – women	Overlapping index
Total	0.167	0.415	-0.248	-0.117
Managers	0.274	0.494	-0.220	-0.197
Professionals	0.239	0.396	-0.157	-0.265
Technicians and assoc. profess.	0.229	0.385	-0.156	-0.279
Clerical support workers	0.019	0.276	-0.256	0.012
Service and sales workers	0.130	0.317	-0.187	-0.105
Craft and related trade workers	0.337	0.435	-0.098	-0.454
Plant and machine operators	0.220	0.361	-0.142	-0.252
Elementary occupations	0.214	0.340	-0.126	-0.294

Source: own calculations.

In general, the income gap index was 0.167, which means that women, on average, gain wages nearly 17% lower than men. Considering only those differences in wages in which men dominate over women, the gap would be more than 41% of the men's wages, in the opposite case

⁴ For example, in the study of the risks associated with business, there are used statistical measures of variation based on the fact that the higher is the variability of the results of the business, the higher is the risk associated with it (Nowak, 2009, p. 99).

(the domination of women over men) this gap would amount to approx. 25% of the men's wages. The highest level of the wage gap index is observed in the case typically male occupations (craft and related trades workers), and the lowest – in the case of office workers (clerical support workers). The confirmation of the displacement of the women wage distributions towards lower values in relation to the distributions of men can be found in the values of the overlapping distributions index⁵. The most displaced to each other are the distributions for employees in occupations of craft and related trade workers, and least displaced distributions – for clerical support workers. The results of similar calculations for the total wages of the years 2006, 2008, 2010 and 2012, presented in Table 6 are the supplement of the information mentioned above. They show a relative stability of the gender differentiation of wage level in the considered period.

Table 6. The wage gap and overlapping index for years 2006-2012

Year	Wage gap	Wage gap – men	Wage gap – women	Overlapping index
2012	0.167	0.415	-0.248	-0.117
2010	0.150	0.400	-0.250	-0.091
2008	0.187	0.416	-0.229	-0.149
2006	0.178	0.422	-0.243	-0.128

Source: own calculations.

Tables 7 and 8 show the gender wage gap according to the age of the employee and his or her seniority.

Table 7. The gender wage gap according to the age of the employee and occupation

Occupation	24-	25-34	35-44	45-54	55-59	60-64	65+
Total	0.112	0.146	0.187	0.183	0.116	-0.057	0.123
Managers	0.111	0.208	0.277	0.340	0.246	0.118	0.138
Professionals	0.156	0.218	0.281	0.262	0.239	0.116	0.160
Technicians and assoc.profess.	0.128	0.197	0.258	0.272	0.210	0.120	0.175
Clerical support workers	-0.010	0.032	0.078	0.022	-0.034	-0.113	-0.030
Service and sales workers	0.057	0.166	0.210	0.124	0.005	-0.031	0.105
Craft and related trade workers	0.200	0.304	0.377	0.363	0.336	0.429	0.205
Plant and machine operators	0.202	0.218	0.252	0.226	0.204	0.249	0.413
Elementary occupations	0.228	0.242	0.238	0.208	0.170	0.062	0.090

Source: own calculations.

⁵ In Table 4, for office workers, a slightly higher average wage for women than men can be observed, which would lead to a negative income gap. The values of individual indicators presented in the table have been obtained using the Burr distribution, while the calculations in Table 5 have been based on (empirical) decile distributions, in which the average wage of women on the position is slightly lower than that of men. Also, overlapping distributions index was recalculated on the basis of theoretical distributions, resulting in a slightly positive value for the wages of office workers.

Table 8. The gender wage gap according to the seniority of the employee and occupation

Occupation	1.9 -	2.0-4.9	5.0-9.9	10.0-14.9	15.0-19.9	20+
Total	0.130	0.148	0.171	0.208	0.209	0.160
Managers	0.445	0.340	0.232	0.294	0.266	0.263
Professionals	0.200	0.236	0.242	0.253	0.262	0.279
Technicians and assoc. profess.	0.149	0.175	0.229	0.214	0.254	0.260
Clerical support workers	-0.001	0.013	0.020	0.078	0.111	0.015
Service and sales workers	0.058	0.103	0.165	0.180	0.162	0.100
Craft and related trade workers	0.183	0.221	0.299	0.332	0.351	0.377
Plant and machine operators	0.168	0.186	0.217	0.201	0.218	0.231
Elementary occupations	0.222	0.243	0.248	0.239	0.245	0.200

Source: own calculations.

In most cases, the income gap ratio shows the surplus of the wages of men over the wages of women both in terms of age and seniority in particular jobs. It is worth noting that for the general population, the wage gap initially increases with age and begins to decline after reaching a certain age (see: 55-59 age category). This overall picture is confirmed by the results of research on wage-age profiles that show clearly parabolic (with the parabola opening downward) shape the relationship between wages and age for men and much more flattened (often linear) relationship in the case of women's wages (Ulman, 2008, p. 301). If the average wages of women grow steadily, and the wages of men, after reaching a given age, begin to decline, such situation should be reflected in the formation of the level of the wage gap in Table 7. It is worth noting that the value for the gap for the category of 60-64 years is negative, and for the following category is positive again. Most women in this age category are already retired. It can be assumed that there work those of them for whom it is mainly profitable (they receive high wages), which makes their wages in relation to the wages of men are high. Then, in the case of people aged at least 65 years, which are the retirement age for men and women, again, the wage gap indicates the better situation of men. As before, we assume that this time, there work these people (women and men) for whom it is profitable. In this group, again, men receive averagely higher wages than women.

In the case of individual occupation groups the level of the wage gap varies depending on whether the position is dominated by women (e.g. clerical support workers) or men (e.g. craft and related trade workers).

Similar conclusions can be drawn on the basis of the formation of the income gap according to work experience. Again, for the general wage, the level of the income gap increases with the seniority, and in case of the category of at least 20-year seniority it starts to fall. It is worth paying attention to a very high level of the gap for the first category of seniority in the case of managers, and relatively low gap level for craft and related trade workers. Nevertheless, in this case, the differentiation in wages between genders is growing steadily reaching high levels for people with work experience of at least 20 years. This means that women generally cannot count on improvement of their situation thanks to their seniority, in particular at masculinised posts.

4. Conclusion

Both statistical data and the results of the carried out analysis present the wage differentiation according to gender, showing a worse situation of women than men in almost all dimensions of the study. This raises a legitimate question, and maybe a doubt whether these figures indicate the existence of an economic discrimination, particularly a wage discrimination in Poland on grounds of gender. Apart from the fact of the ambiguous definition of the concept of discrimination, in order to determine it, as well as its scope and causes (sources), there are required more detailed and, primarily, statistical surveys focused on the object.

In the introduction, there has been briefly discussed the definition of the concept of discrimination. It has been mentioned that discrimination is a situation in which we have to deal with an unequal treatment of employees with comparable socio-occupational and demographic characteristics only because of the gender difference. This definition assumes the “uniformity” of individual workers according to all the characteristics except gender. Nevertheless, it seems that women and men are not alike, and gender is not the only factor differentiating these groups. The study pointed out one of the possible reasons differing women and men, which is a sense of confidence in the labour market. If women express the attitude of a greater aversion to risk (although the performance comparable to the performance of men), then the operation of economic mechanisms of the free market leads to lower average wages. Speaking about discrimination, it must be decided how women and men should be alike – whether only because of the work results or also due to all the other characteristics. Excluding these other aspects of “disaccord” of gender, we can be exposed to acts of violation of free market principles in order to equalise the wages of workers with a comparable performance, but not comparable due to their different characteristics. For this reason, the discussion on the concept of discrimination is still an open question.

Bibliography

1. Kalinowska-Nawrotek B. (2004), *Formy dyskryminacji kobiet na polskim rynku pracy*, *Ruch Prawniczy, Ekonomiczny i Socjologiczny*, rok LXVI, Zeszyt 2
2. Kleiber Ch., Kotz S. (2003), *Statistical Size Distribution in Economics and Actuarial Sciences*, John Willey & Sons.
3. Kot S.M. (ed.) (1999), *Analiza ekonometryczna kształtowania się płac w Polsce w okresie transformacji*, Warszawa–Kraków, PWN.
4. McConnell C.R., Brue S.L. (1992), *Contemporary Labor Economics*, McGraw-Hill Collage.
5. Nowak E. (2009), *Statystyczne metody szacowania ryzyka w audycie wewnętrznym*, *Studia i Prace WNEiZ No. 16*, Szczecin, Wydawnictwo Naukowe Uniwersytetu Szczecińskiego.
6. *The Structure of Wages and Salaries by Occupations in October 2012* (2014), GUS, Warszawa.
7. Turner J., Musick D. (1985), *American Dilemmas. A Sociological Interpretation of Enduring Social Issues*, New York, Columbia University Press.
8. Ulman P. (2008), *Dyskryminacja płacowa kobiet w kontekście ich oczekiwań płacowych* [in:] *Modelowanie i prognozowanie zjawisk społeczno-gospodarczych*, (ed.) J. Pocięcha, Kraków, Wydawnictwo Uniwersytetu Ekonomicznego w Krakowie.

9. Ulman P. (2015a), Teoretyczne modele rozkładu płac i dochodów z pracy oraz ich wykorzystanie [in:] *Statystyka pracy. Wybrane zagadnienia*, (ed.) P. Ulman, Kraków, Wydawnictwo Uniwersytetu Ekonomicznego w Krakowie.
10. Ulman P. (2015b), Sytuacja kobiet i mężczyzn na rynku pracy w Polsce [in:] *Marginalizacja na rynku pracy. Teorie i implikacje praktyczne*, (ed.) N.G. Pikuła, Kraków, Oficyna wydawnicza Impuls.
11. Zwiech P. (2011), Rodzaje dyskryminacji kobiet na rynku pracy, *Polityka Społeczna*, No. 4.
12. www.un.org/en/documents/udhr/ [9.06.2015].

PART IV

DEVELOPMENTAL CHALLENGES IN THE WORLD OF INFORMATION TECHNOLOGY



Chapter 32

Optimization of Web Services Composition for Virtual Enterprise Synthesis

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1. Introduction

The problem of web services composition for virtual enterprise synthesis is becoming more and more popular today. The limited functionality offered by an atomic web service or stable set of services provided by traditional EIS (Enterprise Information System) providers cannot usually satisfy complex and rapidly changing customer requirements and appropriately reflect complicated business processes of virtual enterprises.

As a great number of web services are available through the Internet, EIS providers should consider the new dynamic approach for building information systems based on web services composition in order to avoid the loss of significant part of potential customers and to satisfy the demand of different categories of users.

A virtual enterprise (Guerra, 2006, pp. 12-14) is a temporary alliance of cooperating enterprises that acts as a single organization to share skills, core competencies and resources in order to react quickly to changes in the market conditions and become agile enterprises. For small companies, collaboration gives the chance to provide effective and individual customer service and to get access to the bigger capital and various technologies due to cooperation with large organizations. In return, large organizations become more flexible and they can immediately react to changes in the market and can develop their business more effectively.

In our paper, we are going to describe our approach to optimization of web services composition process for virtual enterprise synthesis (illustrated by a travel agency) based on the theory of formal grammar and automated planning algorithms application. The rest of paper is organized as follows. Section 2 contains the review of a corpus of literature on web services theory and composition process, virtual enterprises and automated planning algorithms. Section 3 describes the main stages of web services composition process. In Section 4, we present formal grammar approach. Section 5 describes Hierarchical Task Network (HTN) planning algorithm applied to virtual enterprise composition. Finally, we present our performance results, conclusions and future work.

2. Literature review

Advantages and disadvantages of the main approaches to web service composition are widely discussed by many researchers. In the paper “An integrated approach to automated semantic web service composition through planning” (Hatzi et al., 2012, pp. 319-332) approaches to web service composition ranging from manual, where user intervention is required in every step of the process, to fully automated, where intervention is confined to defining user requirements for the desired composite service, are analyzed. Jürgen Dorn, Peter Hrastnik, and Albert Rainer in their research (Dorn et al., 2007, p. 190) described web services discovery and composition problem in the context of virtual enterprises. The process of dynamic service composition considering the following critical issues, such as service matching, selection and retrieval is described in the paper “Using assumptions in service composition context” (Lu et al., 2006, pp. 19-25). However, none of these papers considers the possibility of applying the theory of formal grammar for web services composition.

In our research, we are based on the HTN planning algorithm, that was proposed in the paper “SHOP2: An HTN planning system” (Nau et al., 2003, pp. 379-404). Nevertheless, using the intelligent planning algorithm produces too much different combinations of web services to create a target configuration. In this paper, we suggest using the theory of formal grammar as a means to support the process of automated web services composition of virtual enterprise based on algorithms of intellectual planning. We use the theory of formal grammar to reduce sorting by dropping out of the combinations of atomic services, which do not form the necessary intermediate components, non-terminal symbols. Thus, the formal grammar rules act as a preliminary elimination of unpromising services.

3. Web Services composition

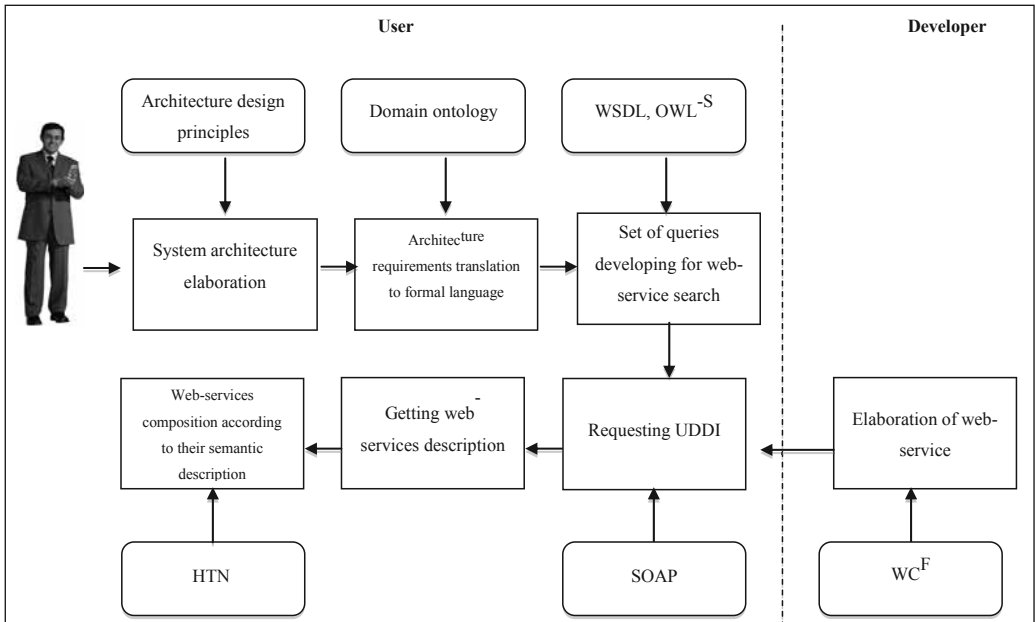
Different books and organizations provide various definitions to Web Services (<http://www.tutorialspoint.com/webservices/>). To summarize, a complete web service is, therefore, any service that:

- is available over the Internet or private (intranet) networks;
- uses a standardized eXtensible Markup Language (XML) messaging system;
- is not tied to any one operating system or programming language;
- is self-describing via a common XML grammar;
- is discoverable via a simple find mechanism.

A web service enables communication among various applications by using open standards such as HyperText Markup Language (HTML), XML, Web Services Description Language (WSDL), and Simple Object Access Protocol (SOAP).

The main stages of virtual enterprise information systems development process based on web services composition are presented in Figure 1.

Figure 1. Stages of virtual enterprise information system development process



Source: own work.

Stage 1: First, it is necessary to elaborate the requirements to the developed system and its architecture.

Stage 2: On the following step, it is necessary to translate the received requirements to the formal language. Ontologies are used for this purpose. A standard ontology consists of a set of basic classes and properties. It is used to declare and describe services.

Stage 3: Further, the set of requests for searching web services is worked out. Several technologies, such as SOAP, WSDL, are being developed to provide a standard way of describing web services:

- **WSDL – syntactic description**

WSDL definitions describe how to access a web service and what operations it will perform (<http://www.tutorialspoint.com/wsdl/>). Thus types of messages, which it receives and sends in WSDL interface, determine functionality of web service. An operation associates a message exchange pattern with one or more messages. A message exchange pattern identifies the sequence and cardinality of messages sent and/or received as well as who they are logically sent to and/or received from. An interface groups together operations without any commitment to transport or wire format (<http://www.tutorialspoint.com/wcf/>). WSDL is often used in combination with SOAP and XML Schema to provide web services over the Internet (<http://www.tutorialspoint.com/wsdl/>). The abstract interfaces are associated to concrete message formats and transmission protocols with binding descriptions.

- **OWL – semantic description**

The OWL-S profile represents two aspects of the functionality of the service: the information transformation (represented by inputs and outputs) and the state change produced by the execution

of the service (represented by preconditions and effects). OWL-S ontology – standard language for the description of web services. OWL-S includes opportunities that are used for automatic service discovery. The functional description of service is based on the changes it makes. Moreover, this ontology describes preconditions and the expected effects and results. So on the example of travel agency, which is used in this paper, a precondition will be the valid credit card, and the expected result – number of the room in hotel.

Stages 4-5: Universal Description, Discovery and Integration (UDDI) (<http://www.tutorialspoint.com/uddi/>) is an XML-based standard for describing, publishing, and finding web services. UDDI allows businesses to promote their services by publishing their description in the global registry. The Registry consists of three main parts: the white pages with contact information, yellow pages describing service belonging to different categories and green pages that directly contain WSDL description. Thereby, user sends a query containing WSDL description to UDDI by means of the special protocol of communication SOAP developed for message exchange between applications on a network. Having automatically carried out comparing of the description made by the user with the description provided on yellow pages at the fifth stage user receives a web service and its description.

Stage 6: Finally, we propose to use HTN planning to compose the information system for a virtual enterprise from obtained web-services. HTN planning is similar to classical planning in which each state is provided by a set of literals, and each action attracts state transition. However, unlike classical planning, the objective of an HTN planner is to produce a sequence of actions that perform some activity or task (Sirin et al., 2005). Descriptions of planning domain consist of a set of operators, and a set of methods. Each method defines how it is necessary to decompose the task into subtasks. HTN planning proceeds until primitive tasks, which cannot be executed, are reached. For example, the task “reach the airport” can be broken into primitive subtasks “to take a taxi” and “to use public transport”. Application of planning in relation to virtual enterprise will be covered more detailed in the Section 5.

Above-mentioned is preceded by creation of service and its registration in UDDI. This can be made by various means, for example by Windows Communication Foundation (WCF). The elementary feature of WCF is interoperability. It is one of the latest technologies of Microsoft that is used to build service-oriented applications (Martin et al., 2004, pp. 5-8).

The dynamic composition of services primarily requires understanding the capabilities of the available services (i.e. what they can do) and the compatibility of those services. Several technologies, such as SOAP, WSDL, are being developed to provide a standard way of describing web services. Web Service descriptions can be extended to include information such as preconditions and effects. OWL-S description language uses these constructs to give more information about what the service does. It is possible to map such descriptions to planning operators and exploit intelligent planning techniques for automatic service composition by treating service composition as a planning problem. Ideally, given a user’s objective and a set of web services, a planner would find a combination of web services that achieves the objective.

The OWL-S descriptions are used to obtain the available actions in the planning domain. More specifically, each web service description WSD_i is translated to a domain action A_i , using the information provided by the corresponding profile instance (each web service description is actually an instance of the OWL-S Profile class) (Hatzi et al., 2012, pp. 319-332). The name of the action is the rdf:ID of the profile instance:

$$\text{name}(A_i) = \text{WSD}_i.\text{ID} \quad (1)$$

The preconditions are based on the service input and precondition definitions (concepts):

$$\text{prec}(A_i) \equiv \bigcup_{k=1}^n \{\text{WSD}_i.\text{hasInput}_k\} \cup \bigcup_{k=1}^m \{\text{WSD}_i.\text{hasPrecondition}_k\} \quad (2)$$

The add effects comprise of the service output and positive effect definitions (concepts):

$$\text{add}(A_i) \equiv \bigcup_{k=1}^n \{\text{WSD}_i.\text{hasOutput}_k\} \cup \bigcup_{k=1}^m \{\text{WSD}_i.\text{hasEffect}_k^+\} \quad (3)$$

The delete list is formed by the negative effect definitions (concepts). The Semantic Web Rule Language (SWRL) was used in order to model the preconditions and effects of the web services (<http://www.w3.org/Submission/SWRL/>). Preconditions are modeled by SWRL rule conditions, while positive effects are modeled as SWRL atomic expressions that are true in the world after the execution of the web service. The <neg> element is used by the transformation process in order to discriminate between add and delete effects. The delete list of the action is formulated as follows:

$$\text{del}(A_i) \equiv \bigcup_{k=1}^n \{\text{WSD}_i.\text{hasEffect}_k^-\} \quad (4)$$

Invocation of planning algorithms over the newly formulated planning problem produces plans, representing the description of the desired composite web service.

4. Formal grammar

A formal grammar (Aho, Ullman, 1972) is a system for defining the syntax of a language by specifying the strings of symbols or sentences that are considered grammatical. A grammar G is a quadruple

$$G = (\Sigma, V, S, P) \quad (5)$$

where Σ is a finite set called the terminal alphabet. The elements of Σ are called the terminals. V is a finite nonempty set disjoint from Σ . The elements of V are called the nonterminals or variables. $S \in \bigcup V$ is a distinguished nonterminal called the start symbol. P is a finite set of productions (or rules) of the form $\alpha \rightarrow \beta$ where $\alpha \in (\Sigma \cup V)^* V (\Sigma \cup V)$ and $\beta \in (\Sigma \cup V)^*$, i.e. α is a string of terminals and nonterminals containing at least one nonterminal and β is a string of terminals and nonterminals.

Let $G = (\Sigma, V, S, P)$ be a grammar. G is also called a Type-0 grammar or an unrestricted grammar.

G is a Type-1 or context-sensitive grammar if each production in P satisfies $|\alpha| \leq |\beta|$. By “special dispensation”, we also allow a Type-1 grammar to have the production $S \rightarrow \epsilon$, provided S does not appear on the right-hand side of any production. The symbol ϵ is a regular expression, and represents the language whose only member is the empty string, namely $\{\epsilon\}$.

G is a Type-2 or context-free grammar if each production $\alpha \rightarrow \beta$ in P satisfies $|\alpha|=1$; i.g. α is a single nonterminal (Aho, Ullman, 1972).

5. HTN algorithm

Most of the planning approaches rely on a general model, the model of state-transition systems. In a state-transition system, there are finite or recursively enumerable set of states, actions and events along with a transition function that maps a state, action, event tuple to a set of states. Given a state transition system, the purpose of planning is to find which actions to apply to which states in order to achieve some objective, starting from some given situation.

The most commonly used systems for representing planning problems, such as STRIPS (Stanford Research Institute Problem Solver) and PDDL (Planning Domain Definition Language) for classical planning, are based on state variables. A state is represented by a set of ground literals expressed in a first-order language. An action is an expression specifying which first-order literals belong to the state in order for the action to be applicable, and which literals the action will add or remove in order to make a new world state. An atom p holds in state s if $p \in s$. If g is a set of literals with variables, s satisfies g (denoted $s \models g$) when there is (g) is in s and no negated literal of σ such that every positive literal of σa substitution $\sigma(g)$ is in s .

In classical planning, a planning operator is a triple $o = (\text{name}(o), \text{precond}(o), \text{effects}(o))$. Effects of an operator can be positive or negative, i.e. $\text{effects}^+(o)$ (generally referred as the add list) represents the set of literals that will be added to the state and $\text{effects}^-(o)$ (generally referred as the delete list) represents the set of literals that will be removed from the state. An operator o is applicable in a state s when the preconditions are satisfied in the state, i.e. $s \models \text{precond}(o)$. Most planners represent the world state with a relational database and thus precondition evaluation is very fast. Applying the effects of an operator is done by adding or deleting entries from the database. This representation is insufficiently expressive for some real domains. As a result, many language variants have been developed. Action Description Language (ADL) is an important variation. ADL extends STRIPS representation by explicitly including negative literals in the state, having conditional effects for operators and allowing existential variables and disjunctions in goal formulas.

HTN planning is similar to classical planning. However, HTN planners differ from classical intelligent planners in what they plan for, and how they plan for it. The objective of an HTN planner is to produce a sequence of actions that perform some activity or task. The description of a planning domain includes a set of operators similar to those of classical planning, and also a set of methods, each of which is a prescription for how to decompose a task into subtasks. Planning proceeds by using methods to decompose tasks recursively into smaller and smaller subtasks, until the planner reaches primitive tasks that can be performed directly using the planning operators. Many service oriented objectives can be naturally described with a hierarchical structure. HTN-style domain fits in well with the loosely coupled nature of web services: different decompositions of a task are independent so the designer of a method does not have to have close knowledge of how the further decompositions will go or how prior decompositions occurred. Such hierarchical modeling is the core of the OWL-S process model to the point where the OWL-S process model constructs can be directly mapped to HTN methods and operators.

We suppose that HTN planning should be applied to synthesis of virtual enterprise because decomposition of tasks in HTN planning is similar to decomposition of composite processes, which are used in case of virtual enterprise synthesis. Moreover, HTN encourages the modular principle, which will well be coordinated with web services. There are many advantages of application of this algorithm. For example, we can focus on the certain level of decomposition, and methods can be written without considering how its subtasks will decompose or what compound tasks it decomposes. Methods correspond to recursively composable workflows. These workflows (Song, Lee, 2013, pp. 261-273) can come from diverse independent sources and then integrated by the planner to produce situation specific, instantiated workflows. We are supposing that special knowledge discovery program tool is used for extracting from natural language description of web-service profile, formed with Web Services Modeling Ontology, the set of formal concepts (Romanov, Pantileeva, 2005, pp. 153-163). Values and attributes detected by this algorithm, form a formal context (Wille, 2005, pp. 1-33).

Formal context $K: = (G, M, I)$ consists of sets G, M and a binary relation

$$I \subseteq G \times M, M - \text{attribute set, } G - \text{objects sets,}$$

$$(g, m) \in I - \text{object } g \text{ has attribute } m.$$

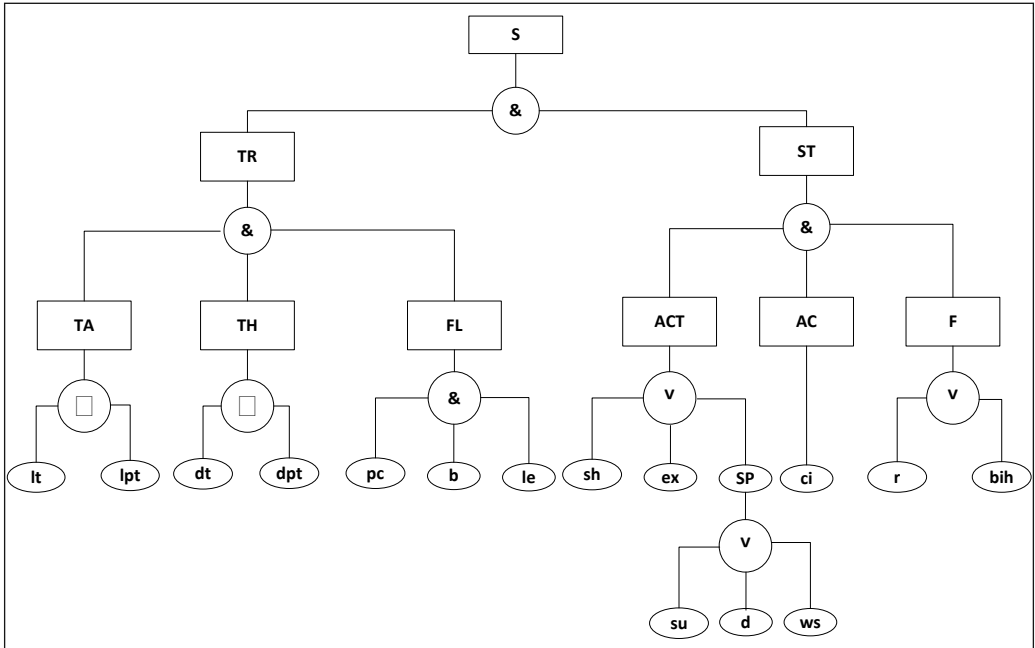
Let us define the mapping: $\varphi: 2^G \rightarrow 2^M$ and $\psi: 2^M \rightarrow 2^G$, $\varphi(A) = \text{def } \{m \in M \mid gIm \forall g \in A\}$, $\psi(B) = \text{def } \{g \in G \mid gIm \forall m \in B\}$, $A \subseteq G, B \subseteq M$. If $A \subseteq G, B \subseteq M$, then (A, B) – formal concept of context K , if $\varphi(A) = B, \psi(B) = A$.

The correspondence between query and web-service description is based on the concepts coincidence and implications. Let M – attribute set and G objects set. The rules are defined as the implication $X \Rightarrow Y$, where $X, Y \subseteq M, X \cap Y = \emptyset$. Then confidence criteria is defined as $\text{conf}(X \Rightarrow Y) = \text{supp}(X \cap Y) / \text{supp}(X)$. The implication means that all objects of context which contain attributes X also contain attribute Y . The attribute Y may be web-service class number or just ID. The sub- and super concepts relations are used in case of approximate matching. Subconcept–superconcept relationship: is expressed as; $A_1, A_2 \subseteq G, B_1, B_2 \subseteq M$:

1. $(A_1, B_1) \leq (A_2, B_2) \Leftrightarrow (A_1 \subseteq A_2) \wedge (B_2 \subseteq B_1)$.
2. (A_1, B_1) – subconcept.
3. (A_2, B_2) – superconcept.

Using HTN planning we can decompose non-primitive tasks recursively until primitive tasks are reached and present them according to formal grammar rules.

Figure 2. Parsing tree of virtual enterprise on an example of travel agency



Source: own work.

In this modified parsing tree we have introduced several logical operations, which define different kinds of web-services connections for VE composition. The atomic services (terminal symbols) are introduced by lowercase letters:

- “lt” is for local taxi atomic service;
- “lpt” is for local public transport atomic service;
- “dt” is for destination taxi atomic service;
- “dpt” is for destination public transport atomic service;
- “pc” is for passport control atomic service;
- “b” is for boarding atomic service;
- “le” is for luggage examination atomic service;
- “sh” is for shopping atomic service;
- “ex” is for excursions atomic service;
- “su” is for surfing atomic service;
- “d” is for diving atomic service;
- “ws” is for water skis atomic service;
- “ci” is for check-in atomic service;
- “r” is for restaurant atomic service;
- “bih” is for breakfast in the hotel atomic service.

The composite services (nonterminal symbols) are introduced by uppercase letters:

- “S” is for tour package composite services;
- “TR” is for transportation composite services;

“TA” is for transportation to the airport composite services;

“TH” is for transportation to the hotel composite services;

“FL” is for flight composite services;

“ST” is for stay composite services;

“F” is for food composite services;

“AC” is for accommodation composite services;

“ACT” is for activity composite services;

“SP” sport composite services;

If “&” means “AND”, “ \vee ” means “OR”, “ \oplus ” means “EXCLUSIVE OR”, the formal grammar of the parsing tree can be described in the following way:

$S \rightarrow TR \ \& \ ST$

$TR \rightarrow TA \ \& \ TH \ \& \ FL$

$TA \rightarrow lt \oplus lpt$

$TH \rightarrow dt \oplus dpt$

$FL \rightarrow pc \ \& \ b \ \& \ le$

$ST \rightarrow ACT \ \& \ AC \ \& \ F$

$F \rightarrow r \vee bih$

$AC \rightarrow ci$

$ACT \rightarrow sh \vee ex \vee SP$

$SP \rightarrow su \ \vee \ d \ \vee \ ws$

So as formal grammar describes the operation of concatenation of symbols and is monoid. Describing the parsing tree, we used extra symbols $\&$, \oplus , \vee but that doesn’t mean that we try to change the algebraic properties of formal grammar. We use these symbols to simplify the writing formal grammar rules and parsing tree. These symbols are used in the following meanings:

$\&$ – all symbols belong to concatenation;

\oplus – only one symbol belongs concatenation;

\vee – supposes including of one or more symbols of the previous level.

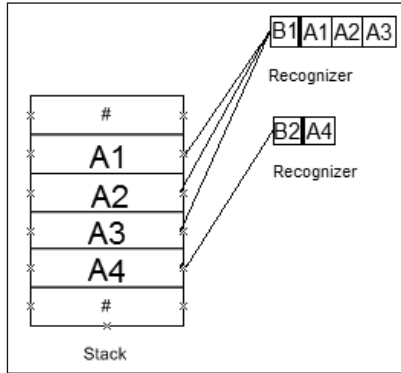
We suggest an HTN-like algorithm of composition of web-services. The algorithm is based on the idea of representation of the structure of a VE as a syntax tree where web-services are represented as nonterminal symbols.

Parsing algorithm is pushdown automaton-based. The automaton consists of the stack and several groups of recognizers.

1. Terminal symbols appear on the input tape.
2. Terminal symbols are read by the stack automaton and placed in the stack for subsequent analysis and recognition.
3. The string of terminal symbols begins and ends with the symbol “#”.
4. The stack is connected with recognizers of terminal symbols and recognizers of nonterminal symbols.
5. The recognizers of terminal symbols associate every terminal symbol with one of the finite number of the categories of nonterminal symbols. At the same time the recogniser checks correspondence the IOPEs (input, output, postcondition, effect) of the current and next concatenated services to provide outputs, post conditions (results) of the current service satisfies the inputs, preconditions of the next service
6. Every recognizer of terminal symbols has memory in the form of the list of terminal symbols that belong to the certain category. Every recognizer compares a terminal symbol in the stack

with every terminal symbol stored in its list (Fig. 3). The defined categories that include existing terminal symbols are placed in the stack.

Figure 3. Memory structure of terminal symbols recognizer



Note:

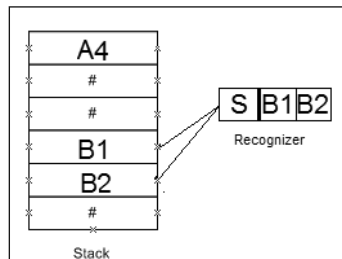
$B_1 \rightarrow A_1 \& A_2 \& A_3$

$B_2 \rightarrow A_4$

Source: own work.

7. When every terminal symbol is associated with one of the categories, the string of nonterminal symbols is formed. The string of nonterminal symbols also begins and ends with the symbol “#”. The analysis of the string of nonterminal symbols begins.
8. The recognizers of nonterminal symbols operate on the received nonterminal symbols (Fig. 4).

Figure 4. Recognizer’s operation on the received nonterminal symbols



Note:

$S \rightarrow B1 \& B2$

Source: own work.

Every nonterminal symbol has a counter denoting its valence (n) – the number of inferior symbols (e.g. valence of S =2). When the counter is reset to zero, the string of the nonterminal symbols of the next level begins to form.

The algorithm ends when the upper-level symbol S is defined. 1 is the number of not defined nonterminal symbols of the next level.

Therefore, the suggested algorithm of web services composition for travel agency based on the formal grammar helps to reduce sorting by dropping out of the combinations of atomic services, which do not form the necessary intermediate components, non-terminal symbols. Thus, the formal grammar rules here act as a preliminary elimination of unpromising services.

6. Conclusion

Nowadays virtualization changes our perception of what a modern enterprise should be and how new enterprise information systems should be built to meet the demands of a rapidly changing market. The heart of virtual enterprises, which are, in fact, a new type of information systems, is a dynamic composition of services that enables the rapid change of the existing and composition of the new enterprises of the atomic services. In our research, we have shown how the idea of web services composition by hierarchical network tasks can be implemented based on formal grammar. As the result of intelligent planning algorithm execution, too much different combinations of web services to create a target configuration are produced. Formal grammar works as a preliminary eliminator of unpromising services. Further improvement of the algorithm should provide verification of the combined web services on the inputs and outputs, as well as, optimizing the structure of composite services for virtual enterprise synthesis.

Bibliography

1. Aho A.V., Ullman J.D. (1972), *The Theory of Parsing, Translation, and Compiling*, Prentice-Hall, Inc.
2. Chinnici R., Moreau J.J., Ryman A., Weerawarana S. (2007), Web Services Description Language (WSDL) Version 2.0 Part 1: Core Language, *W3C recommendation*, Vol. 26.
3. Dorn J., Hrastnik P., Rainer A. (2007), Web Service Discovery and Composition for Virtual Enterprises, *Agent and Web Service Technologies in Virtual Enterprises*.
4. Guerra M.A.P. (2006), *Analysis and Design of Virtual Enterprises* (Doctoral Dissertation, University of Saskatchewan Saskatoon).
5. Hatzi O., Vrakas D., Nikolaidou M., Bassiliades N., Anagnostopoulos D., Vlahavas I. (2012), An Integrated Approach to Automated Semantic Web Service Composition through Planning, *Services Computing, IEEE Transactions on*, 5(3).
6. Lu Z., Hyland P., Ghose A.K., Guan Y. (2006), Using Assumptions in Service Composition Context [in:] *Proceedings of the 2006 International Workshop on Service-oriented Software Engineering*, ACM, May.
7. Martin D., Burstein M., Hobbs J., Lassila O., McDermott D., McIlraith S. et al. (2004), OWL-S: Semantic Markup for Web Services, *W3C Member Submission*, 22.
8. Nau D.S., Au T.C., Ilghami O., Kuter U., Murdock J.W., Wu D., Yaman F. (2003), SHOP2: An HTN Planning System, *J. Artif. Intell. Res. (JAIR)*, 20.
9. Protogeros N. (ed.) (2007), *Agent and Web Service Technologies in Virtual Enterprises*, IGI Global.
10. Romanov V., Pantileeva E. (2005), Knowledge Discovery in Large Text Databases Using the MST Algorithm [in:] *Data Mining VI*, A. Zanasi, C.A. Brebbia, N.F.F. Ebecken, WIT Press.

11. Sirin E., Hendler J., Nau D. (2005), *Planning with Incomplete Knowledge for the Composition of Web Services*, MARYLAND UNIV COLLEGE PARK.
12. Song S., Lee S.W. (2013), A Goal-driven Approach for Adaptive Service Composition Using Planning, *Mathematical and Computer Modelling*, 58(1).
13. Wille R. (2005), Formal Concept Analysis as Mathematical Theory of Concepts and Concept Hierarchies, *Formal Concept Analysis*, Springer Berlin Heidelberg.
14. SWRL, <http://www.w3.org/Submission/SWRL/> [20.05.2015].
15. UDDI Tutorial, <http://www.tutorialspoint.com/uddi/> [20.05.2015].
16. WCF Tutorial, <http://www.tutorialspoint.com/wcf/> [20.05.2015].
17. Web Services Tutorial, <http://www.tutorialspoint.com/webservices/> [20.05.2015].
18. WSDL Tutorial, <http://www.tutorialspoint.com/wsdl/> [20.05.2015].

Chapter 33

Possibilities of Using the Data Source from Internet Resources¹

Jan Ministr

1. Introduction

Most of software applications on internet is focused on the area of marketing where they are analyzed information from social networks and forums to determine the sentiment of customers about competing products. Further information harvested from internet resources may enrich such systems which are systems of Customer Relationship Management (CRM) and systems Human Resource Management (HRM). Finally, these applications are used in security systems to identify people, objects and relationships.

The paper describes the specifics of a three-layer architecture in these application areas.

2. Internet data resources

On the Internet data sources can be viewed from several perspectives. In terms of data availability and time data can be obtained data in the following ways:

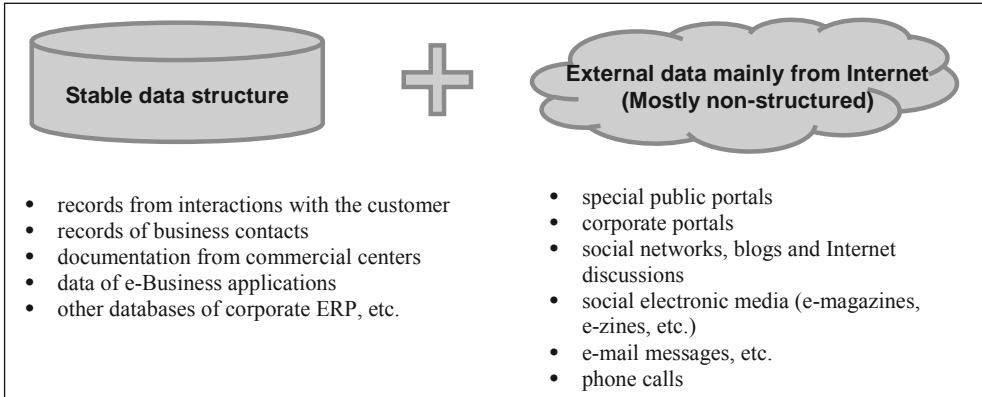
1. *Indirectly* (offline, one-off or repeatedly) as a service provided by specialized software companies. However, this method has certain time lag and is very costly.
2. *Directly* (online, continuously) as a service of a component of the corporate information system. The key problem here is the identification of relevant data sources. In the Czech Republic, there are several public portals providing paid or free information on companies and contacts of their key employees. These data sources include primarily the following: www.ipoint.cz, www.justice.cz etc.

Internet data sources can be divided also according to their data structure stability into two main groups (see Fig. 1), namely sources with:

- *stable data structure* which are stored in form of company intranet;
- *unstructured* data which are in form of internet external sources. One of the main tasks in analyzing unstructured and semi-structured data is the identification of object described in data and identification of their relationships.

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Figure 1. Forms of data resources

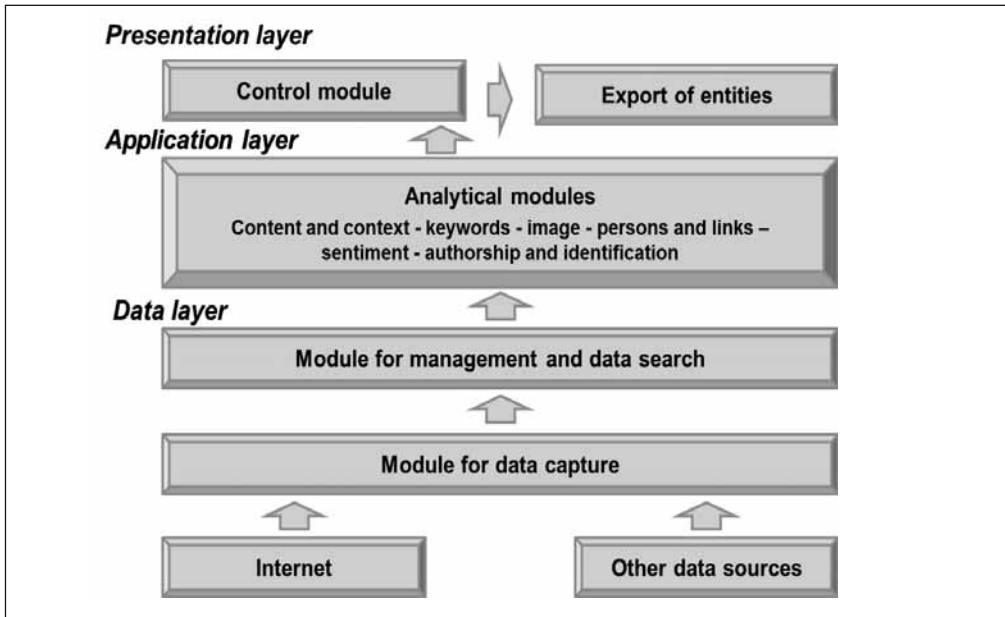


Source: own work.

3. Concept of system architecture

Concept of system architecture is based on the three-layer architecture. The data layer consists of separate modules for obtaining, managing and searching of data. Application layer is based on the requirements of area of implementation and presentation layer provides access to the results of data analysis.

Figure 2. Modular concept of tree-layer architecture



Source: own work.

4. Data layer

This layer forms the basis for all kinds of software applications. The data layer represents the Internet and other data sources which are for example e-mails and documents from different computers or data from passive probes. The data are imported into system by module for data capture. Subsequently, the data are stored in a common format using the module for managing and searching data. Besides storing the module searches the data for the second application layer with goal to narrow the quantity of interest data. It enables effective work of specialized analytical modules whose basic functionality was described and categorized by Sathi (2012). Typically, this is the selection of data by source, time of occurrence, the time of acquisition or author. From the perspective of three-layer architecture can be understood the data layer as a pair of modules for data acquisition and data management. The functionality of this concept of data layers based on descriptions of the methods that closely defines Ashton et al. (2014). Processes which take place at the data layer can then be divided into the following two groups:

1. Process monitoring and downloading of Internet content.
2. Process management and searching of stored data.

For capturing data from the Internet no exists one universal technique. Data collection is to be selected depending on the type of pages from which data are recorded. Simply we can say that other techniques are used in the case of social networks and others in the rest of the Internet, such as advertising and discussions. In the case of discussions, advertisements and other similar web sites is performed so that the selected part, typically individual forums are downloaded in full, or are downloaded in a sufficiently short time period. All new posts are stored on a dedicated server. For this can be used technology the *Web Harvest Heritrix* which has more versatile use. For most sites, however, it is fully sufficient technology *Web Harvest*. In the case of social networks, the situation is different. Web techniques *Harvest* or *Heritrix* not work here too. There is generally necessary to obtain the contents of a server using special plug-ins that automatically pass either the public or private part of the network into which it is generally can penetrate through a specially set up user profiles. Successful technique is also in some types of networks, online monitoring and storing short messages and news users, as shown in Khan et al. (2014). In addition to these procedures can be added to the database also additional data that are not obtained by the above techniques. Examples of such data might mails or import data from passive probes to monitor the operation of telecommunication networks. A combination of these sources creates large data files, all of which can be useful when analyzing to obtain valuable data.

Given that the data are extensive it not suitable to be stored in conventional relational databases. Depending on the nature and amount of acquired data, but also on the amount of resources that are available, are used for these purposes specialized servers. Mostly used for this purpose combination *nonSQL MongoDB* database, relational database *PostgreSQL* and *Apache Solr* indexing tools. The advantage of using these tools is their capacity, speed and capability of indexing of unstructured data. At the same time use these tools to solve initial filtering data even before it is made your own analysis. In terms of analysis this means that on data are usually first applied function which has a built *Apache Solr*. It are thus narrowed the set of data and then will be applied a specialized analysis algorithms.

5. Application layer

At the level of work with databases in these systems can be applied multiple analytic functions, such as filtering according to selected words or author. But these options are usually not in use. The main reason is that these data filtration is to be calibrated depending on the relevant domain area which do not allow commercial products. Basic tasks by analyzing selected and partially pre-processed data are to recognize and identify:

- the searched entities, i.e. subject, person or event;
- the relationships between the found entities;
- the relationship of found entity or group of entities to the outside world.

These tasks are solved using special analytical tools that you need to create. These are a few library of functions that are combined with one another and with their help are addressed basic analytical cases. The specifications of analytical functions are based on user requirements. Features basic analytical tasks is described in the following paragraphs.

5.1. Content analysis and identification of entities

Content analysis is a basic task of unstructured text processing. The goal is to identify key words that appear in the text. However, to achieve this, several problems must be solved, such as the following:

- in which language the text is written;
- are the different parts of the text already processed using dictionaries and rules of the language;
- typos and colloquial terms.

Subsequently, words carrying semantic information, i.e., combinations of selected nouns and adjectives, verbs and numerals, are selected from the text. At the same time, the synonyms that make terms equal in meaning replaced with one selected proxy. Such modified text is then used for deriving the topics of the different texts, which can have, for instance, the form of a list of keywords. The whole process of content analysis consists of several main steps that are described in the following paragraphs (Yatsko, Vishnyakov, 2007):

1. *Tagging of word types* using external libraries (such as POS Tagger). From such tagged words, keywords are selected, mostly nouns, verbs and adjectives (Nasipuri, Sarkar, Ghose, 2010; Evert, Giesbrecht, 2009).
2. *Processing of synonyms* permits grouping of words according to their meaning, not only depending on their form, but also with an option of creating relationships between them. When identifying the synonyms, it is necessary to eliminate from the output list of keywords the words that have different forms, but basically identical meanings (Frank, Gutwin, Craig, 1999). These cases can be distinguished using a lexical database dictionary.
3. *Lemmatization and stemming* tries to convert words to their basic forms. Lemmatization is more time-consuming as the processing is based on the context of the word. Stemming does not take account of the word's context and is therefore faster. In order to achieve high quality of the processed text content, lemmatization or stemming is essential as words found in different forms must be recognized as identical. Then equivalent words can be grouped and it is possible to avoid multiplicity of keywords (Christopher et al., 2003).

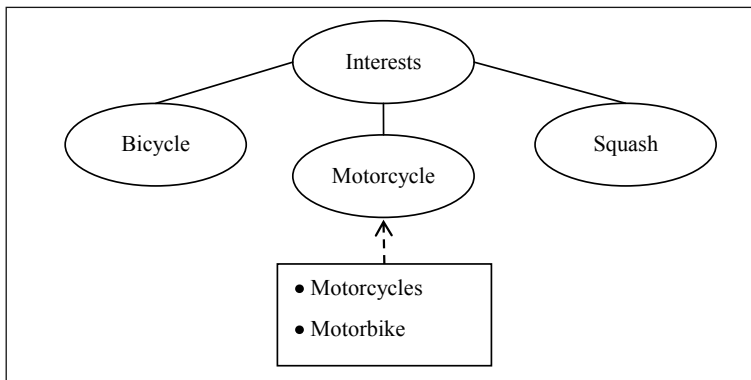
Subsequently, it is separated from the text the words bearing semantic information. Roughly speaking, it is a combination of selected nouns and adjectives, verbs and numerals. Along with the ongoing analysis of synonyms under which they are expressions of the same importance replaced with one selected representative. From these is derived the theme of individual texts, which may take forms such as keyword list.

In the case that in the text searches any entity on the basis of a reference sample, reference sample is compared with the identified content. The result is then a reference to the place where the searched entities occur and a numerical (relevant) as a measure of compliance of the searched and found sample data.

5.2. Ontology of decision making tree

It is based on the pre-definition of keywords, i.e. entity attributes, in advance by the user. From these attributes, a query in the decision-making tree is generated, with the nodes of the tree being the queried entity attributes (areas of information needs of the user with respect to the entity), which are expressed by a table of synonyms for the queried area. The detail level of the query is then expressed by the level of explosion of the given node, see Figure 3. The structure of the query can be optimized using the decision-making trees induction theory or Occam's razor (Nguyen, Pitner, 2012). A shortcoming of this approach is the fact that in generation of the list of entity attributes, not all key attributes need be specified that can be identified using analytic tools directly from the unstructured texts than the approach described above, for instance, we monitor attributes such as sports for some persons, but we cannot find out from the given data that he has started gambling. In general, this approach is appropriate in the SME segment as the application development is less costly.

Figure 3. Example of Ontology of decision making tree



Source: own work.

5.3. Sentiment analysis

Sentiment analysis is carried out using special software, which seeks concrete phrases that denote the type and degree of sentiment in the domain area. The software developed for sentiment recognition can be divided into two parts:

- creation and calibration of the knowledge database,
- sentiment assessment.

The two parts are independent of each other. The purpose of the knowledge database is to teach the system how to recognize the sentiment type in the given domain area. The function for sentiment assessment uses the respective part of the knowledge and calculates the sentiment of unknown texts. This function can be included right in the company's information systems, or it can be used as a Web-based service (Pang, Lee, 2008). The knowledge database is a set of statistical data regarding different word combinations (Ministr, Ráček, 2011). In order to create the knowledge database, one must have sufficient amount of correctly assessed reference texts. Each text must be assigned to its sentiment, which is used as an input value for the calibration of the system. These texts are subsequently analyzed using statistical functions.

5.4. Authorship and identification analysis

Persons appearing on the Internet use a variety of pseudonyms and often act completely anonymously. Koppel et al. (2012) noted, that it is very important to recognize that the same person is hiding multiple identities. This can partially recognize from structured data such as the same phone number or e-mail, but in most cases these data are not available. For these purposes can be used data from monitoring the occurrence of individual persons, where is monitored the intensity, duration and frequency of the activities of individual pseudonyms. In the case that several pseudonyms shows very similar behavioral traits are then triggered additional analytical features, which are designed to determine the degree of probability that this is the same person.

Another technique that can be used in identifying persons, is an analysis of their written texts. Here we examine the similarities of vocabulary, the frequent occurrence of the selected word combinations, the same spelling and typographical mistakes, like typos. This information is then derived the probability that the text was written by the same person. Cases of use of these features can to find in combating child pornography on the Internet.

5.5. Image data analysis

For image analysis are used external third-party libraries. Compared to classic techniques of image recognition as input for such analyzes is not only the searched picture but there enters semantic textual information that describes what is searched in the picture and what is in the recognized images. Image recognition algorithms then thanks to this information may be better to divide the scene and searched the object to recognize with greater accuracy than without the appropriate semantic information in the input. The input semantic information have different structures depending on the searched domain and data source. A typical use case is a quest for stolen works of art, which offers both a verbal description and photographs of the searched subject.

5.6. Social links analysis

In the case where the person identified in the data, either as authors or people talked about, it is one of the key roles to identify relationships between them. Of records about individuals from various sources, it is reconstructed internal “social” network of persons. For each person are registered themes in connection with which is mentioned and persons with which it is related. In relationships between individuals they are further distinguished the types of relationships and their intensity. With all these data is registered as an independent parameter the time. This allows to see in time how developed the object of interest of a specific person or how to develop relationships between a group of persons, as it detailed described in Scott (2000). Based on this, a person can be segmented into groups or define the metrics determining the proximity of individuals. This functionality can be part of a tool for uncovering organized crime.

5.7. Presentation layer

The form of presentation of results is a very important part of the application, and it basically sells it, because the user must quickly comprehend the information in a wider context. The results of the analyses are presented in three different forms:

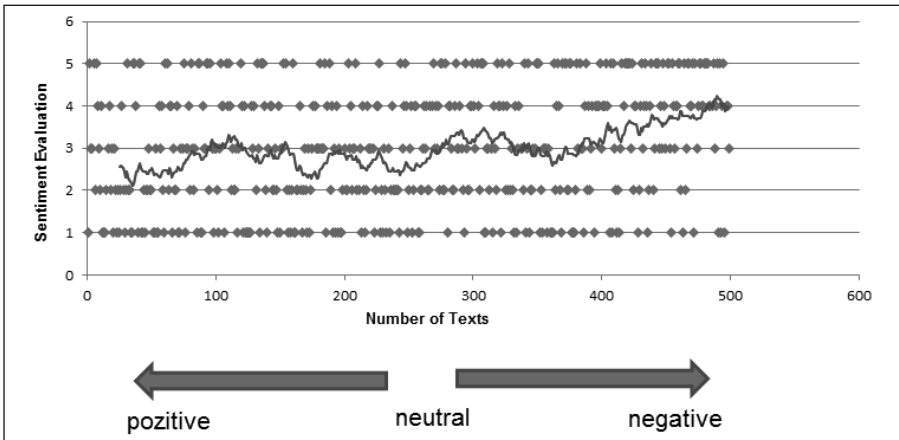
- detail of the found record;
- graph, which is used primarily for visualization of the development in time of the phenomenon (line and bar graphs), visualization of percentages for the different entity types (pie-charts), or for visualization of relationships (network charts, polygons);
- combination of graphs.

5.8. Main application areas

Among the main areas of application processing unstructured texts in the Czech Republic belong following areas:

- *marketing*, where is mainly utilized sentiment analyses, as shows example output of such applications in Figure 4;
- *Customer Relationship Management (CRM)* and *systems Human Resource Management (HRM)*, as are shown in Figure 5;
- *security systems* to identify people, objects and relationships between them, as shows the Figure 6.

Figure 4. Example of sentiment analysis – Reviews for the new type of pension scheme



Source: own work.

Figure 5. Interface of CER support – detail of person

Jméno, příjmení, titul, adresa

Seznam firem dle rejstříku:

IČ	Název společnosti	Angažma osoby ve spo
25900595	D3Soft s.r.o.	Člen statutárního orgán
27856631	D3Soft Future s.r.o.	Člen statutárního orgán
28574087	D3Business Consulting s.r.o.	Společník s vkladem
46577807	MEDIUM SOFT s. r. o.	Společník s vkladem

Detail firmy:

Nalezení podrobných informací o vybrané firmě

Insolvence:

Lustrace vybrané firmy

Jméno/název Stav řízení Spisová značka

Klíčová slova z nestrukturovaných dat:
company's direction Oracle's History Director

Oracle Board leadership team basic fact

It Find **company's** unleashing innovation

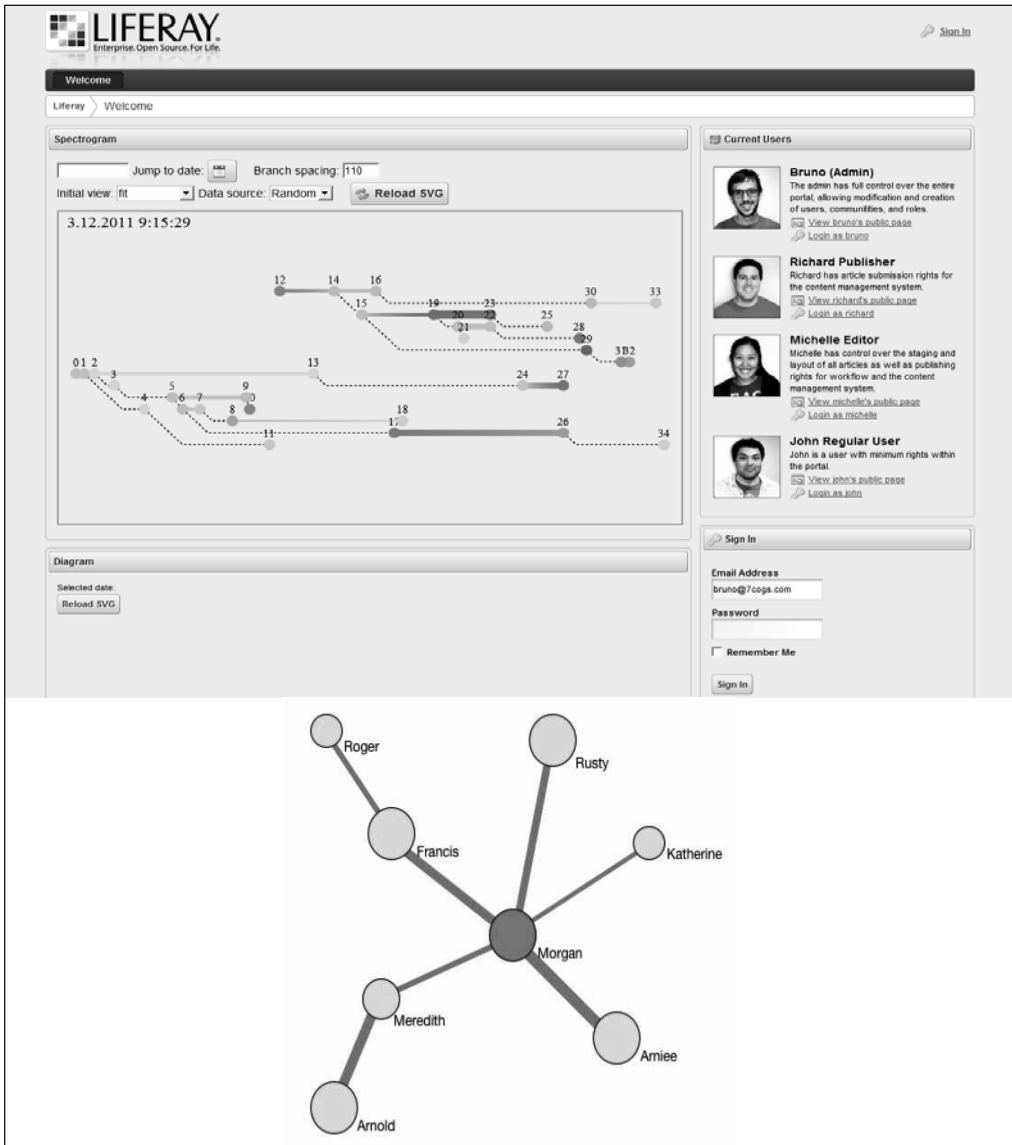
Rozhodovací strom přístupu k datům:

- Obchodní partner
 - Zájmy
 - Hokej
 - Golf
 - Rodina
 - Vzdělání
 - Současné zaměstnání
 - Mínulé zaměstnání
 - Příspěvky
 - Odkazy

Mapa působnosti:

Source: own work.

Figure 6. Life-ray and Internal social network of persons



Source: own work.

6. Conclusion

Currently, it is the business organizations in Czech Republic begin to use unstructured text. In particular small and medium-sized, in the area of obtaining customer data, using the approach combining data from the primary CRM system with a Customer Intelligence-type add-on. For

deployment in small and medium-sized companies, it is important to define the purpose of processing the non-structured texts. However, what is decisive for the deployment of use because are relatively high. As for the requirements of standard information, offline analysis can be used, and it is possible to make a selection from the companies processing data on economic entities on the domestic market. In the case of more complex requirement with respect to the volume and structure of processed information, the turn-key solutions would entail large financial burden.

Architecture software system that uses automated tools for the detection and identification of persons, objects and relationships in unstructured data is based on the use of commercial tools in the data layer, but the main functionality of such software system is ensured by special analytical and presentation features that need to be created on base of the specific needs of deploying such a system. The aim is to develop a tool versatile enough to be applied in various areas of police practice (search for persons and objects, uncovering networks and social relationships of suspicious persons, combating extremism, fighting child pornography).

Bibliography

1. Christopher D. et al. (2003), Feature-rich Part-of-speech Tagging with a Cyclic Dependency Network [in:] *Proceedings of HLT-NAACL*.
2. Evert S., Giesbrecht E. (2009), Is Part-of-speech Tagging a Solved Task? An Evaluation of POS Taggers for the German Web as Corpus [in:] *Web as Corpus Workshop WAC5*.
3. Frank E., Gutwin C., Nevill-Manning C.G., Witten I.H., Paynter G.W. (1999), Kea: Practical Automatic Keyphrase Extraction [in:] *DL '99 Proceedings of the Fourth ACM Conference on Digital Libraries*.
4. Koppel M., Schler J., Argamon S. (2009), Computational Methods in Authorship Attribution, *Journal of the American Society for Information Science and Technology*, 60(1).
5. Ministr J., Ráček J. (2011), Analysis of Sentiment in Unstructured text [in:] *IDIMT-2011 Interdiscipinarity in Complex Systems: 19th Interdisciplinary Information Management Talks*, (eds.) P. Doucek, G. Chroust, Linz, TRAUNER VERLAG.
6. Nasipuri M., Sarkar K., Ghose S. (2010), A New Approach to Keyphrase Extraction Using Neural Networks, *IJCSI International Journal of Computer Science Issues*, 7(3).
7. Nguyen F., Pitner T. (2012), *Information System Monitoring and Notifications Using Complex Event Processing*, Paper presented at the 5th Balkan Conference in Informatics BCI. Novi Sad, Serbia.
8. Pang B., Lee L. (2008), Opinion Mining and Sentiment Analysis, *Foundations and Trends® in Information Retrieval*, Vol. 2, <http://www.cs.cornell.edu/home/llee/omsa/omsa.pdf>.
9. Sathi A. (2012), *Big Data Analytics: Disruptive Technologies for Changing the Game*, Boise, Mc Press.
10. Scott J. (2000), *Social Network Analysis: A Handbook*, Thousand Oaks, SAGE Publications.
11. Yatsko V.A., Vishnyakov T.N. (2007), A Method for Evaluating Modern Systems of Automatic Text Summarization, *Automatic Documentation and Mathematical Linguistics*, 41(3).

Chapter 34

On the Use of Requirements Based Software Measures in Management of the IT Projects¹

Dariusz Dymek

1. Introduction

There are many software measures which uses the requirements as a basic data for the calculation of various indicators which are used in the IT projects for evaluation some quality characteristics (including evaluation of project management quality) or tracking the work progress. The majority of requirements based software measure is connected with the role of requirements in software development process and the fact that requirements varies during this process what has a great influence on the product and process quality.

This paper consists of two major parts. The first part covers the brief description of requirements characteristics (section 2) and the brief overview of common usages of requirements for measurement purposes in software engineering and IT project management (section 3). The second part concentrates on the measure of stability of IT projects. It begins from the consideration of the well-known Stability Index, provides some propositions of improvement of this index (section 4) and presents the characteristic of new defined indexes with determination of their area of usage. The conclusion (section 5) contains the summary of features of newly defined measures, points out the possible problems with their usage and possible ways of solving these problems.

2. Requirements in software development process

The requirements play the crucial role in the process of software system development. They are the only common language for users and developers which allow the users to explain their needs. The process of requirements development for software systems is the study area of Requirements Engineering which is treated as a part of Software Engineering. The general requirements role is to express the organization and users needs in the form and terms comprehensible and unambiguous for software developer. The Requirements Engineering distinguishes three lev-

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els of requirements: business, users and product (software) ones. The business level describes the organization needs in terms of business processes. The business requirements are the most general and ambiguous within the meaning of susceptibility to interpretation and allow determining the users (stakeholders). Identified stakeholders are the source of users' requirements. The user's requirements present the users' needs in the context of the previously defined business requirements. They describe the opportunities and properties which the software system must possess to allow the users fulfilling the requirements set out at the business level. The user's level covers the three basic domains: user's requirements, general rules (e.g. low regulation) and quality attributes.

Properly developed the business and users requirements constitute the system (requirements) specification. It reflects the organizational needs in the terms of business processes and users activities. Unlike the software specification which will be describe later, the system specification uses mainly the natural language or some other methods based on simple drawing with only few elements of easy formalisms (e.g. Use Case Diagrams from UML, Usage Scenarios, etc.) and is easily understandable for people without the technical background particularly for users. This feature makes the system specification the best tools for communication between users and developers.

To make the system specification fully appropriate for developers, the user level requirements must be transformed into the product level requirements which can be divided into five basic domains: constrains, functional and non-functional requirements, data requirements and external interfaces requirements. Description of the product level requirements use more formal languages allowing definition of algorithms, data flows, etc. All used terms must be clearly explained in unequivocal manner. Development of the requirements on this level is time consuming and requires understanding of the business aspects and good technical background. They are hard to understand for people without knowledge from the area of the software engineering, in particular for typical software users, but they are intelligible for developers. Product level requirements constitute the software (requirements) specification.

Requirements Engineering sets on the general principles of requirements development process and defines requirements features (Hull, Jackson, Dick, 2005; Aurum, Wohlin, 2005; Lutowski, 2005). The most important features are singularity, consistency, coherence, same granularity on all levels and hierarchical structure (interdependences between the requirements on different levels).

Although the term 'requirements' is used by both the system and the software specifications, there is a significant difference between their form and possible usage in the management of software development process. The most important difference lay in their understandability for different participants of software development process. While the requirements on user's level are readable for both the users and the developers, the requirements on product level are typically readable only for developers. As it will be shown later, this feature determines the area of usage for particular software measures based on requirements. In following sections, the term 'requirement' will be used in the meaning of user level requirements; the other levels of requirements will be pointed out directly by full name.

3. Software measures based on requirements – the scope of use

User level requirements are available at the very early stage of software development process. Typically they are set out before the contractor choosing and project launching. System specification (which includes the user level requirements) is conventional part of the formal contract between client and contractor which defines the scope of works and describes the final results. It makes the user level requirements a perfect candidate for using them for different purposes connected with IT project management such as planning, scheduling, budgeting, project monitoring and evaluation, change management and others.

Typical example of the requirements usage in project management is monitoring the software development process. The PSM (Practical Software and System Measurement, 2003) suggests the use of requirements based measures for the following purposes:

1. Work progress:

The basic measure is based on the proportion between the number of requirements on the given development stage² and the number of all requirements. This measure can be used for evaluation of work progress in relation to project schedule (compliance with plan) or to whole project scope.

2. Process efficiency:

Efficiency is measured as workload or cost spent on the singular unit e.g. requirement. This measure can be used for evaluation and improvement of the process development.

3. Product size and stability:

Number of singular requirements is a common measure of software size. The stability is measured as the proportion between the number of requirements changed (deleted, added, alternated) and the number of all requirements. This ratio called Stability Index gives information about changes in project scope which can have a great influence on the development process with regards to such parameters as time, costs or resources. Linked with information about the source of changes (typically it can be the external project environment e.g. new low regulation, changes of users' needs, fixing the errors in system specification or mistakes in project plan) the Stability Index can be used for evaluation of the project preparation and management processes.

Presented examples of measures use requirements (or rather their number) directly. In software engineering the requirements are often use indirectly, e.g. for estimation of different parameters which describe or can affect the process of software development (and by this influence the process of project management). The good examples are methods such as Function Points (FP) or Use Case Points (UCP) which are used for estimation of such values as workload, duration, costs or resources (number of team members). The input data for these methods are user level requirements which are used for calculation abstract units such as FP or UCP (Laird, Brennan, 2006).

² There are several stages in the global model of software development process. Typically the process starts from specification, going through analysis, design and coding to integration and finally implementation and maintenance. The specification stage deals mainly with user level requirements (though can cover also others levels of requirements) and on this stage according to the requirements there can be distinguished the following phases for the single requirements: defined, traced, verified and validated.

In the measures of process efficiency or product size presented above the requirements are often replaced by FP or UCP³ and measures based on different (size) units are used in the same time.

The number of requirements or other units derived from them which are used to measure the software size can be used for the estimation of the effort on different kind of activities during the software development process. For example, statistical data from past projects allow to predict such values as number of documentation pages or number of testing scenarios per single unit of software size (typically for FP, UCP and similar). Such information allows estimating the workload connected with these kinds of activities in IT project (Capers, 2005).

The next usage domain of requirements based measures is connected with change management. During the software development process the system specification and, in particular, the user's level requirements can be modified according to different (already mentioned above) reasons. The most important question linked with each decision connected to requirements change is how it can influence the development process according to assumed parameters connected with workload such as time, budget or resources.

4. Measuring the impact of requirements changes on IT project

Modern approach to IT project management directly assumes that the system specification will be alternate during the project lasting and independently from source of changes all request should be taken into consideration. The problem is how to predict the impact of changes on the project, anticipate the new scope of work and establish the modified project plan and schedule.

The simplest measure of the impact of requirement changes is mentioned earlier the Stability Index (*SI*), defined as follow:

$$SI = \frac{\#AS}{\#PS} \quad (1)$$

where:

AS is a set of alternated requirements (added, deleted, modified),

PS is a set of original requirements and

the # stands for the number of elements in a given set.

The Stability Index has some significant weaknesses:

- it assume that alternation of every singular requirements has a similar impact on project what in other words means that fulfilling every singular requirement is connected with similar workload (similar part of software structure);
- it doesn't take into account the advancement of work, in particular it does not make a difference between requirements already done and those which are just planed to be implemented.

³ The FP or UCP are the measures of software system size based on requirements. Usage of the number of FP or UCP instead of the number of requirements results from the fact that the number of requirements don't give any information about some specific software features (e.g. complexity, cross-platform, etc.) which are taken into account in the FP and UCP methodologies.

The next part of this section present the proposition of improvement of Stability Index by including information about the impact of singular (or subset) requirement and advancement of work.

Before introducing the changes in the requirements set every request must undergo the process of impact analysis. That process consist of the following basic steps: data range analysis, data source analysis, identification of the involved software components, preparation of general software systems design, determination of the workload alteration and preparation of a new project plan (Dymek, 2011). As a result of conducted work we can obtain one of six potential scenarios (Wysocki, McGary, 2005), impact of which can vary from the negligible (changes do not affect the project costs and duration) to the serious one (changes are feasible but cause the major modifications in all project cost and duration).

The most important information needed to incorporate the requirement impact and the advancement of work is the information about the relation between the requirements and the software components responsible for fulfilling these requirements. This information should be available in project documentation but the problem is that obtaining such information for singular requirement or set of requirements is time consuming if the documentation is not tailored to maintain this relation. An alternative to manually provided analysis can be usage of tools which are able to maintain this information automatically. Example of such a tool is UML(VR) with the Accomplish Relation function which allows gathering, maintaining and providing the information about relations between different software components treating the requirements as one of those components type (Dymek, Kotulski, 2007).

In the first step we use information about relation between requirements and software components to improve the Stability Index. Let $C=\{c_j\}$ be set of software components in the design structure of software system S and let $R=\{r_i\}$ be set of requirements of the system S . Then structural impact ratio SIR for singular requirement will be defined as follow:

$$SIR(r_i) = \frac{\#CR(r_i)}{\#C} \quad (2)$$

where $CR : R \rightarrow C; CR(r_i) = \{c_j \in C : c_j \text{ taking part in fulfillment of requirement } r_i\}$.

In classical formula of Stability Index (1) alternation of every singular requirement has the same impact on value of this ratio. In practice such assumption is very rough because the requirements reflect the user point of view typically dealing with system functionality and such assumption means that implementation of each singular system function needs the same effort what is not true. Using the SIR allows to improve the Stability Index by incorporate into its formula the impact of singular requirement change on the structure of software (which is the final product of project) what gives the better approximation of the impact of such a change on the project implementation. The Structural Stability Index SI^S can be defined as follow:

$$SI^S = \sum_{r_i \in AS} SIR(r_i) \quad (3)$$

The value of SI^S can be interpreted as a rate of potential modifications in the software structure made by requirements changes. These modifications are potential because not every requirements

change causes the modification of all software components being in relation with alternated requirements, but for sure this value reflects what part of software structure must be carefully re-examined according to requirements changes (what consumes the time, resources, creates a new costs and can be in the future the source of problems if any mistake would appear⁴).

In the second step we use the information about the advancement of work to make the next improvement of the Stability Index. As it was mentioned in section 2 the number of requirements at the given development stage is used for measure the progress of work. Each of requirements must undergo through several stages of workout till it can be said that it is implemented. There are five basic stages (specified by software life cycle models with an accuracy of nomenclature and granularity (e.g. Scacchi, 2002)) of work advancement according to software components: analyzed (*A*), designed (*D*), coded (*C*), tested (*T*) and integrated (*I*). These stages create the time-based order in tasks of the process of software development what means that every software component must go through all of these stages in a given order ($A \rightarrow D \rightarrow C \rightarrow T \rightarrow I$) and every modification in related requirements means that component must go through all already done stages again. Let $S = \{A, D, C, T, I\}$ will be a set of stages with sequence order ($A < D < C < T < I$), $P(c_j)$ denotes the stage of work advancement of component c_j and $w(c_j, X)$: $X \in S$ means a workload needed to achieve stage X by component c_j .

It can be assumed that in case of change request the rework ratio is strongly related to workload already spent and moreover such request have an impact on planned work. Because the change request appears during the development process it means that software component can be on a certain stage of work advancement, what can be denoted as follow:

$$w(c_j, X) = \sum_{y \leq P(c_j)} w_{\Delta}^A(c_j, y) + \sum_{P(c_j) < y \leq X} w_{\Delta}^P(c_j, y) = w^A(c_j, X) + w^P(c_j, X) \quad (4)$$

where $w_{\Delta}^A(c_j, y)$ is the workload spent on software component c_j on stage y and $w_{\Delta}^P(c_j, y)$ is the workload planned for works on software component c_j on stage y .

These values are accessible in project documentation. Using this designation the $w(c_j, I)$ means the total workload spend on and planned for development of component c_j .

The $w(c_j, X)$ depends on the work advancement of the software component c_j what means that it depends on time of the appearance of the change request (denoted as t_r). Then the c_j can be treated as $c_j(t_r)$ (state of software component c_j is depending on time) and the formula (4) can be rewriting as follow:

$$w(c_j(t_r), X) = \sum_{y \leq P(c_j(t_r))} w_{\Delta}^A(c_j, y) + \sum_{P(c_j(t_r)) < y \leq X} w_{\Delta}^P(c_j, y) = w^A(c_j(t_r), X) + w^P(c_j(t_r), X) \quad (5)$$

The formula (5) directly points out the time dependency of the workload spent on and planned for development of software component c_j .

⁴ The modifications of software (including error fixing) are the source of about 10% of errors.

Let assume that software module c_j takes part in fulfilling the requirements r_i ($c_j \in CR(r_i)$) and the request of change of this requirement appears in time t_r . The $rw(c_j, t_r)$ potential (estimated) reworks linked with modification of component c_j in time t_r can be denoted by following formula:

$$rw(c_j, t_r) = \sum_{y \leq P(c_j, t_r)} \lambda_{\Delta}^A(c_j, y) * w_{\Delta}^A(c_j, y) \quad (6)$$

where coefficient $\lambda_{\Delta}^A(c_i, y)$ is a ratio of potential reworks linked with stage y .

Using the different coefficients for different stages is connected with the fact that the scale of reworks on different stages can vary in significant way. The specificity of activities undertaken on given stages defines the general characteristic of potential rework. For instance, regardless of the scale of modification of source code of a given software component (activities undertaken on coding stage as a result of activities undertaken on analysis and design stages), almost all activities on testing and integrating stages have to be repeated (e.g. all tests must be conducted once again to check the correctness of software component as a whole). It means that rework ratio can be different for workload on each of stages and for better estimation the same value of these coefficients cannot assumed. Moreover, the values of coefficients $\lambda_{\Delta}^A(c_i, y)$ can vary for different components so it is hard to arbitrary points out their ranges of values. In practice these values can be obtain in mentioned early process of impact analysis or we can take an average value of these coefficients from historical data (statistical approach). The second option gives more rough estimation but don't need a time and resources for providing analysis.

Requirements change has an impact not only on reworks but it affects also the planned works. The $pw(c_j, t_r)$ estimated alternation in a planned works linked with modification of component c_j in time t_r can be denoted as follow:

$$pw(c_j, t_r) = \sum_{P(c_j, t_r) < y \leq I} \lambda_{\Delta}^P(c_j, y) * w_{\Delta}^P(c_j, y) \quad (7)$$

The values of coefficients $\lambda_{\Delta}^P(c_j, y)$ can be obtained by comparison of newly prepared and previous plans of the project or can be estimated basing on historical data (under the same circumstances as in case of rework coefficients).

Having the estimations of the impact of requirement change on workload connected with singular software component (formulas (6) and (7)), the impact of requirement r_i change on whole project (all planned works) can be defined in a following way:

$$WI(r_i, t_r) = \sum_{c_j \in CR(r_i)} [rw(c_j, t_r) + pw(c_j, t_r)] \quad (8)$$

The ratio $WI()$ can be used in process of project scope management to predict the impact of the requirements changes on development process and such project parameters like duration, costs, resources, etc. The verification of prediction quality can be made at the end of the project when instead of estimated values of $rw()$ and $pw()$ we can use the values achieved in reality.

In case of verified $WI()$ ratio the time factor can be omitted and $WI(r_i, t_{r_i})$ can be denoted as $WI(r_i)$.

The verified $WI()$ ratio can be use for defining the improved version of the Stability Index. The Procedural Stability Index SI^P , defined as follow:

$$SI^P = \sum_{r_i \in AS} WI(r_i) \quad (9)$$

gives information about influence of the requirements changes on the whole project. Such information is crucial for evaluation of the project management quality, in particular to identify the sources of potential differences between project plan and achieved results.

5. Conclusion

Presented work deals with the issue of using the software requirements based measures in IT project management. It concentrates on features of the Stability Index, well known and popular measure used for project evaluation. The way of improvement of this index using the information about relation between requirements and software components was presented. The final result is establishment of the set of stability indexes which consists of the following elements:

1. Stability Index SI – classical, well known formula based on proportion between the number of requirements changed (deleted, added, alternated) and the number of all requirements. Because the requirements are the best approximation of users needs which on technical level are expressed by software functionality this index expresses the stability of users needs and indirectly the functional stability. It can be called the Functional Stability Index SI^F . This index can be used for evaluation of the IT projects.
2. Structural Stability Index SI^S – formula of this index is based on the number of modified software components due to requirements changes. It can provide information about the impact of the singular requirements change or about the global impact of all requirements changes on software structure. While the SI^F gives information only about the number of changes the SI^S gives information how these changes affects the software structure (one of the final project results). The SI^S can be used in the processes of project scope change management (for estimation purposes) and for evaluation of the IT projects.
3. Procedural Stability Index SI^P – formula of this index is based on the impact of the requirements changes on the process of software development. It complements the information provided by SI^F and SI^S with the information about reworks level and plan alternations caused by requirements changes. The same as SI^S it can be used during the project for management purposes or for the evaluation of the IT projects.

Presented set of Stability Indexes provide an extended information about the impact of requirements changes on the IT project and it covers the areas of interest of different project participants reflecting the functional, structural and procedural points of view.

The main problem of using this set of indexes is necessity of having the strict knowledge about the relations between the requirements and software components. There are some solution in particular cases as, mentioned earlier, the UML(VR) concept with AR function (Dymek, Kotulski, 2007), but in general cases obtaining such a knowledge needs an analysis of documentation what

can be time and resource consuming. The modern approaches to IT project management, in particular approaches based on incremental model of software development (e.g. agile approach) and on scenarios of usage as the basic form of users needs specification, partially solve this problem by establishing the linkage between requirements, software components and workload.

Bibliography

1. Aurum A., Wohlin C. (eds.) (2005), *Engineering and Managing Software Requirements*, Berlin–Heidelberg, Springer-Verlag.
2. Capers J. (2005), Software Cost Estimating Methods for Large Projects, *CrossTalk – The Journal of Defence Software Engineering*, Vol. 18, No. 4, April.
3. Dymek D. (2011), Managing the Requirements Changes in the UML Based Projects [in:] *Software Engineering: Proceedings of the Tenth IASTED International Conference, February, 15-17, 2011*, (ed.) A. Toptsis, Innsbruck, Austria, Anaheim–Calgary–Zurich, Acta Press.
4. Dymek D., Kotulski L. (2007), *The Influence of Relations among Different Levels of UML Diagrams onto Software Maintenance*, *Proceedings of 2nd International Conference on Dependability of Computer Systems – DepCoS-Relcomex'07*, Szklarska Poręba, IEEE Computer Society.
5. Hull E., Jackson K., Dick J. (2005), *Requirements Engineering*, London–Berlin–Heidelberg, Springer.
6. Lutowski R. (2005), *Software Requirements: Encapsulation, Quality, and Reuse*, Boca Raton–London–New York–Singapore, Auerbach Publications.
7. *Practical Software and System Measurement – ver. 4.0c* (2003), Department of Defense and US Army, <http://www.psmisc.com> [10.06.2015].
8. Laird L.M., Brennan M.C. (2006), *Software Measurement and Estimation – A Practical Approach*, Hoboken, New Jersey, John Wiley & Sons, Inc.
9. Wysocki R.K., McGary R. (2005), *Effective Project Management: Traditional, Adaptive, Extreme (Polish edition)*, Gliwice, Helion.
10. Scacchi W. (2002), Process Models in Software Engineering [in:] *Encyclopaedia of Software Engineering*, 2nd. Edition, (ed.) J. Marciniak, Inc. New York, John Wiley & Sons.

Chapter 35

An Effective Procedure of Neural Classification for Imbalanced Data and Its Implementation to a Credit Granting Issue¹

Janusz Morajda

1. Introduction

Neural classifiers (and similar methods based on supervised learning) can efficiently perform classification tasks if all cases are evenly distributed into classes. However, in practice, a distribution of cases in classes is often significantly imbalanced, i.e. one (minor) class may contain much less cases than the other, but the correct recognition of observations belonging to this class is substantial. Such a situation often takes place in problems of potential borrowers classification during credit granting procedures (credit scoring). The paper submits researches concerning construction of an effective neural network classifier in a credit granting process. The considered dataset contains imbalanced data unevenly distributed in two classes: “good” and “bad” borrowers. A substantial factor concerning a successful creation of a neural classifier have been identified and discussed.

The key stress has been put onto proper preliminary data processing (performed before starting the network learning procedure). Particularly, the following hypothesis has been considered: “the effectiveness of a neural classifier raises if all classes are represented by the same number of instances in the training dataset”. This issue is extremely important when the source set of learning instances (used for construction of a neural classifier) contains unevenly distributed data with one class represented by majority of cases and with the other “minor” class, which is actually crucial for reaching the ultimate goal. Such a situation usually exists in the problem of credit decision support – majority of borrowers belong to the “good” class (and pay back credit installments in time), whilst the correct recognition of “bad” potential borrowers (i.e. risky credit granting decisions), creating a relatively small group, is essential for the creditor.

The issue of neural networks application to credit scoring problems has already been considered in wide literature, see e.g. (Lee et al., 2002; Huang et al., 2004; Angelini et al., 2008; Hsieh,

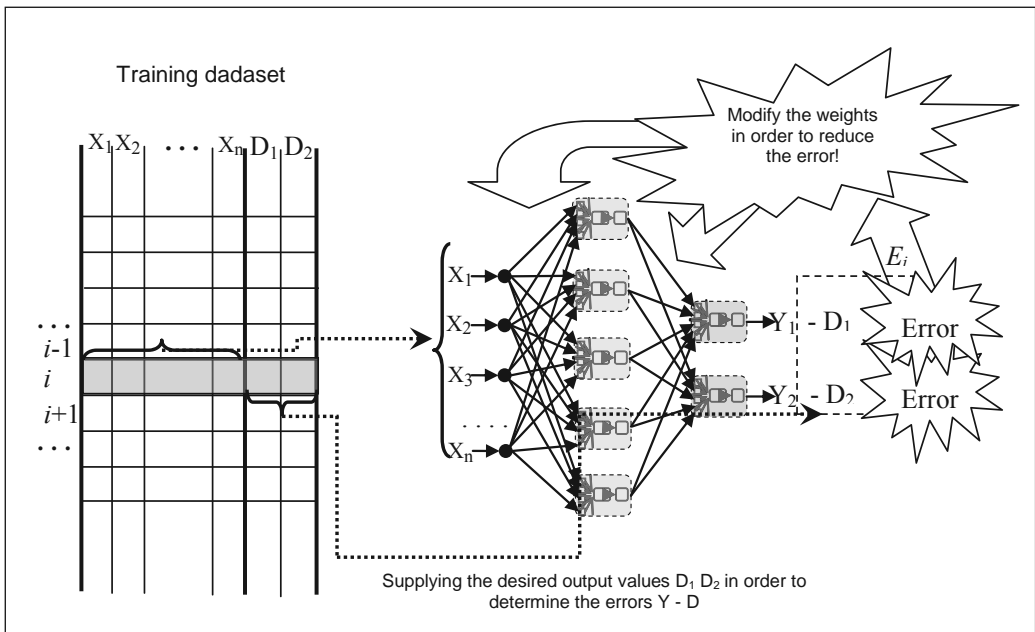
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Hung, 2010; Pacelli, Azzollini, 2011). However, rather few articles report researches concerning imbalanced credit data classification, e.g. (Huanga et al., 2006; Yen, Lee, 2009; Brown, Mues, 2012), so the problem is ongoing and worth consideration.

2. Artificial neural networks

Artificial neural networks (NN) are non-linear data processing techniques that can solve complex problems, for which finding a mathematical model or exact algorithm is impossible or very difficult, but there is a large number of observations (cases) of a phenomenon being modelled (Tadeusiewicz, 1993; Haykin, 1994; *Inteligentne...*, 2000; Rutkowski, 2005). These observations are used to NN construction (learning, training), during which the knowledge embedded in particular cases is transferred to the model and encoded in the network parameters (weights). As a consequence, the network collects knowledge about a particular phenomenon (modelled object) based on a set of examples included in the training set (set of training cases). This stage consists in appropriate modification of the network weights (Fig. 1). The process is analogous to natural human learning.

Figure 1. A scheme of supervised neural network training



Properly trained NN can identify this implicit knowledge and build a suitable model, which can be used during NN operation stage in solving specific tasks, such as decision making, classification or prediction (Tadeusiewicz, 2010).

Mathematically, the NN training consists in minimisation of error function E (see Eq. 1), i.e. finding such a NN weights set \mathbf{W} that minimises E considering all the cases in the training set (*Intelligentne...*, 2000).

$$E(\mathbf{W}) = \sum_i E_i = \sum_i (Y_i - D_i) \quad (1)$$

where E_i is the elementary error for training case i , D_i is desired (correct) answer delivered together with the case i in the training set and Y_i is the network output signal (see scheme in Figure 1).

Neural networks have the following main properties: non-linearity – the ability to model nonlinear phenomena; NN generate non-parametric data analysis models; NN require no *a priori* knowledge about the modelled phenomenon – it is enough to have a sufficient number of observations that can be used in the training (validation, test) set.

2.1. Problem of knowledge generalisation

During the NN training process, neural networks are exposed to the so-called overfitting effect (the network learns to generate ideal output signals for patterns belonging to the training set, but responds incorrectly to other patterns, not utilised in the learning phase). In such a case, the neural model does not have the ability to generalise the acquired knowledge. This effect eliminates the practical applications of the network where we expect appropriate responses (decisions, forecasts) to new input information, appearing during the operation stage. Therefore, the generalisation ability is the crucial factor during the correct creation of a neural model.

The basic method used to ensure the generalisation is the implementation of the so-called independent validation of the network during the training process.

Validation is the ongoing control of the network's ability to generalise during the training stage, based on a separate subset of cases, called a validation set. Sometimes it is advisable to use the so-called cross-validation. It involves the division of the whole data set into m approximately equal and disjoint subsets. The learning process of the model is carried out m times, using a different validation set (from among the m subsets) in each of these processes, and implementing the appropriate training using the remaining $m-1$ sets. The final model consists of m networks, whose signals are averaged. The advantage of this method is the use of all available data, both for teaching the model and to verify its ability to generalise.

2.2. Multilayer perceptron (MLP)

Multilayer perceptron (MLP) is the most commonly used neural network type (applied mainly to forecasting, valuation and classification problems). MLP is a feedforward network (Rutkowski, 2005) comprising of one or more hidden layers of neurons (see Fig. 1). If the hidden layer(s) use the neuron model with the non-linear activation function (e.g. sigmoid, tangential or exponential), the MLP can be used in modelling of complex, non-linear phenomena. Training is performed in a supervised mode (Fig. 1); a backpropagation algorithm (Haykin, 1994; *Intelligentne...*, 2000) or its modification (e.g. BFGS algorithm) can be applied.

2.3. Selected aspects of data pre-processing in neural modelling

The following main aspects should be taken into account during the preliminary data processing, before starting a NN training stage (Morajda, 2002; Rutkowski, 2005):

Defining the set of observations. The basic principle is to use the largest possible number of available cases, however, all observations should be representative of the analysed phenomenon.

Selection of input variables. The selection of the number and type of input variables significantly determines the effectiveness of the neural model. These variables should provide important information, and should be mutually independent (if possible). Tools supporting the selection of input variables include: knowledge of the expert in the field, selected statistical methods, and some artificial intelligence techniques (e.g. evolutionary algorithms).

Selection of the method for encoding symbolic variables. As NN can process numerical data only, a transformation of symbolic (qualitative) data to a numerical form is necessary.

Initial transformation of input variables. The appropriate conversions of input variables usually lead to significant enhancements in network effectiveness. The basic operations performed on the input variables (attributes) include (Morajda, 2002):

1. Verification of the correctness of values – the elimination of erroneous data, supplementing the missing values, using proper procedures for dealing with unusual observations.
2. Operationalisation of variables – involving certain mathematical transformations, for example determining logarithms, powers, roots of raw input signals, possible elimination of noise, smoothing of time series, etc.
3. Reduction of the number of variables and eliminating their mutual correlation – the principal component analysis (PCA) is a classical tool for performing both these operations simultaneously.
4. Normalisation – consisting in a linear scaling of each variable to a specified range, e.g. [-1, 1]; the main purpose of this operation is to give similar importance to each input variable in relation to other variables.

Here in the paper, another important aspect of neural modeling (applicable in classification tasks) has been considered – balancing the numbers of cases that represent particular classes.

3. The dataset used in the research

The main issue in credit scoring procedures is the correct classification of a potential borrower, i.e. his or her assignment to one of two classes: trusted (“good”) and risky (“bad”). An MLP neural network can be used as an effective classifier in such problems. Input variables (attributes) are the features of the borrowers that affect their profile (e.g., age, income, education, bank account status, etc.). Two output MLP neurons represent both classes. During the operation stage of trained MLP, the output neuron generating a higher numerical signal indicates a class, to which a borrower should be qualified.

For the purpose of the presented research, the dataset German (available in the UCI Machine Learning Repository, <http://archive.ics.uci.edu/ml/datasets/Statlog+%28German+Credit+Data%29>) has been used. Twenty attributes (input variables), listed below, have been used in the set (7 numerical and 13 categorical):

1. Status of existing checking account.
2. Credit duration in month.
3. Credit history.
4. Credit purpose.
5. Credit amount.
6. Savings account/bonds.
7. Present employment duration.
8. Installment rate in percentage of disposable income.
9. Personal status and sex.
10. Other debtors/guarantors.
11. Present residence duration.
12. Property owned.
13. Age in years.
14. Other installment plans.
15. Housing status.
16. Number of existing credits at this bank.
17. Job (employment).
18. Number of people being liable to provide maintenance for.
19. Telephone.
20. Foreign worker (yes, no).

The categorical output variable indicates the label of the class (there are 2 classes denoted by labels “good” and “bad”).

The dataset contains 1,000 instances concerning borrowers that can be classified according to the credit risk into two groups:

- “good” (reliable) – represented by 700 cases,
- “bad” (risky) – represented by 300 cases.

Due to significantly uneven distribution of instances into both classes, the data should be definitely regarded as imbalanced.

4. Research goal and methodology

The main goal of the research is to construct possibly best classifier that allows identification of the group a borrower belongs to. Such a tool, if constructed and tested correctly, can be used as a decision support model during the credit granting procedures. Due to the lack of clear rules indicating dependencies between input attributes and the output variable, having considered a possible nonlinearities and problem complexity, a neural network approach has been selected for the classifier construction. Actually, the effectiveness of neural networks application to this task has been confirmed in wide literature and practice. In the research presented here, multi-layer perceptrons (MLP), discussed in Section 2, commonly recognized as highly effective classification tools, have been utilized (a consideration of other methods and possible comparative studies transcend the scope of the paper but indicate a valuable direction of further research).

The original dataset has been divided into two subsets:

- Model development set (MDset), containing randomly selected 900 cases out of ,1000;
- Test set (Tset), containing remaining 100 cases.

After creation of both subsets, the following number of cases belonging to both classes have been obtained:

- MDset: good – 626, bad – 274,
- Tset: good – 74, bad – 26.

The model development set is used for neural network construction, i.e. training together with validation. The test set is utilized for final network testing (when the neural classifier is ultimately created); results of these tests are the main basis for a neural model effectiveness evaluation.

Classical effectiveness indicators, used also here, are as follows:

1. Total percentage of correct classification for both classes – *ptotal*.
2. Percentage of correct classification for class “good” – *pgood*.
3. Percentage of correct classification for class “bad” – *pbad*.

However, as correct recognition of cases belonging to class “bad” is more important than class “good” (here, importance factor = 5 is assumed for the “bad” class), one more indicator – *pa* (percentage adjusted) has been introduced (Eq. 2):

$$pa = (pgood + 5 pbad)/6 \quad (2)$$

The following three experiments A, B and C, concerning various preparation of training and validation data, have been performed:

- A. Whole MDset (900 cases) is used for MLP training and validation, with proportions between training and validation sets as 85% and 15% respectively.
- B. Limited MDset, called here LMDset, is created by random selection of 274 “good” instances out of 626 existing in the MDset; the LMDset contains balanced data regarding both classes: 274 original “bad” cases and 274 randomly selected “good” cases (total number of instances has been consequently decreased from 900 to 548 in the LMDset). This dataset is used for MLP training and validation, with the same proportions of training and validation sets as in experiment A (85% and 15%).
- C. Extended MDset, called here EMDset, created in the following steps:
 - 136 validation instances (around 15% out of 900) have been randomly selected from the original MDset (68 representing “good” class and 68 – “bad” class) to create a constant (fixed) validation dataset,
 - Remaining 558 “good” cases have been included into the training dataset,
 - The second half of training set have been created from remaining 206 “bad” cases (not included into validation set) by doubling them and once again adding 146 randomly selected (out of 206) instances, to obtain finally $2 * 206 + 146 = 558$ “bad” cases.

The training set contains finally 1,116 balanced cases.

In the experiments A and B, two variants of MLP development have been applied:

1. Variant 1 (V1) – MLP with 30 hidden units (structure 61-30-2), hidden units activation function: hyperbolic tangent, output units activation function: linear, training algorithm: BFGS, error function: sum of squared errors, method of preventing from overfitting: cross-validation, 3 best neural models selected out of 20 constructed.
2. Variant 2 (V2) – automatic optimization of MLP structure with number of hidden units selected from the range [6, 30] (minimal structure 61-6-2, maximal structure 61-30-2); hidden units activation function selected from the set: {hyperbolic tangent, sigmoid, exponential}; output units activation function: linear; training algorithm: BFGS; error function (selected):

sum of squared errors or cross-entropy, method of preventing from overfitting: standard validation, 3 best neural models selected out of 50 networks constructed.

For experiment C, due to fixed validation set, only Variant 2 has been applied.

The Statistica² software has been utilized for the research.

5. Results

Below (Tab. 1, 2, 3, 4 and 5), test results (percentages of correct classifications in the test dataset) for particular experiments described in Section 4 are submitted (detailed explanations in the text above). Each table contains test effectiveness indicators *ptotal*, *pgood*, *pbad* and *pa* (see Section 4) for three best networks (arbitrarily selected on the basis of training and validation results) and for the “committee” constructed from all of these three models (such a committee model generates classification decisions after averaging output signals from particular networks). Average value of *pa*, calculated for all 4 models, has been indicated for each experiment.

Table 1. Test results of Experiment A (MDset), variant 1

Neural model	<i>ptotal</i>	<i>pgood</i>	<i>pbad</i>	<i>pa</i>
1. MLP 61-30-2	77.0%	82.4%	61.5%	65.0%
2. MLP 61-30-2	79.0%	86.5%	57.7%	62.5%
3. MLP 61-30-2	79.0%	85.1%	61.5%	65.5%
Committee 1,2,3	79.0%	85.1%	61.5%	65.5%
Average <i>pa</i>				64.6%

Source: own calculations.

Table 2. Test results of Experiment A (MDset), variant 2

Neural model	<i>ptotal</i>	<i>pgood</i>	<i>pbad</i>	<i>pa</i>
1. MLP 61-20-2	78.0%	82.4%	65.4%	68.2%
2. MLP 61-16-2	83.0%	94.6%	50.0%	57.4%
3. MLP 61-13-2	81.0%	87.8%	61.5%	65.9%
Committee 1,2,3	81.0%	87.8%	61.5%	65.9%
Average <i>pa</i>				64.3%

Source: own calculations.

Table 3. Test results of Experiment B (LMDset), variant 1

Neural model	<i>ptotal</i>	<i>pgood</i>	<i>pbad</i>	<i>pa</i>
1. MLP 61-30-2	64.0%	60.8%	73.1%	71.0%
2. MLP 61-30-2	64.0%	62.2%	69.2%	68.1%
3. MLP 61-30-2	73.0%	73.0%	73.1%	73.1%
Committee 1,2,3	68.0%	67.6%	69.2%	69.0%
Average <i>pa</i>				70.3%

Source: own calculations.

² StatSoft, Inc. (2011). STATISTICA (data analysis software system), version 10. www.statsoft.com.

Table 4. Test results of Experiment B (LMDset), variant 2

Neural model	<i>ptotal</i>	<i>pgood</i>	<i>pbad</i>	<i>pa</i>
1. MLP 61-6-2	67.0%	64.9%	73.1%	71.7%
2. MLP 61-17-2	65.0%	63.5%	69.2%	68.3%
3. MLP 61-6-2	63.0%	63.5%	61.5%	61.9%
Committee 1,2,3	67.0%	66.2%	69.2%	68.7%
Average <i>pa</i>				67.7%

Source: own calculations.

Table 5. Test results of Experiment C (EMDset), variant 2

Neural model	<i>ptotal</i>	<i>pgood</i>	<i>pbad</i>	<i>pa</i>
1. MLP 61-12-2	75.0%	79.7%	61.5%	64.6%
2. MLP 61-6-2	72.0%	73.0%	69.2%	69.9%
3. MLP 61-6-2	69.0%	63.5%	84.6%	81.1%
Committee 1,2,3	72.0%	73.0%	69.2%	69.9%
Average <i>pa</i>				71.4%

Source: own calculations.

Assuming that *pa* is the most important effectiveness indicator, another neural model has been constructed – it is a “committee” model created on the basis on two best networks with the highest values of *pa*. The selected networks are:

- Network 3. MLP 61-30-2 (experiment B, V1) – see Table 3, *pa* = 73.1% (but also all effectiveness indicators are evenly distributed with values around 73%), and
- Network 3. MLP 61-6-2 (experiment C, V2) – see Table 5, *pa* = 81.1%.

The test results obtained for this model are presented in Table 6.

Table 6. Test results for the “committee” model constructed from two best networks: 3. MLP 61-30-2 (experiment B, V1) and 3. MLP 61-6-2 (experiment C, V2)

Neural model	<i>ptotal</i>	<i>pgood</i>	<i>pbad</i>	<i>pa</i>
Committee of two best networks	74.0%	73.0%	76.9%	76.3%

Source: own calculations.

It is worth noting that generating committees of best networks, as presented in Table 6, may often enhance classification effectiveness. Here (Table 6), all correctness indicators of the network 3 (Tab. 3) have been improved, and the *ptotal* indicator raised in relation to both component networks. Moreover, all indicators have similar values (between 73% and 77%), so the model can be regarded as reliable for all cases.

6. Conclusion

Analysis of results, submitted in Section 5, allows creating the following conclusions:

1. The application of original development (training+validation) dataset (MDset) enables achieving best results, if only total percentages of correct classification (p_{total}) or correct classification for class “good” (p_{good}) are considered. Consequently, if a researcher or practitioner treat identically both classes (results for both classes are equally important), no modifications in the dataset (considering the number of cases) are necessary. However, in a credit scoring procedures, usually correct identification of class “bad” is much more important due to possible losses for a creditor. In such a case, an operation of dataset balancing (by ensuring the even distribution of cases for both classes) is strongly recommended; it leads to generating neural models according to experiments B and C.
2. Using balanced development sets (LMDset or EMDset) generates significantly better results for minor class recognition (class “bad”).
3. Using committees of best neural models may enhance the classifier effectiveness (see results in Tab. 6).

Assuming much higher importance of minor (here “bad”) class recognition, the hypothesis, formulated in Section 1 (Introduction) has been confirmed by the research results presented in the paper. Therefore, researchers and practitioners who create classifiers as decision support models for credit scoring (or similar) issues should remember about significance of proper preliminary data preprocessing, including ensuring a balance of cases numbers in the training and validation datasets. However, balancing (equaling) class sizes in model development data is not necessarily an optimal method of data preparation; consequently, further research in this area is desirable.

Bibliography

1. Angelini E., Tollo G., Roli A. (2008), A Neural Network Approach for Credit Risk Evaluation, *The Quarterly Review of Economics and Finance*, Vol. 48, No. 4.
2. Brown I., Mues C. (2012), An Experimental Comparison of Classification Algorithms for Imbalanced Credit Scoring Data Sets, *Expert Systems with Applications*, Vol. 39, Iss. 3.
3. Haykin S. (1994), *Neural Networks. A Comprehensive Foundation*, New York, Macmillan College Publishing Company.
4. Hsieh N.C., Hung L.P. (2010), A Data Driven Ensemble Classifier for Credit Scoring Analysis, *Expert Systems with Applications*, Vol. 37, No. 1.
5. Huang Z., Chen H., Hsu C.J., Chen W.H., Wu S. (2004), Credit Rating Analysis with Support Vector Machines and Neural Networks: A Market Comparative Study, *Decision Support System*, Vol. 37, No. 4.
6. Huang Y.-M., Hung C.-M., Jiaub H.C. (2006), Evaluation of Neural Networks and Data Mining Methods on a Credit Assessment Task for Class Imbalance Problem, *Nonlinear Analysis: Real World Applications*, Vol. 7, Iss. 4.
7. Lee T.S., Chiu C.C., Lu C.J., Chen I.F. (2002), Credit Scoring Using the Hybrid Neural Discriminant Technique, *Expert System with Applications*, Vol. 23, No. 3.

8. Morajda J. (2002), Czynniki efektywnego wykorzystania sieci neuronowych w procesie modelowania rynków finansowych, *Zeszyty naukowe AE w Krakowie No. 604*, Kraków, Wydawnictwo AE w Krakowie.
9. Pacelli V., Azzollini M. (2011), An Artificial Neural Network Approach for Credit Risk Management, *Journal of Intelligent Learning Systems and Applications*, 3.
10. Rutkowski L. (2005), *Metody i techniki sztucznej inteligencji*, Warszawa, PWN.
11. Tadeusiewicz R. (2010), New Trends in Neurocybernetics, *Computer Methods in Materials Science*, Vol. 10, No. 1.
12. Tadeusiewicz R. (1993), *Sieci neuronowe*, Warszawa, Akademicka Oficyna Wydawnicza RM.
13. Yen S.-J., Lee Y.-S. (2009), Cluster-based Under-sampling Approaches for Imbalanced Data Distributions, *Expert Systems with Applications*, Vol. 36, Iss. 3, Part 1.
14. Zieliński J. (ed.) (2000), *Inteligentne systemy w zarządzaniu. Teoria i praktyka*, Warszawa, PWN.

Chapter 36

A Clustering Method Inspired by Firefly Algorithm¹

Janusz Morajda, Paweł Wołoszyn

1. Introduction

The term *clustering* or *cluster analysis* is an area of data processing which aims at grouping given objects into classes (clusters) in a way that every two objects belonging to the same cluster are possibly similar and objects from different clusters are dissimilar. Clustering process is performed to discover structures in data without *a priori* knowledge about them, i.e. without any theory or explanations concerning existing structures (clusters).

Cluster analysis is an important category of data mining issues and plays important role in many scientific disciplines (for example in biology, chemistry, medicine, archaeology, etc.). Clustering techniques are frequently applied also in business and economy, for example in customers classification, enterprise grouping or in other economic data analyses.

Clustering involves a number of different methods. Actually a crucial issue in all of them is how to organize objects (observations) into *meaningful* structures.

Cluster analysis methods have been discussed in many fundamental monographs, e.g. (Hartigan, 1975; Spath, 1980; Gordon, 1999; Cichosz, 2000; Everitt et al. 2001) and in a great number of scientific articles.

Here we propose a new clustering method, which we have named *Firefly Clustering Algorithm* (FCA), based on a recently developed and commonly applied optimisation technique – Firefly Algorithm (FA) that follows natural behaviour of living fireflies. Section 2 presents the original idea of FA, used in solving various optimisation problems. Section 3 submits details of FCA – the proposed clustering method inspired by certain ideas implemented in the FA. Sections 4, 5 and 6 describe some empirical clustering experiments with the use of FCA applied to selected datasets, and discuss research results. Final remarks are presented in Section 7.

In our research presented here we have considered only 2-dimensional problems, i.e. datasets with only 2 numerical features (variables). However, the method is universal and can be applied for any number of inputs (obviously with limited visualisation capabilities).

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2. An outline of the original Firefly Algorithm

Firefly Algorithm (FA) was developed by X.S. Yang (2008, 2009). It is a nature-inspired algorithm based on behaviour of fireflies that emit light and move towards other luminescent conspecifics. FA utilises the following 3 basic rules (Yang, He, 2013):

1. Fireflies are unisex so that one firefly will be attracted to other fireflies regardless of their sex.
2. The attractiveness is proportional to the brightness, and they both decrease as the distance between fireflies increases. Thus for any two flashing fireflies, the less brighter one will move towards the brighter one. If there is no brighter one than a particular firefly, it will move randomly.
3. The brightness of a firefly is determined by the landscape of the objective function.

In other words, the main idea of FA is that a firefly is attracted to any other firefly that has a higher brightness, and this attractiveness is stronger if the distance between the two fireflies is smaller. As the brightness (and attractiveness) of a firefly depends on the value of the objective function (“better” values induce higher brightness), the fireflies, moving in the feature space (that determines arguments for the objective function), tends to find optimal feature vectors. Consequently, after a number of FA steps, certain fireflies are usually positioned very close to global extremum of the objective function and the whole process can be regarded as a metaheuristic optimisation procedure. Recent developments show its high optimisation effectiveness for various complex problems.

3. Proposed FCA algorithm for firefly-inspired clustering

Let us consider a set of objects (observations) expressed as points (vectors) in the feature space. The goal is the identification of groups (clusters) of objects, having no *a priori* information about possible clusters, their shapes and their number. We assume that each observation becomes a firefly, which can move according to the general rules of the classical firefly algorithm. Consequently, the whole set of observations becomes a dynamic system and its behaviour is simulated during subsequent steps of the algorithm.

As there is no objective function here, initially all fireflies have the same luminance. Anyway, they can collide and aggregate during the simulation phase (see section 3.2 - 2.c); two colliding fireflies create a new one (that replaces colliders) with possibly higher luminance.

We can assume that an aggregated group of fireflies (that collided and linked together) creates a cluster, so observation of simulation (aggregation) process enable identification of clusters in the initial set.

3.1. The model of a firefly

A firefly is modelled as an object with following attributes:

- position – a vector in the feature space; a firefly can move in any direction according to the algorithm specified below and the movement does not adhere to physical laws of motion in classical mechanics (firefly has no mass and does not exhibit inertial properties);
- luminance – a dimensionless positive value describing how bright is the light emitted by a firefly;

- leader – an optional relation to another firefly which acts as a target to follow; not all fireflies have to have a leader and, conversely, it is not necessary for fireflies to have any followers at all.

Fireflies are able to perceive each other's luminance, but emitted light becomes attenuated as it propagates through the medium surrounding fireflies. The model imitates real-world light absorption with luminance decaying exponentially according to Beer-Lambert law.

3.2. General description of the algorithm

The algorithm is divided into three distinct phases:

1. Initialization phase

Fireflies are created on the basis of observations taken from the input data set. Each observation vector becomes the position of one firefly. Initial luminance of all fireflies is set to 1.

2. Simulation phase

During the simulation phase fireflies are moving, colliding with each other and aggregating into larger clusters until all fireflies combine into a single unit. The simulation is an iterative, fully deterministic process with each iteration consisting of three steps:

a) Choosing leaders

Each firefly tries to choose a leader by comparing its own luminance with luminance of all peers as they are seen in the fly's location, taking into account light absorption depending on the distances between firefly and its peers. The brightest peer with perceived luminance exceeding firefly's own luminance becomes its leader.

It is possible that due to light absorption none of the peers appears brighter than the firefly itself even if their actual luminance is in fact greater. In such a case the firefly checks whether it has any followers. If there are any peers moving towards the firefly, it assumes being their leader itself and therefore it does not choose its own leader.

Otherwise if no peers seem to follow the firefly it chooses the most luminous peer as its pseudo-leader despite that peer appearing dimmer than the firefly itself. This decision is made independently by each fly in the population and is retaken in every iteration without memory of previous decisions. This ensures that two symmetrical fireflies become mutually their own pseudo-leaders and move towards themselves instead of waiting indefinitely for any asymmetrical change in their states. As fireflies have no memory they have also no sentiment for their leaders and can change them even as often as in every iteration.

b) Moving fireflies

Firefly which follows a leader or a pseudo-leader moves directly towards that peer. Its position is translated in the direction of the leader by a small distance determined by the speed of flight. Speeds of all fireflies are uniform and constant throughout the entire simulation and must be chosen sufficiently small to assure that distances travelled in each iteration are short compared to initial distances between fireflies, otherwise the system can become unstable.

Fireflies which have neither leader nor pseudo-leader remain still in their positions. They do not perform any random movement as opposed to the original Firefly Algorithm.

c) Aggregating fireflies

If the distance between a firefly and its leader becomes smaller than assumed threshold, these fireflies collide and aggregate into a bigger unit which behaves exactly as a normal firefly replac-

ing both colliding flies. Collisions are considered only between leader and its follower, any other close encounters, for example between two followers of the same leader, are not regarded as collisions leading to aggregation.

The luminance of the aggregate is calculated as a weighted average of the larger of two luminance values and the sum of both of them. The weight w (which is a parameter of the algorithm) determines the proportion of mixing of two extremes where luminance values are simply added during firefly aggregation (for $w = 1$) or remain unchanged (for $w = 0$). The position of aggregated unit remains the same as the position of leader fly involved in the collision unless both flies are their mutual pseudo-leaders in which case the aggregate assumes averaged position of both flies.

Since fireflies do not possess mechanical properties (such as momentum or kinetic energy) which are subject to physical conservation laws, they can be simply replaced with their aggregate without further processing. As the simulation progresses, more and more flies are replaced with aggregated units and those units further aggregate into higher level units as well. Aggregation events are recorded along with the time of their occurrence in a history log which allows to reconstruct the order of cluster creation. It is possible that in a single iteration more than one follower collides simultaneously with the same leader. In that case all collisions are resolved in an implementation-dependent deterministic sequence and a single aggregate is created before the next iteration.

3. *Analysis phase*

The simulation phase terminates when all of initially present fireflies become aggregated into a single unit. At that point the collision history is processed in reverse chronology order and aggregation events are interpreted as dissociation of clusters into smaller subunits. The process begins with a single cluster which becomes the root of the dendrogram and each recorded collision introduces a new branch in the tree. After all collisions are processed the resulting tree's leaves correspond to all fireflies initially present in the model and at the same time to all hierarchically clustered observations. Although the analysis phase has divisive, top-down characteristic, it is nevertheless based on data collected during simulation phase which is definitely an agglomerative process of merging observations into clusters.

Finally the constructed tree can be used for partitioning observations into given number of clusters which is equivalent to cutting the tree at the level where it has that number of branches already forked. The descendants of each branch become members of appropriate cluster.

3.3. *Pseudocode of the FCA algorithm*

```

create a firefly for each observation
while population size > 1:
  for each fly in population:
    find brightest peer
    if brightest peer perceived luminance > fly luminance:
      brightest peer becomes fly's leader
    else:
      find fly's followers
      if no followers found:
        brightest peer becomes fly's pseudo-leader

```

```

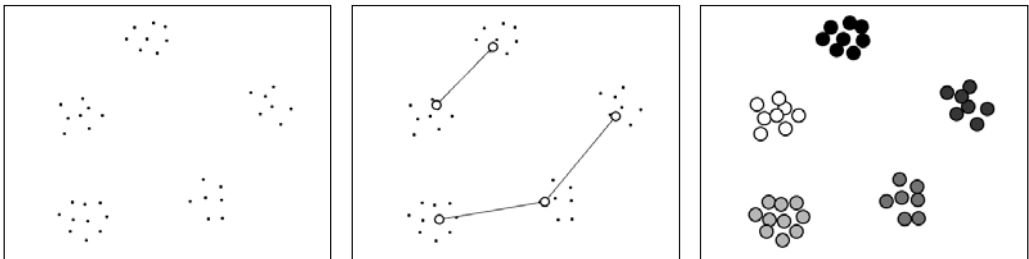
else:
    fly has no leader
for each fly in population:
    if fly has leader or pseudo-leader:
        move fly towards leader
for each fly in population:
    if fly collides with leader:
        remove fly from population
        determine aggregated luminance
        replace leader with new firefly

```

4. A simple example of clustering process with utilisation of FCA method

Here we show results of FCA clustering process for a simple, artificially generated dataset of observations, presented in Figure 1(a). Each observation is described by two features (input variables) and can be regarded as a point in a 2-dimensional space. It is easy to note, that all observations create 5 separate clusters.

Figure 1. An original dataset (a), visualisation of FCA stage that reached 5 leaders (clusters) (b), final assignment of observations into clusters expressed by differently shaded circles (c)



Source: own calculations.

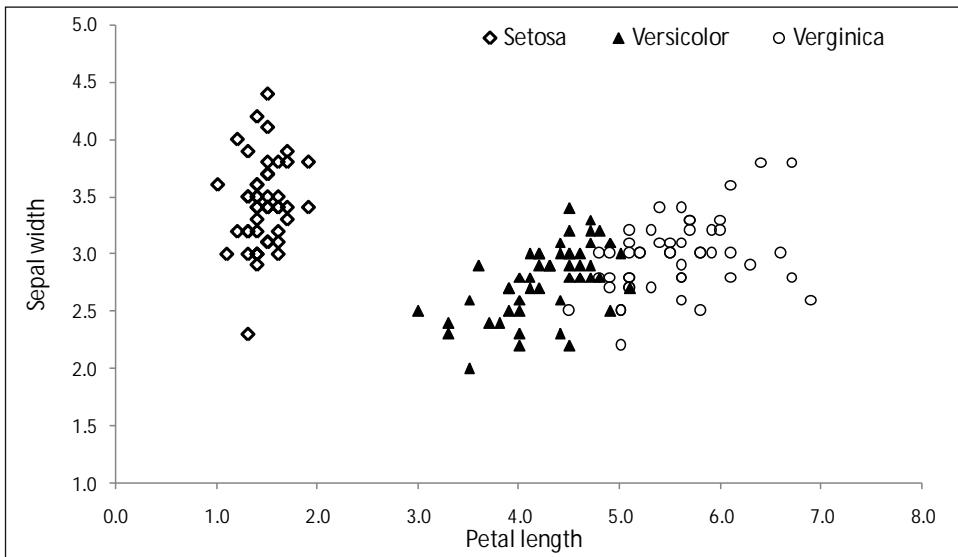
We have performed a clustering process with the use of the proposed FCA algorithm with the parameter $w = 0$ (the weight w determines the luminance of a new firefly after the aggregation (see section 3.2)), and with the *a priori* assumption that 5 clusters should be identified. Figure 1(b) depicts the stage of FCA clustering with 5 “aggregated” fireflies, shown by small white circles. After identification of original observations (i.e. starting fireflies that were aggregated during the process) belonging (joined) to particular 5 fireflies, we obtained a division into clusters shown in Figure 1(c) with various shadings. Clearly, the clusters has been identified correctly.

5. The simulation and its results for a reduced (2-dimensional) *Iris* dataset

The *Iris* dataset, introduced by R.A. Fisher in 1936, is a classic set of 150 observations, commonly used for evaluation of various classification methods. The data concern 3 kinds (groups) of *Iris* flowers (*Setosa*, *Verginica*, *Versicolor*), with 50 elements in each group. The set contains 4 input variables (features) and an output attribute that indicates the name of group. For the purpose of our research, we have prepared a “reduced” dataset by:

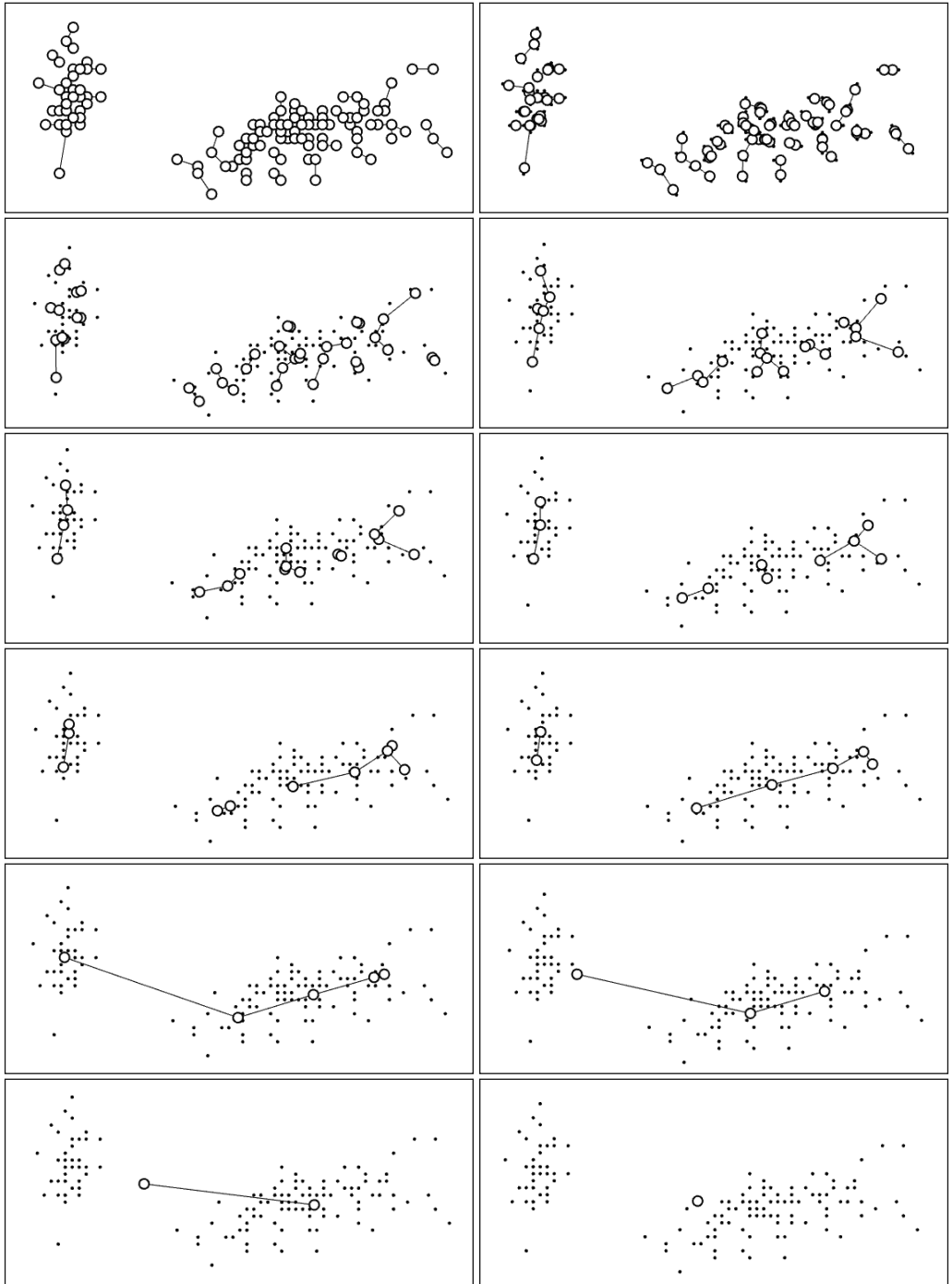
- removing the output attribute (not applicable in clustering problems, however still possible to use in identification of correct classifications);
 - reducing the number of input features from 4 to 2 by calculating correlation coefficient cc between all 6 pairs of variables (all cc values are greater than 0.5) and selecting a pair with the lowest cc (the selected variables are: *Petal length* and *Sepal width* with $cc = 0.52$).
- All observations belonging to the so modified *Iris* dataset are shown in Figure 2.

Figure 2. A graphical representation of the reduced *Iris* dataset



We have performed a clustering process for this dataset with the use of the proposed FCA algorithm, described in Section 3.

Figure 3. A sequence of steps (selected stages) of clustering process



As the procedure starts from a state, where each observation is a single 1-element group, and ends on one cluster containing all objects, the method can be classified as an agglomerative clustering technique, which leads to creation a dendrogram. Let us here show, however, another graphical form illustrating the grouping process (see Fig. 3) – a sequence of selected clustering stages. At the beginning of the process, each observation determines a single firefly located on its original (starting) position in the feature space. During the grouping process, leaders (denoted by small circles in Fig. 3) are being created and other fireflies are finding their leaders (such connections are denoted by lines) and are moving towards them. Original positions of fireflies (i.e. vectors of observations in the feature space) are denoted by dots. Due to aggregation of fireflies, their number decreases in subsequent stages. Actually, the number of joined fireflies (small circles) can be regarded as the current number of identified groups.

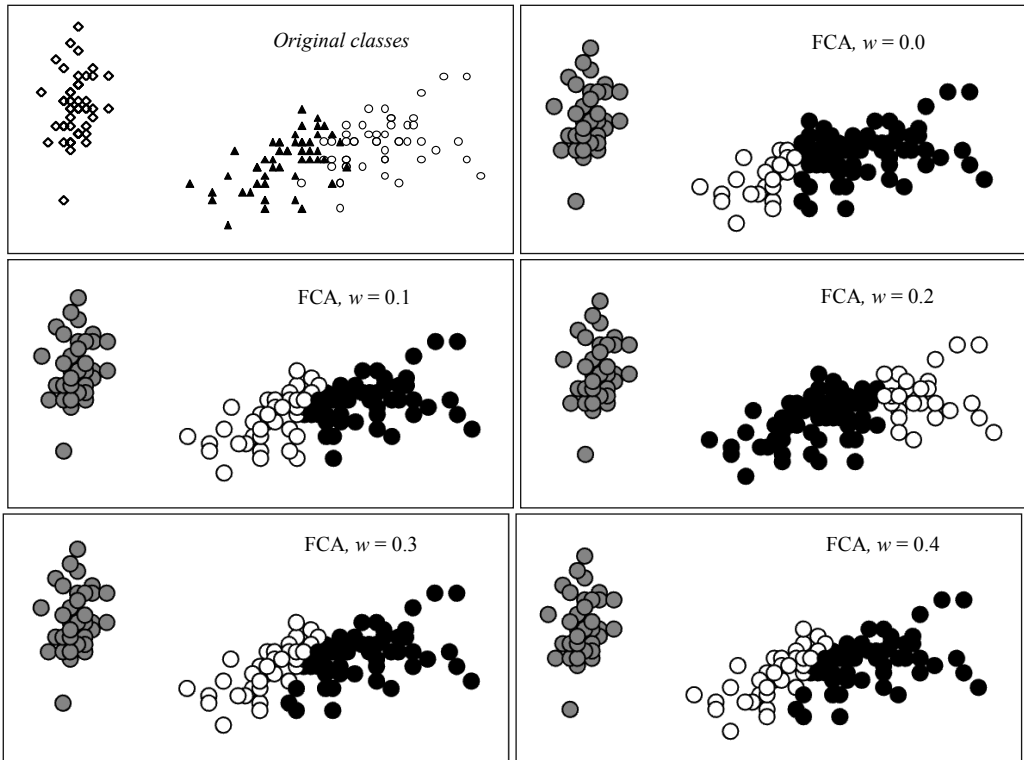
Let us now show the results of grouping, assuming that the number of groups is 3 (like in original dataset), i.e. the clustering algorithm is stopped when the number of aggregated fireflies is 3. In such a case, it is possible to determine the total percentage of correct observations assignment to the particular three clusters. As we recognised that results of classification strongly depend on the parameter (weight) w , which determines the luminance of a new firefly after the aggregation (see section 3.2), we submit the percentage of correct assignments for various w belonging to the range $[0.0, 0.4]$, see Table 1. Also, due to the comparison needs, we attach the result achieved by the classical k -means clustering algorithm for $k = 3$. Graphically, the assignment of particular objects to three identified clusters is depicted in Figure 4.

Table 1. Results of clustering correctness

w	Percentage of correct assignments done by FCA	Percentage of correct assignments done by the k -means algorithm
0.0	83.3%	92.7%
0.1	94.0%	
0.2	86.7%	
0.3	93.3%	
0.4	86.0%	

Source: own calculations.

Figure 4. Assignment of observations to identified clusters (shown by different symbols or shadings), executed by FCA algorithm, assuming that the number of clusters is equal to 3



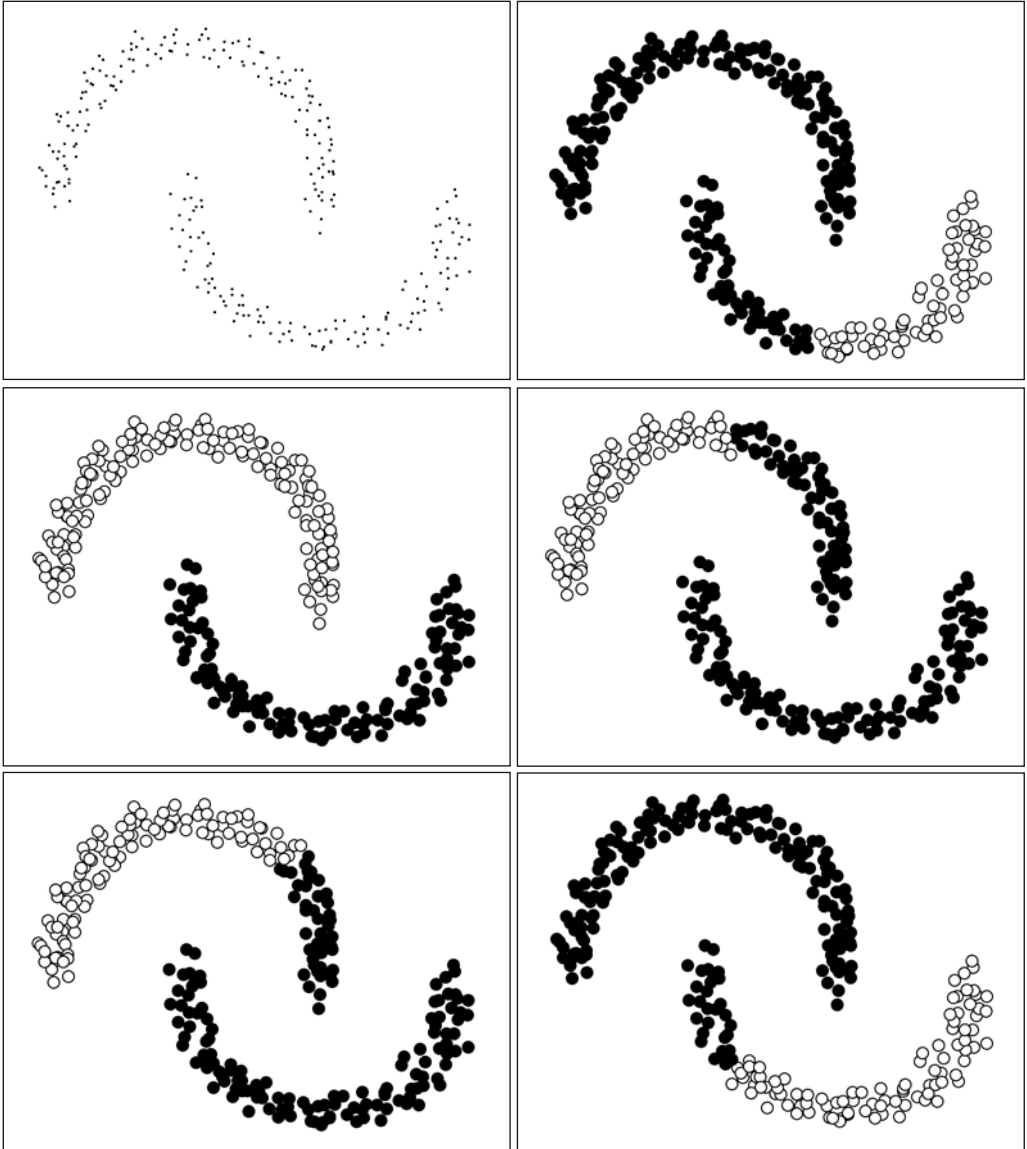
Source: own calculations.

Generally, the FCA algorithm has generated relatively good results for the reduced 2-dimensional *Iris* dataset. In comparison with the *k*-means algorithm, the FCA can generate better division of observations dataset into clusters, but under condition of proper selection of the w parameter. Consequently, the issue of parameters selection for the FCA method needs further research.

6. The simulation for *Croissants* dataset

The clustering experiment shown here concerns a dataset with two clusters having “croissant” form (see Fig. 5). Such groups are regarded as hard to distinguish by majority of clustering algorithms. We applied the FCA algorithm to this problem, assuming the existence of two groups of observations. The results (for selected five w values from the range $[0.0, 1.0]$), presented in Figure 5, generally confirm the effectiveness of the FCA method and its certain dependency on w .

Figure 5. Original dataset and assignments of observations to identified two clusters (shown by black and white circles), executed by FCA algorithm, for 5 selected values of w



Source: own calculations.

7. Conclusion

In the paper we proposed a new clustering algorithm (FCA), based on some ideas taken from the recently developed Firefly optimisation technique. So far, the FCA method has been developed and tested for 2-dimensional datasets, however it can be easily generalised to any number of input features. Such FCA generalisation should be regarded as an important direction of further work in the subject.

Obtained results, presented and discussed in sections 4, 5 and 6, proved that the effectiveness of the FCA clustering method are comparable with other grouping algorithms. As it was indicated that this effectiveness depends on some FCA parameters (mainly on w), further research concerning optimisation of their values is necessary. We have also developed a hypothesis (to be tested during our future work) that the FCA effectiveness can be improved by assigning certain non-linear rules of fireflies motion.

Bibliography

1. Cichosz P. (2000), *Systemy uczące się*, Warszawa, WNT.
2. Everitt B.S., Landau S., Leese M. (2001), *Cluster Analysis*, New York, Oxford University Press.
3. Gordon A.D. (1999), *Classification*, Boca Raton, Chapman&Hall/CRC.
4. Hartigan J.A. (1975), *Clustering Algorithms*, New York, John Wiley.
5. Spath H. (1980), *Cluster Analysis Algorithms*, Ellis Horwood.
6. Yang X.S. (2008), *Nature-Inspired Metaheuristic Algorithms*, UK, Luniver Press.
7. Yang X.S. (2009), Firefly Algorithms for Multimodal Optimisation, *Proc. 5th Symposium on Stochastic Algorithms, Foundations and Applications*, (eds.) O. Watanabe, T. Zeugmann, Lecture Notes in Computer Science, 5792.
8. Yang X.S., He X. (2013), Firefly Algorithm: Recent Advances and Applications, *Int. J. Swarm Intelligence*, Vol. 1, No. 1.

Chapter 37

Automated Discrimination between Genuine and Fake Written Opinions¹

Paweł Wołoszyn, Katarzyna Wójcik, Łukasz Walewski

1. Introduction

Textual opinions written by clients and consumers are valuable source of feedback information about their sentiments and satisfaction. Such information is especially important for assessing subjectively perceived quality of student education in universities and other teaching institutions. In some circumstances however opinions written by students can be heavily biased by their personal opinion about teachers. Due to anonymous nature of feedback questionnaires some opinions about teaching courses can even be written by students not participating in those courses. In this paper we investigate possible applications of computer text analysis and stylometry tools in determining credibility of student opinions about courses. Our goal is to develop an automated method for discriminating between fake and genuine opinions. This paper presents the proposed method along with results of processing several text samples acquired in an experiment. We also draw conclusions about practical applications of our approach.

2. Motivation and research objectives

People like having opinions. This commonsense truth gained quite a new meaning with the advent of the Internet and digital social media which in practice allow anybody to comment almost anything and share their opinion with the entire global population. Due to the very nature of web technology these opinions are mostly expressed in digital written form, using only typed letters of alphabet with a modest addition of punctuation signs and emoticons. Such a simple form makes it very easy to write an opinion and social feedback encourages people to do so even if they have little or no knowledge about commented topic. As there is no formal authorization required in most websites and any email address is sufficient to sign up, there is also no verifica-

¹ The publication has been financed from funds granted to Faculty of Management, Cracow University of Economics, for supporting scientific research capability.

tion of expressed opinions which can be objective, balanced and credible as well as subjective, unsound and fictitious.

The majority of opinions written online concerning everyday topics perhaps have little impact on what those who read them are thinking – it includes personal blogs, comments on news websites, discussion boards, media sharing websites, hobby portals and similar places. However there are such situations when opinions not only can strongly influence the view on a specific subject which dominates in a society but also can bring some more or less formal consequences. Some examples include boycotts and other forms of consumer activism, politics, especially in periods before important elections or plebiscites, or lifestyle, fashion and health trends. In such cases it can be tempting for some parties to exploit social media and publish false, ungrounded opinions as a mean of spreading views beneficial for them. Fake opinions can then be harmful if people make important decisions relying on what other people write not necessarily in good intentions.

This raises the question how to distinguish truthful and deceptive opinions taking into consideration only their written form. There are numerous approaches in psychology and crime detection science aimed at differentiating true and false statements expressed by given person, however those methods are based on some kind of holistic observation of the person. Factors such as the general behavior, voice and speech characteristic, eye movement, facial expressions (Porter, Ten Brinke, 2008), posture or hand gestures are often analyzed by experts. Unfortunately all such factors are missing in written text. There are some sources of information about writer truthfulness hidden in the very act of writing, encoded for example in handwriting behavior which can be extracted with biometric methods (Luria, Rosenblum, 2009). However in final digitalized text those factors are missing too. It makes distinguishing authentic and fake opinions much more difficult as the only accessible information is the static text of the opinion itself.

Of course in formal circumstances where veracity of a statement has to be confirmed for the sake of justice and lawfulness, as for example in court, the person who testifies can be summoned and asked additional questions, even in the presence of experts (Vrij, Edward, Roberts, Bull, 2000). Nevertheless there are situations when written opinions are never verified but still are formally accepted and processed, especially in procedures which are designed to preserve anonymity of opinion holders. In this paper we bring up an example of such situation concerning student opinions about their teachers.

It is common for schools and universities to implement a quality assurance system aimed at maintaining as high standards of teaching as possible. This kind of quality management often involve gathering and analyzing student opinions about teachers and courses. The opinions act as a feedback loop and help to determine whether courses and teaching methods are meeting student expectations. For example in Cracow University of Economics at the end of each semester students are asked to fill in an online questionnaires which consist of two parts regarding a course: fixed-scale closed grading questions and open overall textual opinion. The feedback system ensures anonymity of respondents and therefore it is impossible to gain any information about circumstances in which students are writing their opinions as well as to ask them any additional verifying questions.

When designing quality feedback system one could assume that students would write honest and authentic opinions based on their actual evaluation of courses and teachers. However we have reasons to believe that not all opinions are honest and some of them are entirely fake. One of these reasons are personal prejudices held by some students who did not developed enough social skills to separate opinions about teachers from personal emotions thus rating negatively

courses only because they are taught by disliked teachers. Another reason is the opportunity for revenge for receiving low grades which some students can utilize as a kind of tit for tat strategy. Fake opinions need not be always negative though and exaggerated unsound positive ratings also happen as an effect of willingness to please the teacher perhaps in hope to gain better grades in forthcoming courses.

It is important to note that opinion writing, commenting and rating are activities well known to students who often practice them online, yet there is crucial difference between commenting on the Internet and rating teachers: the former is mostly inconsequential or has only social effects, excluding some extreme cases, while the latter can entail formal consequences after opinions are reviewed by department or faculty superiors. Many students treat feedback questionnaires as another form of online commenting and fill them with generic, superficial, ironic or even fatuous answers. Moreover, drawing an analogy from the phenomenon of consumer boycott it is quite conceivable that students can organize and forge enough negative opinions to make impact on managerial decisions regarding specific teacher.

Therefore it seems that distinguishing between authentic and fake written opinions becomes important problem especially when two conditions are met: the respondents are young people accustomed to contemporary ubiquitous online commenting paradigm and the opinions are regarded as an important factor in making managerial decisions. Due to massive amounts of opinions collected it would be desirable for such distinction to be performed automatically or with little human supervision. This sets our first, long term objective of research as developing an automated method of discriminating fake and genuine student opinions about teachers. The second objective, intended as an auxiliary task and pursued mainly in this paper, is to investigate possible applications of computer text analysis to determining credibility of traditionally acquired student opinions.

3. Possible approaches

There is a well-established branch of linguistic research called stylometry concerning itself with quantitative analysis of writing style (Holmes, 1998). Several features of text composition and presentation are considered, mainly focusing on word occurrence frequencies, collocations, hapaxes, distribution of word and sentence lengths, usage frequency of function words and content words, vocabulary richness and other measures. All these features constitute what is known as writer invariant, or a set of specific style parameters which are persistent throughout all texts written by the same person and unique to such an extent that it allows to distinguish them from invariants characteristic for other persons. Ideally writer invariant should allow for author identification of texts of unknown origin and the main objective of stylometry is to provide tools for resolving authorship disputes. Style metrics can be used in legal linguistics to identify authors of digital texts or detect cases of plagiarism, forgery or ghostwriting.

An interesting application of stylometry is the study of language used in deceptive communication. The idea that false statements are expressed in different style than truthful ones finds its confirmation in results of computer-aided text analysis aimed at determining what could be called "liar invariant". Results presented in (Newman, Pennebaker, Berry, Richards, 2003) suggest that writing or telling lies engages much more cognitive abilities than telling the truth because liars have to fabricate believable story and therefore they have less mental resources available for

controlling their language. They tend to use less elaborate expressions and less complex verbs, instead using more simple motion verbs (“go”, “move” etc.) which do not require additional descriptions. It also results in fewer figures of speech that contrast what they claim is true with what is not (“but”, “except” etc.). Liars are presenting more anxiety and guilt in their language using more words denoting negative emotions. They also avoid first-person pronouns as they are distanced from their stories for obvious reasons.

These criteria allow for moderately successful automatic classification of text samples roughly with 60% rate of correct recognition of both liars and truth-tellers (significantly better than chance and better than untrained human judges). However there are severe limitations which hinder potential application of such method in our case. First, stylometric measurements have to be performed on a substantial sample of text containing hundreds of words or otherwise they become unreliable. Unfortunately student opinions about courses in our experience tend to be very concise and rarely do they exceed few dozen words with vast majority of them occurring only once in a sample. Frequency analysis of such a depleted sample can be uninformative. Second, the opinions are in fact very monothematic, many of them reiterating the same arguments or expressing similar observations. On the contrary the text samples analyzed in the study cited above were collected from participants asked to express their opinions on open subjects, as for example describing people they liked or disliked. It seems unlikely that thus obtained research findings can be applied to very narrow and specific class of text samples encountered in the case of student feedback.

Third, in most experimental protocols employed in cited study either participants were explicitly told that their statements were going to be reviewed by human judges in an attempt to detect deception, or the text samples were obtained during an interview resembling formal interrogation. It can then be assumed that analyzed samples contained at least some traces of writer’s efforts to convince reader that the statement is true. On the other hand students write their opinions assured that there is no lie-detection procedure carried out and without motivation to justify their views. For that reason many possible indicators of lie, like for example inconsistencies in argumentation, are just missing from written opinions simply because there is no argumentation at all.

Fourth, it should be mentioned that cited results are valid for English language and it is not obvious whether they still hold for other languages with different grammar. Our study is conducted in Polish university hence all analyzed opinions are collected in Polish language. In contrast to English there are very few linguistic tools available for computerized text analysis in Polish which further makes it difficult to reproduce similar results in our context.

Having considered above limitations we decided to conduct an experiment and collect samples of genuine and fake opinions in order to analyze them in an attempt to find some patterns characteristic for false statements.

4. Empirical research

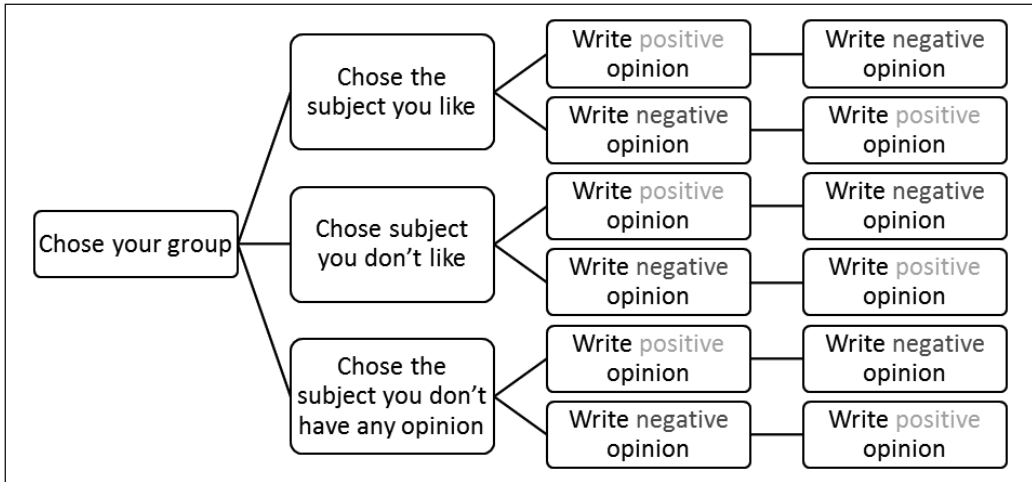
To achieve the objectives defined at the end of the second part of this paper empirical research were conducted. The idea behind the experiment was to collect genuine and fake written student opinions about university courses. Then these opinions were analyzed in order to determine factors that can help in distinguishing truthful and deceptive opinions. For that purpose a question-

naire has been created as a web-based survey². The questionnaire was prepared in Polish and opinions were also supposed to be written in this language.

There are 6 possible variants of the survey. At the beginning of the questionnaire student is asked to fill in the full group number. On this basis a list of subjects is generated and each student is provided only with subjects scheduled for his or her group. Then the student has to choose one subject. Respondents are asked with uniform probability to pick up a subject they like, they dislike or they have no opinion about. This creates three possible paths (variants). Then, also randomly, students are asked to write positive or negative opinion about the subject (each variant divides into 2 paths). Respondent's real attitude to the subject has no influence on the type of opinion he has to write. If student's real opinion about the subject is opposite to the one he has to write, he is asked to fabricate false opinion about the subject as it was his real opinion. This is how fake opinions are collected. When respondent has to write opinion consistent with his attitude to the subject, a genuine opinion is collected.

In the next step of the survey student is asked to write the opposite (in the sense of sentiment) opinion about the same subject. Once again it can be genuine or fake opinion depending on the previous step. In the final step respondent is asked whether he wants to do the questionnaire once again or prefers to get back to the group chose step. Student can also finish by closing the webpage.

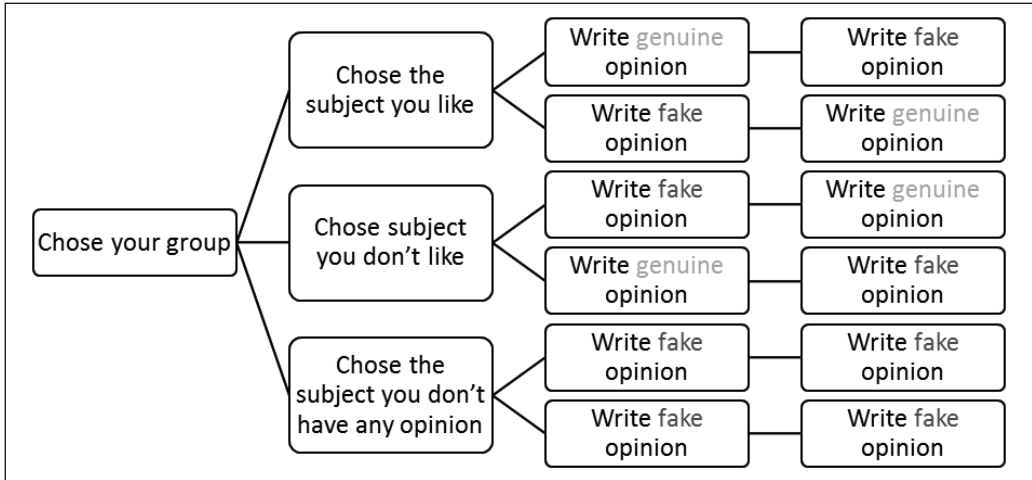
Figure 1. Questionnaire variants distinguishing positive and negative opinions



Source: own elaboration.

² The survey is available online at <http://mutu.dev.uek.krakow.pl>

Figure 2. Questionnaire variants distinguishing genuine and fake written opinions



Source: own elaboration.

Figures 1 and 2 above present possible paths of the experiment. Figure 1 concentrates on sentiment of each opinion (if it has to be positive or negative) while Figure 2 is focused on genuineness of opinion (if it is truthful or deceptive). Figure 3 below presents consecutive steps in exemplary passage through the survey.

From Figures 1 and 2 it can be seen that while the same number of positive and negative opinions can be collected, more fake opinions than genuine ones are recorded. When student has to choose subject about which he doesn't have any opinion both opinions (positive and negative) are fake.

During the first batch of experiment (ended before finishing this paper) 113 questionnaires were completed from which 22 were useless (they contained random strings) what gives 91 correctly filled surveys. Each questionnaire contained one positive and one negative opinion. However because of uneven distribution of genuine and fake opinions there were 65 genuine opinions and 117 fake ones. It allowed us to carry out some analysis on collected samples, nevertheless we are planning to repeat the experiment to obtain more opinions.

Figure 3. Exemplary questionnaire

KrDZIs20

Ankieta, którą wypełniasz, jest elementem badań prowadzonych przez nas w dwóch celach: Dlatego prosimy o wypełnienie ankiety dokładnie w taki sposób, jakby to był oficjalny system oceny zajęć.

KrDZIs20110j

Rozpocznij Ankieta!

Krok 1/3

Wybierz z poniższej listy takie zajęcia, o których nie masz w ogóle zdania, ponieważ w nich nie uczestniczyłeś lub ich nie pamiętasz:

Zarządzanie przedsięwzięciami informatycznymi [wykład]

Zarządzanie przedsięwzięciami informatycznymi [ćwiczenia]

Krok 2/3

Wybrałeś Metody eksploracji danych[ćwiczenia]. Napisz **negatywną** opinię o tych zajęciach. Ponieważ nie masz własnej opinii, musisz ją zmyślić, ale nie czuj się tym skrępowany. Napisz negatywną opinię **tak, jakby była Twoją autentyczną opinią**.

Twoja odpowiedź

Krok 2/3

Wybrałeś Metody eksploracji danych[ćwiczenia]. Napisz **negatywną** opinię o tych zajęciach. Ponieważ nie masz własnej opinii, musisz ją zmyślić, ale nie czuj się tym skrępowany. Napisz negatywną opinię **tak, jakby była Twoją autentyczną opinią**.

Bardzo nudne zajęcia. Niekompetentny prowadzący

Zatwierdź

Krok 3/3

Teraz napisz **pozytywną** opinię o tych samych zajęciach (Metody eksploracji danych[ćwiczenia]). Tę opinię także musisz zmyślić, podobnie jak poprzednią. Napisz pozytywną opinię **tak, jakby to była Twoja prawdziwa opinia**.

Bardzo ciekawe zajęcia. Prowadzący miły i dobrze przygotowany. |

Zatwierdź

Koniec ankiety

Dziękujemy za wzięcie udziału w badaniu. Jeżeli masz ochotę, możesz wrócić na początek i wypełnić jeszcze raz ankietę dla jakiegoś innego przedmiotu. **Polecenia mogą być inne za każdym razem**, więc uważnie je czytaj

Celem ankiety nie jest ocenienie wszystkich zajęć, więc nie musisz na siłę powtarzać tego dla wszystkich przedmiotów.

Jeżeli pomnownie chcesz rozwiązać ankietę klikając **Jeszcze raz** powrócisz do kroku 1/3.

Powrót do wyboru grup

Jeszcze raz

Source: own elaboration.

At the beginning of analysis it occurred that single opinions were too short to analyze them separately. Only few opinions were longer than a sentence or two. Because of this four sets were created: first with all positive opinions, second with negative, third with genuine and fourth with fake ones. First two sets altogether contained all opinions as well as the other two sets combined, but first two sets classified opinions according to sentiment and second two according to their genuineness.

In the next step all sets were preprocessed. This stage involved transformation to lowercase, punctuation removal and whitespaces removal. Then stemming process was conducted using Spejd (Buczyński, Wawer, 2008). Table 1 below presents basic statistics of all sets of opinions.

Table 1. Basic statistics of collected opinions

	positive	negative	genuine	fake	all
number of opinions	91	91	65	117	182
number of words	1,015	730	712	1,033	1,745
number of unique words	481	392	407	495	714
percentage of unique words	47%	54%	57%	48%	41%
words per opinion	11.2	8.0	11.0	8.8	9.6
unique words per opinion	5.3	4.3	6.3	4.2	3.9

Source: own elaboration.

Table 2. Most frequently appearing words

word	sum	negative	positive	negative normalized	positive normalized	difference in appearing in positive and negative opinions (normalized)	fake	genuine	fake normalized	genuine normalized	difference in appearing in genuine and fake opinions (normalized)
“zajęcia” (classes)	86	35	51	48	50	2.30	57	29	86	55	14.45
“nudny” (boring)	21	21	0	29	0	28.76	17	4	16	6	10.84
“ciekawy” (interesting)	29	5	24	7	24	16.79	23	6	22	8	13.84
“sposób” (manner)	21	5	16	7	16	8.91	17	4	16	6	10.84
“wiedza” (knowledge)	27	8	19	11	19	7.76	19	8	18	11	7.16

Source: own elaboration.

Table 2 above contains information about words that were identified among ten words with higher difference in appearing in documents within both groups – concerning sentiment and concerning genuineness.

5. Findings

All results of conducted empirical research can be presented in two aspects. The first aspect concerns description of student opinions collected during the experiment and the second one is related to the content of described opinions.

5.1. Student opinions description

Reviewing student opinions with regard to their overall form and style leads to the following conclusions:

1. Single opinions are too short to be analyzed using stylometry. They contain too small style sample. It seems that only the whole sets of opinions can be the subject of stylometry analysis.
2. Analyzed opinions are semantically poor whereas in order to conduct stylometry analysis it is desirable that texts (authors) have developed their styles. Collected opinions have little or no internal structure, they are only sets of mere facts expressed in simple statements.
3. Respondents are focused on specifying reasons of their opinions rather than explicitly expressing the opinions themselves. Instead of answering question “what do you think about...” they are answering question “why do you think that...”.
4. Even if the task was to write opinion about courses, students mostly wrote opinions about teachers conducting those courses.

5.2. Student opinions contents

Concerning the content analysis of student opinions the findings include the following:

1. Genuine and fake opinion sets can be distinguished not by the frequency and selection parameters but by presence of certain words (markers). The word “wiedza” (knowledge) appears in fake opinions much more often than in genuine ones. In fake opinions students tend to use vocabulary which they think is important for teachers although for them has no importance. They think teachers expect those words in opinions.
2. The most important matter for students was the subjective feeling (something that cannot be verified) whether classes were boring (“nudne”) or interesting (“ciekawe”) – these were the most frequently appearing words with sentiment.
3. Fake opinions are full of generalities – the word “zajęcia” (classes) has highest difference of appearance in fake and genuine opinions. Words “nudny” (boring) and “ciekaw” (interesting) are on the next positions. These words are unspecific, have very broad meanings and the context of their use does not contain additional details.
4. Fake opinions are constructed with poorer vocabulary – they are ordinary and stereotyped. They are also more subjective – contain more polarized words and strong statements. Genuine opinions are more spontaneous and words used in their construction repeat less often.
5. The word “zajęcia” (classes) appears in both fake and genuine opinions frequently but in fake almost twice as often as in genuine ones.

6. Conclusion

The set of opinions taken into consideration in experiment was quite small and conclusive findings are difficult to be taken. However our conclusion is that the more an opinion is untestable (their genuineness and reliability cannot be tested) and undeveloped (poorer vocabulary, shallow opinion with no details) the greater is the likelihood that it is false.

We are convinced that stylistic analysis alone is not sufficient to discriminate authentic and false opinions, especially if text samples are so short. There are other possible approaches which would provide more information about the real attitude of opinion writers, although all of them require modifications to the process of collecting student opinions. Nevertheless it is better to get more information at the moment of writing than try to judge the credibility of entirely unconstrained statements afterwards.

The least intrusive option is to supplement opinion gathering protocol with detailed written instruction telling the students that their opinion would be evaluated and classified as true or false before considering it as a valid feedback about courses and teachers. It could motivate students to elaborate their writing and include some argumentation instead of sole complaints or acclaims. This approach resembles the bogus pipeline methodology (Roese, Jamieson, 1993) used in social sciences. The other extreme is the possibility of implementing biometric methods to obtain not only the text of opinion but also its edition history and dynamic profile of typing by recording keystrokes. It is easily achievable in a web application but it would certainly rise objections about violating anonymity because authors could be later identified by their typing profiles.

Probably the most complex and at the same time effective solution would be to recreate the circumstances of an interview in the context of online questionnaire. Classic interview as a technique of qualitative research performed by trained interviewer gives the opportunity of separating truthful and deceptive statements by asking additional questions. It could be possible to automate this task by employing artificial intelligence methods in a similar manner as it is done in online chatterbots simulating human conversation. Quality assurance system equipped with such kind of interviewing agent could provide student feedback in a form of conversation transcript rather than plain written opinion. However design and implementation of such system is beyond the scope of this paper.

Bibliography

1. Buczyński A., Wawer A. (2008), Automated Classification of Product Review Sentiments in Polish, *Intelligent Information Systems*.
2. Holmes D.I. (1998), The Evolution of Stylometry in Humanities Scholarship, *Literary and Linguistic Computing*, 13(3).
3. Luria G., Rosenblum S. (2009), Comparing the Handwriting Behaviours of True and False Writing with Computerized Handwriting Measure, *Applied Cognitive Psychology*, John Wiley & Sons, Ltd., 24(8).
4. Newman L.M., Pennebaker J.W., Berry D.S., Richards J.M. (2003), Lying Words: Predicting Deception From Linguistic Styles, *Personality and Social Psychology Bulletin*, 29(5).
5. Porter S., Ten Brinke L. (2008), Reading between the Lies: Identifying Concealed and Falsified Emotions in Universal Facial Expressions, *Psychological Science*, 19(5).

6. Roese N.J., Jamieson, D.W. (1993), Twenty Years of Bogus Pipeline Research: A Critical Review and Meta-analysis, *Psychological Bulletin*, 114.
7. Vrij A., Edward K., Roberts K.P., Bull R. (2000), Detecting Deceit via Analysis of Verbal and Nonverbal Behavior, *Journal of Nonverbal Behavior*, 24(4).

Chapter 38

Data Series Visualisation Along Space-filling Curve as a Tool for Text Analysis¹

Paweł Wołoszyn, Przemysław Płyś, Jacek Wołoszyn

1. Introduction

Stylometric analysis can be applied to text opus to obtain specific metrics describing overall literary style characteristics. It can also be applied to sample window moving through the text as in the case of rolling stylometry which provides some insight into dynamics of style alteration occurring in the course of literary work. Data series produced by rolling stylometry can be visualized in any suitable manner, however the method chosen should allow for comparison of texts with different lengths and structures, for example novels and short essays, without repeating the same analysis procedure with different sampling parameters. In this paper we present a method of visualizing data series as a two-dimensional map created by following self-similar curve filling the unit square. Such a method creates visual signature which can be further processed as an image, possibly utilizing other well established methods of image analysis. The paper focusses on application of proposed method to comparing text works by comparing visual features of their signatures.

2. Rolling stylometry

Stylometry is a collective term for rich set of methods and tools for quantitative analysis of literary style. It can be regarded as stylistics equipped with numerical measuring tools (Stamatos, 2009). One of the important concept of stylometry is writer invariant which is a property held by all texts authored by the same person. The most prominent use of stylometry is determining text authenticity, detecting plagiarism or ghostwriting and resolving disputes on problematic authorship (Stańczyk, Cyran, 2007).

However in case of longer literary works, for example novel or drama, the author's style is not so invariant and changes more or less in the course of the writing. The approach specifi-

¹ The publication has been financed from funds granted to Faculty of Management, Cracow University of Economics, for supporting scientific research capability.

cally aimed at analysing style variability within single text opus is known as rolling stylometry which can be thought of as a combination of stylometric analysis with text subsampling (Kjell, Woods, Frieder, 1994; Eder, Kestemont, Rybicki, 2013). As the name implies, stylometric analysis is performed on smaller text chunks located within fixed-size window of interest. The window is moved (rolled) along the entire text shifting by some interval in each iteration while stylometric features are recorded along with the position of the window.

Windowing procedure can be treated as a kind of signal filter with properties depending on window size and overlap. The larger the window width and overlap the more low-pass characteristic will be exhibited in resulting data with higher frequencies attenuated and only slow stylistic drift visible. On the other hand shorter window and small overlap will act as high-pass filter emphasizing high frequency style variations and concealing more general trends enclosing the entire text. Rolling stylometry generates data sequence which can be interpreted as one or more time series with time domain corresponding to linear development of literary work. The data produced by windowing procedure can then be examined with several methods of sequential analysis, especially change detection which can point to abrupt changes in writing style and reveal boundaries between fragments of different authorship.

Windowing procedure can be combined with whichever kind of stylometric analysis, not necessarily intended to inspect literary style, as for example a specialised measurement tailored to peculiarity of computer programming language (Joshi, Argiddi, 2013). Therefore rolling stylometry can be thought of as a meta-analysis tool which transforms research of specific style characteristics into research of dynamics of that style. Such approach bears some resemblance to mathematical tools of calculus, especially to the notion of function derivative. Reducing the rolling window size to a single word as an analogue of infinitesimal could hypothetically produce the momentary style which author adopted while writing that very word of the opus.

3. Visualisation of stylometry data

Although the stylistic features of a given text could be somehow visualised, it is the comparison between text where the real need for visualisation arises in the case of traditional stylometry (Abbasi, Chen, 2006; Chuang, Ramage, Manning, Heer, 2012; Orebaugh, Kinser, Allnutt, 2014). Because text comparison leads to classification or clustering of a collection of literary works, mainly those visualisation techniques are chosen which deal with such relations between objects as affinity, group membership or class hierarchy.

One of the simplest comparison method is a table with rows corresponding to several texts, columns representing style metrics and cells coloured according to their values. Tabular presentation allows to find visually similar rows while preserving all data in original format and is able to manage with several features in one figure. If the number of stylometric variables taken into account can be reduced to two, it is possible to visualise a collection of texts as two-dimensional plot with both axes corresponding to measured stylistic features, assuming those variables have scalar values. In case of more than two originally present variables the plot becomes a planar projection from multidimensional feature space to two-dimensional plane of chosen variables. Such a projection helps to visualise otherwise impossible to draw multidimensional sets of points, however it can also merge clusters of points into false agglomerates due to reduction of the number of visible features.

To avoid such problems it is better to give up visualising measured features and instead to plot relationships between texts obtained with typical classification or clustering methods. Dendrograms are often used for presenting hierarchical clusters of texts as they are comprehensible and intuitive in interpretation. Similarities and other relations between texts can also be shown on network graph diagrams consisting of vertices and edges. This kind of visualisation is more flexible and suitable for large sets of points especially when combined with color coding of vertices or edge weighting. Although the most natural static graph visualisation is two-dimensional image, it is also possible with the use of interactive technology to provide three-dimensional dynamic presentation which can be transformed by the viewer in order to explore graph structure or empirically find its optimal projection.

Whereas classic stylometry converts given text into a single vector in feature space, rolling stylometry generates entire series of such vectors as a function of word offset. For this reason rolling stylometry requires different visualisation methods capable of expressing the relationship between stylistic features and position within text. Typical function graphs are the method of choice with one, usually horizontal, axis corresponding to word offset. If the feature space is multidimensional, each vector component can be plotted as a separate data series or other techniques can be applied involving for example different colours and marker shapes.

Sometimes in analysis of style variation within a single opus it is less important at which exact word offset a change occurs but it is more interesting at what proportion the changepoint is located relative to the entire text structure. Therefore the scale of position axis in function graph can be normalised so as to become independent of real text length. To assume such uniform scaling it may be useful to utilize some different mapping than typical Cartesian coordinate system. For example polar coordinates commonly found in radar plots are naturally normalised to full angle representing the entire text opus.

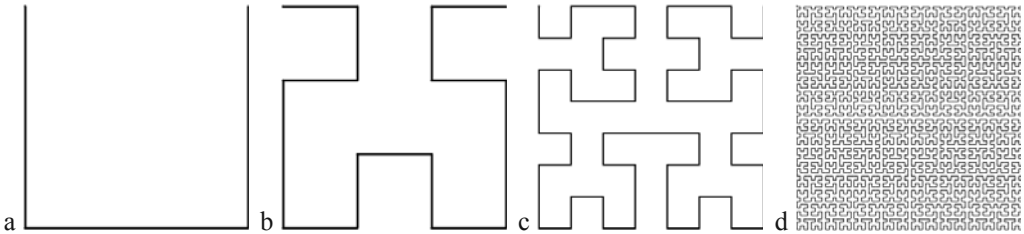
4. Space-filling curve visualisation

Typical function graph in two-dimensional Cartesian plane uses one dimension for encoding function argument and the other for function value. Both quantities are encoded as geometric displacements in two orthogonal hence independent directions. However it is possible to propose different approach where both planar dimensions are used for encoding function argument while function value is represented by distinct non-geometric quantity, for example colour (Keim, 1996; Wattenberg, 2005; Irwin, Pilkington, 2008; Anders, 2009). Function graphs plotted with this kind of mapping take the form of two-dimensional images instead of simple curves. Such images may have noteworthy properties which make them interesting tool for data presentation and subsequent visual analysis.

First of all it is important to note that there exist such bijective mappings that assign every real number to one unique point on a plane. Because both the unit interval and unit square contain uncountably infinitely many points but differ in dimensionality, the exact definition of bidirectional mapping between them poses a nontrivial challenge. Typical method to overcome that challenge is to use recursion and define certain curve as a limit of iterative procedure taking a lower-order curve as its input and mutating it into higher-order curve on output. After infinitely many iterations the resulting curve gains unusual property: it fills the entire unit square while still remaining

continuous curve with two endpoints. Due to recursive nature of generating procedure the curve exhibits self-similarity and can be classified as a fractal.

Figure 1. First (a), second (b), third (c) and sixth (d) iteration of recursive Hilbert curve generation process



The Hilbert curve (Fig. 1) is one well known example of a space-filling curve which maps unit interval into unit square. Its construction starts with four vertices joined with three straight segments and in each iteration every vertex is replaced with four new vertices lying around it in a square grid while the grid becomes twice as dense in both directions. The number of rows and columns is always a power of 2. This makes the Hilbert curve an interesting concept for computer science because the mapping between one and two dimensions can be easily and efficiently implemented with the use of bitwise operators and without resorting to recurrence. The curve is used in diverse fields of computer science such as data structures and databases, telecommunication technology or computer graphics.

Although it is still a curve in mathematical sense, each Hilbert curve of finite order can also be considered a specific sequence of vertices arranged in a square grid resembling the structure of digital image consisting of pixels. Therefore, in application to image processing, travelling along the Hilbert curve may not necessarily mean drawing actual lines but instead it can provide specific pixel enumeration order. Only square bitmaps can be traversed in this manner with width and height both being an exact power of 2. A data sequence of matching length can be unambiguously mapped to every pixel in corresponding bitmap. Sequences of other lengths must be either downsampled or upsampled to match some arbitrarily chosen Hilbert curve order.

Very important property of Hilbert curve is preserving locality while mapping a position in a sequence into location in the unit square (Moon, Jagadish, Faloutsos, Saltz, 2001). It can be informally stated that if two terms of the sequence are close to each other, then their corresponding pixels also lie close to each other in the mapped image. Moreover, two consecutive terms are always mapped to two adjacent pixels. The opposite is generally not true for the entire image as there exist neighbouring pixels which correspond to sequence terms lying far apart. Locality preserving properties of Hilbert curve are stronger than those of other space-filling curves commonly encountered in computer science like z-curve or Peano curve. In data visualisation these properties cause that continuous segments in the linear space of data sequence are mapped to cohesive regions of image area. To take the advantage of these properties data values must be visually coded with the use of colour scale. For scalar data series the most straightforward colour coding is a simple grayscale which is used in all examples provided in this paper.

5. Example applications in stylometry

Visual interpretation of images is more natural cognitive human activity than reading function graphs, including computer-aided but still humanistic science of linguistics. The transformation from linear space to image space not only can be helpful as a visualisation technique but may also open new opportunities of further data processing with the use of image-oriented methods and tools.

Figure 2. Linear ramp from 0 (white) to 1 (black) visualised along Hilbert curve

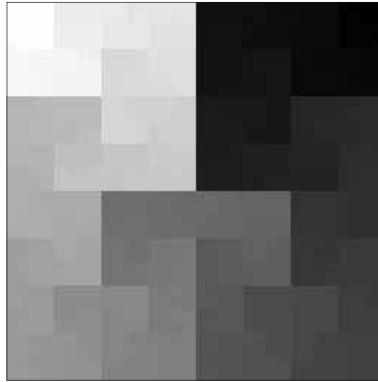


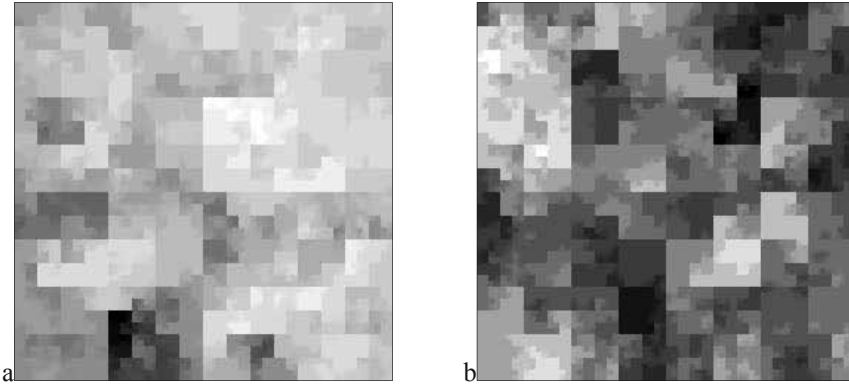
Figure 2 shows the most simple data sequence consisting of only two values: 0 and 1. The sequence is upsampled by linear interpolation to provide 1024 steadily increasing values which fill 32 x 32 pixels image. The sequence is plotted along fifth-order Hilbert curve using greyscale colouring with white corresponding to 0 and black to 1. The same colour scale is used in all figures in this paper with data values normalised by linear mapping to the interval $[0, 1]$. Therefore white colour represents minimal values obtained with style metrics and black represents the maximal ones.

The progression from lighter to darker shades of grey on Figure 2 shows the meandering path of Hilbert curve which begins in the top left corner of square and ends in the top right corner. Colour changes are smooth and spread gradually through the entire area of the square. There is one main seam visible between upper two quadrants of the square where values from starting and ending parts of the sequence approach each other. Also there are other less pronounced seams of higher order between smaller subsquares of the image. It is possible to visually comprehend the linear sequence position of a given image pixel knowing that the lower left corner of the square is mapped to the element exactly at $1/3$ of the sequence and the lower right corner to the element at $2/3$ of its length. However such comprehension is not the main objective of space-filling curve visualisation of rolling stylometry data.

Instead the aim is to generate visual signature of a literary work. Two-dimensional image is generated deterministically based only on the sequence of scalar style metrics and its appearance is much more repeatable than that of typical function graph. The shape of the image is always square and due to self-similarity of Hilbert curve the exact size of the square does not matter because for any given data sequence smaller or larger images can be obtained by downsampling or upsampling the sequence respectively. Assuming the same colour scale and data normalisa-

tion two images generated for the same text by two independent researchers should be similar to each other even if the level of detail is different. Human visual perception is definitely better at comparing images than comparing function plots and because of that the proposed method of generating text signatures seems to fit the purpose of data visualisation as a method of conveying information in friendly, intelligible and not necessarily precise manner.

Figure 3. Median sentence length in Reymont's *Chłopi* (a) and Sienkiewicz's *Potop* (b)



The most straightforward reason to draw space-filling text signature is to observe the diversity and distribution of stylistic features across the text opus. Such signature presents style variability in very unique, idiosyncratic manner dissimilar to simple function graph. As an example Figure 3 shows the image of median number of words per sentence calculated for two Polish novels, *Chłopi* by Władysław Reymont and *Potop* by Henryk Sienkiewicz. Both texts were processed with rolling window procedure producing 1024 text chunks with 95% overlap. The most dark areas on images correspond to fragments of texts containing the longest sentences.

It can be seen that the styles of analysed novels differ significantly and the difference is visually perceptible. Reymont's *Chłopi* novel is composed mainly of shorter sentences, most of them being dialogues, and the rhythm of narration is more or less stable throughout the entire text with the exception of prominent dark cluster marking single fragment of more descriptive or reflexive writing with median sentence length 2.15 times higher than the median for the entire novel. On the other hand Sienkiewicz's *Potop* has more diverse sentence lengths and blocks of short-sentence narration are interspersed between several long-sentence portions of text. However overall diversity is not as high as in *Chłopi* with median sentence lengths in dark areas of image reaching no more than 1.42 median value for the entire opus.

Square image visualisation can also be used to inspect the distribution of various stylistic aspects within single opus. Figure 4 shows the frequency of selected dialect words and their standard Polish equivalents in Reymont's *Chłopi*. The novel is written mostly with stylised rustic dialect, however some critics recognise at least two distinct styles of narration mixed with changing proportion, one of them extensively using the dialect and the other choosing more often the standard language. Visual signatures on Figure 4 seem to corroborate such interpretation as they are not only distinct but also complement each other at least partially. The distribution of dark spots of stronger dialect use roughly matches lighter areas of less frequent standard lan-

guage use and vice versa. Nevertheless there are fragments where both images are similarly grey and both narration styles occur at the same time.

Figure 4. Frequency of selected dialect words *gdziesik, trza, letko, la* (a) and their standard Polish equivalents *gdzieś, trzeba, lekko, dla* (b) in Reymont’s *Chłopi*

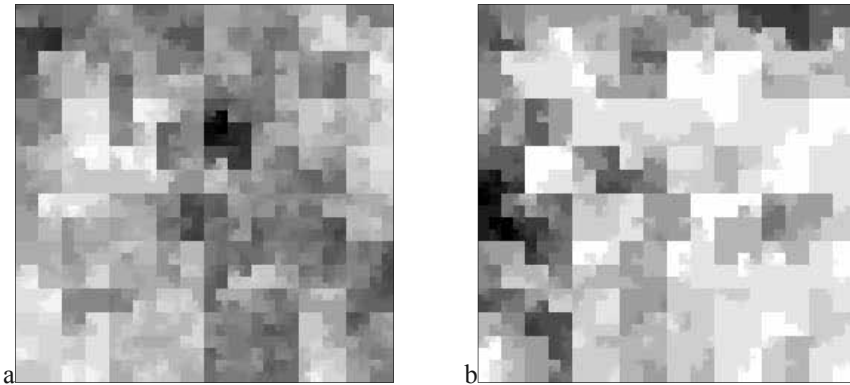
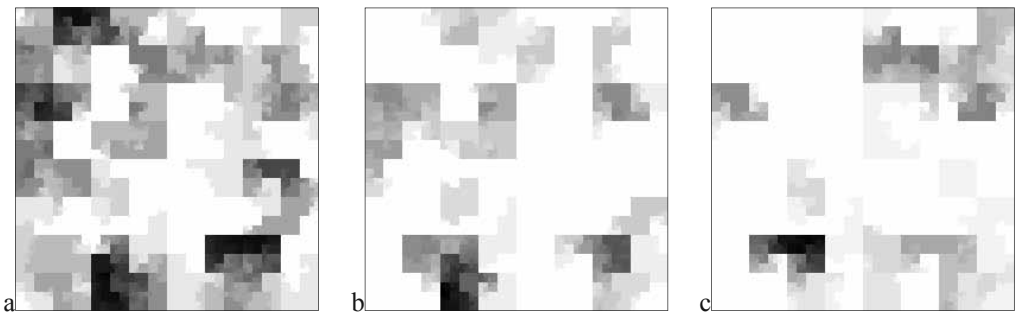
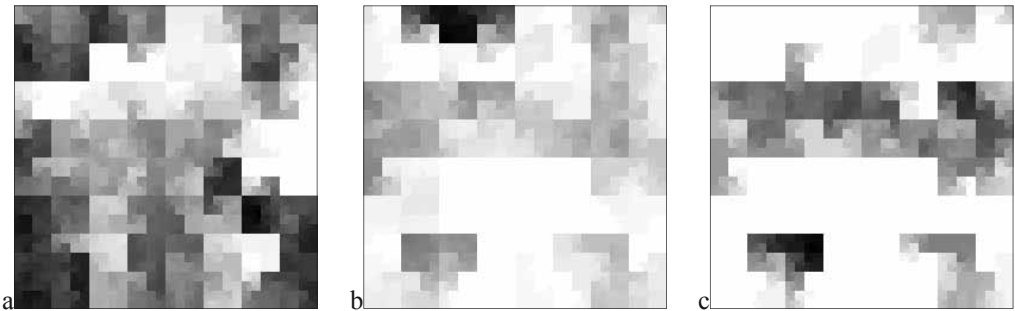


Figure 5. Frequency of name occurrences for three characters of Mickiewicz’s *Pan Tadeusz*: Tadeusz (a), Telimena (b) and Zosia (c)



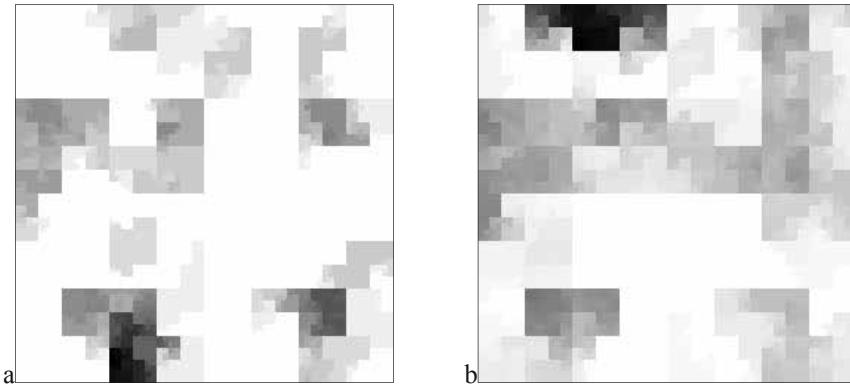
Another possible application of space-filling curve imaging is to summarise visually the presence of certain characters, names, places, events, artefacts, actions, emotions or other motifs. An example on Figure 5 shows the frequency of explicit name occurrences for three characters, Tadeusz, Telimena and Zosia in the text of Polish epic poem *Pan Tadeusz* by Adam Mickiewicz divided in 1024 chunks with 95% overlap. While Tadeusz is the main character of the poem the other two are female characters with whom Tadeusz is having love affairs. It is exceptionally well visible that the name of Telimena is nearly always encountered in direct proximity to main character name as dark spots in Telimena visual signature are almost exactly a subset of Tadeusz signature. It is also apparent that Zosia signature bears striking resemblance to that of Telimena but is somewhat less developed. Again, the visualisation follows the fabular setting of the poem where love between Tadeusz and Zosia is much less tempestuous than the affair with Telimena.

Figure 6. Frequency of name occurrences for three characters of Sienkiewicz's *Potop*: Kmicic (a), Wołodyjowski (b) and Zagłoba (c)



Another example of name signatures and their visual similarity comes from Sienkiewicz's *Potop*. Figure 6 shows the frequency of name occurrences calculated again for three prominent novel characters, Kmicic, Wołodyjowski and Zagłoba, with the same windowing procedure parameters as above. Kmicic is the main character of the novel, a fact which is reflected in density of the visual signature with his name occurring ubiquitously in most fragments of the text. The other two names have scarcer signatures despite being also main characters of the novel but what is more interesting it is the prominent similarity between them. With the exception of one episode at the beginning of the novel Wołodyjowski almost always accompanies Zagłoba, at least in name frequency domain if not in fabular domain.

Figure 7. Name occurrence signatures of Telimena in Mickiewicz's *Pan Tadeusz* (a) and Wołodyjowski in Sienkiewicz's *Potop* (b)



The last example (Fig. 7) shows how space-filling curve signature can be used for comparison between texts of different origin and style. The figure displays two signatures generated from rolling name frequency metrics for two different characters, Telimena in Mickiewicz's *Pan Tadeusz* and Wołodyjowski in Sienkiewicz's *Potop*. Both signatures were produced with the same windowing procedure parameters. Interestingly enough these images look quite similar suggesting that both characters' roles have more or less parallel profiles of occurrence, their appearances forming similar structure within text opus. It must be stressed however that this example has only

the purpose of illustrating how signature similarities can be visually recognised as a motivation for more thorough research in order to avoid perils of unsound conclusions.

6. Conclusion

Linear data series can be visualised by drawing colour trail following a space-filling curve, in particular the Hilbert curve, unambiguously mapping the data to two-dimensional image. Such a mapping can be realised practically with desired resolution by calculating finite approximation of the curve, a relatively easy task in the case of Hilbert curve. One can think of such visualisation as a classic function graph recursively folded on itself tightly to form solid block. The choice of specific curve type is quite arbitrary and in fact any space-filling curve is suitable, however the Hilbert curve is chosen because of its good locality-preserving properties and the ease of computer implementation.

Actual topology of plotted data trail is unrelated to its meaning and therefore exact shapes and patterns emerging from visualisation cannot be treated as meaningful. However the main benefit of proposed technique is related to facilitation of more holistic data perception. Unlike traditional function graph this method uses both planar dimensions to pack information much more densely and therefore details lying far apart in linear sequence can be seen simultaneously in close proximity. Moreover, due to locality preserving feature of Hilbert curve, continuous strings of similar values become packed together into visually discernible clusters of similar colour making them more prominent than in typical function graph. The resulting signature is natively normalised to unit square regardless of data volume and it helps to compare sequences of different length. For human perception and memory it is easier to remember and recall shapes than numbers or function graphs and comparing visual shapes can easier attract attention to similarities between so far unrelated text works.

There are however some pitfalls of the method that should be stressed. Regardless of the choice of space-filling curve it is never totally separation preserving, meaning that there are such fragments of visualised sequence which are separated in the linear domain but closely neighbouring in image domain. It can lead to spurious visual features and artefacts induced by specific curve route. When interpreting generated images one must remember that no more information can be conveyed than it is already present in the data, no matter how it is organised spatially. Also visual similarities do not implicate causal similarities and dependencies so one must be cautious not to jump prematurely to conclusions.

Bibliography

1. Abbasi A., Chen H. (2006), Visualizing Authorship for Identification [in] *Intelligence and Security Informatics*, Berlin Heidelberg, Springer.
2. Anders S. (2009), Visualization of Genomic Data with the Hilbert Curve, *Bioinformatics*, 25(10).
3. Chuang J., Ramage D., Manning C., Heer J. (2012), Interpretation and Trust: Designing Model-Driven Visualizations for Text Analysis, *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*.

4. Eder M., Kestemont M., Rybicki J. (2013), Stylometry with R: A Suite of Tools, *Digital Humanities 2013: Conference Abstracts*.
5. Irwin B., Pilkington N. (2008), High Level Internet Scale Traffic Visualization Using Hilbert Curve Mapping [in:] *VizSEC 2007*, Berlin Heidelberg, Springer.
6. Joshi R., Argiddi R. (2013), Author Identification: An Approach Based on Style Feature Metrics of Software Source Codes, *International Journal of Computer Science and Information Technologies*, 4(4).
7. Keim D. (1996), Pixel-oriented Visualization Techniques for Exploring Very Large Data Bases, *Journal of Computational and Graphical Statistics*, 5(1).
8. Kjell B., Woods W., Frieder O. (1994), Discrimination of Authorship Using Visualization, *Information Processing and Management*, 30(1).
9. Moon B., Jagadish H., Faloutsos C., Saltz J. (2001), Analysis of the Clustering Properties of the Hilbert Space-filling Curve, *IEEE Transactions on Knowledge and Data Engineering*, 13(1).
10. Orebaugh A., Kinser J., Allnutt J. (2014), Visualizing Instant Messaging Author Writeprints for Forensic Analysis, *Proceedings of the Conference on Digital Forensics, Security and Law*.
11. Stamos E. (2009), A Survey of Modern Authorship Attribution Methods, *Journal of the American Society for Information Science and Technology*, 60(3).
12. Stańczyk U., Cyran K. (2007), Machine Learning Approach to Authorship Attribution of Literary Texts, *International Journal of Applied Mathematics and Informatics*, 1(4).
13. Wattenberg M. (2005), A Note on Space-filling Visualizations and Space-filling Curves, *IEEE Symposium on Information Visualization, INFOVIS 2005*, IEEE.

Chapter 39

Overcoming Difficulties in ICT Use by the Elderly¹

Ewa Soja, Piotr Soja

1. Introduction

Nowadays, population ageing, defined as an increase in the share of older people in the population, is a typical phenomenon of developed countries. According to demographic forecasts, in the case of European countries, the process of populations ageing will deepen in time. Such a process has a profound influence on the whole economy and, among other things, affects labor force, whose size will significantly shrink (Coleman, 2001; Kotowska, 2006; Soja, Stonawski, 2007). In consequence, an adaptation to new conditions will be the main challenge for all actors (i.e. institutions, employees, employers) involved in economic processes (e.g. Mc Morrow, Roeger, 2004; Boersch-Suspan, 2003). Prior research suggests that employers are aware of the future demographic changes and ageing of labor force. The employers tend to associate an ageing staff with a higher knowledge base, but also with higher costs and lower productivity levels (Conen et al., 2011, 2012; van Dalen et al., 2010; Soja, Stonawski, 2012).

Information and communication technology (ICT) is a critical component of the contemporary world, offering a wide range of potential benefits for organizations and individuals. However, these benefits are not enjoyed equally by all members of society – the idea which is known as the digital divide (Hill et al., 2008). This especially refers to the older members of society, who are less likely to benefit from ICT. Various factors contributing to such a situation are connected with ageing. In particular, as age increases, attitudes toward computers tend to be more negative (Wagner et al., 2010) and technology anxiety increases (Meuter et al., 2003).

The current study focuses on difficulties experienced by the older people in ICT use. The research questions that guided our investigation might be formulated as follows: *What are the difficulties faced by older people in ICT use? How do these difficulties might be overcome?* This study starts with the discussion of problems faced by the elderly in ICT use. Then, it elaborates on various solutions that might be adopted in order to overcome difficulties faced by older people in ICT use. The study closes with concluding remarks and discussion of avenues for future research.

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2. Difficulties experienced by the elderly in ICT use

Prior research indicates that the elderly face numerous difficulties in using Internet and computers. The character of these problems might be connected with various attributes of an individual, such as health status, level of education, experience, and attitudes. However, on the other hand, prior research works also indicate several issues related to the characteristics of the used technology, such as user friendliness or usability of software applications and websites. In addition, some studies refer to the important role of the environment and interpersonal relationships in influencing the elderly in their computer use. The following sections briefly discuss selected studies dealing with difficulties and barriers to Internet and computer use by the elderly.

Gatto and Tak (2008) conducted research among 58 American older adults who were members of SeniorNet, a computer learning center in a southern state of the USA. The purpose of the study was to examine the perceived benefits of and barriers to Internet and computer use by the elderly. The discovered barriers include frustration, physical and mental limitations, mistrust, and time-related issues. Frustration was mainly connected with learning experiences (e.g. length of time it took them to learn computer skills, lack of time to practice at home) and software and hardware features (e.g. spam, pop-ups, unwanted emails, problems with information retrieval). Physical and mental limitations resulted in a limited amount of time devoted to the computer use and were also connected with lack of knowledge and computer skills. Mistrust was mainly connected with privacy issues and trustworthiness of the retrieved information. Finally, time-related issues boiled down to the reported lack of time to seek information or get support through the Internet.

Renaud and Ramsay (2007), conducting research on problems related to identification and authentication of older web users, propose the following areas in which older people have to face challenges:

1. Cognition – challenges connected with learning, attention, and memory. Learning-related issues refer to the reduced rate of learning and using experience while learning more than younger people, which might be a problem while using training programs mainly targeted to the needs of younger users. Attention-related issues include diminished ability to pay attention, decreased selective and divided attention, and resulting lower ability to multi-task. Memory-related issues involve short-term memory limitations and resulting problems with remembering such important fact as passwords and user names.
2. Dexterity – challenges connected with limited dexterity. Dexterity-related issues refer to problems with using the mouse and keyboard such as ability to generate a double-click or to click on small targets. Other issues include coordination problems and related difficulties in pointing precisely with the mouse or typing long character strings.
3. Vision – challenges connected with failing vision and reduced visual processing speed. Vision-related issues refer to problems with perceiving very fine details on the screen and understanding busy web pages. Other issues are connected with affected color discriminating ability related to the fact that eye lenses yellow with age.
4. Hearing – challenges connected with impaired hearing abilities. In general, problems with hearing may increase people's sense of loneliness and might affect their self-esteem negatively. Hearing-related problems may result in overlooking information which is transmitted audibly.

5. Time – challenges connected with changing role of time across age. Time-related issues refer to the fact that the elderly do things more slowly and, in consequence, they tend to be less impatient and do not want to be hurried.
6. Special requirements – challenges connected with limited IT awareness/expertise of the elderly. Limited understanding of computers and the Internet by the elderly might prevent them from using the software/system which requires technical expertise or installation and configuration of special software and hardware.
7. Psychosocial factors – challenges connected with loneliness, anxiety, and attitude. Loneliness-related issues are connected with the fact that older people may use computers to combat loneliness and that increased use of computers might reduce negativity and a feeling of being sidelined by technology. Issues connected with anxiety refer to computer-related anxiety which appears to increase with age and is intensified by the use of jargon and ill-formulated error messages. Attitude-related issues are connected with various levels of confidence revealed by older users.

Difficulties and barriers connected with computer and Internet use by the elderly can be illustrated with the help of the idea of social moderators. These moderators draw on the concept of the “social digital divide” understood as an individual’s degree of marginality to ICT and based on differences in perceptions, culture, interpersonal relationships and operational skills (Hill et al., 2008). Hill et al. (2008), drawing on interviews and observations conducted among the participants of computer workshops in the UK and using the abovementioned categorization, proposed a number of social moderators to help explain the levels of Internet engagement of older people.

The social moderators connected with perceptions include the following issues (Hill et al., 2008):

1. Interest – interest/disinterest in the opportunities afforded by the Internet; older people need to be sufficiently interested and motivated to engage with Internet technology.
2. Motivations – extrinsic and intrinsic motives for using the Internet; extrinsic motivations are helpful in achieving valued outcome (such as using Internet for bookings), intrinsic motivations include Internet use for reasons of curiosity and enjoyment.
3. Convenience – convenience of access venues; “fitting in” use with other daily tasks/hobbies; Internet engagement was perceived as convenient when it complemented other tasks and vice versa, when Internet usage did not complement other activities, it was perceived as inconvenient.
4. Relevance – integration of the Internet usage with daily life; older people tend to integrate only those Internet activities that are perceived as personally relevant, such as e-mail, but to a much lesser extent online shopping and banking.
5. Practical value – felt worth of performing tasks electronically.
6. Affordability – purchasing/updating hardware and connection costs; older people need to perceive the Internet as appropriate and affordable, affordability was perceived as a significant factor contributing towards non-adoption, however, disinterest seemed to be more influential than financial costs.
7. Outcomes – perceived benefits and risks; benefits included wider sources of information and faster information retrieval, risks were mainly connected with Internet security.
8. Technical complexity – knowledge of how to use the Internet and understanding of jargon; older people need to perceive Internet as non-complex, which is impeded by difficulties understanding technical jargon.

9. Skills – Internet self-efficacy beliefs; older people need to have confidence in their skills.
10. Experience – adequacy of experience and impact of past experiences; older people need to have confidence in their levels of experience, which might be undermined by negative past experiences.

Culture refers to the values, beliefs and practices that influence the ways in which people interpret the world. Culture can manifest itself in a range of social settings such as homes, schools and communities. The social moderators connected with culture include the following issues (Hill et al., 2008):

1. Older age – impact of age on all perceptions; older age may impact positively and negatively: positive impact is connected with a desire to keep abreast of technological change, negative impact refers to negative perceptions such as disinterest, lack of affordability, and lack of practical value.
2. Relative distance – distance from schooling and workplace compared to younger generations; might be the reason of some negative perceptions of the Internet.
3. Technophobia – mild, moderate and severe discomfort experienced in the use of technology; an example of severe technophobia included perceptions of being “taken over” by computers.
4. Resistance to change – perceived desirability or otherwise of technological change; might be connected with technophobia.

The moderating interpersonal relationships include the following issues:

1. Equipment acquisition – acquiring hardware from family members or friends; in this way older people might avoid issues related to affordability of hardware and software purchase.
2. Social support – encouragement, guidance and support from family members or friends; important in persuading older people to go online.
3. Maintaining interpersonal contact – desirability or otherwise of using internet application such as e-mail for contacting family members or friends.
4. Sharing of limited resources – sharing Internet connections with family members or friends.
5. Co-participation of use – using the Internet in conjunction with family members or friends.

The social moderators connected with operational skills include the following elements:

1. Navigation – abilities to navigate the Internet using search tools; when lacking, the Internet usage is undermined and can lead older people to revert to more traditional means of accomplishing tasks.
2. Usability – abilities to use internet applications such as e-mail; might be hindered by typing errors and difficulties operating the mouse.
3. Physiological limitations – impact of ageing process on navigation and usability; older people may suffer from age-related physiological limitations such as tremors and decrements of memory which impact usability and navigation.

3. Means of overcoming difficulties in ICT use by the elderly

3.1. Motivations for ICT use by the elderly

In order to investigate the possible ways of overcoming difficulties in ICT use by the elderly, it is useful to understand why older people decide to start using computers and Internet. In doing so, we can examine the benefits from Internet use, as perceived by the elderly. In addition, we can

investigate the main reasons behind Internet use by older people. Another issue which is worth of investigation is connected with supporting activities and characteristics of the elderly that can influence the use of Internet by them. The abovementioned issues have been shortly discussed in the following paragraphs.

The study among American older computer and Internet users conducted by Gatto and Tak (2008) illustrates that the positive aspects of Internet use include connectedness, satisfaction, utility, and positive learning experience. Connectedness is connected with using emails and communicating with others. Satisfaction relates to several characteristics of information available through the Internet such as easiness and quickness of access, and updated and current content. Utility refers to the various activities facilitated by the Internet and perceived by the older users as useful: online financial services, entertainment, shopping, and travel arrangements and information. Positive learning experience refers to various means of learning such as learning at work or through volunteer duties, self-learning, and being taught by friends and relatives.

Peacock and Kunemund (2007) analyzed data from 15 European countries with the purpose of analyzing the reasons for Internet use. In particular, the authors researched how socioeconomic and cultural background influences Internet access at an advanced stage in people's life. The border age needed in order to be classified as the elderly amounted to 55 years. The authors divided the researched population into four different welfare regions: Nordic (including Denmark, Finland, and Sweden), Continental (including Austria, Belgium, Germany, France, Luxembourg, and The Netherlands), Liberal (including England and Ireland), and Mediterranean (including Portugal, Spain, Italy, and Greece). The results indicate that, in general, marital, occupational, and educational status has large impacts on relative chances to access the Internet by the elderly. In particular, decisions to remain offline are based on private access possibilities, motivational indifference, and deficient knowledge. Interestingly, the findings suggest that financial concerns are non-relevant. With respect to the division into regions, the results imply that in the southern regions of Europe the digital divide is tightly intertwined with socioeconomic inequity.

Nasi, Rasanen and Sarpila (2012) investigated the relationship between the Internet use and leisure activities amongst Finnish seniors, understood as people aged from 60 to 79 years. In general, the findings indicate that the active Internet use in old age has a strong positive correlation with the number of different leisure activities amongst Finnish seniors. The authors also concluded that, apart from leisure activities, age and education seemed to have the strongest effects on Internet use by the elderly. In particular, the findings suggest that the younger the person, the more likely he or she is to use the Internet regularly. With respect to education, the results reveal that those having the best educational qualifications are the most likely to use the Internet frequently.

3.2. Supporting older workers in ICT use

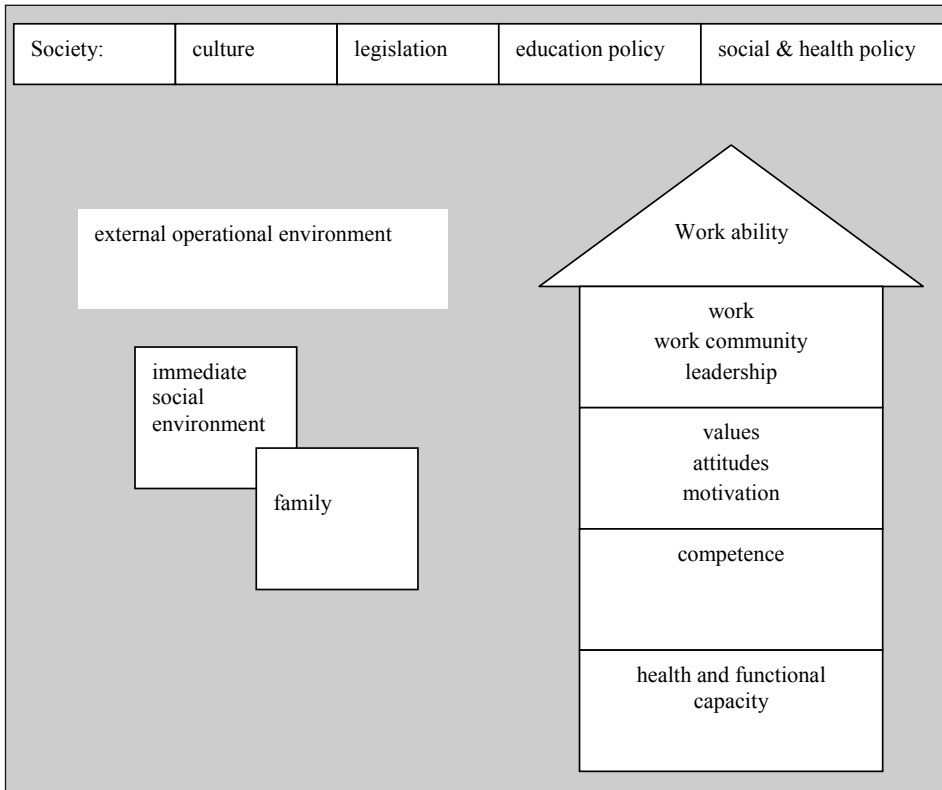
ICT use by older people is a multi-disciplinary research area (Wagner et al., 2010), which calls for holistic and integrative approach in solving difficulties. Therefore, prior studies proposed various multifaceted frameworks to understand and overcome barriers to ICT use by the elderly. In particular, an approach proposed by Hill et al. (2008) suggests four main potential means of encouraging digital inclusion of the older people: fostering positive attitudes towards the Internet, encouraging cultural currency, promoting a meta-cognitive approach to learning, and facilitating individuals' progress as expert learners.

In the light of inevitable demographic changes resulting in shrinking labor force, strategies supporting the growth of work activity and productivity are being worked out. These strategies include all stakeholders involved in the economic process (institutions, companies and employees) and their efficiency relies on the level of mutual cooperation (e.g. Reday-Mulvey, 2005; Ilmarinen, 2011). The character of today's economy, which is based on knowledge and constant technological progress, imposes a number of requirements for remedial measures and strategies. The required actions should be connected with employees' competence in ICT, companies' openness, use of new technologies by organizations, and integrated state support (e.g. Olsson, 2014).

Mutual interrelationships among stakeholders in the light of the growth of work activity and efficiency are illustrated by the so-called Work Ability House model proposed by Ilmarinen (2006). In this comprehensive model, factors influencing work ability were constructed like a house with four floors (see Fig. 1): health, competence, values and attitudes, and work. The model also covers the environment outside the Work Ability House: family, close community, operating environment and policy level. Figure 1 depicts that the workers' health and their functional capacity (1st floor) is a foundation for work ability (Hasselhorn, 2008). The 1st (ground) floor can bear the work demands only when enough professional and social competence is available. The relevance of the 2nd floor (competence) is increasing in today when continuous change is becoming a main characteristic of working life. The 3rd floor represents the social and moral values of the worker, such as respect, esteem and justice, accompanied by commitment to the organization, motivation and engagement. These values influence the ability and motivation for learning and qualification (2nd floor). Finally, the 4th floor summarizes all aspects of the work content (physical, psychological and social demands), the work environment and work organization. The influential factors at this level are leadership and work factors such as possibilities for development and influence at work.

The Work Ability House Model serves as a new generation concept of work ability. It can be applied both in planning research and developmental projects, in constructing training and education programs, in planning actions to promote work ability and well-being, in developing corporate well-being policy, and in planning legislation aiming to support the work ability and longer work careers (Ilmarinen, 2011). An example of the practical application of this model are activities proposed by Morschhauser and Sochert (2006) as regards adjusting work conditions to the needs of older workers, fostering continuous training, supporting new starts in occupations, and rethinking negative age stereotypes.

Figure 1. Work Ability House model



Source: own elaboration based on Ilmarinen, 2006.

The above described Work Ability House model appears useful in considering the propositions how to support ICT use by the elderly. In particular, at the level of health status and functional capacity of an employee, the important solutions are connected, among other things, with perception, memory, and learning, which are elements enumerated among important barriers to ICT use by the elderly. At the level of an employee, activities are connected with leading a healthy lifestyle, which delays the process of ageing. In the case of companies, possible interventions include the organization of health-related offers at work and taking care of occupational health and safety.

The level of competence refers to problems connected with the situation when an employee's skills become obsolete and may depreciate the value attached to previously accumulated work experience. The responsibility of an employee is to take care of his/her education, training, and carrier planning (looking for and planning the ways of increasing one's competence). The responsibility of an employer is to create appropriate strategies with respect to human resources development, career opportunities, and age management.

Values, attitudes and motivation belong to the important factors supporting ICT use. Frequent barriers at an employee's level are fear, reluctance, and lack of willingness to become involved in ICT-related initiatives. Looking at the employers' side, we can observe negative stereotypes

connected with older workers. In this respect, it appears that the greater responsibility and possibility of interventions lie in the hands of organizations, rather than of an employee. Companies should create an appropriate social climate and corporate culture supporting the elderly in adapting to the changing work conditions connected with progress in ICT. In this respect, research shows that appropriate motivation combined with prior experience counterbalance barriers connected with health and functional capacity of an employee (e.g. reduced rate of learning or weaker perception) (Ilmarinen, 2001).

Problems connected with work, work community, and leadership refer largely to activities connected with work organization and design. Technological and organizational changes often happen so fast that employees are not able to fully adjust themselves to these changes. The difficulties encountered provoke stressful situations and may lead to the decision to leave the work places by older workers. Ilmarinen (2001) posits that such a process is wrongly explained by lack of competence of older workers. He argues that the responsibility for adapting labor force to the new requirements should be borne by company's management. Therefore, good communication and management, such as clear definition of tasks and responsibilities, should increase the feeling of job security in the light of the necessity to adapt to changing work conditions.

Important activities also include appropriate tools and methods helpful in effective implementation of the alignment strategies. Concrete examples connected with ICT include an appropriate user interface of software applications and websites. Such an interface should be more readable, have longer response time, and should not contain unnecessary applications. In general, software applications should be aligned to the needs of older users. In addition, attention should be paid to the implementation process, which should be adapted to the needs of the elderly and supported by well prepared instructors. Prior research indicate that personal one-on-one instruction and computer mentors who provide step-by-step printed instructions, and use of computer games to teach basic computer skills have provided the best outcomes for older users. Older adults differ from the younger users with respect to the time-related consequences of computer use. In particular, contrary to younger users, older adults do not take time away from face-to-face interactions with other, but they rather decrease use of television and radio and perceive the Internet as a replacement for the library (Gatto, Tak, 2008).

Prior research illustrate that the maintenance of good work ability throughout the occupationally active years has a strong impact on later-life health (Seitsamo et al., 2011). Therefore, it can be predicted that people using ICT in their professional activities at their jobs will be willing to use computers and the Internet in their everyday life when their professional career is over. In consequence, such a situation will help them in healthy and active ageing (Olsson, 2014).

4. Conclusion

The current study examined difficulties in ICT use experienced by the older people and investigated possible solutions to the problems encountered. The findings illustrate that the idea of work ability is central while dealing with age-related problems and, in today's economy, ICT use is an integral part of work ability. The results demonstrate the need to involve all stakeholders in ageing-related strategies and, in particular, the need to bring together the needs of employers and employees and to support the work careers of older workers. There is a need to work out models evaluating costs and benefits of ICT-related initiatives and trainings in a long-term

perspective. The new approaches should initiate the discussion about ageing and work, might increase the awareness of human work ability and the role of ICT, should improve the collaboration between employers and employees due to win-win possibilities, and can be used as tool for promoting, training, coaching and consulting.

The current study illustrates the need for future research into the role of ICT in the process of ageing. The particular avenues for future studies include a more in-depth investigation taking into consideration the division into professionally active and inactive older people. Another promising direction for future research refers to the role of a country's level of economic development while investigating the influence of ICT on ageing-related considerations. An interesting research question in this respect is connected with the idea how less developed economies might efficiently use ICT-related solutions while addressing the problem of population ageing.

Bibliography

1. Boersch-Suspan A. (2003), Labor Market Effects of Population Ageing, *Review of Labour Economics and Industrial Relations*, 17.
2. Coleman D. (2001), Population Ageing: An Unavoidable Future. Social Biology and Human Affairs No. 66, *The Journal of the Biosocial Society*.
3. Conen W., van Dalen H., Henkens K., Schippers J.J. (2011), *Activating Senior Potential in Ageing Europe: an Employers' Perspective*, ASPA project report.
4. Gatto S.L., Tak S.H. (2008), Computer, Internet, and E-Mail Use Among Older Adults Benefits and Barriers, *Educational Gerontology*, 34.
5. Hasselhorn H.M. (2008), *Work Ability – Concept and Assessment*, http://wai-netzwerk.uni-wuppertal.de/picture/upload/file/Concept_and_Assessment.pdf [30.06.2015].
6. Hill R., Beynon-Davies P., Williams M.D. (2008), Older People and Internet Engagement: Acknowledging Social Moderators of Internet Adoption, Access and Use, *Information Technology & People*, 21(3).
7. Ilmarinen J. (2001), Aging Workers, *Occupational & Environmental Medicine*, 58.
8. Ilmarinen J. (2006), *Towards a Longer Worklife. Ageing and the Quality of Worklife in the European Union*, Helsinki, Finnish Institute of Occupational Health, Ministry of Social Affairs and Health.
9. Ilmarinen J. (2011), 30 Years' Work Ability and 20 Years' Age Management [in:] *Age Management during the Life Course. Proceedings of the 4th Symposium on Work Ability*, (eds.) C.-H. Nygard, M. Savinainen, T. Kirsi, K. Lumme-Sandt.
10. Kotowska I.E. (2006), *Starzenie się populacji i wyphywające z niego wyzwania dla polityki społecznej. Pracownicy w wieku podeszłym na rynku pracy i w polityce społecznej*, Biuletyn nr 50, Warszawa, Rządowa Rada Ludnościowa.
11. McMorro K., Roeger W. (2004), *The Economic and Financial Market Consequences of Global Ageing*, Springer Verlag.
12. Meuter M.L., Ostrom A., Bitner M.J., Roundtree R. (2003), The Influence of Technology Anxiety on Consumer Use and Experiences with Self Service Technologies, *Journal of Business Research*, 56.

13. Morschhauser M., Sochert R. (2006), *Healthy Work in an Ageing Europe. Strategies and Instruments for Prolonging Working Life*, Essen, Germany, Federal Association of Company Health Insurance Funds.
14. Nasi M., Rasanen P., Sarpila O. (2012), ICT Activity in Later Life: Internet Use and Leisure Activities Amongst Senior Citizens in Finland, *European Journal of Ageing*, 9.
15. Olsson S. (2014), *Turning Demographic Ageing in Europe into Opportunities*, Sweden, HealthAccess.
16. Peacock S.E., Kunemund H. (2007), Senior Citizens and Internet Technology, *European Journal of Ageing*.
17. Reday-Mulvey G. (2005), *Working Beyond 60. Key Policies and Practices in Europe*, London, PalgraveMacmillan.
18. Renaud K., Ramsay J. (2007), Now What Was That Password Again? A More Flexible Way of Identifying and Authenticating Our Seniors, *Behaviour & Information Technology*, 26(4).
19. Seitsamo J., von Bonsdorff M.E., Ilmarinen J., von Bonsdorff M.B., Nygard C.-H., Rantanen T., Klockars M. (2011), Work Ability and Later-life Health: A 28-year Longitudinal Study Among Finnish Municipal Workers [in:] *Age Management during the Life Course. Proceedings of the 4th Symposium on Work Ability*, (eds.) C.-H. Nygard, M. Savinainen, T. Kirsi, K. Lumme-Sandt.
20. Soja E., Stonawski M. (2007), Demographic Future of Europe In the Light of the UN Projections [in:] *Proceedings of 12th Polish-Slovak-Ukrainian Scientific Seminar "Comparative Analysis of Socio-Economic Consequences of Transition Processes in Central-East European Countries"*, (ed.) J. Pocięcha, Wydawnictwo AE w Krakowie.
21. Soja E., Stonawski M. (2012), Zmiany demograficzne a starsi pracownicy w Polsce z perspektywy podmiotów gospodarczych [in:] *Demograficzne uwarunkowania i wybrane społeczno-ekonomiczne konsekwencje starzenia się ludności w krajach europejskich*, (ed.) J. Kurkiewicz, Wydawnictwo Uniwersytetu Ekonomicznego w Krakowie.
22. van Dalen H.P., Henkens K., Schippers J. (2010), Productivity of Older Workers: Perceptions of Employers and Employees, *Population and Development Review*, 36(3).
23. Wagner N., Hassanein K., Head M. (2010), Computer Use by Older Adults: A Multi-disciplinary Review, *Computers in Human Behavior*, 26.

Chapter 40

A Framework for Requirements Modeling During ERP System Implementation: Learning from a Case Study¹

Jan Trąbka, Piotr Soja

1. Introduction

Enterprise resource planning (ERP) system adoptions run the risk of failure which grows with the complexity of a company's business processes and scale of operations. Prior studies indicate that a precise definition of requirements during the initial phases of the project is one of the key success factors in ERP implementation (Finney, Corbett, 2007). Considering model approaches to the ERP lifecycle, it appears that the pre-implementation analysis is the main stage which results in the agreement and definition of the requirements for the target system (Markus, Tanis, 2000; Ross, Vitale, 2000; Somers, Nelson, 2004). In consequence, we may conclude that a good pre-implementation analysis is a critical precondition for a successful ERP adoption project. During pre-implementation analysis the modeling of enterprise and its business processes is performed, which are considered central activities in ERP system adoption (Berio, Vernadat, 2001; Dalal et al., 2004).

Global ERP providers such as SAP, Oracle and IFS have procedures elaborated and documented not only for requirements definitions, but also for the whole implementation process (e.g. ASAP). Polish ERP providers, having much smaller market experience, are just in the process of working out their own methods on the basis of techniques known from information system analysis and design field enriched with their own experience. Furthermore, Poland is an example of a transition economy – an economy transitioning from communist style central planning system to free market system (Roztock, Weistroffer, 2011). Being a transition economy, Poland experiences the fast changing business environment which might result in the necessity to treat enterprise modeling and pre-implementation analysis as a separate project with a separate contract and agreements (Themistocleous et al., 2011).

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The current study discusses the framework for requirements modeling on the basis of a complex ERP implementation project conducted in a Polish company from IT industry. The framework is understood as a set of tools, analytical techniques, and organizational rules (e.g. staffing). In general, the framework for requirements modeling might be divided into two major areas: human-related framework and tool-related framework. Human-related framework covers human resources and relates to their availability, competences, involvement and decision making capabilities. Tools-related framework includes tools and procedures used in the execution of the modeling process.

The project analyzed in the current study was conducted by a Polish mid-size ERP provider having about ten years of market experience. The study discusses the employed tools and phases of the analytical process in the investigated case. The study is concluded with the discussion of good and bad practices observed in the analyzed project. These observations might be used for improving frameworks for requirements modeling in future ERP implementation projects.

2. Characteristics of the case organization and motivations for ERP implementation

2.1. Company characteristics

A company from IT industry, named “IT Firm” in this report, is the focal organization in this study. A company providing implementation services in the considered ERP adoption project in named “ERP Supplier”. IT Firm specializes in computer system integration and its activities are divided into three main areas: system integration, building automation systems, and IT service and outsourcing. These three areas are shortly described below.

1. System integration – as a nationwide integrator of computer systems, IT Firm provides a range of services related with the consolidation of heterogeneous information processing environments. The related activities and services include analysis of customer needs and resources, systems design, pilot project implementations, final project implementations, acceptance tests, and post-implementation maintenance.
2. Building automation systems – IT Firm offers a majority of currently available systems used in modern buildings. The company offers services connected with electric installations, low voltage installations, and automation systems. The offered complex services include technical consultancy, integrated design, and project implementation and maintenance.
3. IT services and outsourcing – the company’s Service Department specializes in the implementation of complex services including the maintenance of the information and communication infrastructure of the company’s clients. This is performed on both a standard and outsourced basis. The company has 18 branches scattered over the whole country that allow for a delivery of time-critical services. IT Firm offers its services to companies and institutions operating in public administration, banking and financial sector, telecommunication, manufacturing, trade, and service. The company employs 400 people.

2.2. Motivations for ERP implementation

IT Firm is a project-driven organization and its activities are divided into projects conducted for the company's clients and governed by the signed contracts. The projects are restricted in time, have predefined budget and involve company's resources. The key information required by the company's management refers to the projects profitability. During the project realization various organizational units are involved and a range of products and services might be delivered. Therefore, as compared with traditional companies, the cost and profit accounting must be more granular and multidimensional. For the purpose of this study we will call various dimensions of cost and profit accounting (i.e. projects, organizational units, product types etc.) controlling cross-sections. The main information problem is that all source data gathered within an organization (payroll, purchase and sale invoices, etc.) have to be classified (recorded) simultaneously into all controlling cross-sections that are important from the perspective of managerial analysis.

The project is the basic cross-section; however, other important perspectives include organizational units, product and service types, or location. In such analytical approach it is required that the information system ensures an easy recording of source data and then creates a reporting mechanism that is able to present the aggregated data in a multidimensional controlling cross-sections. This requirement is difficult to satisfy when an organization has a number of independent systems governing operational processes and autonomous analytical tools for controlling analysis. IT Firm, before making a decision on the implementation of a new software solution, was using an ERP system which did not have any dedicated module for project management or analytical tool satisfying the requirements of a project-driven approach. As a result, improvement in project reporting became the first goal of the new system implementation.

The second goal included the optimization and integration of business processes within the whole organization. The most difficult area involved services, with a special focus on so called service logistics involving management of parts which might have been owned by the company or held on deposit. Processes in this area are unusually complex and multidimensional, and the result of related projects hinges upon their performance. The main parameter defining quality of services is the guaranteed time of disaster recovery which varies from a dozen to even two hours. The company employed a dedicated portal to manage service requests. Service portal can be accessed by both customers and company's employees from various departments such as service, logistics, and call center. Using service portal, a client registers its service requests and then is able to track their status. The service portal was not integrated with the ERP system which resulted in the necessity of manual entering data connected with service requests into the ERP system's logistics module. Next, feedback on the related process status had to be keyed in the service portal. Such lack of integration resulted in process discontinuity and excessive workload required in order to meet service deadlines. In consequence, optimization and integration of IT processes and systems became the second goal of the new system implementation.

2.3. Project assumptions – implementation methodology of ERP Supplier

The implementation methodology, adopted in the project conducted in IT Firm with the support of ERP Supplier, is based on three pillars:

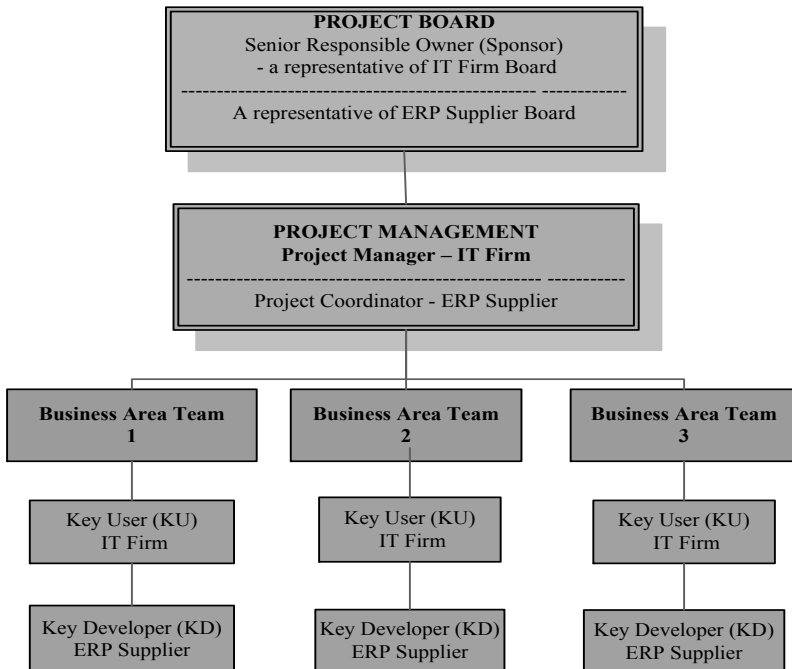
- international project management standard PRINCE 2 (Bradley, 1997; OGC, 2009),
- agile project management methodologies such as SCRUM (Schwaber, 2004; Schwaber, Sutherland, 2011),
- flexible architecture of the system being implemented and the provider's extensive experience gained during a few hundred implementation projects in various industries.

In the following, the first stage of the project, Pre-implementation analysis, is shortly discussed. The whole implementation project cycle is described in (Trąbka, Soja, 2013). Pre-implementation analysis involves specification of processes, with a map of top-level processes as a starting point for creating a hierarchical list of processes. Next, the processes are being decomposed into the elementary processes, which are defined by the description of implementation contexts, execution procedures, additional user requirements, data structures, document and report templates, and access and execution rights. Additional elements include terms and data dictionaries, and detailed project schedule.

3. Human-related framework of analytical process

The structure of the analytical team has been presented in Figure 1. The following paragraphs shortly describe roles and responsibilities of main actors in the team.

Figure 1. Project team structure



Source: own elaboration based on provider resources.

1. Steering committee – a body of top management representatives from both companies delegated to the project supervision. The committee was responsible for long-term project management and monitoring which included control of the project run at the strategic level, verification of project outcomes against previously defined goals, and checking if the project satisfies defined scope, cost, and time criteria. All major changes in the project had to be approved by the committee. In the analyzed project, the committee has been lead by a vice-president of IT Firm, who also served as a project sponsor. The supplier’s side was also represented by a person from top management – a director of operations in ERP Supplier.
2. Project manager – was responsible for supervision and coordination of activities conducted by units involved in the project from the IT Firm side. Project manager was responsible for communication in the project team and with the steering committee. Project manager, together with project coordinator, made operational decisions in the project. In the analyzed project, project manager role was played by a director of IT department in IT Firm.
3. Project coordinator – was responsible for supervision and coordination of activities conducted by units involved in the project from the ERP Supplier side. In the analyzed project, project coordinator role was played by a director of implementation department in ERP Supplier.
4. Key users – a team of specialists from various areas of IT Firm involved in all stages of the project and responsible for verification of all solutions being implemented (project products). In the analyzed project, key users were recruited among managers of departments and teams working in areas covered by the implementation project. It should be noted that in an IT Firm’s organizational structure managers are supervised by directors; however, the latter were not involved in the project duties. Some areas were supervised by three representatives of IT Firm.
5. Key developers – employees of ERP Supplier with broad implementation experience in individual functional areas. Responsible for creating and delivering project products. In the analyzed project, during pre-implementation analysis, key developers also helped in process and document specification. A team for analytical support was involved among ERP Supplier’s representatives. Its members were responsible for implementation methodology, analytical tools, and documentation.

In the analyzed project, the empowerment of the chief of the steering committee, who was also the project sponsor, played a very significant role. The appointed person was a member of the company board, which assured access to company’s resources. The project manager, who was an IT director, assured an effective project organization and good communication with the ERP Supplier’s team. Nonetheless, the key users’ empowerment raises doubts because, despite having adequate knowledge, they did not have a crucial influence on organizational changes or team members’ availability. Formally, the key users were supervised by the departments’ directors; however, the latter did not take part in analytical works. The directors were informed about planned changes by “intermediaries” who often were not able to explain accurately the ideas developed by the analytical team. In general, very few suggested organizational changes were implemented. Another problem was connected with the limited key users’ involvement in the analytical process, caused by the fact that they had to complete their regular duties as they were not able to delegate.

4. Tool-related framework of analytical process

A document named Pre-implementation Analysis (PA) was the main product of the analysis stage. It was a model of information system in the organization managed with the help of the new IT system. In the analyzed case, PA also included organization- and project-related elements (e.g. schedule). The adopted approach to enterprise's information system was based on the structural analysis and design principles (Yourdon, 1989) where models of data and processes were the most important elements of the system. PA document was divided into the following parts:

1. Analysis organization.
2. Organizational characteristics.
3. Map of processes with proposed solutions.
4. Project organization.
5. Schedule.

As already mentioned, process and data models are the most significant models created within the structural approach. The ERP provider's analysts, based on prior projects experiences, supplemented the overall framework with organizational structure (model of organization) and document flow models. The latter was treated as a supplement of data model. Therefore, the overall model of requirements presented in the PA document included the following models:

1. Organizational structure model.
2. Process model.
3. Data model.
4. Document flow model.

Individual models, supplemented with examples of their practical application in the PA document, are discussed in the following sections.

4.1. Organizational structure model

Organizational structure model describes a company taking into account the division into organizational units and job positions. It depicts the managerial hierarchy and functions being executed in an organization. Organizational Chart (Org Chart) appears the most often used tool in this area. Org chart is a simple notation used not only in computer-related applications, but also in organization and management. In the analyzed case study, during the first stages of the project, an "official" organizational structure of the company IT Integrator has been created. This structure was helpful in understanding the company operation by the ERP provider's analysts and also in building the analytical team at the adopter's side. In the course of the analysis this diagram was repeatedly referred to, especially while building the analytical cost structures (controlling domain) and defining user rights in the ERP system.

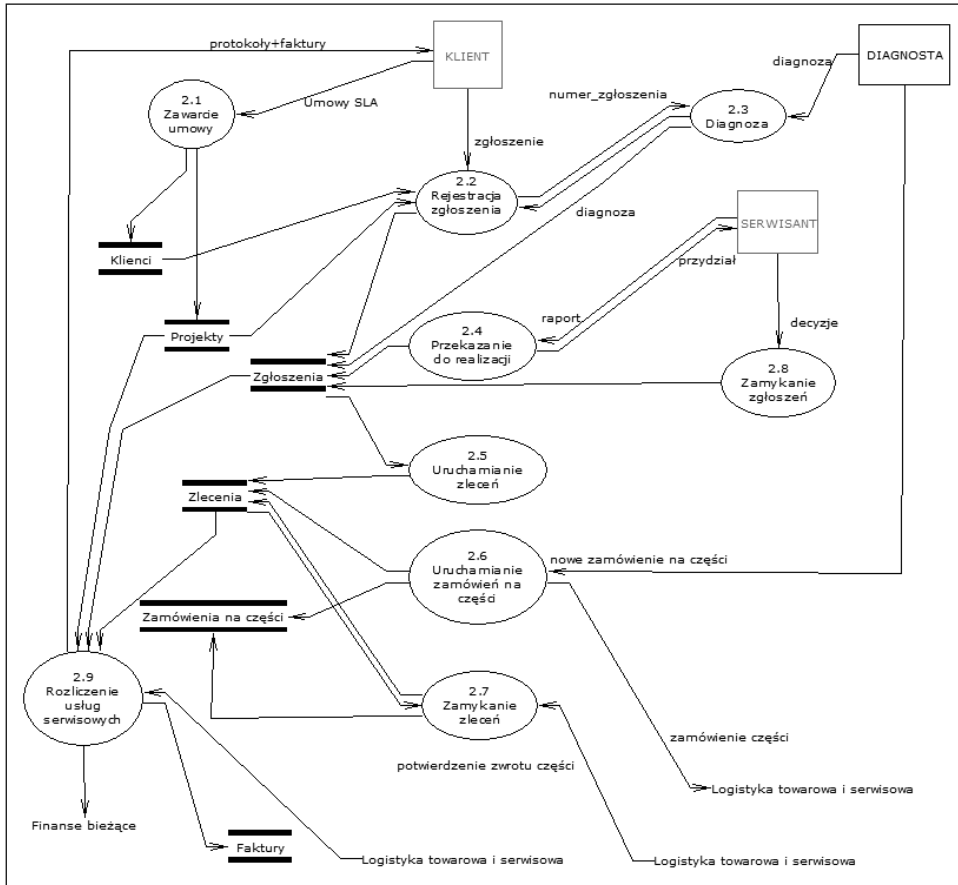
4.2. Process model

Process model included Data Flow Diagrams (DFD) and process specification.

1. Data Flow Diagrams (DFD) – depicts the system as a grid of information processes connected by data flows and data repositories. The key feature of this technique is related with decomposition which enables modeling of very complex information systems at various levels of de-

tails. In the analyzed project, the modeling process started at the topmost level (level 0) which illustrates all main information processes of the organization. Next, each main process was decomposed and detailed until the elementary process. It was agreed that the elementary level will include processes that might be completed during a single working session in the system (e.g. issuing invoice, placing order). Figure 2 presents example of elementary process: sale of maintenance services.

Figure 2. DFD level 1 – sale of maintenance services



Source: provider resources.

2. Process specification – each elementary process was defined with the help of a so called process card. Specifications were created in natural language; however, thanks to a formalized layout of the process card, they were unambiguous and precise. Table 1 depicts a sample process card. On the whole, IT Firm’s model included 82 processes specified in this way.

Table 1. Process card model

Process specification no: */Number compatible with DFD/*

Process name: */Name compatible with DFD/*

Process owner from IT Firm: */Area team responsible for process specification/*

Process owner from ERP Supplier: */Analytical team responsible for process specification/*

Description: */Description of steps realized in the process. It is a list of activities performed by a user in the process, it is not the description of user-system interaction (use case level)/*

User requirements: */List of additional functional requirements reported by users during the analysis/*

Organizational changes: */Required changes, addressed to the steering committee/*

Used dictionaries/data repositories: */Reference to data structures/*

Conversion – data sources in legacy systems: */Mapping of data sources needed to feed the new system/*

Document flow: */Representation of a process in ERP system, including a chain of linked objects (so called proofs)/*

List of generated documents (with patterns):

List of reports (with patterns):

- **standard** */Present in the system after installation/*
- **used-defined** */Prepared according to user requirements/*

Impact on finances: */Definition for book-keeping in financial and accounting module/*

Process-specific implementation procedures: */Definition of procedures performed at user's request/*

Rights for access/execution: Registration/Modification/View: */Indicating roles from organizational and system-related structure/*

Archiving: */Time periods and means of document storage/*

Note: Comments are displayed in italics.

Source: own elaboration based on provider resources.

4.3. Data model

The most important tools in data model included data dictionaries. Data dictionaries included: element name, description, type, necessity, and default value. The field “description” was especially important as it defined and clarified the understanding of attributes in the analyzed organization. It should be emphasized that Entity-Relationship Diagrams (ERD), which are a classical tool for showing relationship among objects in structural approach, were not used. This results from the specificity of ERP systems that are ready-to-implement software packages having their own data structures. Modification of the existing data structure in the ERP system is highly risky and not advised. Sometimes there is only a necessity to add new attributes and new objects.

Table 2. Data dictionary – example – customer dictionary

Column name	Type	Description	Required	If empty
K_Logo	varchar(10)	Customer logo	yes	
K_odb	varchar(1)	Consumer	no	
K_dos	varchar(1)	Provider	no	
K_prc	varchar(1)	Employee	no	
K_hnd	varchar(1)	Sales person	no	
K_bank	varchar(1)	Bank	no	
K_Nazwa1	varchar(100)	Name of consumer I	yes	
K_Nazwa2	varchar(255)	Name of consumer II	yes	

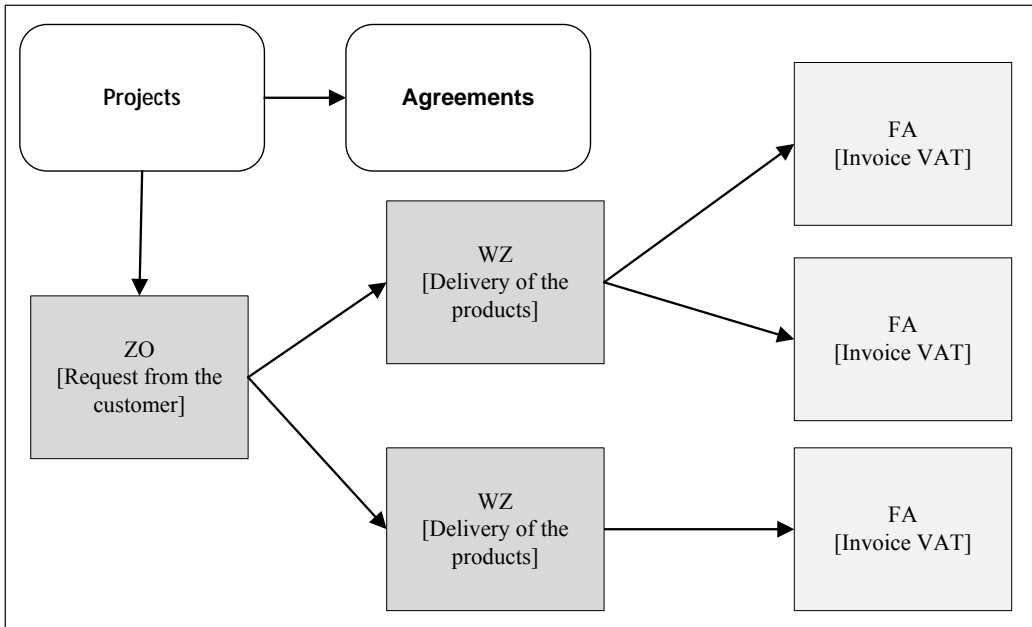
Source: own elaboration based on provider resources.

4.4. Document flow model

As described in the previous subsection, the traditional data structures were not modeled with the help of ERD diagrams. Nevertheless, a very important aspect connected with data structure in the ERP system was added – document flow. Document flow is a means by which ERP systems perform processes carried out in an organization. A process is manifested by the procedures generating documents in the consecutive elementary activities of the process. Every organization develops its own, specific processes; therefore, ERP systems should have capability to configure any path of document flow. In the analyzed case, document flow was especially complex in the areas of logistics and service – there were a dozen individual types of documents created in many alternative paths. In order to model the relationships among the documents being created, a notation has been proposed, named document flow diagram. The main elements of this notation are:

- documents, marked with system symbols (e.g. FV – VAT invoice);
- sequence relationships, illustrating the order of document occurrences on the path;
- data dictionaries, being the basis for documents creation.

Figure 3. Document flow diagram – example



Source: own elaboration based on provider resources.

5. Analysis run in main areas

During the preparatory stage of the project, the project team was divided into domain teams (named business-strategic teams by project participants; however, these names in the authors' opinion were not adequate). The domain teams were created for the following areas: service, logistics, sales/CRM, finance, and IT. The adopted division turned out to be not adequate as, from the very beginning, people from service and logistics areas worked together. Also, IT team was supposed to take care of system integration and interfaces; however, since these responsibilities were not properly communicated to the team members, they restricted their involvement to just organizational and technical support of analytical works.

The analytical teams from various domains started their activities at the same time. The schedule assumed meetings of teams at the same time and place so that mutual experience could be exchanged. However, in time, such a discipline disappeared and in consequence domain teams worked according to their individual schedules and often in distant regions of the country. The complete analytical team initially was meeting fortnightly; nonetheless, in the later periods this rule was neglected. Project manager did not participate in analytical works and project coordinator from the supplier part took part in activities of the logistic and service team.

Activities in the areas of service and logistics. The team met on a regular basis and adopted the most detailed analytical perspective. The IT Firm's logistic team had a previous experience in business process modeling gained in past projects, when they used MS Visio and created process diagrams similar to BPMN notation (Panagacos, 2012). This experience was very useful

during the analysis, when the team, in several steps, defined company processes using DFD and process cards. The logistic team was very involved and motivated which resulted from the large scale of the team activity, as they had to handle a few thousand of service requests per month. Bearing in mind that each service request might have had several paths of realization and might have used various materials (own, entrusted, under warranty), it was obvious for the team that an efficient software tool was a critical precondition for the team's performance. In fact, a very difficult aspect of service-logistic activities was connected with the necessity of using two separate software tools. Customers, servicemen, call-center workers used the service portal for registering and handling requests. Logisticians, in turn, were handling materials and service equipment in the ERP system. In consequence of the analysis, the required interface was defined. To this end, for appropriate processes, the status of the associated service request in the service portal upon the process completion was defined. The analysis of data structures and technical connection between systems was left without specification.

Activities in the area of finance. The team adopted an assumption that only processes relevant for the activities of financial department have to be modeled, such as cash register, bank transfers, and chart of accounts. Other processes were not analyzed, which also referred to logistics and service areas and their impact on the accounting registers. The logistic team adopted an opposite assumption and presumed that the financial team is responsible for the definition of accounting schema and business rules binding logistic and accounting operations. In consequence, these connections were defined just during the project run, which was sometimes connected with changes in processes. Upon analyzing the implementation project assumptions, a strong emphasis on controlling processes is noticeable. However, in the analytical team a delegated group of people responsible for this area was lacking. It was assumed that the financial team would handle the controlling domain as in the organizational structure both areas were at the same organizational level and were subordinate to a financial director (vice-president). Project requirements assumed that controlling activities, conducted by the controlling department, included gathering and processing of data coming from various areas of the company. Nonetheless, the requirements overlooked origin of data and impact of other areas' requirements on controlling processes. It was assumed that members of other teams would handle controlling-related issues in their processes. Overall, processes were defined at a very general level and did not reach elementary level. Instead of using DFD, process cards were employed. The process definitions were too general in the controlling area and did not include sample reports nor data structure and algorithms definitions. The definitions were largely based on company regulations and manuals.

Activities in the area of sales/CRM. The sales/CRM team worked separately from other groups due to its distinct location. Before the project start, this area employed the largest number of nonintegrated software solutions, mainly desktop applications. In consequence, the vision of a uniform, integrated solution was very difficult to develop. In practice, the sales/CRM activities were governed by the sales procedures, where an emphasis was put on the acceptance of sales offers depending on their financial parameters. The team did not put any effort into a detailed modeling of the client acquisition process and preparation of offers or contracts depending on a client's business background. The process definition was restricted to a text-based description linked to the abovementioned sales procedure and other official regulations. The data structure analysis nor process decomposition was not performed. As a result, the project participants from both involved parties did not have a general vision how to support this area with the new system.

6. Conclusion

The guidelines for requirements modeling framework, analyzed in the current study and verified in practice, allow us to formulate several conclusions as regards human- and tools-related aspects.

With respect to tools-related aspect, we can suggest the following factors which might determine the successfulness of the analytical process and, in turn, the whole project:

1. A division into the main organizational business processes yields a natural structure for the whole analytical process and documents being created. It also simplifies the division into domain teams and task allocation within these teams. An important problem might be connected with the common domains, a so-called inter-process interfaces, which should be modeled by joined domain teams. The analyzed case study illustrates that such domains might be omitted in the whole procedure and could be treated as “stray” areas.
2. A difficult task which should be faced by the analytical team is connected with the interface between the ERP system and other domain systems which were not replaced by the ERP and have to be integrated with the ERP. Due to the fact that, most often, we do not have any influence on domain systems, the analytical process should start with the analysis of data being retrieved from and supplied to the legacy systems. The process interfaces should be modeled at the very beginning because they have a significant influence on internal structures and processes being executed in the ERP system.
3. The analyzed case study illustrated that despite the use of proven analytical tools it was not possible to achieve a uniform and sufficient level of details in certain domains. Most often such a superficial approach to processes results from lack of awareness about their character or lack of vision how they should operate. In practice, passing over this problem during the analysis leads to intuition-based project planning and evaluation, which almost always results in delays and budget overruns.

With respect to human-related modeling framework, it is worth mentioning the following factors:

1. The empowerment of the analytical team within the organizational hierarchy. Such an empowerment should assure availability of resources and knowledge over the whole analytical process.
2. Key users defining system requirements should be empowered to make changes in the organization. Without such an empowerment, many good ideas would not be proposed because their prospective proponents would doubt that these ideas have a chance to be implemented.
3. The analyzed case study illustrates that members of the analytical teams are often working in distant regions/areas. Meanwhile, the creative part of the analytical process is most often executed jointly by a number of teams, for instance by brainstorming. Therefore, adequate resources (such as time schedule) should be assured for the whole analytical process in order to organize such meetings. Nowadays, video conferencing supported by communicator tools such as WebEx or Skype might be used.
4. Involvement of the members of the analytical team. Involvement is understood as a clear delegation to the analytical tasks and relief of some everyday duties. Participation in the analytical process is often connected with a number of additional duties and more time spent at work. Such additional workload should be appropriately recompensed.

Summing up the discussion on the framework for requirements modeling in ERP implementation, we can conclude that, in the light of the analyzed case study, Polish ERP providers are building their own implementation methodologies, based on proven standards and experiences. Nevertheless, complex tools and methodologies are not the only prerequisites for successful ERP implementation. In fact, human-related framework of the whole analytical process is of vital importance. Human resources, competences, involvement and the organization of the analytical process are equally important.

Bibliography

1. Berio G., Vernadat F. (2001), Enterprise Modelling with CIMOSA: Functional and Organizational Aspects, *Production Planning & Control*, 12(2).
2. Bradley K. (1997), *Understanding Prince 2*, Spoco Project Management Limited, Dorset.
3. Dalal N.P., Kamath M., Kolarik W.J., Sivaraman E. (2004), Toward an Integrated Framework for Modeling Enterprise Processes, *Communications of the ACM*, 47(3).
4. Finney S., Corbett M. (2007), ERP Implementation: A Compilation and Analysis of Critical Success Factors, *Business Process Management Journal*, 13(3).
5. Markus M.L., Tanis C. (2000), The Enterprise System Experience – From Adoption to Success [in:] *Framing the Domains of IT Management: Projecting the Future Through the Past*, (ed.) R.W. Zmud, Cincinnati, OH, Pinnaflex Educational Resources, Inc.
6. OGC (2009), *OGC: Managing Successful Projects with PRINCE2® 2009 Edition*, London, The Stationery Office.
7. Panagacos T. (2012), *The Ultimate Guide to Business Process Management: Everything You Need to Know and How to Apply It to Your Organization*, Theodore Panagacos.
8. Ross J.W., Vitale M.R. (2000), The ERP Revolution: Surviving vs. Thriving, *Information Systems Frontiers*, 2(2).
9. Roztocki N., Weistroffer H.R. (2011), From the Special Issue Editors: Information Technology in Transition Economies, *Information Systems Management*, 28(3).
10. Schwaber K. (2004), *Agile Project Management with Scrum*, Washington, USA, Microsoft Press.
11. Schwaber K., Sutherland J. (2011), *Scrum Guide*, Scrum Org, <http://www.scrumguides.org/> [24.06.2015].
12. Somers T., Nelson K. (2004), A Taxonomy of Players and Activities Across the ERP Project Life Cycle, *Information & Management*, 41.
13. Themistocleous M., Soja P., Cunha P.R. (2011), The Same, but Different: Enterprise Systems Adoption Lifecycles in Transition Economies, *Information Systems Management*, 28(3).
14. Trąbka J., Soja P. (2013), Enterprise Modeling in Complex ERP Adoptions: Learning from the Experience of an IT Company [in:] *Short Paper Proceedings of the 6th IFIP WG 8.1 Working Conference on the Practice of Enterprise Modeling (PoEM 2013)*, (eds.) J. Grabis, M. Kirikova, J. Zdravkovic, J. Stirna, Riga, Latvia, November 6-7, 2013, CEUR-WS.org/Vol-1023, pp. 95-104.
15. Yourdon E. (1989), *Modern Structured Analysis*, Prentice Hall.

PART V

EVALUATION OF EXPERIENCES AND CHANGES IN LAW, BUSINESS ACTIVITY AND MANAGEMENT



Chapter 41

The Reform of the Common Judiciary in Poland – Annexation or Adaptation?

Monika Odlanicka-Poczobutt

1. Introduction

After 20 years, the level of trust in the justice system (prosecutors, courts) is one of the lowest among public institutions in Poland. On the other hand, the expenditure on the administration of justice is one of the highest among the countries belonging to the Council of Europe (share of aggregate public expenditure on the administration of justice in GDP per capita in the 40 member states by the Council of Europe in 2006). Poland also has a relatively high employment rate for judges and other court personnel per 100 thousand inhabitants (respectively 12th and 10th place among the 40 countries belonging to the Council of Europe, the data for 2008).

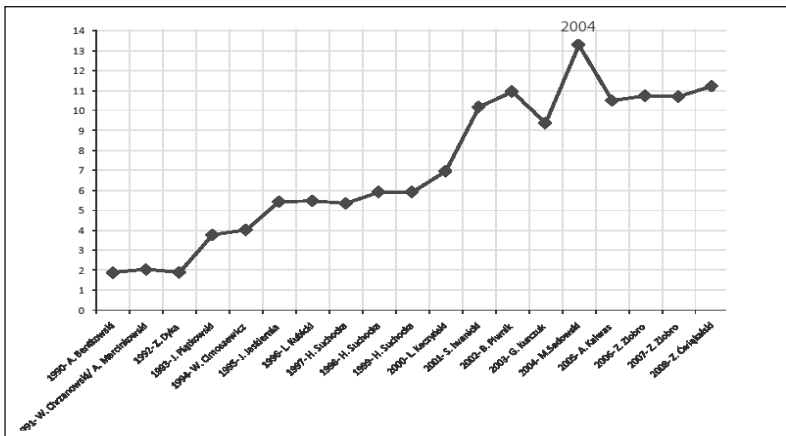
The multilevel organizational structure, existing in the Polish common judiciary, is characterized by a multi-instance proceeding. In addition, we should pay attention to the differences in the size of individual appeals, superior and district courts, not only in terms of the areas of their properties, but also of the number of incoming cases, and thus the size of the units and the number of posts. The basic problem of the Polish judiciary is its overly complicated structure, hardly applicable to the real needs. The faulty design of the system and the multiplication of the number of court units determine the need to involve more and more members of the judiciary, in particular of judicial positions. It should also be noted that a large number of mainly small units of the court (about one third of the district courts) employ fewer than 10 judges (Petryna, 2010), which contributes not only to the fragmentation of the structure, but primarily to the multiplication of functional positions in the courts and increasing the costs of the judiciary.

The lack of determination in introducing overall changes in the Polish courts is a common feature of the successive governments. This is why the list of the problems to solve is still long. In particular, the long-proposed postulates require execution, especially the releasing of the courts' presidents of the administrative management in their units through delegating these activities to the director of the court, secondly, changing the model of judges' career paths (resignation from the bureaucratic model of career progression), and, thirdly, further work on the network of courts in Poland.

2. The judiciary in Poland over the decades

During the twenty years of the Third Republic the position of the Minister of Justice has already been exercised by eighteen people. Practically, all of the ministers who came to the ministry, promised a reform. On average, their implementation lasted for one year and two months, which was an average length of their mission. The measure of reform achievements of individual ministers is the scope of initiated and driven to the end legislative and organizational changes, which contributed to the acceleration of procedures, reducing their costs and boosting their quality. But it is not always the minister in office who is responsible for the failure of the reform, or the lack of thereof. Many projects have collapsed along with the ministers and governments who submitted them. Some of the projects, which over years proved to be defective, have not been changed.

Figure 1. Filing of cases to courts in 1990-2008 (million)



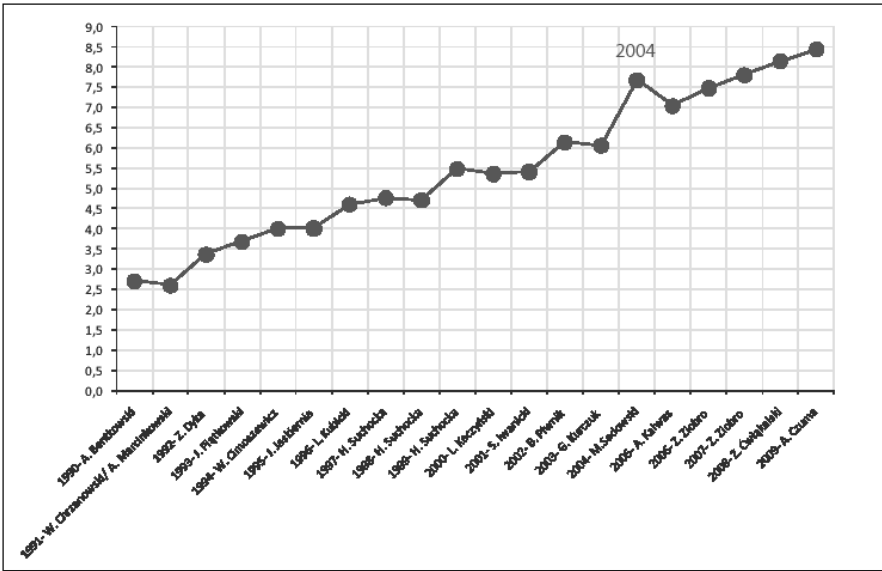
Source: GUS and Sześcińo, Beldowski, 2010, p. 4.

At the threshold of the Third Polish Republic, the justice system had to cope not only with the stigma of the political influence on its activity during the period of communism. An equally important task was to adapt its structures to the new reality, and, in particular, to changes in the law, and hence to the cognition of the courts, the principles of government, and the carrying out of their proceedings. The basic measure of the tasks which the justice system in Poland has had to comply with over the past two decades has been an increase in the number of cases brought to the courts. During the twenty years, the number of cases filed in the courts in Poland has increased by over 500 percent. In 1989 the Polish courts received approximately 1.9 million cases, compared to 13.26 million cases in 2004. In recent years, the filing of cases has begun to stabilize and varies between 10.5 million and 11.9 million.

With the increasing number of cases in the courts the budgetary expenditure on the Ministry of Justice has been growing accordingly. In 1991 the budget of the Ministry of Justice was about 2.5 billion zloty (converted in 2009 prices). In 1994-1995 it stabilized at the level around 3.8 billion, then in 1996-1999 remained at 4.5 billion, to shoot subsequently from the year 2000 and grow almost continuously to the present day.

Considering the percentage of aggregated expenditure on the justice system, Poland is almost at the top among the countries belonging to the Council of Europe. The relation of aggregate expenditure on the courts, the prosecution and legal aid to GDP per capita in Poland is much higher than in all the most developed countries of the European Union.

Figure 2. Expenditure on the judiciary in the years 1990-2009 in the prices for 2009 (billion zloty)



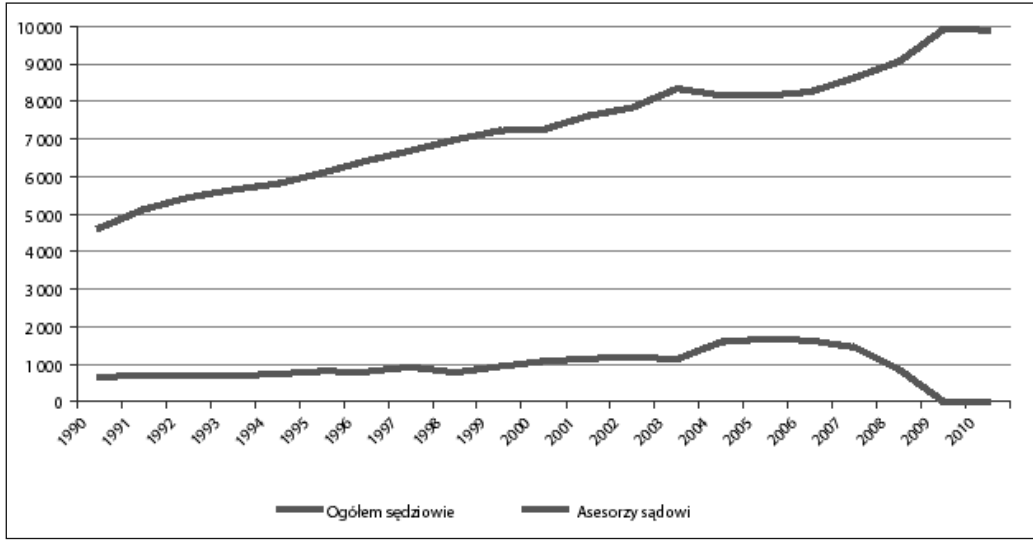
Source: GUS and Sześcińo, Beldowski, 2010, p. 5.

The increase in the number of cases incoming to the courts has been followed by the increase in the number of judges. It has been, however, slightly slower than the growth in the number of cases; the number of judges has increased by almost 300 percent, from about 3.5 thousand to more than 10 thousand. Today Poland, compared to other European countries, has a relatively high employment rate of both judges and other court personnel. However, the growth of employment has not resulted in the efficiency in the resolution of cases in Poland.

In terms of the number of full-time judges Poland takes the 3rd place among the members of the Council of Europe (after Russia and Germany). Counting nearly 50,000 employees, the Polish judiciary belongs to the most expensive ones. Poland is in the top five countries both in absolute terms and in % of GDP, in terms of the amount of public funding for the maintenance of the judiciary from the state budget. The data of the financial resources available to the Polish justice system, compared to other countries, contradict the thesis of its serious underfunding. They rather tend to pose questions about the exact structure of public expenditure and economic efficiency of necessary means (*Efektywność...*, 2010, p. 6.).

Since 1990, the number of judges in all institutions has been increased, except for assessors, whose employment growth has been, “blanked” as a result of the judgment of the Constitutional Court¹.

Figure 3. Number of judges and assessors of common courts in 1990-2010



Source: GUS and Sześcińo, Beldowski, 2010, p. 7.

During the terms of office of the individual ministers, the adoption of unconstitutional amendments to the Law on Common Courts took place, which allowed for dismissing judges because of “the faithlessness to the principles of independence”, and expanding the powers of the Minister of Justice in the procedure of appointing court presidents. The first of the changes was the aftermath of the efforts to remove from office those judges who were supposed to represent improper ethical attitudes during the period of the non-democratic country. The second change was an attempt to increase the political influence on the personnel holding managerial functions in the courts. In fact, no other proposals aiming at improving the management of the courts emerged.

The insufficiency of the judicial system has been treated by the successive ministers as the cost of the democratic transition. The assurance of inhibition of the uncontrolled expansion of cognition of courts has not worked, e.g. the application of a preventive measure in the form of pre-trial detention. It was a natural consequence of the adjustment of the Polish law to the standards of protection of an individual’s rights, but on the other hand, the organizational problems of the courts deepened. Introducing the principles of efficient management of the court failed, despite the establishment of CFOs; the problem is mainly in their weak position, their dependence on the presidents of the court and a still significant administrative competence held by them.

¹ The decision of the Constitutional Tribunal of 30 October 2006, Transient act S 3/06.

More frequent reaching for preventive measures, including detention, resulted in a high number of the European Court of Human Rights' sentences, in which the abuse of the institution in Poland was noticed, perceiving it even as a systemic problem².

The growth of the budgetary expenditure on the judiciary in 2003 helped to increase the network of courts. This change, however, was not accompanied by a wider reflection on the effectiveness of the small courts' model, consisting sometimes of several judges, in addition, all of them performing their functions. The reform was not preceded by the analysis stating whether independent courts in small local communities, where it is difficult to avoid the relationship between the judiciary and the local elites, are not particularly exposed to the risk of corruption.

The question why small, independent courts are a better solution than the nonresident departments of larger courts, supported by the judges commuting into the area, was also left without an answer. The ministers tried to justify the changes, referring to unspecified requirements of the European Union, without indicating the EU documents which dictated the introduction of such changes. The flagship project of the so-called 24-hour courts, which were supposed to accelerate the adjudication in simple criminal cases (drunk drivers and cyclists), has proved to be a costly failure, which was soon abandoned. Other announcements of a thorough reform of the judiciary has not produced a coherent, comprehensive vision for change in the judiciary and the prosecution, either³.

New ministers were expected to clearly cut off from the political attempts to influence the prosecutors' actions and undermining the independence of judges and the courts (Golona, Czech-Śmiałkowski, 2007, p. 16).

But the liquidation of the so-called horizontal promotion of judges (Wytrykowski, 2009) was pushed through and wage hikes for judges and prosecutors were linked to the average salary in the enterprise sector. A new model of general, judicial and prosecutor application, and the National School of Magistracy were established.

3. The main problems of the Polish justice system

A major problem of the Polish judiciary, most noticeable from the point of view of the citizen, is the excessive length of the proceedings. It happens that some procedures in complicated cases

² See: Temporary resolution HP/ResDH (2007) 75 concerning the judgments of the European Court of Human Rights in 44 cases against Poland concerning the excessive length of detention on remand. Until the adoption of the Resolution the Court issued 44 judgments finding an infringement of the European Convention on Human Rights because of the excessive length of detention on remand. As of the beginning of 2009, moreover, the Court recognized the following 145 cases of this problem (see Tymczasowe aresztowanie problemem strukturalnym, *Biuletyn Programu Spraw Precedensowych Helsińskiej Fundacji Praw Człowieka*, February 2009).

³ A positive element was the establishment of the Office of Analysis and Etatisation of the Judiciary General, whose tasks include, among others:

- a) to make analyses of the workload of judges and other judicial personnel and their widespread deployment and the use of the various organizational units;
- b) development and introduction of the rational use of judges and other judicial personnel and taking other activities to ensure the state control in courts according to the actual needs arising from the state of the workload;
- c) initiating and developing proposals for limits of employment of judges and proposals for the level of employment in other occupational groups of courts' workers in connection with the planned tasks to the draft budget of the Ministry for the year; http://www.ms.gov.pl/ministerstwo/org_baies.php.

(all instances) last more than 10 years. This is evidenced by, among others, numerous judgments of the European Court of Human Rights. At the stage of the work of Sejm (the Lower House of the Parliament) the law on complaint of infringement of the right to a trial within a reasonable time is currently being amended (Sejm printing No. 1281). Its objective is to adapt the regulations to the standards imposed by the European Court of Human Rights, including the coverage of complaint of preparatory proceedings.

The proposed changes, although they are a step in the right direction, seem to be insufficient. They do not include, *inter alia*, the fact that the excessive length of proceedings may have a multi-instance character, and may correspond to the various authorities and courts. But even the best act concerning a complaint against the excessive length of the procedures will not solve the problem of excessive length of proceedings itself. In order to eliminate this phenomenon, there needs to take place necessary comprehensive and reliable organizational work, which would be related to the functioning of the courts and the effectiveness of their work.

Therefore, the possibility of a better organization of judicial proceedings by scheduling individual hearings before the trial should be considered, as well as the application of the principle of concentration of the process by setting hearings, day after day or week after week. This should be particularly frequently used in the diagnosis of criminal cases(...) (*List Helsińskiej...* – Letter of the Helsinki Foundation for Human Rights to the Minister of Justice Andrew Czuma, 2009).

An important solution was the so-called e-court in Lublin, created for quick recognizing of simple civil cases in the electronic procedure.

The problem that may arise here, however, is the destruction of the dynamics of the reform of the justice system. Even the largest media activity and the determination to fight against irregularities cannot replace actions which are less spectacular, but most needed.

Part of the blame for the stopping of the reforms in the phase of general ideas and plans certainly falls on the general shaking of the Polish political scene and frequent changes of the government and coalition systems. On the other hand, even a short period of office can be very effective, if the minister comes with a clear vision of what they want to do. A valuable reform can then be carried out even without changes in the law, using the internal regulations and acts, as well as organizational activities.

Since the beginning of the political transformation, reviews of underfunding and staff shortages in the Polish justice system have been repeated like a mantra. For the successive ministers the fight for increasing the budget of the courts and prosecutors' offices and ensuring new jobs was a priority. But adding another million without any reform of the court management system, will not solve the problem.

After the twenty years of change in the justice system, the effect is that the share of expenditure on the administration of justice in GDP per capita in Poland is relatively high, higher than in most developed member states of the Council of Europe. However, the level of satisfaction with the services of the courts and the prosecutor's office is catastrophically low⁴.

The same applies to employment in the courts. As it was indicated at the beginning, compared to the other countries of the Council of Europe, we fall far above average in terms of employment levels, both of judges and court staff (clerks of the court, assistants, technicians). This

⁴ According to recent studies, 41% of the respondents do not trust the judges, and the courts – 40.9%. Prosecutors fall out even worse, more than 42% of the population do not trust them (Ministry of Justice) (*Badanie opinii publicznej...*, 2009, p. 15).

raises the question, how it is possible that systematically strengthened by financial and human resources, the Polish justice system, cannot cope with efficient dealing with citizens' cases. The excessive length of judicial proceedings is in fact a problem which has long been pointed out by participants and observers of the Polish justice system (Bodnar, Bernatt, 2009, pp. 100-102). It is also perceived in the work of the institutions of the Council of Europe, and particularly in the jurisprudence of the European Court of Human Rights. With more than 550 judgments finding a violation of the European Convention on Human Rights by Poland, which were made up to 1st January 2009⁵, it can be estimated that approximately one third of judgments concern violations of the right to a hearing within a reasonable time (Article 6 ECHR).

The estimates are based on the Committee of Ministers, Interim Resolution ResDH (2007) 28 concerning the judgments of the European Court of Human Rights in 143 cases against Poland related to the excessive length of criminal and civil proceedings, and the right to an effective remedy (Adopted by the Committee of Ministers on 4 April 2007 at the 992nd meeting of the Ministers' Deputies)⁶.

The problem of the excessive length of proceedings in Polish courts is also visible in the study conducted by the World Bank's annual Doing Business study, which, among others, embraces the measuring of times of claims for receivables from contracts. Since the beginning of the Business Doing research in this area, the position of Poland has only slightly improved. Currently, the process of claims for receivables from contracts in Poland (data concerning Warsaw have been taken into account) is 830 days, of which 660 days is coming to judgment, and thus closing the judicial phase of the claim. The rest of the time (160 days) absorbs the stage of the execution of the judgment. In Latvia, for the closing stage they only need less than 200 days, in France it is 271 days, and in Hungary – 305 days (www.doingbusiness.com).

A detailed analysis of the justice system in the years 2000-2004 contains the report of justice functioning in Poland (*Raport o funkcjonowaniu...*, 2006, pp. 7-12).

4. Annexation of solutions – examples of transplantation in selected countries

Experts have conducted a review of judicial reforms in many countries, characterized by varying levels of economic growth and different economic situations. The review shows the problem of trying to take over solutions, as identified in some countries, by other countries. The extensive research indicates, however, the negative effects of this type of action (Botero et al., 2003, pp. 61-88).

Specialists argue that e.g. the importation into England of administrative tribunals modeled on the French Conseil d'État, where individuals could sue the government, was unsuccessful because the English legal tradition, unlike the French one, did not have a well-developed distinction

⁵ Data from Country Information: Poland, <http://www.echr.coe.int/50/en/#countries-infos>.

⁶ Content of the resolution is available on the website: <https://wcd.coe.int/ViewDoc.jsp?id=1115721&Site=CM>. The Committee of Ministers noted that until its final resolution in Strasbourg were 143 Polish cases, the object of which was a violation of the right to a trial within a reasonable time (Article 6. 1 ECHR) and the right to an effective remedy (Article 13 ECHR). The vast majority of them (over 130 cases) concerned the excessive length of civil proceedings.

between private and public law (Allison, 1996). Others explain the similar perils of transplanting Anglo-American rules of evidence into the Continental system (Damaska, 1997, pp. 839-59).

Anyone contemplating the use of foreign legislation for law making in his country should ask himself: how far does this rule or institution owe its existence or its continued existence to a distribution of power in the foreign country which we do not share? (Kahn-Freund, 1974, pp. 1-27) In a critique of the annexation of the American constitutional model into Ethiopia, experts wonder whether the Western rule of law is a desirable target for an African country (Mattei, 1995, p. 127). If Africa desires to borrow solutions from western institutions, it should do so after a serious comparative analysis of the pros and the cons of each institutional alternative. Similarly, after a thorough review of transplanted legal systems and customary law in several African countries, a South African legal scholar categorically concludes that it would be a pity to miss the opportunity to enrich our social and legal culture by some imaginative fusion of distinctly African models of, for example, dispute settlement.

The blind and hegemonic push for uniformity around a non-African standard simply increases resentments that have been simmering since colonial times, which in people's minds translates into "westernization", a process not characterized in the past by too much respect for the African viewpoint (Nhlapo, 1998). In the Philippines, enhancing tribunal and community-based traditions and systems for resolving conflict has proved to be an effective strategy for addressing structural inefficiencies of the judiciary. Transplantation may give rise to serious strains in the recipient justice system, for foreign law is not "a boutique in which one is always free to purchase some items and reject others" (Mayo-Anda, 2001).

An arrangement stemming from a partial purchase can produce a far less satisfactory result in practice than either the recipient or the source system in its unadulterated form. Part of the reason is that to succeed, a judicial system must achieve a balance among at least three elements: accuracy (or fairness), speed, and access and the tradeoffs among these elements differ for different countries (Zuckerman, 1999). Some countries, for example, France, Germany, Japan, and the United States, have achieved a balance among accuracy, speed, and access that if not optimal at least does not seem glaringly wrong. Other parts of the world have succeeded less well. The accuracy-speed-access tradeoffs in the developing world may be quite different than those in developed economies. It is unlikely that complicated legal systems that work in rich countries, which have the resources and expertise to handle complexity, can be transplanted without significant modification into poor countries (Botero et al., 2003, p. 77). Developing economies tend to lack a highly trained and competent judiciary, have fewer resources with which to fund such a system, and would have more trouble achieving good results even if they had the same resources as developed economies. The evidence suggests that poor countries have more formal procedures than rich countries, apparently as a result of legal transplantation/annexation. In many developing economies proceedings often last more than 10 years, even for simple cases (Buscaglia, Dakolias, 1996). In Sri Lanka, lawyers have a high level of professional competence, and a high number of them have been trained in western, and particularly North American countries, but the judicial system functions not so well. Even appeals against death penalty sentences take many years, and land disputes are often passed on to sons and grandsons (Malik, 2001, pp. 93-97).

This is not to mean that lawyers in poor countries should not seek foreign education. Instead, it suggests that in a large society with a judiciary that has very limited human and financial resources, greater emphasis should be placed on reducing the gap between highly sophisticated justice in a few cases and no justice at all in most. Poor countries, or countries without a devel-

oped judicial tradition, should probably concentrate on instituting simple rules and procedures that are easy to enforce. A legal system that will do perfect justice in infinite time and at infinite cost is probably a luxury that the poor can ill afford. Efficient though blunt justice is better than no justice at all (Botero et al., 2003, p. 77).

5. Practice in the Polish judiciary

Since the beginning of the reforms in the Polish judiciary we can generally notice the lack of a coherent vision and specific strategies. The successive ministers have been trying to implement some of the western solutions applied by other countries, without an in-depth analysis and forecasts of the effects of such actions. In Europe there is a widely developed model of subordination of the Attorney General prosecutor's office to the Minister of Justice, which is reflected not only in the possibility to appoint and dismiss prosecutors by the Minister, but also in the powers of the Minister to issue binding guidelines and instructions to prosecutors, including those related to the conduct of specific cases. This is the case, among others, in Austria, Germany, France, Denmark, the Netherlands, Luxembourg and the Czech Republic. The model similar to that introduced in Poland is mainly the domain of post-socialist countries, such as Hungary, Latvia, Lithuania and Slovakia (*Sądownictwo...* – the report prepared by the MCC Group in the framework of the project). Among the so-called "Old EU" countries the model of the Attorney General's independence (constitutionally guaranteed) occurs in Italy. The only authority to control held by the Minister of Justice there is the possibility of disciplinary action against the head of the prosecutor's office. In Lithuania and Hungary the supervision of the prosecution has been moved towards the parliament, which can determine the broad lines of prosecution action (Lithuania), or even require from the Attorney General some information about specific investigations (Hungary) (Tak, 2005, pp. 33-34).

It is therefore possible to take advantage of ready-made solutions, however, there must be made an analysis who should be the benchmark, and whether indeed adaptation is not required, due to the specific conditions and traditions of the country concerned.

Resource management (human resources and material) is also a problem, with which the public administration in Poland cannot cope for years. The need to improve the management of the courts stumbles on the barrier still unknown to reformers of public administration, which is the barrier of independence and accountability of judges. Allegations of the judicial community include not only the content of the proposed changes, but also "an illusory form of consultation with the judges" (*Uchwała Zarządu Stowarzyszenia...*). It is unacceptable, however, that for two decades the government and the judicial environment have not been able to work out a model to protect the independence of the judiciary, while still guaranteeing them the improvement of their work. Imposing the U.S. model would not be the right solution, because of a different legal system and a much different way of perceiving the judge by the citizens of both countries.

An example of the Dutch Council for the Judiciary was used to develop solutions in the institutional sphere, allowing the transfer of issues related to the supervision and budgeting of the judiciary outside the executive branch. In the Polish legal system, the Minister of Justice is responsible not only for policy-making in the field of justice, but also for the disposal of public funds allocated from the state budget to finance the courts. The delegation of competences in the above areas to an independent judicial authority would allow to work out a system of funding that takes

into account the real needs of individuals units. In Poland, there have never functioned court budgeting mechanisms made by external bodies, and it is not surprising that such a proposal is being opposed, suggesting a threat to the sovereignty of the body.

In terms of the organizational structure of the universal judiciary, taking into account the organization and structure of the courts of the countries surveyed, we should instead strive to compensate for areas of jurisdiction and the internal structure and the number of posts of judges in the courts of various levels. From the point of view of the analyses, it seems necessary to create a model of judiciary, in which departments, courts, counties and appeals would be comparable to each other, particularly in terms of impact cases. However, the inappropriate transfer of information on the reorganization of the Polish judiciary through the media, provoked the opposition of citizens who understand that the court in the place stops to exist, and not that it will act as a department of a larger nonresident court.

Among the listed problems associated with the efficiency of the judicial system in Poland, there should also be mentioned a still insufficient level of digitalization of services. There should certainly be mentioned, among the positive examples of tools implemented in recent years, a system of electronic proceedings functioning since 2009, an electronic land registry system or the National Criminal Register. Such solutions should definitely be taken over from countries that have experience in their implementation. Information technology solutions are generally dedicated, but you can learn on mistakes of others, before you commit your own errors.

6. Conclusion

The lack of coherent and developed strategies to carry out a reform has a decisive influence on the efficiency and effectiveness of the Polish judiciary, in particular on the speed of the proceedings. The adaptation of the jurisdiction of the courts to the population and economic potential of particular areas and providing full computerization should be an objective of the actions taken by the actors and institutions responsible for the condition of the Polish judiciary. It should be remembered that the citizens' access to the courts cannot be determined and understood only by issues of logistics and transport. Availability of a national court should be seen primarily as the efficiency of its operation, including in particular the speed of adjudication. Draft changes in separable areas of the judiciary should be widely consulted.

Moreover, some proved valid tools for testing the workload of judges and other employees in common courts should be created. The level of workload in a decisive way influences the effectiveness and efficiency of the proceedings. The process of estimating the length of judicial proceedings is a very difficult task, which consists of many independent factors, including an increase in the number of cases, or the nature and complexity of the issues requiring e.g. opinions of experts. It is worth pointing out that among the countries that inform the parties of anticipated timelines of its duration is Finland. In Spain, however, there are procedural rules establishing the time frame of the proceedings. When designing one's own solutions it is advisable to pay attention to the good practice of other countries, but not to accept it uncritically, just adapt only selected items to your own needs.

Conducting a rationally planned reform of the judiciary would allow the elimination of the universal substantial disparities in workload, which in turn would translate into speed of the proceedings. In addition, the statistical data showing the level of employment in the Polish justice system,

based on the efficiency of proceedings before the courts, allow us to conclude that the current human resources potential is not used in the correct way. It seems necessary to develop a model of rational management of human capital.

Institutional arrangements should be supported by the continuation of the process of computerization and increasing the availability of electronic services. The development of technology to a large extent can compensate for a geographical proximity and access to the courts. The implementation of new solutions, such as video conferencing, the ability to use electronic forms and the exchange of documents between the parties, or the Internet proceedings for small claims, will certainly contribute to improving the efficiency and quality of the judiciary.

An extremely important factor contributing to the efficiency of the judiciary, affecting the quality of services, is the level of knowledge and competence of the personnel. Providing training and lifelong learning for the judicial personnel is entrusted to the National School of Magistracy, created in 2009. In addition to the training system, proper incentive models should be worked out, allowing to increase the efficiency of work, plans, career paths and professional development of judges and other employees.

The knowledge owned by Polish experts from the fields of law, management, government officials and other persons associated with the judiciary, should help to develop a coherent strategy for reforming the institution. There is also a need and ability to develop our own solutions, without uncritical annexation of those that may lead to negative situations described in the foreign literature. If there are good practices that can help to streamline operations, you must use them, but it is necessary to adapt to the conditions prevailing in the country, including the needs of the citizens and the tradition of the legal system.

Bibliography

1. Allison J.W.F. (1996), *A Continental Distinction in the Common Law: A Historical and Comparative Perspective on English Public Law*, Oxford, Clarendon Press.
2. *Badanie opinii publicznej na temat wizerunku wymiaru sprawiedliwości, oceny reformy wymiaru sprawiedliwości, aktualnego stanu świadomości społecznej w zakresie alternatywnych sposobów rozwiązywania sporów oraz praw osób pokrzywdzonych przestępstwem* (2009), Warszawa, Ministerstwo Sprawiedliwości, luty.
3. Bodnar A., Bernatt M. (2009), Wymiar sprawiedliwości [in:] *Demokracja w Polsce 2007-2009*, (eds.) L. Kolarska-Bobińska, J. Kucharczyk, Warszawa.
4. Botero J.C., La Porta R., Lopez-de-Silanes F., Shleifer A., Volokh A. (2003), Judicial Reform, *The World Bank Research Observer*, Vol. 18, No. 1 (Spring).
5. Buscaglia E., Dakolias M. (1996), Judicial Reform in Latin American Courts: The Experience in Argentina and Ecuador, *World Bank Technical Paper 3 50*, Washington, D.C.
6. Country information: Poland, <http://www.echr.coe.int/50/en/#countries-infos>.
7. Damaska M. (1997), The Uncertain Fate of Evidentiary Transplants: Anglo-American and Continental Experiments, *American Journal of Comparative Law*, 45.
8. *Efektywność polskiego sądownictwa w świetle badań międzynarodowych i krajowych* (2010), Forum Obywatelskiego Rozwoju, Warszawa.
9. Golona S., Czech-Śmiałkowski C. (2007), Niezależność sądów i niezawisłość sędziów w prawie i orzecznictwie międzynarodowym, *Przegląd Sądowy*, No. 1.

10. Kahn-Freund O. (1974), On Uses and Misuses of Comparative Law, *Modern Law Review*, 37.
11. *List Helsińskiej Fundacji Praw Człowieka do Ministra Sprawiedliwości Andrzeja Czumy*, 5 lutego 2009.
12. Malik S. (2001), Access to Justice: A Truncated View from Bangladesh [in:] *Comprehensive Legal and Judicial Development*, (ed.) R.V. Van Puymbroeck, Washington, D.C., World Bank.
13. Mattei U. (1995), The New Ethiopian Constitution: First Thoughts on Ethnic Federalism and the Reception of Western Institutions [in:] *Transplants, Innovation and Legal Tradition in the Horn of Africa*, (ed.) E. Grande, Turin, L'Harmattan Italia.
14. Mayo-Anda G. (2001), Engaging and Empowering Communities [in:] *Comprehensive Legal and Judicial Development*, (ed.) R.V. Van Puymbroeck, Washington, D.C., World Bank.
15. Nhlapo R.T. (1998), The Status of Customary Law in Africa: From the Age of 'Law and Modernization' to the Era of Human Rights and Constitutionalism [in:] *The Judiciary in Africa*, (eds.) B. Ajibola, D. van Zyl, Juta, Cape Town.
16. Orzeczenie TK z dnia 30 października 2006, syg. akt S 3/06.
17. Petryna K. (2010), *Analiza struktury wielkościowej apelacji, okręgów sądów okręgowych, sądów apelacyjnych, sądów okręgowych i rejonowych oraz wydziałów w tych sądach (stan na dzień 31.12.2009 roku)*, Warszawa, Ministerstwo Sprawiedliwości.
18. *Raport o funkcjonowaniu wymiaru sprawiedliwości w Polsce* (2006), (ed.) J. Stefanowicz, Warszawa, Centrum im. Adama Smitha & Ius et Lex.
19. *Sądownictwo w krajach o zbliżonym do polskiego systemie prawnym – inspiracje i problemy z transferem doświadczeń. Analiza struktury organizacyjnej sądownictwa powszechnego – etap I*, Raport opracowany przez MCCGroup w ramach projektu „Modernizacja sposobu świadczenia usług przez wymiar sprawiedliwości” (POKL2007-2012 Priorytet V – Dobre rządzenie, Działanie.5.3. Wsparcie na rzecz realizacji Strategii Lizbońskiej); dane: Ministerstwo Finansów.
20. Sześcińo D., Beldowski J. (2010), *Reformatorzy i hamulcowi. Przegląd działań Ministrów Sprawiedliwości po 1998 r.*, Warszawa, Fundacja im. S. Batorego.
21. Tak P.J.P. (2005), *Tasks and Powers of the Prosecution Services in the EU Member States*, Nijmegen, www.euro-justice.com.
22. *Tymczasowa Rezolucja KM/ResDH (2007)75 dotycząca wyroków Europejskiego Trybunału Praw Człowieka w 44 sprawach przeciwko Polsce dotyczących nadmiernej długości aresztów tymczasowych* (2009), Biuletyn Programu Spraw Precedensowych Helsińskiej Fundacji Praw Człowieka, luty.
23. Uchwała Zarządu Stowarzyszenia Sędziów IUSTITIA z dnia 25 października 2009 r.
24. Wytrykowski K. (2009), Awans poziomy sędziów: czy aby na pewno zniesiony, *Rzeczpospolita* 30 stycznia 2009 r.
25. Zuckerman A.A.S. (ed.) (1999), *Civil Justice in Crisis: Comparative Perspectives of Civil Procedure*, Oxford, Oxford University Press.
26. http://www.ms.gov.pl/ministerstwo/org_baies.php.
27. <https://wcd.coe.int/ViewDoc.jsp?id=1115721&Site=CM>.
28. <https://www.doingbusiness.com>.

Chapter 42

Legal Risk (Management) – The Concept and Its Scope

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1. Introduction

When we begin to analyse the issue of risk management, one of the crucial points to be aware of is the transformation of civilisation. In the recent past, all the social processes had strong value stability and change was an exception. Currently, change is the principle and stability is becoming a very rare exception. This means that an entrepreneur managing his/her business, encounters uncertainty to a much greater extent. This is the reason why the concept of risk management is becoming indispensable for management.

On the other hand, risk management is of normative value. In 2006, the Directive 2006/43/WE¹ introduced the requirement of obligatory monitoring of risk management on the part of the Audit Committee², which is a quasi-corporate organ operating obligatorily in the what are known as public-interest entities³, chiefly in public companies (Grzegorzcyk, 2011, pp. 23-35; Grzegorzcyk, Miś, 2009, pp. 121-128; Grzegorzcyk, 2010, pp. 39-46).

The simple consequence of this legal regulation is the statutory obligation to implement a risk management system in selected entities. The other consequence is the potential liability of corporate organs resulting from this regulation⁴. This may be liability on the part of board members (executive directors) for the improper functioning of the risk management system, as well as members of the supervisory board (non-executive directors)⁵, particularly members of the au-

¹ Directive 2006/43/EC of the European Parliament and of the Council of 17 May on statutory audits of annual accounts and consolidated accounts, amending Council Directives 78/660/EEC and 83/349/EEC and repealing Council Directive 84/253/EEC, Official Journal of the European Union of 9 June 2006, L 157/87.

² Article 41.2 of the Directive 2006/43/EC: (...) the audit committee shall (...) monitor the effectiveness of the company's internal control, internal audit where applicable, and risk management systems.

³ Defined in article 2.13 of the Directive 2006/43/EC.

⁴ See article 483 of the Polish Commercial Companies Code.

⁵ In the Polish legal order, as a general rule (except for some European companies), a two-tier system of corporate governance operates. However, in many jurisdictions there is a one-tier system of corporate governance. The position of executive directors in the one-tier system corresponds to the position of management board

dit committee, for the lack of activity or the improper monitoring of the risk management system. Thus it is worth mentioning that neither the concept of “risk” nor “risk management” has been defined within this directive.

Undoubtedly, within the concept of “risk” defined in economic literature, a specific type of risk is distinguished, namely legal risk. In European Union law, legal risk was also noticed in the Banking Directive 2006/45/EC⁶ which, without defining legal risk, implies that it constitutes part of what is referred to as operational risk⁷.

The above statements clearly indicate that attempts at defining the concept of “legal risk” are necessary. It seems obvious that defining phenomena and concepts from the scientific point of view has intrinsic value, in the sense that it is the aim in itself, an element of the cognitive process. However, in the case of risk management, it is the application goal that moves to the foreground. Risk management is first and foremost a practical skill whereas the theory is of an auxiliary nature. Thus, the authors attempt to adapt a managerial perspective for the sake of investigating the problem.

2. Legal risk – attempts at defining the concept

Two dominant approaches to defining the concept of legal risk are commonly accepted. The first defines legal risk as any business risk bearing serious legal consequences (e.g. risks connected with: suing, market regulator activity, losses resulting from the improper performance of contractual and non-contractual obligations). The second approach defines legal risk as the risk stemming from lawyers’ work effects and uncertainty of law (Moorhead, Vaughan, p. 4).

A similar approach to the problem is offered by literature within the banking and finance domain, which distinguishes two types of legal risk. “The first is legal risk, which is specific to an individual organisation or its objectives. In this category, for example, this would be the risk that the organisation is found to have acted unlawfully because, although the law itself was in no doubt, its own internal arrangements left it with a legal problem (...). In contrast, the second type of risk could be defined as the risk that the law itself gives rise to a result that is both unplanned and unwelcome. This may arise because of:

- the law changing or developing,
- an unclear law being made clear, or
- the law, though clear, being widely misunderstood or widely ignored” (Whittaker, 2003, p. 5).

According to UNIDROIT Principles, legal risk is a situation where the applicable law does not provide for a predictable and sound solution (McCormick, 2006, p. 111). The Basel Committee on Banking Supervisions claims that legal risk includes, but is not limited to, exposure to fines, penalties, or punitive damages resulting from supervisory actions, as well as private settlements (Basel Committee on Banking Supervision, 2006, footnote 97). The Bank of Eng-

members in the two-tier system, while the position of non-executive directors in the one-tier system corresponds to the position of supervisory board members in the two-tier system.

⁶ Directive 2006/48/EC of the European Parliament and of the Council of 14 June 2006 relating to the taking up and pursuit of the business of credit institutions (recast), Official Journal of the European Union of 30 June 2006, L 177/1.

⁷ According to article 4.22 of the Directive 2006/48/EC, operational risk means the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events, and includes legal risk.

land's approach is to define legal risk as the risk that the unexpected interpretation of the law or legal uncertainty will leave the payment system or members with unforeseen financial exposure and possible losses (McCormick, 2006, p. 107). Some academics suggest that legal risk means the likelihood that a trading partner will opportunistically breach a contract or expropriate intellectual property rights (Hill, 2005, glossary).

Legal risk can and should also be approached in a way typical of risk management, i.e. a process including elements such as: identifying, assessing, monitoring and reporting legal risks (Anderson, Black, 2013, p. 1). Somehow or other, there is no standard definition of legal risk and – as some people claim – it may not be very helpful to produce one (Whittaker, 2003, p. 5).

In literature one may also encounter the definition of legal risk that refers to stages of law functioning within society and business. Legal risk is thus risk stemming from the processes of the creation⁸, application⁹ and execution of the law. This definition comprises sources of legal risk to a large extent (Balereja, Wachowicz, 2008, p. 70). Assuming that, as the first stage of risk management is its identification, the most extensive span of the sources of this risk has significant merit. This is the reason why it is worth examining the concept of legal risk more closely based on this very definition.

3. Legal risk and the stages of law operation in economic turnover

At the law-making stage, a classic source of risk may be creating legal regulations as a result of the lobbying of particular interest groups. An example of this could be the implementation of the EU enforcement of replacing regular lightbulbs with energy-saving ones. The official justification of this regulation pointed to pro-ecological arguments for such legal regulation as well as a positive economic effect, which, however, has since been questioned. From the entrepreneurs' point of view, the application of this regulation could imply the necessity of changing their production profile (if they are manufacturers) or changing the acquisition structure if they use or trade lightbulbs. Some literature has presented views that this particular EU idea was the result of the effective lobbying of two multinationals that had invested in energy-saving fluorescent bulbs and intended to regain at least part of the expenditure bearing in mind the emergence of the new LED technology, alternative both to traditional bulbs, as well as the energy saving fluorescent bulbs (Position, 2015).

Aside from the credibility of the views expressed, there is definitely no doubt that law-making, which strongly interferes in the domain of economic turnover, constitutes a spontaneous source of legal risk. Obviously an entrepreneur has some time to adapt to changing legal regulations yet such adaptation entails costs as well as other problems, e.g. the lack of possibility to predict the scale of occurring economic processes evidently aiming at circumventing these legal regulations. In other words, an entrepreneur who obeys legal regulations with due respect may suffer far higher adjustment costs than an entrepreneur aiming at bypassing legal regulations unfavourable for him/her. Incidentally, the example cited is evidently a situation resulting at the stage of the im-

⁸ Also called: law-making.

⁹ Also called: implementation.

plementation of law, although it also presents other risk factors connected with the implementation of law and its execution. It is evidence of the complex character of the concept.

The above example was connected with evident improper law-making as a result of excessively taking into account particular interests. However, factors of legal risk also occur when a lawmaker seeks to satisfy unquestionable public interest by means of rather unfortunate legal solutions or creating regulations of an overly low level of formal quality. The most obvious example of this are tax regulations. On the one hand, the state must obtain revenue to finance the implementation of public duties while, on the other, the low quality of tax regulations is a frequent phenomenon and results in extensive problems for entrepreneurs. In extreme cases, it leads to bankruptcy of entrepreneurs who often receive high compensation from the State Treasury after several years as a result of a court ruling, which clearly demonstrates that the law was wrongfully applied. Proper economic calculation should, on the one hand, indicate tax revenue and, on the other, show costs both on the part of the state¹⁰, as well as on the part of society, including business. This example gives rise to the notion that legal risk having its source at the stage of law-making is inseparably connected to legal risk arising at the stage of the application and execution of the law.

In literature on the subject the quality of the created legal standards is subjected to far-reaching (though mostly justified) criticism. At this point it is worth mentioning in particular the views expressed by W. Modzelewski. Without going into details, the author, revealing the extremely low level of the quality of tax law, uses such terms as “basic problems” (Modzelewski, 2013a, pp. 3-4), “pathologizing” (Modzelewski, 2013b, pp. 7-8), “of the tax system” (Modzelewski, 2013c, pp. 20-22), and finally “the current tax system crisis” (Modzelewski, 2010, pp. 3-5). All these terms refer to law-making activity. The fact that law-making in Poland is highly imperfect (thus simultaneously constituting a legal risk factor), was evidenced in the official document prepared at the Chancellery of the President of the Polish Republic (*System stanowienia prawa w Polsce. Zielona Księga*, 2013). It contains many interesting proposals referring to the improvement of the current state of affairs.

The stage of law application is also one of high uncertainty. The most classic example is the duration of court proceedings. If the average duration of the simplest legal proceedings in Poland oscillates around three years, it simultaneously constitutes a source of risk for an entrepreneur¹¹. Namely, it implies the necessity of freezing some assets and bearing the cost of such litigation with a far-reaching lack of certainty as to the expected outcome of the proceedings.

Another, yet similar in essence, example of a legal risk factor is the duration of administrative proceedings connected with obtaining concessions, permits, permissions, licenses, approvals, etc. Theoretically, the Code of Administrative Procedures¹² guards the rational pace of settling administrative matters, which foresees a two-month deadline for settling particularly complicated matters¹³. Please note that, in accordance with the Act on Freedom of Economic Activ-

¹⁰ Such as, for example: tax collection costs, damages, loss of tax revenue from companies in bankruptcy, the costs of social assistance for victims of bankruptcy.

¹¹ In Poland, the time of enforcing contracts is at an average of 830 days, see: *Efektywność polskiego sądownictwa w świetle badań międzynarodowych i krajowych*, 2015.

¹² Act of 14 June 1960 of the Code of Administrative Procedure, Official Journal of 2013, No. 267, as amended.

¹³ Article 35 § 3 of the Code of Administrative Procedure.

ity¹⁴, cases of entrepreneurs should be dealt with without undue delay¹⁵. In many cases, it turns out that indicated deadlines for settling matters are in fact mostly of an instructional nature and a typical example of the excessive length of proceedings are some cases of notifying the intention of the concentration of entrepreneurs¹⁶. The provisions of law allow the almost infinite delay of this procedure, which often implies a very long state of uncertainty on the part of the interested entrepreneurs.

The simplest example of legal risk connected with the stage of law execution is the case widely discussed in national media of a bailiff who, within the scope of executive proceedings, took a tractor worth several hundred thousand Polish zlotys, that did not belong to a debtor, and sold it at a price several times lower than its market value. It was only after dramatic feedback in mass media that, after several months, the bailiff was suspended (www.konfederacjalewiatan.pl). However, till today there is a lack of any information on the compensation to the disadvantaged farmer for the full damages suffered. On this occasion there was also mass publicity about other glaring misbehaviours and irregularities in the operation of the execution system. It is worth mentioning that business organisations often point to numerous pathologies related to the functioning of the law execution system, i.e. the average level of efficiency of execution in Poland (approx. 25%).

4. Conclusion

Hitherto studies allow the drawing of conclusions regarding the very definitions of legal risk, as well as the scope of this concept.

With deep respect towards the hitherto scientific heritage in the domain of attempts at defining legal risk, one must unfortunately notice that it is still difficult to claim full success. As was indicated in the introduction, in the case of risk management, the application aim appears at the forefront. Risk management is first and foremost a practical skill in respect of which theory plays an auxiliary role. Therefore, defining legal risk should take into consideration mainly this perspective. Taking such a point of view one concludes that some definitions of legal risk are obviously too narrow in scope, and are often limited to indicating a limited catalogue of potential legal consequences of a given phenomenon. On the other hand, other definitions referring to an extremely broad spectrum of issues lead to the definition of legal risk as law-related risk.

Although it is difficult to deny the formal correctness of these attempts, their explanatory value from the managerial point of view is limited. The further discussed definition indicating that legal risk is the risk associated with the creation, application and execution of the law, is certainly a step in the right direction, in a sense that properly indicates the legal sources of risk (broadly comprising the scope of legal risk and simultaneously implying that sources of risk may occur at any stage of law functioning in the society and economy). However, one should notice that a given socio-economic occurrence may constitute the source of many risks that shall arise with the creation, application as well as execution of the law. Moreover, people without any formal legal background may encounter an authentic problem with distinguishing particular stages

¹⁴ Act of 2 July 2004 on the freedom of economic activity, Official Journal of 2013, No. 672, as amended.

¹⁵ Article 11 of the Act on freedom of economic activity: “Public administration authorities shall consider and decide entrepreneurs’ matters without undue delay”.

¹⁶ Act of 16 February 2007 on competition and consumer protection, Official Journal of 2015, No. 184.

of law functioning in the context of risk. Finally, the division of risks into risks related to the enlisted stages of law functioning is of typological rather than logical character (in terms of formal logic). For these reasons, most application values have approaches that emphasise the complexity of the problem.

It seems that the sources of risk may be of legal (thus the sources of risk are processes of creating, applying and executing law) and extralegal character. At the same time the legal or extralegal character of a risk source is not a deciding factor as to the legal or extralegal character of risk consequences. Such approach may be illustrated by the following examples:

- 1) A legal source of risk resulting in legal consequences: unclear legal background of market regulator decisions may result in banning certain business activities of an economic organisation.
- 2) Extralegal sources of risk resulting in legal consequences: armed conflict having an impact on an economic organisation; banning export of its products to countries within the conflict zone.
- 3) A legal source of risk resulting in extralegal consequences: the unclear legal background of market regulator decisions may result in uncertainty as to the profitability of lasting investment.
- 4) Extralegal source of risk resulting in extralegal consequences.

The first three indicated situational variants may be described as legal risk. A graphic illustration of the presented solution constitutes Table 1, in which legal risk has been marked with an "X".

Table 1. Legal risk

		Source of risk	
		Legal	Extralegal
Risk consequences	Legal	X	X
	Extralegal	X	

Source: author's own research.

It should be emphasised here that the variants outlined are of model character and, in fact, often complex phenomena occur where source of risk and/or risk itself may be of complex character, i.e. not exclusively legal. The authors believe that the concept of legal risk comprises all situations in which at least one of the factors is of legal character and/or at least one of the consequences is of legal character. This implies an immense span of legal risk.

Such a broad approach has its weaknesses, but its basic advantage from the managerial point of view is raising awareness of the immensely broad span of phenomena of legal character that must be taken into consideration in the risk management process. It is not about limiting risk management strictly to legal issues, but rather avoiding or minimising these issues building the risk management system for the sake of business organisations. The proposed approach to defining the concept of legal risk requires a complex and comprehensive consideration focused on finding appropriate risk management tools.

It is also worth noting the fact that the mere defining of legal risk does not satisfy the legal aspects of risk management. One cannot limit risk management to identification, assessment, monitoring and reporting. The key element in risk management is so-called risk manipulation, which answers the question of what to do with the risk (Buła, 2015, pp. 34-36 and 41-44). Just as the risk

may have a legal and extralegal character, similarly risk manipulation tools can be legal and extralegal. Hence the reappearance of the matrix of the following options:

- legal risk manipulated with legal tools;
- extralegal risk manipulated with legal tools;
- legal risk manipulated with extralegal tools;
- extralegal risk manipulated with extralegal tools.

The first three variants should be identified as legal aspects of risk management. A graphic illustration of the presented view is shown in Table 2, in which the necessity to use legal tools to manipulate risk is marked with an “X”.

Table 2. Manipulating risk from the point of view of tools character

		Risk	
		Legal	Extralegal
Risk manipulating tools	Legal	X	X
	Extralegal	X	

Source: author’s own research.

This means that only extralegal effects of certain occurrences, resulting from extralegal sources and manipulated with extralegal tools, do not have legal aspects. **The above imposes the re-consideration of the concept of risk management in general.**

Bibliography

1. Act of 14 June 1960 Code of Administrative Procedure, Official Journal of 2013, No. 267, as amended.
2. Act of 2 July 2004 on freedom of economic activity, Official Journal of 2013, No. 672, as amended.
3. Act of 16 February 2007 on competition and consumer protection, Official Journal of 2015, No. 184.
4. Anderson K., Black J. (2013), *Herbert Smith Freehills and London School of Economics Regulatory Reform Forum. Legal Risks and Risks for Lawyers*, Herber Smith Freehills LLP, London School of Economics, June.
5. Balereja K., Wachowicz A. (2008) [in:] *Ryzyko w rachunkowości*, (ed.) A. Karmańska, Warszawa.
6. Basel Committee on Banking Supervision (2006), *International Convergence of Capital Measurement and Capital Standards. A Revised Framework, Comprehensive Version*, Bank for International Settlements.
7. Buła P. (2015), *System zarządzania ryzykiem w przedsiębiorstwie jako element nadzoru korporacyjnego*, Kraków.
8. Directive 2006/43/EC of the European Parliament and of the Council of 17 May on statutory audits of annual accounts and consolidated accounts, amending Council Directives 78/660/EEC and 83/349/EEC and repealing Council Directive 84/253/EEC, Official Journal of the European Union of 9 June 2006, L 157/87.

9. Directive 2006/48/EC of the European Parliament and of the Council of 14 June 2006 relating to the taking up and pursuit of the business of credit institutions (recast), Official Journal of the European Union of 30.6.2006, L 177/1.
10. *Efektywność polskiego sądownictwa w świetle badań międzynarodowych i krajowych* (2015), Warszawa, www.for.org.pl [1.05.2015].
11. Grzegorzczak F. (2011), Dyrektywa 2006/43/WE w sprawie sprawozdań finansowych w kontekście funkcjonowania rynku wewnętrznego, *Europejski Przegląd Sądowy*, No. 3.
12. Grzegorzczak F. (2010), Komitet ds. audytu – uwagi o potrzebie właściwego uregulowania instytucji w prawie polskim, *Przegląd Prawa Handlowego*, No. 11.
13. Grzegorzczak F., Miś G. (2009), O możliwości zastosowania instrumentów z zakresu rachunkowości do wzmocnienia nadzoru właścicielskiego [in:] *Sprawozdawczość i rewizja finansowa wobec kryzysu gospodarczego*, (eds.) B. Micherda, M. Stępień, Kraków.
14. Hill C.W.L. (2005), *International Business: Competing in the Global Marketplace*, McGraw-Hill/Irwin.
15. McCormick R. (2006), *Legal Risk in the Financial Markets*, Oxford University Press.
16. Modzelewski W. (2010), Kilka refleksji o przyczynach obecnego kryzysu systemu podatkowego, *Biuletyn Instytutu Studiów Podatkowych*, No. 6.
17. Modzelewski W. (2013a), Tworzenie przepisów materialnego prawa podatkowego: problemy podstawowe, *Doradztwo podatkowe – Biuletyn Instytutu Studiów Podatkowych*, No. 3.
18. Modzelewski W. (2013b), Odwrotne obciążenie przyczyną patologizacji podatku od towarów i usług, *Doradztwo podatkowe – Biuletyn Instytutu Studiów Podatkowych*, No. 2.
19. Modzelewski W. (2013c), Bezprecedensowy przyrost długu publicznego skutkiem demontażu systemu podatkowego, *Doradztwo podatkowe – Biuletyn Instytutu Studiów Podatkowych*, No. 12.
20. Moorhead R., Vaughan S., *Legal Risk: Definition, Management and Ethics*, ed. UCL Centre for Ethics and Law, <http://ssm.com/abstract+2694228> [1.05.2015].
21. *Position of the Association of Polish Electricians*, http://home.agh.edu.pl/~czos/elektryka/lib/exe/fetch.php?media=sep_stanowisko.pdf [1.05.2015].
22. Projekt ustawy o zmianie ustawy o komornikach sądowych i egzekucji – opinia, www.konfederacjalewiatan.pl [1.05.2015].
23. System stanowienia prawa w Polsce. Zielona Księga (2013), www.prezydent.pl [1.05.2015].
24. Whittaker A.M. (2003), Lawyers as Risk Managers, *Butterworths Journal of International Banking and Financial Law*, January.

Chapter 43

Organization of Monitoring of Management Reporting

Olena Fomina

1. Introduction

The operation of a business in conditions of uncertainty and risk necessitates continuous improvement of management info ware of an enterprise, and therefore the approaches to the formation of management reporting system which differs from other reporting types by users, tasks, content, form, cast methodology. For every separate enterprise reporting system will have individual features, which complicate the development and approbation of effective methodology of reviewing this system.

For estimating of implemented specified requirements to such system in the dynamics the regular analysis is necessary, which should answer the following key questions (criteria): capacity of management reporting to uncover the existing problems, shortcomings and find appropriate solutions; operational efficiency, that is the reality of management of a business (subdivision); to intervene in unsatisfactory processes and correct them in time; prevision of trouble making situations, the possibility of comparative analysis with historical information and forecasting data; sufficiency of (overload of) information for a certain level of management; ease of presentation (submission) of information for the content, ease to analyze and use it.

2. Monitoring system of the management accounting

Many Ukrainian and foreign scientists study theoretical and methodological aspects of management accounting. However, the questions of methodology and organization of diagnostics in the management accounting system and monitoring of management reporting are not given enough attention. The issues of impact of diagnostics in management accounting system and monitoring of management reporting on formation of accounting and analytical system of enterprise management and enhancement of efficiency its financial and economic activity were not considered in the specialized literature.

This led to the need for scientific research and practical application of management reporting monitoring that provides a systematic approach to the production, maintenance and continuous

improvement of information system of management accounting. Within this study the author does not expect to estimate the accordance of management accounting performing to the methods that underlie its organization. This article presents only theoretical, methodological and organizational aspects of management accounting monitoring of an enterprise. The purpose of this paper is to develop proposals and recommendations to the organization of the monitoring system of management accounting in the enterprise.

3. Development of the monitoring system of management accounting

Implementation of management reporting is a process that requires constant improvement and introduction of modifications. The changes introduced in the system are determined by a number of factors: changes in market condition; changes in macroeconomic conditions; introduction of innovations; change of management strategies; opening up new business segments; changes of organizational structure of an enterprise.

Analysis of changes and their introduction is done through diagnostics of management accounting system and management reporting monitoring.

Developing approaches to diagnostics and analysis in the financial management capacity of an enterprise, N.V. Temnikova notes that economic science has no established unified opinion on the interrelationship between the concepts “analysis” and “diagnostics” (Temnikova, 2013). The range of different viewpoints on this issue can be reduced to three main approaches:

1. Diagnostics is the component of the analysis.
2. Analysis is the component of the diagnostics.
3. Diagnostics is the process of interpretation of the analysis results in order to clarify and specify the evaluations.

If the diagnosis is retrospective in nature, the monitoring of management reporting system allows conducting continuous monitoring of the system that needs its improvement. The use of information technologies in enterprises allows to design and use effectively workable system of management reporting. For estimating of implementation requirements established by the enterprise to the system of management reporting in the dynamics the regular monitoring is necessary.

E.M. Korotkov believes that monitoring is the systematic tracking of processes or trends, constant observation with the view to evaluate situations in time (Korotkov, 1997, p. 293). B.G. Litvak considers that monitoring is specially organized systematic observation of any objects by position (Litvak, 2000, p. 187). Monitoring of financial and economic activity of an enterprise can also be considered in the controlling system: as retracing processes occurring in the enterprise in real time; compiling flash reports on the company’s performance results for the shortest time periods (day, week, month); comparison of targeted results with actually achieved.

The term financial monitoring determined by the economists is specially organized systematic and continuous supervision of the financial activity and financial condition of the object and their operational evaluation. Thus, financial monitoring can be divided into two blocks: monitoring of financial activity of an enterprise (as the process) and monitoring of the financial condition (as the characteristics at a certain period of time).

Monitoring system of management reporting should correspond to the general principles of its operation such as:

- adequate information: only known information (regulatory, helpful, predictive) should be used in each system with the required accuracy for modeling of the enterprise performance results;
- continuity: each next subsystem should not break the object properties and criteria set by a higher level system; probability and comparability of information allow to provide results close to reality;
- the probability of errors that allows to track errors occurring in the process of evaluation or modeling, and within the developed model evaluate the risk of possible error and its consequences, produce basic methods of response to an error;
- complexity: interdependence and proportional mutual agreement of the development system as a whole, providing connection of all subsystems and elements; as the transition period in Ukraine's economy requires high efficiency and flexibility in responding to changes in market opportunities and emerging danger (Plikus, 2003, pp. 40-41).

The method of monitoring organization management reporting system, which is the control of the degree of compliance management reporting needs of their users. In this case, the basic requirements for such reporting system remain unchanged.

At the heart of monitoring and the evaluation of management reporting system the cycle "Plan-Do-Check-Act" (PDCA) may be used:

- planning (plan) – determination of goals and processes necessary for achieving results in accordance with the consumers' requirements and organization's policy. In connection with management reporting this cycle stage means the establishment of methods of preparation and presentation of this reporting;
- accomplishment (do) – implementation processes. In relation to the management reporting it is the process of organization and keeping of management accounting and preparation of management reporting;
- check (check) – constant monitoring of processes and products in comparison with the policy, objectives and requirements to them and informing about the results of monitoring. At this stage of the chain management reports monitoring should be carried out;
- action (act) – taking actions on constant improvement of processes indications. Referring to management reporting system it means actions on improvement the composition, structure and frequency of submission of management reports in accordance with the objectives and requirements of information users.

The purpose of monitoring management reporting is not fundamentally different from such audit related services as control services (including control services of accounting and reporting). Therefore, the monitoring procedure analogous procedures of obtaining audit evidence (audit procedures in point of fact). In general, review of management reporting system is similar to the audit by the special audit tasks. Features of the application of these procedures in monitoring management reports are presented in Table 1.

Table 1. Features of procedures to obtain audit evidence in the monitoring process of management reporting

Procedure title	Procedure description	Features of application of the procedure
Audit	Checking the records, documents and tangible assets	Checking actually used registers of management accounting and management reporting forms
Monitoring	Tracking of process and procedures performed by other persons	Tracking the preparation and presentation of management reporting
Inquiry	Information search from knowledgeable people (person who is responsible for drafting or from other employees)	Finding information for each form of management reporting within the enterprise by main criteria: <ul style="list-style-type: none"> • reliability, • usefulness
Confirmation	Answer to the request of information in the accounting records	Answer to the information request in the management reports by main criteria: <ul style="list-style-type: none"> • reliability, • usefulness
Recalculation	Accuracy check of arithmetic calculations in supporting primary documents and accounting records or performing calculations by an independent auditor	Accuracy check of arithmetic calculations in the forms of management reporting, performance of alternative calculations of management reporting indicators
Analytic procedures	Analysis and evaluation of information obtained by the auditor, the study of the major financial and economic indicators to identify unusual and (or) incorrectly reflected transactions in management accounting business, detection of the causes of these errors and distortions	Analysis and evaluation of the received management reporting to identify errors and distortions in these statements and their causes

Source: own work.

Monitoring of management reporting system can be carried out by the employees of audit department or another company's department that has the power to control its financial and economic activities, and in some cases, by consulting companies. However, due to the fact that the list of forms of management reporting and structure of records in a greater degree than financial statements depend on the characteristics of a particular enterprise, monitoring of management reporting can be conducted more effectively by the staff of the enterprise. Their independence should be ensured from the staff responsible for the management accounting and preparation of management reporting.

During the procedures of management reporting monitoring, the emphasis should be made on the degree determination of its usefulness (including truthfulness of reporting indicators) for decision making.

Thus, the monitoring of management reporting system of the enterprise is divided into two types:

1. Monitoring of the formal characteristics – control of the content, addresses and reporting deadlines for compliance with the approved system of management reporting of an enterprise. Two sets of procedures are carried out under this type of monitoring:
 - comparison of actual parameters (requisites and terms of presentation) of management reporting with the approved parameters (review of formal indication);
 - validation of arithmetic calculations.
2. Monitoring of compliance with reporting needs of users – control of reporting in compliance with management tasks. This area includes the following procedures:
 - monitoring of facilities and management tasks;
 - review of indications needed for solving management tasks;
 - the availability control of these indicators in the approved reporting forms;
 - evaluation of reporting forms to the management levels (to authority of managers-users of management reporting);
 - adequacy check of the reporting periods by management decisions terms;
 - level control of users' training records (the compliance of submitted information).

Description of monitoring procedures (methods and terms) can be executed by a plan or inspection schedule.

Monitoring work papers should contain all necessary and sufficient information for the following operations:

- draw up the report on the results of the audit;
- proof that the inspection is carried out in accordance with approved procedures;
- review of audit flow;
- inspection planning.

According to the requirements work papers must include records of planning the audit; records of the nature, time and volume of performed control procedures; conclusions made on the audit basis showing all significant issues.

According to the results of each direction in monitoring the final work papers are compiled. The report on the review results is offered to prepare after the results of monitoring formal characteristics. Monitoring of compliance reporting needs of users is also included in the report on the audits and draw up a users' report about reporting quality.

In order to improve the maneuverability of a management reporting system managers need to be able to submit a report to the user about the quality of management reporting not only during the review, but also at any time when, in their opinion, the appropriate report loses its usefulness, or can be made more useful.

The inspection report of management reporting system and report on the quality of management reports is presented to the person responsible for organizing the management accounting and in the case of significant deficiencies that require overview of reporting system – to the head of an enterprise. Changes to documents and data should be analyzed and approved by the same units, which conduct the primary analysis and approve these records. By the decision of the responsible persons, performed by organizational-administrative document, all or some recommen-

dations of these reports are taken for execution. Forms of management reports and the presenting procedure are modified by taking into account the accepted recommendations. Changes in management reporting system are approved by organizational-administrative documents of the enterprise (orders, instructions of the head of the organization).

4. Conclusion

The monitoring of management reporting helps to ensure the optimal development of the enterprise due to the following factors: distribution of powers to improve reporting not only for the compilers of these reports, but also for its users; continuous monitoring and modification; delegation of the management functions (elements of planning, monitoring, maintaining communications) to staff responsible for the preparation and presentation of management accounts; reducing the cost of enterprise management.

System of management reports as a whole should cover all control objects in the organization. Accordingly, the system of internal regulatory processes for the preparation and presentation of management reports should be harmonized with other corporate (internal) company standards. Such system will streamline and link all the functions and scope of management of the organization on the basis of standardized descriptions of business processes.

Bibliography

1. Aleshin V.D., *The Problems of Deming Cycle Using in the International Standards*, http://www.itmane.ru/files/Aleschin_Vladimir.
2. Controlling as the Instrument of Management of an Enterprise (1998) [in:] *Vocabulary of Financial Manager*, (ed.) N.G. Danilochkina, I.A. Blank, Kiev, Nika-center.
3. Korotkov E.M. (1997), *Management Concept*, Moscow, Deko.
4. Litvak B.G. (2000), *Development of Management Decision*, Moscow, Delo.
5. Plikus I.Y. (2003), Monitor System for Financial Forecast of Enterprise Activity, *Finance of Ukraine*, No. 4.
6. Temnikova N.V. (2013), Diagnostics and Analysis in Management of Financial Ability of an Enterprise, *Scientific Herald: Finances, Banks, Investments*, No. 3.
7. Zabrodskiy V.A., Kyzym N.A. (2000), *Diagnostics of Financial Stability of Productive-economic Systems Functioning*, Kharkov, Business Inform.

Regional Innovation System in the Restructuring Process of Region Management

Zbigniew Makięła, Paweł Mucha

1. Introduction

Changes in the global economy are aimed at obtaining a sustainable competitive advantage for enterprises, regions, states, and spatial organisations. This process requires modifying the concept of functioning of economic entities which adapt to new trends in the world economy that depart from the work- and material-consuming economy, mass production for the economy in which innovation is a major factor in boosting growth and competitiveness. Regions that based their development on an innovative economy have become the leading regions in a relatively short time. Being specialised in providing products with a significant share of innovation resulted in technologically advanced economies that determine the economic growth. That entails the improvement in the research and development sector, the creation of regional innovation entities (technology parks, business and innovation incubators etc.), as well as the formation of cooperation between business and science.

Currently, the key challenge for enterprises, universities, local administration of the regions is to answer the questions of where and how they should look for the source of innovation. The experience of the regions where innovation is the prevailing element of their development strategy indicates that the leading concept of regional growth should be the Regional Innovation Strategy, opting for new management mechanisms.

The objective of the present paper is to assess the Regional Innovation Systems in the restructuring process of region management based on the concept of an innovative economy. The concept is designed as a common platform for initiatives to promote new technology and solutions for the region. The initial phase in the development of the regional concept of an innovative economy is to build the RISs for leading regions, which have undertaken restructuring activities to implement theories, practices, and tools stimulating regional innovation. Another stage in the development of institutional structures for regional innovation management consists in establishing the Regional Innovative Technology Centre, the institutional form of networking between the producers of new “regional” technology and universities, administration and community of the regions.

2. Knowledge-based regions, learning regions

The concept of the learning region has revived research and aroused unrest in the realm of theory and practice in the local and regional development in Poland (Gąsior-Niemiec, 2011, p. 22). The learning region concept was the inspiration for efforts to build the knowledge-based economy and stimulate entrepreneurship and innovation as the main tool, which allowed its inclusion into the group of instruments of the state's regional policy, recommended by the European Union (Landabaso, 1997, p. 28). The evolution of the learning region concept has mainly taken the form of the Regional Innovation Systems (RISs) and inspired the flagship development-oriented projects implemented by the regional authorities across the European Union with the participation of partners representing the sectors of business, research and development, and – sometimes – the social sector (Gorzelać, Bąkowski, Kozak, Olechnicka, 2007, p. 27).

The turn of the 20th and 21st centuries marked the transition to the knowledge-based economy, in which the source of innovation and economy growth is intelligence, creativity and ability to learn. That was a change of the system, as for the first time since the transition from feudalism to capitalism, the source of added value is not manual labour, but de facto intellectual value (Florida, 2000, p. 7). In the knowledge-based market economy, learning regions play a key role as a factor of competitiveness, create network links, infrastructure necessary for the flow of knowledge and innovation, starting businesses and building cooperation between companies and institutions.

Development of Regions of Knowledge, Innovative Regions is a complex, long-term, as well as regionally diverse process. The regional dimension of this process is visible in Poland, a highly diversified country in terms of potential and opportunities for regional development. Well-developed regions are areas in which adaptation to building the knowledge-based economy can be performed relatively quickly and thus improve their competitiveness. Enhanced competitiveness of regions means building their potential and strengthening their advantage over other regions. This is reflected in the gradual reinforcement of regional enterprises, searching and developing economic activity zones, networking between science and business, as well as paying attention to the development of regional labour market. The concern about attracting external investment as a stimulus for growth and competitiveness is of particular importance for underdeveloped regions (e.g. voivodeships of eastern Poland). Investment, especially foreign investment due to the possibility of innovative capital imports, is of particular interest. Not each region is an area with favourable conditions for the development and implementation of innovations, which, as already emphasised, are necessary to build a modern economy. The best conditions for innovation occur in the regions that are already well-developed and competitive¹. Such regions are those where the authorities and entrepreneurs can properly read the needs of the national and local economy and use the knowledge for the needs of their development and modernisation.

Regions in the knowledge-based economy build its competitive advantage through the ability to “produce” new knowledge and support its diffusion into the Regional Innovation System entities. The realisation of this process is allowed by the regional infrastructure systems that ensure the flow of innovation by creating a capacity for lifelong learning.

¹ A competitive region is a region capable of adapting to changing conditions faster than other regions, whereby improves its position in the competition between regions.

The learning region relies on specialised infrastructure systems:

- production infrastructure system – based on outsourcing and network of subcontractors;
- labour market infrastructure system – based on increasing participation of knowledge sector workers capable of continuous improvement and lifelong learning;
- communication infrastructure system – allows for the flow of people, information, goods and services;
- financial market infrastructure system – allows for the flow of credit and capital to companies, stimulates innovation and production of new knowledge;
- industrial policy system – as a set of formal rules and standards and informal relationships between companies and institutional partners, based on flexibility and networking, as well as decentralisation in decision-making, which involves social and businesses partners (Florida, 2000, p. 18).

In the above context, the learning region can be defined as “a territorial unit oriented to the development of knowledge-based economy that is equipped with the systems of technical and economic infrastructure and creates networks of entities such as: production, research and science, administration, finance, and labour market, which allows for a continuous exchange of knowledge and information” (Makiela, 2013, p. 185).

3. Regional Innovation System² and the region management

The best chances for building a modern economy are in the regions where entities are technologically advanced and relationships between science and business promise to increase the competitiveness of companies. A significant role in this process is expected of the local government that manages regional centres and creates networks of enterprises, regional institutions, public and private sector institutions, public and private entities, creating a platform for cooperation according to the criteria acceptable to all stakeholders. The concept of region management requires the networking between the local government (leader of the structure) and the regional management centres (e.g. regional development agencies, information offices, financial consulting offices), innovative companies, universities, research and development institutes, banks, as well as organisations acting for entrepreneurship and innovation (including business incubators, regional technology transfer centres, technology parks, and others).

In literature, the RIS (Miedziński, 2001, p. 212) is seen as a system dominated by the function of creating innovation, where adaptation and modification (“learning”) processes prevail. The region focused on implementing innovative solutions will always be a “learning” region. The authors (Gibbons, Limoges, Nowotny, Schwartzman, Scott, Trow, 1994, p. 19) compared a “learning” region to a “learning enterprise” which implements enhancements, new solutions and improves its own organisation. In “learning” regions, knowledge is generated in the society through cooperation. This knowledge is practical and addresses the current needs. Academic units, research and development units and specialists from various fields of knowledge participate in the process of its creation. Generating knowledge in a “learning” region should be supported by the local authorities. According to Koernik (2007, p. 84), a “learning” region is subject to

² Regional Innovation System (RIS) – a set of various institutions (entities), interactions and events affecting innovation processes in a region. As a result of networking and synergies, they lead to enhanced absorption and diffusion of innovation in a region.

constant alterations, creates highly rated technological innovation, radically changes its actions and thus avoids ossification.

According to the author of the present paper, a “learning” region is a creator of intra-regional network links, involving a growing number of economic entities, universities, schools, and social organisations. The most important role in this process is attributed to regional governments and specialised institutions formed by those governments for the needs of the emerging networked economy. The objective is the rational use of local economic base of the region in order to attract investment supporting the economy development, resulting from the directions of development described in the regional development strategy.

Local governments oriented to the knowledge-based economy (KBE) are designed to support the Regional Innovation System, which allows for the realisation of network connections, thus reinforces its potential and market position. The RIS makes it possible to network structures, point to the opportunities of obtaining the benefits that result from building economic relations between participants in the network, which are based on cooperation, not on subordination of one entity over another. The RIS is a modern tool for the region management, while the emerging structure of the network links allows for overcoming the competitive, organisational and structural barriers. Implementation of the project requires much involvement of local authorities in the strategy building of an innovative region management.

4. Outline of the Regional Innovation System concept

The proposed Regional Innovation System is based on (Fig. 1):

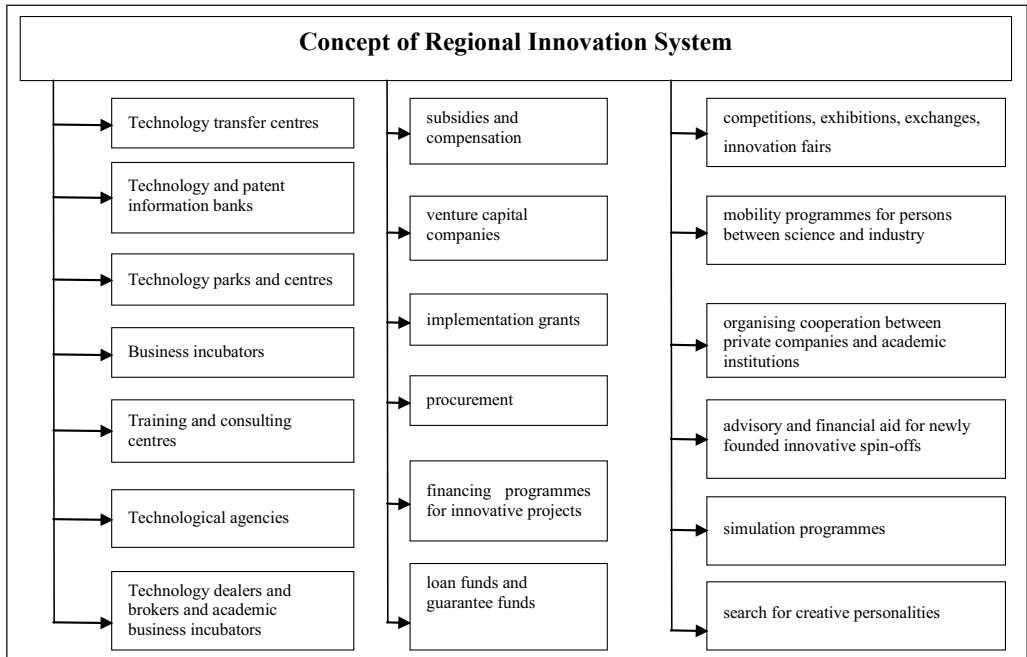
1. Development of academic, business and regional centres of innovation and entrepreneurship.
2. Development of financing instruments for centres of innovation and entrepreneurship, and risky innovative projects, building institutional forms of networking between the producers of new “regional” technology.
3. Promotion of technological entrepreneurship.

Centres of innovation and entrepreneurship include, among others, technology transfer centres, technology and patent information banks, technology parks and centres, business incubators, training and consulting centres, technological agencies, technology dealers and brokers, as well as academic business incubators.

Financing instruments include subsidies and compensation, equity risk funds (venture capital companies), implementation grants, procurement, financing programmes for innovative projects, as well as loan funds and guarantee funds in the shadow banking system.

The activities that stimulate and promote technological entrepreneurship include competitions, exhibitions, exchanges, innovation fairs, mobility programmes for persons between science and industry (especially SMEs), organising cooperation between private companies and academic institutions, advisory and financial aid for newly founded innovative spin-offs, simulation programmes and search for creative personalities.

Figure 1. Concept of Regional Innovation System



Source: own work.

The Regional Innovation Systems are formed by the local government authorities, regional development agencies, universities, innovation and entrepreneurship centres, research and development institutes, associations, consulting companies, counselling centres, financial institutions, manufacturing and service companies, and their R&D facilities. The purposes of the concept are to:

- improve the education quality of residents by matching the faculties and specialisations to the needs of the regional economy, early entrepreneurship education for the youth, vocational adaptation to a restructuring economy;
- provide the financial and organisational support for innovative projects;
- create systems of science commercialisation that inspire the realm of science to cooperate with business;
- transfer systems of relationships enterprises and technology with research centres;
- network between enterprises, administration and the third sector;
- promote teaching entrepreneurship among locals in order to motivate the community to be self-employed.

Within the structure of the Regional Innovation System, there are economic entities, institutions, public and private organisations, linked by a network of relationships and cooperation, focused on the production, promotion and dissemination of entrepreneurship and innovation.

5. Innovative knowledge-based economy

One of the main priorities of the European Union States, described in the Lisbon Strategy, is to build an innovative knowledge-based economy. The main role in implementing this task is played by different regions of the Member States where regional policy should be focused on building a modern and competitive economy. The EU cohesion policy in the years 2014-2020 gained a clear orientation on the implementation of innovative solutions, and innovations are the developmental priority of the EU.

Statistics confirms large disparities between certain Member States and EU regions in the field of innovation and R&D activities and the persistent gap in comparison with the EU major competitors on the world stage. The target for Europe is to become more innovative, more quickly respond to changing global competitiveness and, above all, more effectively shape society and economy that are innovation-friendly.

6. Region categories in relation to knowledge in the European Union

In the analysis of “The regional impact of technological change in 2020” (Wintjes, Hollanders, 2002, p. 232), commissioned by DG REGIO, all European regions were divided into seven categories, taking into account socio-economic criteria of regional economies and the principles of knowledge-based economy.

Table 1. Categories of the European Union regions

Metropolitan regions of the knowledge economy	23 most populous metropolitan areas in Western Europe. These are the regions with the highest capacity for absorption and providing an access to knowledge, but with an average ability to create knowledge. The regions have high levels of urbanisation and the highest level of economic development among all regions in the EU. Most of them are the areas around the major capitals
Regions of knowledge absorption	76 regions, mainly in France, Great Britain, Benelux and northern Spain. These are the regions with a growing capacity for absorption and an average ability to create and provide an access to knowledge. The regions have higher than average levels of economic growth and sustainable development in all branches of knowledge
Public knowledge centres	16 regions, mainly in Eastern Germany and metropolitan areas in Eastern Europe. These are the regions with an average capacity for absorption and production of knowledge, but a growing ability to access knowledge. Their level of economic performance is close to the EU average, and the economic growth is strong

Qualified industrial regions in the EU	All the 44 regions are practically in Eastern Europe. These regions are below the average capacity for absorption, creation and access to knowledge. They are regions dominated by the traditional industry until recently, but also very quickly catching up from the low-level economic performance
High-tech regions	17 regions in Germany, Finland, Sweden and the Netherlands, where new technology companies are located. These are the regions with the above average capacity for absorption, creation and providing access to knowledge. The regions have higher than average levels of economic development and rapid growth, albeit only in the areas of new technology
Regions of modern technology	38 regions in Germany, Northern Italy and Austria. These are the regions with the above average capacity for absorption, creation, providing an access, but their growth has been below the average
Traditional southern regions	39 regions in Southern Europe (Portugal, Italy, Greece, and Spain). These regions are below the average capacity for absorption, processing and access to knowledge. Their levels of economic development are below the average and many regions are based on agriculture and tourism activities

Source: own work based on “The regional impact of technological change in 2020”.

Following the EU extension of the geographical and economic space in 2004, the increased number of region categories should be considered, taking into account regions in the countries of Central and Eastern Europe, e.g. “traditional eastern regions, regions of traditional industries, traditional agricultural regions”.

Significant regional differences in the EU are an economic fact and thus they became the subject of interest to the Europe 2020 Strategy. The European Commission³ has announced the launch of seven so-called flagship initiatives, thanks to which “economically weak regions” will have a chance to accelerate their economic growth, and their economy will be able to achieve high levels of employment, productivity and social cohesion.

Table 2. Flagship initiatives of the European Commission

Digital Agenda for Europe	project to disseminate high-speed Internet and introduce the single digital market of the European Union
Innovation Union	project to improve framework conditions and access to finance for research and innovation so as to ensure that innovative ideas can be turned into new products and services, which in turn will contribute to the economic growth and new jobs
Youth on the move	project to radically improve results of education systems and facilitate the young people’s introduction into the labour market

³ Communication COM(2010) 2020 – “Europe 2020. A strategy for smart, sustainable and inclusive growth.”

Resource-efficient Europe	project to make economic growth independent from the use of resources, change for a low emission economy, increase the use of renewable energy sources, modernise transport sector and promote energy efficiency
Industrial policy for the globalisation era	project to improve the business environment, especially for SMEs, and support the development of strong and sustainable industrial base able to compete in global markets
Agenda for new skills and jobs	project to modernize labour markets and reinforce the position of citizens by lifelong development of their qualifications in order to increase labour participation and better match between supply and demand in the labour market through, for instance, labour mobility
European platform against poverty	project to ensure social and territorial cohesion, so that the benefits of growth and employment could be widely available and people experiencing poverty and social exclusion could live in dignity and take an active part in the community life

Source: Europa 2020 Strategy.

7. The role of academic centres in shaping Regions of Knowledge

Currently, the region management system addresses key determinants of development: competitiveness, entrepreneurship, innovation, financial management, investment. As pointed out by Borowiecki, these determinants are the pillars of regional policy, which is a reflection of the needs, specific objectives, preferences and hierarchy of the local society values (Borowiecki, 2010, p. 89).

From the perspective of the global economy, it may be concluded that not only is the knowledge-based economy that is of growing importance but also the regional and local economy (according to the author, this phenomenon is sometimes called the paradox of globalisation). Functioning of higher education contributing to clear and sustained social and economic modernisation is particularly important to the global development, as well as the local and regional development, in the context of the knowledge-based economy (Kociszewski, Krzemień, 2008, p. 98). Well-educated society is the capital which determines the realisation of both economic objectives and fundamental human rights and human development goals. In the modern economy, universities as the highest level of education are designed not only to educate future professionals and stimulate the flow of scientific solutions from the realm of science to business practices, but also be involved in projects aimed at improving the competitiveness of regions. Thanks to the knowledge-based economy, universities are not only an essential element in the development of the city, but also of the region in which it is located (Marszałek, 2010, p. 97).

The term “competitiveness” is variously defined in the literature. It is assumed that this term conveys the ability to succeed in the economic rivalry. In the context of regional development, competitiveness may be considered as the ability of regions to achieve lasting advantage in the on-going rivalry between the regions. According to Richter-Kaźmierska, factors affecting the competitiveness of the region generally depend mostly on the potential of the region, activity

in the sphere of planning and implementation of regional policy by the regional government authorities, national economic policy, as well as standards of the structural policy and the cohesion policy of the European Union (Richter-Kaźmierska, 2011, p. 3).

Under the conditions of the knowledge-based economy, territorial systems like states, regions, cities, municipalities stand on a par with enterprises in the competition. They compete for capital, especially for innovative capital, which carries significant multiplier effects.

In this context, Gorzelak and Jałowicki have identified two planes of “competitiveness” (Gorzelak, Jałowicki, 2000, p. 12):

1. Competitiveness of companies located in the territorial system, in the open global economy.
2. Competitiveness of the territorial systems for new capital, creating jobs and bringing income, employees with the highest qualifications, capable of generating innovation, using new advanced technology and managing large corporations.

A special role at the regional level is played by cooperation between universities, higher education schools, schools of all profiles as that contributes to an increase in human capital potential and social capital of regions. Some areas with specific conditions qualify for the “learning” regions.

These regions have developed innovative entities and creative procedures in the institutions responsible for building the Regions of Knowledge:

- presence of a reputable university or a research centre;
- location of the large number of enterprises engaged in innovation activities;
- maintaining the competitive position of the region, increasing employment levels, offering high earnings;
- mastering the ability to attract financial resources;
- creating conditions for the import of highly skilled workers;
- creating conditions for the development-oriented region by identifying career paths and social rise of the residents;
- strengthening the position of the region by building competitive advantages of universities, cities, regional companies;
- building the network between universities and the business sector, increasing entrepreneurial activity among students and academics;
- strengthening the brand of the region.

In the “learning” region, the scope of activities of universities and higher schools is very wide. The university offer is directed to all social groups (youth, adults, seniors) and socio-economic entities. The reason behind this is that the university, in addition to its educational offer, proposes the use of research results. Moreover, the concept of how universities should function has undergone a clear transformation of the mission, which is now targeted to the needs of the economy. Therefore, the concept of knowledge-based economy makes university authorities, academics and students think of projects and explore new ways of knowledge management.

The most significant tasks of a university in a “learning” region are to:

1. Conduct research activities, academic activities and teach, which aims to create innovative solutions, inventions, patents; implement tasks assigned by regional entities and implement research results.
2. Create the opportunity for the region residents to use the educational offer; design and offer courses, seminars, workshops tailored to the needs of the region residents in order to improve the quality of human capital and social capital.

3. Manage and evaluate innovative projects, important for the economy of innovative regions, their implementation at local and national level.
4. Develop examples of good practices for regional entities, develop standards of behaviour of local government authorities in relation to the residents, investors, regional entities.
5. Prepare training programmes in counselling and mentoring targeted to employees of local government administration; prepare the strategy of lifelong learning for workers and residents; develop educational and informative materials describing the offered forms of lifelong learning in the region; offer a wide range of education forms to the region residents in the cycle of Bachelor's degree studies, Master's degree studies and doctoral programmes.
6. Encourage and motivate the residents to continue education at postgraduate studies, conduct research, learn foreign languages, engage in the education forms offered by the University of the Third Age.
7. Build the strategy of intra-regional connections with the outside environment through the effective use of electronic networks and the Internet; create networks with other cities and regions in order to create a system of partnerships between municipalities, cities, universities, schools, and enterprises.

The above mentioned important projects fit into the concept of knowledge-based economy and create the opportunity for universities to develop. Academic centres, which will reform its development strategies and adjust to the process of management through innovation, as well as propose solutions to the problems troubling the economic sphere, will be able to compete with similar European universities and expand its position in the competitive market of educational services.

Summing up the previous considerations, it is worth noting that the impact of the academic centre activities on the competitiveness of the region manifests itself mainly through the realisation of the basic functions of higher education: to educate and conduct research. The mission of the university is to create (discover) new knowledge, which is passed on to interested recipients in the teaching process. In the knowledge-based economy, a special role is played by the group of people with knowledge, skills and the highest qualifications, which are unique and relevant to the objectives pursued. By equipping students with adequate qualifications, higher education increases social capital resources in the region, and thus meet the needs and expectations of socio-economic environment. Global competition prompts the restructuring of higher education and education system. The scope of activities of academic centres has also been undergoing changes. Universities do not offer teaching only, but they also conduct research projects intended for the economy or projects commissioned by enterprises, establish close cooperation with institutions, and enter into new business areas.

8. Conclusion

The presented concept of knowledge-based development of the region points to the factors of innovation and creativity as a source of its development. Entities to pursue a strategy based on knowledge are universities (higher education schools), R&D centres, innovative companies and local government administration focused on innovation, and educated local communities. These entities supported by systems of technical and economic infrastructure build network connec-

tions, allow for fast and effective communication, realise the flow of innovation, and consolidate cooperative relations.

The best chances for building a modern economy are in the regions where entities are technologically advanced and relationships between science and business promise to increase the competitiveness of companies. A significant role in this process is expected of the local government that is responsible for networking between enterprises, regional institutions, public and private sector institutions, as well as public and private entities, thus creating a platform for cooperation according to the criteria acceptable to all stakeholders. The concept of region management requires the networking between the local government (leader of the structure) and the regional management centres (e.g. regional development agencies, information offices, financial consulting offices), innovative companies, universities, research and development institutes, banks, as well as organisations acting for entrepreneurship and innovation.

The present concept does not fully explain the problems of regional development. It does not answer the question of what the causes of such differentiation of regions are in terms of the level of economic and social development, what the causes of intra-regional differences are, what the causative agent of growing asymmetry in the standard of living of the metropolitan population is, etc. The questions posed are merely an example of the issues to answer in regard to the possible driving force of progressive asymmetry in the development of regions and whether innovations are likely to stimulate stagnant and limited in its capabilities local government structures.

One of the many problems of regional development is the diversification of economic potential within regions. The weaker part of the regions loses in the competition for resources and markets to a more efficient and better organised centre (core of regional structure – the capital of the region). There is a synergy effect, where together with the rapid development of innovative industry, higher-order services concentrated in the centre, we observe a migration of well-educated personnel and capital from the periphery to the central site. It is an unfavourable phenomenon to the development of both peripheral areas and the whole region. Sustainable development requires the innovation process to focus not only in the centre, but also at the periphery.

Bibliography

1. Borowiecki R., Olesiński Z. (2010), *Kreowanie regionów wiedzy*, Kraków, Uniwersytet Ekonomiczny w Krakowie.
2. Florida R. (2000), The Learning Region, [in:] *Regional Innovation, Knowledge and Global Change*, (ed.) Z.J. Acs, New York.
3. Gąsior-Niemiec A. (2011), Nowy paradygmat polityki regionalnej w Polsce [in:] *Rozwój regionalny – polityka regionalna – studia regionalne*, (eds.) P. Jakubowska, A. Kukliński, P. Żuber, Warszawa.
4. Gibbons M., Limoges C., Nowotny H., Schwartzman S., Scott P., Trow M. (1994), *The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies*, London, SAGE Publications.
5. Gorzelak G., Jałowiecki B. (2000), Konkurencyjność regionów, *Studia Regionalne i Lokalne*, No. 1(1).
6. Gorzelak G., Bąkowski A., Kozak M., Olechnicka A. (2007), Regionalne strategie innowacji w Polsce, *Studia Regionalne i Lokalne*, No. 1(27).

7. Gorynia M., Jankowska B. (2008), *Klasy a międzynarodowa konkurencyjność i internacjonalizacja przedsiębiorstwa*, Warszawa, Difin.
8. Kociszewski J., Krzemień R. (2008), Funkcjonowanie szkolnictwa wyższego w kształtowaniu kapitału ludzkiego we Wrocławiu [in:] *Mechanizmy i uwarunkowania budowania konkurencyjności miasta*, (eds.) J. Słodczyk, E. Szafranek, Opole, Wydawnictwo UO.
9. Koernik S. (2007), Budowa Gospodarki Opartej na Wiedzy w przekroju regionów jako wyzwanie dla procesów integracji krajów UE [in:] *Innowacyjny jednolity rynek – wyzwaniem dla wymiaru gospodarczego UE*, Urząd Komitetu Integracji Europejskiej, Warszawa.
10. Landabaso M. (1997), The Promotion of Innovation in Regional Policy: Proposals for a Regional Innovation Strategy, *Entrepreneurship and Regional Development*, Vol. 9, Iss. 1, Brussels.
11. Makiela Z. (2013), *Przedsiębiorczość i innowacyjność terytorialna, Region w warunkach konkurencji*, Warszawa, Wydawnictwo C.H. Beck.
12. Miedziński M. (2006), Koordynacja procesów innowacji na przykładzie polskiego województwa. Aspekty instytucjonalne regionalnych systemów innowacji [in:] *Organizacje oparte na wiedzy, Zeszyty Naukowe Akademii Ekonomicznej*, (ed.) B. Mięka, No. 173.
13. Porter M.E. (2001), *Porter o konkurencji*, Warszawa, Polskie Wydawnictwo Ekonomiczne.
14. Richter-Kaźmierska A., *Partnerstwo na rzecz rozwoju regionalnego a konkurencyjność regionalna*, <http://mikro.univ.szczecin.pl/bp/pdf/64/19.pdf> [02.06.2011].
15. Różga Luchter R. (2004), Gospodarka oparta na wiedzy a rozwój regionalny na przykładzie regionu Środkowego Meksyku, *Studia Lokalne i Regionalne*, No. 1(15).
16. Wintejes R., Hollannders H. (2011), *Innovation Pathways and Policy Challenges at the Regional Level: Smart Specialisation, MERIT Working Papers*, Maastricht, United Nations University Maastricht Economic and Social Research Institute on Innovation and Technology.

Chapter 45

Security Management in the Food Industry in Relation to Transgenic Food

Joanna Wardega

1. Introduction

Nowadays, food trade and production are among the greatest areas of economy in the world. Their functioning is governed by relevant systems of codified laws. These legal provisions include all basic definitions, determine what is and what is not food, specify the information on the conditions and methods of food production, but most of all, they serve to guarantee consumer's health safety. Enterprises are responsible for implementation, maintenance and observance of required methods and systems which ensure the quality and safety of food products. Proper management of the mentioned field of food safety plays an important role, because the responsibility for any possible health impairments of buyers lies with the producers.

The main objective of this work is to present issues concerning food safety management considering the transgenic food. Due to the controversial and recently very popular subject of genetic modifications, this paper aims to draw attention of a consumer to transgenic food products and to describe how the issues of genetic modifications are legally regulated in the European Union. It is a very important subject because of the aspects related to health and life. Food adulteration, which accompanies contemporary globalization processes, poses a risk for buyers and causes customers often unknowingly get food of poorer nutritional and sensory value. In view of the large scale of this phenomenon, this article proposes a thesis claiming that despite of a growing extent of broadly defined food modifications, consumers relatively rarely pay attention to product composition. Thus, it indicates their low awareness and knowledge on this subject.

In order to meet the main objective, this work explains the most important terms related to the management of food safety in Poland and briefly describes the systems which entrepreneurs of food industry are obliged to implement. Focus was put here on the preliminary programs and the HACCP system. Next, the attention was paid to the genetically modified food and its social acceptance. The transgenic food and basic terms related to it have been characterized. This work also describes the process of labeling transgenic food products and the situations in which producer is obliged to inform consumers about presence of genetically modified organisms in product. Next parts of this work present consumers' behaviour on the transgenic food market. The needed

information has been gathered during own research done among the residents of the Lesser Poland Voivodeship.

2. Basic systems ensuring food safety in food industry

in the food industry all actions taken in food producing plants have to guarantee high quality of offered food products and their safety for health. Out of all elements of quality, only the safety is a subject of appropriate legal acts and is regulated by them. In other words, the safety of food products is lack of dangers and assurance of harmlessness to human health and life, in case of preparing and consuming in accordance with intended use (Skrabka-Błotnicka, Maślowski, 2010). Companies may meet the requirements related to the safety (which is an integral part of quality) thanks to proper business management and implementation of appropriate safety program. Such program contains relevant methods and tools required to be implemented by producer and every member of a food chain. This ensures invariable products in terms of health requirements. Obligatory practices include: Good Hygienic Practice, Good Manufacturing Practice and HACCP System.

Very often GMP and GHP overlap each other and are interdependent. Because of that, they refer to many food chain elements. Good Hygienic Practice are generally activities which companies must perform, and hygienic conditions which they have to meet and control on every stage of trade and production to ensure food safety. It includes procedures and actions based on legal provisions, directly related to hygiene of production and general control of plant infrastructure in terms of hygiene.

Good Manufacturing Practice is a broader category than GHP and covers all the basic requirements for the technical, technological, construction, equipment assumptions, and practices and production methods that are necessary to produce food of adequate healthy quality which is completely safe for consumers. In the food and nutrition safety act, GMP, in terms of food production, was defined as actions that must be taken and requirements which must be met to lead the production in a way that ensures safety of food products. The application of GMP should be based on existing provisions and the experience of companies.

Implementation of the HACCP system should be preceded by introduction of Good Manufacturing Practice in the company, in order to clarify all matters related to the company hygienization and observance of the basic principles of food production. HACCP is a very effective tool for controlling and improving food safety. According to the Codex Alimentarius (FAO/WHO), the system identifies, evaluates and controls threats that are significant for food safety. Therefore, it consists in effective control of Critical Points of the process, established on the basis of risk analysis (Codex Alimentarius, 2003), Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its application, Food Hygiene Basic Texts, FAO/WHO, Rzym 1997). It should be also added that these Critical Control Points (CCP) are elements (e.g. processes) that need to be under control during the entire production procedure. Otherwise, they may contribute to the occurrence of a health risk or deterioration of the product.

Implementation, maintenance and updating of the HACCP system guarantees complete food safety and therefore is beneficial for consumers and companies. The organization of work and the use of resources are improved due to the division of employees' responsibilities, which results in reduction of production costs. Finally, it also leads to the development of workers' knowledge

and improves their efficiency. Additional benefits for companies are associated with certification of implemented HACCP system, since obtaining such certificate can increase the trust of current and potential customers, becoming an effective marketing tool. It should be remembered that food safety is important both for producers and consumers, because they are assured that they buy food produced in a safe and hygienic conditions (Mayes, Mortimore, 2001).

3. The genetically modified food

The presented basic systems ensuring food safety lie within the responsibility of the producer and apply to all types of manufactured food products. Enhancing the quality of offered products and their continuous improvement are indisputably one of the important conditions for maintaining modern enterprises on the market. As mentioned earlier, in this paper the main attention has been focused on genetically modified food (GMF), because of its current and quite controversial character. To make food look attractive, have a taste desired by consumers and make it possible to be stored for a long time, the food industry had used additives – not always safe for human health. Biotechnology, basing on the methods of genetic engineering, has created new opportunities in the production of transgenic food that, according to assumptions, would have a higher quality and durability than conventional food (Bednarski, Rejs, 2003, p. 17).

Genetically Modified Food (transgenic) is the food in which a genetic interference was done, or which was produced from genetically modified ingredients. There are four groups of transgenic food on the market. Such food may be, as previously mentioned, produced with the use of GMOs. An example would be beer, wine, or bread baked with the use of transgenic yeast. In result, those are not GMO products themselves, because the genetically modified ingredient is removed from them after the production. Another group consists of genetically modified plants, most common are seeds, tomatoes and potatoes. The next group is food containing processed transgenic plants, occurring in the market as concentrates or frozen french fries. The last group includes derivatives of genetically modified plants, but they do not contain such ingredients themselves, e.g. soybean oil produced from GM soy (Szkurlat, 2011, p. 64).

4. Consumers' safety – labeling of transgenic products

Community law provisions regarding food labeling are meant to fulfill two fundamental, but equally important objectives. The first is to ensure protection of consumers' interests on the market, and second is to enable the free movement of goods. Customers expect food safe for their health and life, as well as the production of foodstuffs with respect to animal rights and the environment. There has also been a tendency to pay more attention to the quality of products. Therefore, reading labels, customers should obtain reliable and understandable information which could help them decide whether to buy a food product of X or Y producer. We owe this freedom of choice and knowledge of products' compositions to the food labeling (Christofourou, 2004, pp. 661-666).

Food labeling is, to put it simply, placing data about a food product on a package, collective package or label. The data can be words, numbers, trademarks, symbols or pictures. It concerns commercial aspects, expiry dates, the method of preparation for consumption, nutritional value, and information related to GMOs. According to the information on the Chief Sanitary Inspector-

ate's website, food listed in the European Union Register of Genetically Modified Food and Feed can exist on European Union's market, including Poland. However, it has to meet the requirement of labeling in accordance with the provisions of Regulation No. 1829/2003. This Regulation has created the system of authorization of GMO products on the Union market, based on a risk assessment by EFSA, the European Food Safety Authority. In accordance with Article 13 of the aforementioned Regulation, foods consisting of, containing, or produced from GMOs should have specified markings on labels:

1. In a situation when a product consists of more than one ingredient, remarks: "genetically modified" or "produced with genetically modified (name of ingredient)" should be on the label. An example might be a biscuit containing soy flour produced from GMO soybeans. In this case, there is information about the ingredient "genetically modified" or "produced from genetically modified soybeans" on the label (Wrześniewska-Wal, 2008, p. 167).
2. In case where the ingredient is designated by name of the category, remarks such as: "contains genetically modified (name of organism)" or "contains (name of the ingredient) produced from genetically modified (name of organism)" should appear on the list. A good example would be the oil that contains canola with GMOs. In this case, the product should be marked as follows: "contains canola oil produced from genetically modified rapeseed".
3. If a food product does not have a label, it is offered for sale to the final consumer or to mass caterers in a pre-packaged or not packaged form, the information given above for the determination of GMO food should be clearly given on the exhibition label, next to it or on the packaging. Font should be large enough to be easily legible.

If a product contains GMOs at a level not exceeding 0.9%, it is exempted from marking. However, only in the case when presence of GMO was technically unavoidable or unintentional, because otherwise marking is mandatory. To determine it, the producer must be able to provide evidence to control authorities, proving that all possible steps have been taken to avoid the presence of GMOs in food. The provisions do not cover products obtained with the use of GMOs (obtained using genetically modified material, but not containing any transgenic ingredients). Examples of such foods are eggs, meat of animals fed with GM feed, or cheese produced using genetically modified enzyme. In the European Union there are no laws that would regulate labeling of products of animal origin and raise awareness about using or not using genetically modified feed and medicinal products. In these cases, only the general principles of food labeling apply.

Two types of regulations can be distinguished when it comes to food labeling: horizontal regulations, referring to the general presentation of food products, and precise provisions (vertical), related to a particular group of food products (Patkowska, 2000, p. 26). When it comes to GMO products, the Regulation 1830/2003 is devoted to them. It introduces the traceability system, namely, tracking GMO products throughout the supply chain and production. It has been created to enable easy tracing or withdrawal of a product from market when there is an assumption that it can be dangerous for human health or life, or for the environment.

In the end, it is worth mentioning what is recently loudly discussed in the media, namely the free trade negotiations between the USA and the European Union. Although the agri-food sector is a small part of the trade, it is seen by both sides as a very sensitive issue. To a large extent this is due to differences in approach to food safety rules on both sides of the ocean. In the United States the concept of food safety is based on the reasonable certainty of lack of harmfulness. On the other hand, the Union is trying to be proactive and anticipate the risks. It requires applying the aforementioned rules of hygiene at every stage of food production. Thus, it is possible to de-

termine where food comes from, which is done to ensure the consumer's safety. Risk assessment in the US is based on the final product, and not on method of its production, as it is in the European Union. Another issue is that in the US, the institutions which allow for introduction of food products to the market, do not require labeling of genetically modified food. Fortunately for consumers, this situation is changing thanks to the campaign under the slogan „right to know”.

5. The transgenic food and consumers' awareness

There are many publications and studies on consumers regarding their attitudes and knowledge concerning genetic modifications. Most of them shows still a relatively low range of knowledge represented by average customers regarding GMOs and transgenic food, including methods of production and labeling. In order to verify the thesis of this work, there are briefly presented results of the own study conducted in 2014 in the Lesser Poland voivodeship. Due to the limited size of this work, the focus has been put on a few selected aspects.

The study involved 200 people, of which 51% were women and 49% – men over 16 years old. Upon receipt of the completed questionnaires, collected data were compiled in the program Statistica. Consumers' attitude was studied mainly in terms of:

- associations with GMOs and transgenic food;
- support of or opposition to using genetically modified organisms for production of food, pharmaceuticals and animal feed;
- buying transgenic products and existence of convincing evidence of their harmlessness;
- paying attention to information on products (reading labels);
- evaluation of one's own knowledge and a desire/lack of desire to improve it.

The vast majority of respondents have negative associations regarding genetically modified organisms (GMOs). A total of 47% of the respondents has marked this reply. 37.5% of respondents has a neutral attitude, and 15.5% – a positive attitude. The interesting situation was regarding the associations with transgenic food (GMF), which, as it turned out, is perceived as less controversial.

Interesting results were obtained from the analysis of support of using GMOs in production of food, pharmaceuticals, and animal feed. The affirmative answer for the first category (production of food) was given only by 35.5% of consumers, while 62% approves using GMOs in medicine. 37% agrees for the use of GMOs in animal feed. It demonstrates some inconsequence among the consumers, because thinking rationally, the approval or lack of it should cover all the aspects.

The relatively low consumers' awareness can be also proven by the fact that not all respondents pay attention to ingredients of the bought product, which may contain harmful additives. Regarding transgenic food, 42% respondents would not buy a food product if it had, on its label, information about the use of GMOs in its production. Only 18% (36 respondents) would be willing to buy such food. The remaining respondents, who have chosen “I don't know” answer, may need more time to think about the problem, or are waiting for further research on harmfulness or the lack of it in transgenic foods.

It is worth discussing, what could be the most convincing argument proving harmlessness of such food, and consequently would attract the consumers to buy it. To check it, a relevant question had been placed in the questionnaire. The respondents could choose: a high nutritional value, attractive appearance, unique medicinal qualities and taste, lower price, convincing ad-

vertising, opinion of a doctor, and a greater availability on the market. The last possible answer was: “nothing can convince me”. Definitely, a positive opinion of a doctor (65%) and scientifically confirmed health benefits (47.5%) have been the most popular answers. The most convincing evidence of harmlessness of modified food are trustworthy scientific researches and a doctor’s recommendation.

The main source of obtaining information by the consumers is the Internet. Most of them (60%) have claimed that their knowledge was at a low level. Therefore, they were also asked about the desire to expand their knowledge and to search for additional materials on this subject. Only 29% of the respondents declared that after completing this questionnaire they would look for information about GMOs. 55% of the consumers replied “I don’t know”.

There is no doubt that we still lack information campaigns which would allow consumers to familiarize themselves with the subject of genetic modifications and awaken in them the desire to expand their knowledge about what they consume. Because of a continuous struggle waged between supporters and opponents of modern technology, the most visible thing is just the media hype accompanying the social debate. It makes an average consumer unable to clearly perceive the reality. He or she may think that there are few truths at the same time, supported by more or less convincing evidence. Apart from the problem of shortage of knowledge, there is also the question of whether scientists are able to prove with one hundred percent certainty harmlessness or harmfulness of transgenic products and convince the public opinion. It is good to be an aware consumer and take care of our lives and food, so that they are of the highest quality.

6. Conclusion

Food has always been subject to inspection, however only methods of production, packaging, additives and description were controlled. Little attention was paid to the food itself. Today we introduce new food products to our diet within a period shorter than life of one generation. That is why consumers demand full control and food safety from producers, especially when it comes to genetically modified food. However, it is worth noting that the introduction of transgenes into bacteria and obtaining new products such as insulin or cheese, had not provoked public interest. Only introducing them to plants sparked discussions and led to far-reaching legal regulations.

To ensure food safety, producers are obliged to implement and maintain systems such as GMP, GHP and HACCP. When food products become available in shops, they must necessarily contain adequate information on their ingredients and nutritional value they cover. In the European Union, foods containing 0.9% of GMOs must be labeled. As a result, the average consumer can choose between products created in an innovative or the traditional (conventional) way. In the US, there are works in progress to change the existing food law, because at the moment, food produced from GMOs does not have labels. It is good to be aware of this, because, as mentioned previously in this work, there are ongoing negotiations about free trade between the US and the EU (TTIP).

Unfortunately, the awareness of consumers regarding the food they eat is still relatively low. This thesis is confirmed by test results included in many scientific publications and literature. Our study, conducted on the consumers of the Lesser Poland voivodeship, also reveals low public awareness. Most of respondents express disapproval on issues related to GMOs. They rarely read labels on the packagings but they also believe that this food is a threat to their health and life and do not want to make it available on the territory of Poland. It is worth mentioning that so far

there is no convincing evidence of the positive and negative effects of GM food, so researches are still needed in this field. Therefore, it is so important for producers to comply with the relevant regulations on food at both the national and international levels. It would be good to increase the quantity of all kinds of campaigns and events informing consumers about potential dangers of transgenic food, explaining its character and raising public awareness about the existing regulations which are supposed to protect their safety.

Bibliography

1. Bancarzewska R., *Umowa UE-USA może otworzyć drzwi dla amerykańskiej żywności GMO*, www.wyborcza.pl [01.05.2015].
2. Bednarski W., Reps A. (2003), *Biotechnologia żywności*, Warszawa, Wydawnictwo Naukowo-Techniczne.
3. Christofourou T. (2004), The Regulation of Genetically Modified Organisms in European Union: The Interplay of Science, Law and Politics, *Common Market Law Review*, No. 3 (Vol. 41).
4. Codex Alimentarius (2003), *Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for Its Application, Food Hygiene Basic Texts*, FAO/WHO, Rzym 1997.
5. Kolożyn-Krajewska D., Sikora T. (2010), *Zarządzanie bezpieczeństwem żywności. Teoria i praktyka*, Warszawa, C.H. Beck.
6. Mayes T., Mortimore S. (2001), *Making the Most of HACCP – Learning from Others' Experiences*, Cambridge, Woodhead Publishing Ltd.
7. Naseem A., Pray C. (2004), *Economic Impact Analysis of Genetically Modified Crops. Handbook of Plant Biotechnology*, Vol. 2, Editors-in-chief P. Christou, John Wiley & Sons.
8. Patkowska A. (2000), Znakowanie żywności [in:] *Prawo żywnościowe Unii Europejskiej*, (ed.) E. Nitecka, M. Obiedziński, Warszawa.
9. Sitarz S., Janczar-Smuga K. (2012), Współczesne zagrożenia bezpieczeństwa żywności. Możliwości ich kontroli i eliminacji [in:] *Nauki Inżynierskie i Technologie*, Wrocław, Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu.
10. Skrabka-Błotnicka T., Masłowski B. (2010), *Bezpieczeństwo żywności*, Wrocław, Wydawnictwo UE.
11. Szkarłat M. (2011), *Żywność genetycznie zmodyfikowana w stosunkach międzynarodowych*, Lublin, Wydawnictwo Uniwersytetu Marii Curie-Skłodowskiej.
12. Twardowski T. (2001), Biotechnologia żywności – znaczenie gospodarcze i społeczne [in:] *Biotechnologia żywności*, (ed.) W. Bednarski, A. Reps, Warszawa, Wydawnictwo Naukowo-Techniczne.
13. Urban R. (2005), Polish Agri-Food Industry in European Union – Competitiveness and Development Possibilities, *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu*.
14. Ustawa z dnia 25 sierpnia 2006 r. o bezpieczeństwie żywności i żywienia (Dz.U. z 2006 r. Nr 171, poz.1225) wraz z Ustawą z dnia 8 stycznia 2010r. o zmianie ustawy o bezpieczeństwie żywności i żywienia oraz niektórych innych ustaw (Dz.U. Nr 21, poz.105).
15. Wrześniewska-Wal I. (2008), *Żywność genetycznie zmodyfikowana. Aspekty prawne*, Warszawa, Wydawnictwo Uniwersytetu Warszawskiego.

Chapter 46

The Specificity of Transaction Costs in Work of Real Estate Agent

Joanna Sobula

1. Introduction

The purpose of this work is presentation the specificity of transaction costs of real estate agent. Every business, which sim is to provide services, primarily requires the involvement of the workforce, labor resources and tools. This commitment is based on the use of, work, inputs of labor, and capital assets and the cost of materials. The value of labor and objectified expressed in monetary units, which had been used for the provision of the services, defined as costs. The achievement of specified financial result in the real estate business is a key measure of profitability evaluation. Each, who operating in the real estate agency should be a viable entity that costs incurred in carrying out the activities of the cover from the sale of services provided. The most important factor determining the financial result is a level of service. The type and amount of services provided directly affects the level of total costs and revenue from the sale of a specific and, consequently, the amount of profit is realized from the sale. As a result, all decisions in the company are reflected in the amount of the financial result (Nowak, 1996, p. 37).

The real estate office in order to achieve a certain income, it must first bear the costs, i.e. to develop an action plan to hire employees, buy the materials and software, as well as organize trade activity. Only after the completion of the transaction process, the company can achieve revenue. Therefore, the activity of a real estate is associated with incurring costs that should be covered by revenues derived from the sale. The activities of the real estate agency requires cost. These actions result from the principle of economic rationality by which to get profit from their activities, the costs should be formed at an appropriate level, while the revenue from the sale or lease of the property should be higher than them. Revenues and expenses are the conditions of activity of the office, if the increase in revenue is greater than the growth in costs. The result is that real estate is constantly striving to reduce costs (Czubakowska, Gabrusewicz, Nowak, 2009, p. 103). Information regarding costs, are crucial in deciding the company. The cost of considered to be one of the most important synthetic indicators of the company. They reflect the relevance of strategic decisions, the rational allocation of available resources, and the economic use to keep all of its factors of production. The costs of a real estate company are related primarily to the al-

location of resources that make it a potential that determines to a large extent on the economic results, the effectiveness of development as well as contribute to the creation and appreciation (Zyznarska-Dworczak, 2012, p. 12).

2. The transaction costs real estate agent

Transaction costs include:

- the preparing costs.
- the main costs of the transaction.
- the costs of possible interference of an external entity.

2.1. The preparing costs

Real estate agent is a person engaged in on behalf of a client many activities. His work can not be reduced only to find a buyer for your property. This is the person handling a all the formalities associated with the transaction. Its mission is to organize the course of the sale in such a way that the parties at the time of the signing of the notarial deed did not have to participate in its preparation. This is done under the receivable (Kucińska, 2013, p. 17). Remuneration of the intermediary is mainly dependent on achieving the objective, rather than effort or expenditure (Jaworski, 2008, p. 118).

By entering an agreement with the agency, the customer undertakes to cooperate with the real estate agent, in realization the transaction process. For the completion of the transaction, the real estate agent is entitled to salary. The most important activities in the framework of mediation services, include:

- obtaining information about the property accepted for sale;
- acquiring information about those individuals and institutions looking for property;
- promotion and advertising of real estate listings posted in the media, in the press and on the website;
- direct real estate offer interested customers;
- negotiating terms of the transaction;
- preparation of the property in question is legally and financially;
- transfer of the property to a new owner.

By signing the agency agreement, real estate agent opens up the range of preparatory activities that will lead to the completion of the transaction in the notary's office. His job is not only to find a buyer or a suitable property, but also carry out the transaction in such a way that made it in the shortest possible time and without unnecessary complications (Kucińska, 2013, p. 17).

Each broker who performs the client real estate sales transaction, preparing a property for sale must reckon with costs. Regardless of whether it represents both parties, or only one actively involved in the process of preparing to sign a contract of sale in the form of a notarial deed. Depending on the wishes of the buyer's broker in the transaction cooperates with a credit counselor, lawyer and notarial office. Real estate agent which execute the transaction on behalf of one of the parties should be aware of all, even the smallest issues. Being a person of public trust, his activities should be carried out fairly and in a professional manner. It should also take care of the good image of the profession, as well as gaining the trust of customers (Kucińska, 2013, p. 17). It should also complete all the formalities associated with the transaction, as well

inform clients about the legal status of the property. Otherwise, he won't receive the rightful remuneration for his activities, what will ultimately lead to the creation of high costs (Jaworski, 2008, p. 118).

The costs of a real estate agency are classified, depending on your needs – mainly for the purpose of reporting, decision-making and control (Zyznarska-Dworczak, 2012, p. 12).

The costs associated with the preparation of the transaction, real estate mediation include:

- the costs of promotion and advertising.
- the cost of inspection and presentation of real estate.
- the costs of obtaining documents, which are necessary to complete the transaction.

2.1.1. The costs of promotion and advertising

The most important intermediation costs incurred in the course of the transaction, include the running costs incurred for promotional and advertising activities. Promotional and advertising activities undertaken are of great importance for the effectiveness of sales. The main goal is not only the interest of potential buyers, but also provide to relevant information about the property.

Currently, a large part of these activities is carried out by the Internet. The Internet is the most important form of promotion for real estate agents. Advertising on the Internet is the most important tool, the most affecting consumers. The most important form of promotion on the Internet is advertising portals. The most common of these are: gumtree, gratka, olx, otoDom, domiporta, money, oferty net, domy.pl, and many others. They allow not only the presentation of offers given office, but also their distinction and positioning network. Their range of real estate is very popular. Advertising portals are enjoying a lot of interest. They are frequently visited by many customers both offering and seeking.

Equally important form of promotion is advertising by the website. The costs associated with establishing your own website bears a large part of real estate offices. It affects in a significant way not only to better recognition among customers, but also allows for the inclusion of information on the activities of the offices and properties offered.

In order to export bids for portals, real estate agents use the most active programs to handle real estate offices. These software are fast and reliable operation of the Windows operating system. In addition, also they ensure data security. Friendly and flexible service applications are one of the most important of their advantages. Through automatic export to advertising portals streamline and accelerate the activities related to the work of many intermediaries. Programs to support real estate agents also have exchange system offers an exclusive and open, so that real estate from around the country may establish cooperative relationships with each other, the sale of the property. Through integration with multiple portals, they facilitate automatic publication sites on the Internet and attract new offers and requests of customers. An extensive system of powers and checks tools enable the effective management of multi-branch office and sales department developer. Built-in CRM features allow you to maintain relationships with customers and have a positive impact on the perception of the company as a professional. From software to support real estate agents are currently used by many real estate agencies. This programs provide comprehensive and integrated solutions for real estate agencies, supporting their work. This comprehensive software for real estate agencies and real estate agencies, are irreplaceable in the work of many intermediaries. They are friendly and easy to use, offers high data security and a large

set of advanced features. They're suitable to both small real estate office as well as in large or multi-branch chain with outlets in various parts of the city or country (Kucińska, 2013, p. 17).

2.1.2. The costs of inspection and presentation

In work of real estate agent, an important issue is to inspect the property listings. Real estate agent, which has the offer of property (for sale or rent) goes to the court to verify not only the facts, but also legal status. The verification of the facts is important from the point of view of the buyer or renter customer who expects the reliable and accurate information on the property, from the real estate agent.

2.1.3. Costs of obtaining and verifying documents which are necessary to complete the transaction

In order to execute the transaction, the real estate agent requires from the owner of the property in the necessary documents. Although, some people need support in completing the documents, large part of the real estate agencies offers assistance in completing them. Real estate agent which has written authorization from the seller, obtains a set of documents on his behalf. Obtaining documents necessary to complete the transaction binds to the costs that may be charged to both the seller and the agent acting on his behalf.

2.2. Main transaction costs

The main costs associated with the transaction, the intermediary in real estate include: checkout cost and the other costs of real estate agents associated with the transaction.

2.2.1. Checkout costs

In the case of real estate sales checkout costs include costs incurred not only by the intermediary, but also the costs incurred by the seller and the buyer.

Conclusion of the agreement in the form of a notarial deed is necessary in the case of transfer of ownership of the property. Notaries receive their salaries which are set out in the Regulation of the Minister of Justice. However, these rates can be negotiated – it can include reduce the amount of these costs. For fixed rates should also count the cost of VAT (23% of the notary). Other costs include the preparation of notarial copies of the contract of sale of real estate in the form of a notarial deed, which are sent to the tax office, courthouse Land Register or cooperatives and municipalities. If they obtain a mortgage to buy a home, they need the extra, another copy of the act, which preparing is also paid.

2.2.2. Other costs

Other costs include: others agency costs, which are incurred as a result of cooperation with: surveyors, lawyers, credit counselors. As part of the agreement on behalf of the client, the broker doing certain actions decides to cooperate, including the surveyors, lawyers, counselors credit property appraisers, etc. The aim of the real estate agent is competent and professional help to handle the transaction. The intermediary is not a specialist in any field and therefore often assisted by other professionals.

The costs incurred by the real estate agent, are also includes real estate maintenance costs. In addition to unit costs, agency costs also include the costs associated with the maintenance and proper functioning of real estate, which include mainly the cost accounting – balance sheet, such as, among others, materials and energy, the cost of depreciation, the cost of external services.

3. By whom the costs of transaction are incurred

The answer to the question concerning the determination, by whom the costs are incurred, is difficult. Everything really depends on the situation. In the case where the transaction of purchase or sale is made directly between the sides executed the transaction (seller, buyer) – there is no the mediation costs.

Real estate agent is a person who participates in the process of the transaction and helps in achieving all of its stages. In the course of the transaction, he makes inspection and real estate presentation to interested customers, shall regulate the legal status, take action advertising and promotion of the real estate offers, assistance in obtaining the necessary documents and assist with finalization of the transaction. In the case of the sale or rental of property with the help of an intermediary, thing to consider is who and which bear the costs of mediation. Taking cooperation with the agent most customers pay particular attention mainly on the amount receivable. Very often, many people do not take into account the amount of work into making the sale. One of the main cost is the salary. In practice, the height can be shaped differently. The amount of salary of real estate agent is determined as a percentage of the value of the real estate transaction price. Adopted statutory rate is 6% + VAT (from both sides of the transaction). This rate, however, may be negotiable under the agency agreement concluded with the seller and the buyer – the real estate agent can receive the salary, which is pay from the of both of the two sides, may also download paid only from one side of the transaction.

In the case of transactions, the issue is who incurs the costs of mediation. Assuming that the transaction is executed by both sides to a transaction – the seller and buyer – it can be concluded that these costs be borne solely by each party. However, these costs largely borne by the same real estate agent. Real estate agent for the performed activities is paid, which in the opinion of many customers is very high. However, the amount of salary determined by the intermediary not reflects the level of costs, which are incurred by him. Many customers, by determining the amount of salary for the mediation, expects from the real estate agent, not only attend to all the formalities, but also to cover all other costs, which are include – the cost of legal advice, surveying, credit, and a notary. Therefore, in many cases, the broker is the person liable for all the transaction (<http://www.investopedia.com>).

4. The sources of transaction costs

Every profession, also the profession of real estate agent has its good and bad sides. The main reasons, for which customers use the services of a real estate agent is a need to take a number of actions both technical, legal and marketing activities, which aim to buy or sell real estate. Currently, despite the availability of the Internet, only a small proportion of customers alone take these actions.

The main decisive factors, which affect the cooperation with the real estate agent, is to ensure the safety of future transactions and save time. On the basis of law, real estate agent is defined as a person which take actions, which are aim the acquisition or disposal of real property or other rights related to third parties. The basic sources of transaction costs in the real estate agency are: limited rationality customers, opportunism and the specifics of assets.

Limited rationality of customers

Limited rationality of customers is the main source of transaction costs. Limited rationality of customers is due to the limited cognitive abilities of humans and incomplete information. The sides of transaction are not able to detail all aspects of the agency agreement concluded.

Opportunism

Opportunism is understood as the pursuit of the objectives set by them using deception, which manifests itself as: lying, stealing, fraud, distortion and concealment of information, as well as all forms of deception. Its aim is to achieve maximum benefits for at disregard for both the ethics and consequences in the long run. Opportunism makers for making the decision to purchase real estate, is also an important source of intermediation costs. Is associated with procrastination by customers deciding to purchase a specific property. In practice, the time required to make a decision by the customer to purchase the real estate is very different. Some customers make decisions immediately, while others will have to watch their dozens of objects before they decide to choose one of them. Often, however, customers do not make a choice when deciding to forego the services of a real estate agent.

The specifics of assets

One of the main sources of the creation of agency costs is also asset specificity of the real estate. The specificity of the asset is adaptation the resources from investments in real estate. Specific assets in the course of the transaction include mainly: the amount of financial resources, which is necessary to complete the purchase, sale, lease or rental of property as well as knowledge, new technologies, additional qualifications and their skills. As a result, the company spent more and more resources for the implementation of the transaction, and it cause an increase of risk costs of transaction.

6. Conclusion

Adoption by real estate agent offer of property for sale or rent, is associated with incurring costs for which reimbursement will be granted only upon reaching the transaction. Real estate agent is not the only person who makes a connection between both sides, but also performs a number of other activities that are intended to lead to its finalization. The costs of business by that estate agency are very diverse.

The activities of many companies crucial importance of cost management, designed to not only keep them at an appropriate level, but also to minimize them. The main costs associated with their activities of many real estate agents are the costs of promotion and advertising. Promotional and advertising activities undertaken are aimed at attracting and customer interest possessed offer and encourage him to use the services of the agency. In practice, it is difficult to reduce the cost of intermediation. Real estate agent for a client performs a variety of activities that contribute to the formation of the cost. Failure to comply with certain actions in the course of the transaction, may contribute to the failure to transactions between the sides, which would entail additional costs.

Bibliography

1. Brzeziński Z. (2002), *Pośrednik na rynku nieruchomości*, Warszawa, Poltext.
2. Stachura E. (2007), *Marketing na rynku nieruchomości*, Warszawa, Polskie Wydawnictwo Ekonomiczne.
3. Brzeski W.J., Cichoń D., Jurek K., Rogatko B. (2008), *Nieruchomości w Polsce. Pośrednictwo i zarządzanie*, Kraków–Warszawa, Europejski Instytut Nieruchomości.
4. Czubakowska K., Gabrusewicz W., Nowak E. (2009), *Przychody, koszty, wynik finansowy przedsiębiorstwa*, Warszawa, Polskie Wydawnictwo Ekonomiczne.
5. Horngren C.T., Sundem G.L., Selto F.H. (1993), *Introduction to Management Accounting*, Englewood Cliffs, Prentice Hall.
6. Jaworski J. (2008), *Zawód pośrednika w obrocie nieruchomościami*, Warszawa, Wydawnictwo C.H. Beck.
7. Kucińska J. (2013), *Zawód pośrednik. Praktyczny poradnik*, Kraków, Wydawnictwo Tworzymy Obraz.
8. Naumiuk T. (2012), *Koszty w rachunkowości finansowej*, Warszawa, Infor Expert Sp. z o.o.
9. Nowak E., Piechota R., Wierzbński M. (2004), *Rachunek kosztów w zarządzaniu przedsiębiorstwem*, Warszawa, Polskie Wydawnictwo Ekonomiczne.
10. Zyznarska-Dworczak B. (2012), *Jak zarządzać kosztami w przedsiębiorstwie*, Warszawa, Difin.
11. <http://www.investopedia.com> [28.12.2014].

Chapter 47

Managing Development Based on Endogenous Potential in Rural Areas in Malopolska Region

Patrycja Brańska

1. Introduction

Implemented since 2013 in Poland the paradigm of the new regional policy aimed primarily to define competitive advantages of territories, conduct actions to strengthen cohesion on the basis of specific potentials of territories, create networking, better coordination of development activities, as well as the weakness of the institutions for territorial development (which has been underlined in the National Development Strategy 2020) reveal a need for strengthening institutional capacity at all levels of territorial administration.

Territorial authorities are responsible for providing a policy of socio-economic development. However in the case of regions possibilities of using different tools to provide efficient policy based on endogenous potential are limited. Actions aimed at activating local societies and providing development policy based on specific resources are mostly the responsibilities of local authorities, but due to the large number of their competences they are not provided efficiently. One of the elements of institutional infrastructure in the rural areas in Poland supporting process of managing of local development are the local action groups.

Local action groups have been one of the tools of the European Union's policy for many years and they function in many European countries. Their main purpose has been to support socio-economic development on rural areas by activating local community while making maximum use of the internal factors of development.

The main aim of the article is to examine the role of local action groups in the process of territorial development as well as to identify barriers for their efficient functioning. An analysis of all the local development strategies implemented by each of the 39 local action groups in Malopolska region has been done to identify main priorities and fields of intervention. Also a survey among the local action groups in Malopolska has been conducted. The main aim of the survey has been to identify role of the local groups as well as all the barriers and inconveniences of their functioning.

2. Role of the endogenous potentials in the local development

In modern views it is the endogenous development potential, the aim of which is to activate the sustainable rate of local development that is considered to be the main mobilising factor in territorial development (Pietrzyk, 2001, p. 32). The origins should be traced back to the sixties, the crisis and the consequent protest against a mass consumption model, megalomania and uneven spatial development. This process was accompanied by the discovery of the advantages of a small "scale", appreciation of small towns and businesses (Pietrzyk, 1997, p. 87). It should be emphasised that local development in this situation does not mean reducing the scale of the territory (what is still meant is territorial development in a broad sense, its concepts and agents), but it is understood as the actions taken willingly by local entities taking into account the conditions of development occurring in a given territory. "The model of endogenous development guarantees autonomy in the process of transformation of the local economic system where local entities play the main role in decision-making play... It is based on the use of local resources, the ability to control processes of accumulation, control innovation and response to external stimuli at a local level" (Courlet, 1999, p. 540). Local development is, therefore, a *bottom-up* way to generate growth dynamics based on endogenous resources. It should not be linked with the development on a microscale, but with the approach to development, attitudes and behaviours indicating readiness to take responsibility for their own fate into their own hands. According to the current approach, local development does not mean that local communities become reserved. On the contrary, what is stressed is the need to develop international contacts, in which local resources are the territorial competitive force. As Pecquer said, the benefits of proximity (i.e. related to the proximity of entities) and local relationships, can produce positive effects only if they are completely open to the outside (Pecquer, 1989, p. 51).

Greffer believes that local development involves expanding the economic and social activity within a given territory by mobilising it and using its own resources and energy. Local development is possible due to the efforts of a local population (Greffer, 1984). Therefore, aspirations and capabilities of the local population, as well as its internal cooperation are the main factors of such understood local development. According to Guigou, local development is the result of solidarity of a community creating new social relations, and indicates its willingness to the valorisation of local resources, which leads to economic development (Gigou, 1984, p. 4).

Some authors emphasise the important role of a cultural factor affecting economic successes of local communities. Scott distinguishes three aspects of the impact of culture on local development (Scott, 2000, pp. 107-110). Firstly, not only does the development of culture strengthen social ties, but it also leads to informal flow of information, which in turn allows for the spread and dissemination of *the know-how* in a region. In other words, by tight cultural relations between various entities in the region, effective communication is possible, which is based on mutual understanding. Hence, most communities can benefit from the freely flowing information, including professional one, regarding production methods, management, new markets, etc. Secondly, the concentration of economic activity in the region (agglomeration) is often the accumulation of generally accepted conventions, social rituals, particular ways of interpersonal behaviour, which facilitate effective communication between various entities and the environment through the adoption of appropriate forms of behaviour in different business situations. These behaviours contribute significantly to the reputation of individual entities, which, in today's world of intense relations, rapid flow of information, and time pressure, is a competitive power and determines

success. Thirdly, some regions are strongly identified with particular products characterised by unique features (the method of production, appearance, taste, smell) that result from the formation of a particular culture of production in a given region, and which is recognised on external markets.

Modern concepts of regional development are characterised by a strong focus on a territorial development factor. This means that development is tied to a specific geographical, social and economic space, while the level and pace depend primarily on the spatial endogenous potential. Classic theories of development omitted space as an important factor. It was thought that it was as if “given from above” and was only connected with geographical location. Changes in the organisation of production, which began in the 1970s and 1980s, led to a breakthrough in the approach to the role of space in the socio-economic development. “Space is not just a place where economic phenomena occur, but it is an important factor in their organisation and dynamics” (Courlet, 2001, p. 33). The paradigms evolving into a new approach to regional development and emerging within its framework, which are a response to the growing criticism of Keynesian intervention policy, bear the common name of *New Regionalism* in Anglo-Saxon literature. New trends in development and the consequent crisis of the up-to-then model of production organisation came from progressing globalisation processes, the increasing importance of knowledge and the application of new technologies in production and a growing need for cooperation between enterprises. “Competitiveness requires joint action and, as successful regions show, a network of cooperation on a regional scale is the best way to achieve it” (Cooke, Morgan, 1999 after Lovering, 2001, p. 349).

The new territorial paradigm refers to a particular space that integrates or contributes to the integration of economic entities, thus giving them the opportunity to take root (Jewtuchowicz, 2005, p. 64). If the territory is understood in that way, then its most important feature is the appropriate organisation stimulating the development of innovative enterprises, whose business is based on strong cooperation with other entities, such as partner companies, business institutions or research and development units¹. Therefore, the dynamics of territorial development stems not only from a specific strategies of companies, but mainly from the appropriate game played by local institutions and their ability to create resource galore. These resources are endogenous since they derive directly from the internal potential, which consists of all kinds of factors specific to the region, and so distinguish it from competitors.

3. Determinants of rural development in Poland

Rural areas in Poland, in particular the areas located peripherally in relation to major urban centres, are the least developed ones and struggle with serious structural problems such as poor development of technical and social infrastructure, the negative balance of migration, low levels of social capital. Therefore, most of these areas are characterised by weak development of entrepreneurship and innovation, and serious problems on the job market. Rural areas are most commonly associated with the dominance of the agricultural function of economy, which is true in most cases. However, for a long time, rural development has been attributed to the develop-

¹ The paradigm of development including a territory was a kind of return to the earlier concept of Marshall's industrial districts and industrial atmosphere postulated by him, which contribute greatly to the development and attracting new businesses to the area of the district.

ment of non-agricultural economic functions. One of the main objectives of national, regional and local politics towards rural areas is the growth of their multifunctionality. In other words, it is planned to initiate and develop non-agricultural functions derived from both external (e.g. position in relation to larger urban centres) and internal conditions (e.g. human capital, natural determinants, ambition and efficiency of local authorities).

Thus, the opportunities for rural development are determined by a versatile economy. It concerns both the development of individual functions alongside agriculture, generating economic growth; and, ultimately, the development of the whole territory (e.g. tourism), as well as the search for alternative sources of income by the residents of different areas of the economy, where the lack of the main function is.

On the national scale, rural areas of the Malopolska region show relative homogeneity as far the socio-economic and spatial structure is concerned. Their development was significantly influenced by historical factors. So far, the studies of various authors that have been conducted show that these areas are mostly described as “a former Galician village”. However, this does not mean that there are no differences at all across the province. The geographical conditions resulting from the same location affect them, to mention just one of them. The areas in question are, for instance, the ones located around Cracow which is under the influence of a semi-urbanisation process, the ones in the vicinity of the Silesian conurbation, or those located in mountainous areas, where a touristy function has developed.

Analyses of the level of development of rural areas of the Malopolska region show considerable internal differences (Brańka, 2015, pp. 362-370). High economic development indicators in the whole province, especially in the municipalities situated around Cracow, and relatively low (with few exceptions) indicators characterising the development of agriculture prove that non-agricultural economic functions have developed in the area. The urban-rural municipalities are characterised by slightly higher rates of economic growth than rural ones. This proves greater potential of even the smallest towns than the rural communities.

Spatial distribution of synthetic indicators of socio-economic development shows that rural municipalities, as well as most urban-rural communities situated far from large urban centres, did not develop non-agricultural functions significant for their development. Only the municipalities where tourism is an important branch of the local economy are exceptional.

Despite the obvious difficulties in identifying and initiating non-agricultural economic activities in rural areas, it is highlighted in many strategic documents produced at regional, national as well as EU level that there is the need to create an economy based on the endogenous potential of local units as a condition of their future socio-economic development.

One of the suggestions, as the part of the new regional policy paradigm set out in the National Development Strategy 2020, is placing greater emphasis on the use of the endogenous potential of a territory for its development. As to fortifying territorial integrity of the country, it is assumed to increase integrity by boosting the absorption capacity (greater flow of capital, people, knowledge, innovation), special “equalising” actions tailored to the given territorial potential, which are important for the whole country and focus on selected areas to explore and the use of their potentials, to achieve the “critical mass” necessary for further development. However, the National Development Strategy 2020, which is a document defining the strategic objectives of national development, in the mid-term plan, indicates enhancing the competitiveness of the major national metropolitan centres alongside the activities aimed at increasing the efficiency of the institutional structures associated with the growth management in rural areas. “The uneven pace of devel-

opment is a natural part of business processes both globally and nationally. The new regional policy must, therefore, direct the efforts to the strengthening of the endogenous potential of all territories, and to develop mechanisms strengthening the spread of development processes from the major centres of growth to the surroundings. In addition to these activities, development processes in problem areas will be supported, primarily by increasing their capacity of absorption growth factors (capital, skilled human resources, knowledge, innovation)” (Strategia Rozwoju Kraju 2020, 2012).

If the above considerations are taken into account, the management of development in territorial units should be based on the extensive cooperation of local entities: public, social and private ones. Nowadays, when domestic and international competition is increasing in attracting investors, institutions and new residents, local governments are not able to independently pursue development strategies in an effective manner. One of *the sine qua non* of the good management of development is multifaceted cooperation understood as integration activities undertaken by institutions at all governmental levels on the one hand, and the rank-and-file decisions on the other. This means that development should take place willingly by and with participation of a local community as such inspired by local authorities, which, moreover, should coordinate actions taken for local development.

4. Local action groups in the Malopolska as an entity identifying and utilising local development potential

In practice, in the case of numerous rural communities located peripherally, a number of tasks that has been entrusted to the local level the very moment the Local Government Act was adopted make it impossible to carry out measures to identify the internal factors of development, their promotion and, consequently, pursue a policy allowing for economic and social activation.

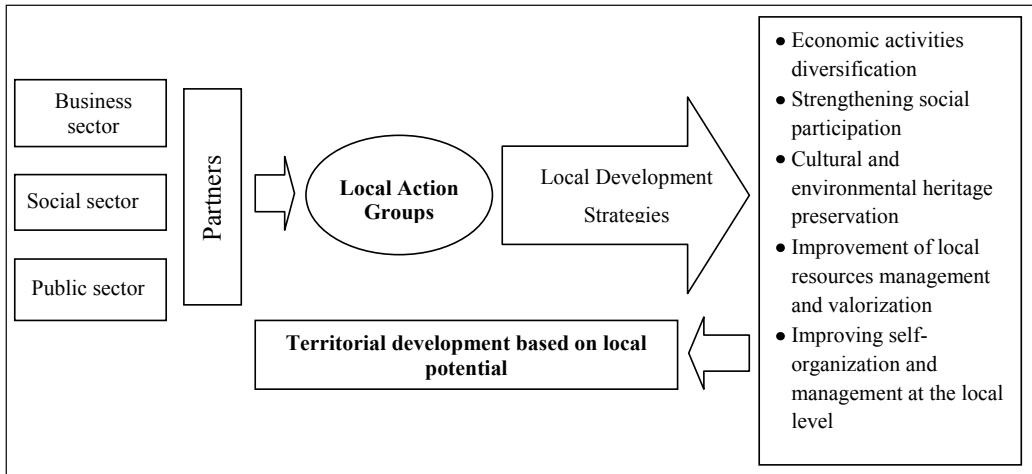
Local Action Groups (LAGs) are public-private partnerships created as a rank-and-file initiative of local entities who want to actively contribute to a local community. In Poland, an organisational and legal form uniform for all these groups is governed by the provisions of the Act dated 7th March 2007 on Support for Rural Development with the Participation of the European Agricultural Fund for Rural Development (Polish Journal of Laws, 2013, item 173), the Act on Supporting the Sustainable development of the Fishing sector with the Participation of the European Fishing Fund (Polish Journal of Laws, 2009, No. 72, item 619, as amended), and the draft Act on Local Development Led by a Community.

In the new 2014-2020 financial perspective, local development led by a community (LDLC) is a continuation and development of the Leader approach, which is to support rank-and-file initiatives in a comprehensive and integrated manner, and to provide an effective response to the needs of local communities².

As a result, local action groups are an association of public entities, public and private organisations active in rural areas, and initiating actions for development of a territory, which are based on its resources (Fig. 1).

² In the project period of 2014-2020, the European Commission puts particular emphasis on the significant strengthening of the territorial dimension of the European Union policy through, among others, the use of new instruments of development. One of them is local development led by a community (LDLC) (*LAG in the 2007-2013 financial prospect...*, p. 25).

Figure 1. Role of local action groups in the process of territorial development



Source: own work.

In the Malopolska region, 39 local action groups are active, comprising from a few to several municipalities. The area of a local action group depends primarily on the characteristics and socio-economic profile of a territory. The associations usually consist of units with similar conditions and objectives of development. One of the major strengths of the functioning of local action groups is a possibility to do larger projects with a greater impact on a territory. The above is linked to the possibility of obtaining EU funds, which are granted in accordance with the principle of concentration.

As already mentioned, local action groups operate on the basis of local development strategies, which enlist the priorities and objectives of the development of the area. Out of 39 local development strategies, the most frequently quoted themes are:

- agrotourism and rural tourism,
- protection of cultural heritage,
- culinary heritage protection,
- use of natural resources,
- ecology, and environment protection,
- support for new technologies,
- the use of renewable sources of energy,
- the development of entrepreneurship,
- improvement of rural infrastructure,
- promotion of local products.

Most local action groups in the Malopolska region focus on the development of different forms of tourism. Hence, the region of Malopolska is so touristic. The second group of associations direct their activities primarily to the development of entrepreneurship. This applies in particular to the groups located around Cracow and in the northeast which is relatively the more urbanised part of the region.

In order to identify the major determinants of the use of the endogenous potential in rural development through local action groups, surveys have been conducted, in which 21 associations took part (representing 54% of the respondents).

Local action groups focus on aims provided in their local development strategies in cooperation with other partners. Surveys have shown that usually the local action groups cooperate with other partners (e.g. marshal office, local enterprises, communal houses of culture, other local action groups, local and regional tourist organizations, advertising agencies, local training centers) in the fields of:

- local promotion,
- documenting the cultural heritage and spreading information about region,
- creating local products,
- organizing cultural and sports events,
- development and improvement of tourism services,
- promoting of culinary heritage.

In the light of the provided research one of the significant advantage of local action groups, in terms of identifying endogenous potential of territory, is initiating and supporting closer cooperation between local partners (public, economic and social) for better local governance. Surveys have also shown that the main advantages of the local action groups include:

- supporting of multifunctional rural development,
- initiating activities aimed at identification and management of local endogenous specific resources,
- involvement of local communities in initiatives for territorial development (building social attitudes),
- raising awareness about local history and culture and involving children and youth in cultural events.

The main barriers for the functioning of the local action groups, in the light of the study, include:

- insufficient legal frameworks,
- weakness of project management,
- insufficient promotion of the action provided by the local action groups.

One of the most significant barriers for the local action groups in Malopolska region indicated by 57 per cents of the surveyed entities is insufficient involvement of the local communities in implemented projects. As it has been mentioned before lack of a local network might unable providing efficient development policy. There are different reasons for such a situation but the most important may include a lack of understanding among the residents for joint actions due to a lack of knowledge and experience in this field, and also lack effective coordination from the local authorities side.

5. Conclusion

Identification and use of internal potential development of the territory require the involvement of many local actors (including residents, businesses and public institutions) in the process of development management. Their participation in territorial development policy should exist already at the programming stage of development. It manifests itself in the strategy of local development,

which should be a consensus between needs, ambitions and intentions of the inhabitants and a vision of the local authorities resulting from experience, knowledge and wide analysis of the socio-economic situation. If the development strategy is a document created by local authorities without an agreement and wider consultation with the environment the accuracy of its assumptions and possibilities of effective implementation are questionable. Local action groups are part of the social infrastructure in rural areas, whose main objectives are activating local community and use of endogenous specific local resources to stimulate development of the territory. Analysis of local development strategies and surveys conducted among local action groups in Malopolska showed their special role in creating the policy in accordance with the local development paradigm. The main areas of their activity are: tourism, rural tourism, cultural heritage, protection of the culinary heritage, natural resources, natural environment protection, support for new technologies, renewable energy, entrepreneurship, improving rural infrastructure, promoting local products.

To play the role of initiator and coordinator of local development the local action groups should meet some demands, the most important are: creating development strategies respecting local conditions, involvement all partners in the process of implementing the strategy, providing relevant mechanisms of management of the group as well as management of the project.

Bibliography

1. Brańka P. (2015), Zróżnicowanie rozwoju obszarów wiejskich w woj. małopolskim [in:] *Gospodarowanie przestrzeni miast i regionów – uwarunkowania i kierunki*, T. Kudłacz, P. Lityński, Studia Komitetu Przestrzennego Zagospodarowania Kraju PAN, TOM CLXI, Warszawa.
2. Cooke P., Morgan K. (1999), *Associational Economies*, Oxford, Oxford University Press.
3. Courlet C. (1999), Territoire et développement, *Revue d'Economie Régionale et Urbaine*, No. 3.
4. Courlet C. (2001), *Territoires et regions. Les grands oubliés du développement économique*, Paris, L'Harmattan.
5. Greffer X. (1984), *Territoires en France: Les enjeux Economiques de la decentralization*, Economica.
6. Guigou J.L. (1984), Le développement local, *Correspondance Municipale*, No. 246.
7. Jewtuchowicz A. (2005), *Terytorium i współczesne dylematy jego rozwoju*, Łódź, Wydawnictwo Uniwersytetu Łódzkiego.
8. Lovering J. (2001), The Coming Regional Crisis (And How To Avoid It), *Regional Studies*, Vol. 35.4.
9. Pecquer B. (1989), *Le developpement local*, Paris, Syros/Alternatives.
10. Pietrzyk I. (1997), Teoretyczne podstawy rozwoju lokalnego, *Prace Naukowe Akademii Ekonomicznej we Wrocławiu*, No. 768, Wrocław.
11. Pietrzyk I., (2001), *Polityka regionalna Unii Europejskiej i regiony w państwach członkowskich*, Warszawa, Wydawnictwo Naukowe PWN.
12. Scott A.J. (2000), *Regions and The World Economy. The Coming Shape of Global Production, Competition and Political Order*, Oxford, Oxford University Press.
13. Strategia Rozwoju Kraju 2020 (2012), Ministerstwo Rozwoju Regionalnego, Warszawa.
14. The Draft Act on Local Development Led by a Community (adopted by the lower chamber of Polish Parliament on 20th February 2015).

Chapter 48

Managing Expert Knowledge in Public Discourse: Official Narration about UEFA EURO 2012 Economic Impact

Jagoda Komusińska

1. Introduction

Hosting sports mega-events has become an attractive country-branding policy in the last 20 years (Chalip, 2005). The undeniable success of urban transformation that took place in Barcelona after the organisation of 1992 Olympic Games coined the term “Barcelona effect” to describe long-lasting and multifaceted local GDP increase that was due to infrastructural investment undertaken during event’s organisation and to increase in tourism that arose thanks to positive media coverage of the event (Brunet, 2005). Although no city has repeated the success of Barcelona ever since and although the architects of “Barcelona effect” admit that the event itself had only little importance to the overall makeover of the city, the dominating narration in public discourse is that sport mega-events are economically profitable to the host (Preuss, 2009). Lately, bids are presented with determination by developing economies, striving to upgrade their international image and hoping for an economic stimulus (Lepp, Gibson, 2011). In 2007 Poland, together with Ukraine, was nominated host of third largest sport event in the world, UEFA EURO in 2012. From the moment UEFA announced its decision, it was considered a political success. In underdeveloped economies meeting the standard requirements of event-managing bodies implies heavy public spending (mostly through acceleration of investments in transport infrastructure, but also building sport facilities; Humphreys, Prokopowicz, 2007). As a standard procedure, in 2009 Polish Ministry of Sports and Tourism commissioned an ex-ante expertise assessing potential economic impact of the event (*Impact Report*) to independent analytics.

The aim of the Paper is a critical analysis of how official public discourse surrounding UEFA EURO 2012 was set up by the preparation and profile of the *Impact Report*.

2. Knowledge management and information management – the case for government

When any organisation, including government, is concerned, the framework of “knowledge management” can be applied. Knowledge management within an organisation, in all various definitions, always involves using both formalised as well as tacit knowledge about the functioning of organisation in order to enhance the flow of information between all members or stakeholders of organisation. The main aim of knowledge management in organisation is to improve its overall performance because of an accessible and increased circulation of knowledge, which is treated as a crucial resource (compare, classic definitions by Nonaka, 1994 or Davenport, 1994). Knowledge, unlike pure information, is personalised and subjective. Therefore the key element is to transform it and communicate to others (Fahey, Prusak, 1998). The further aim of formally organised knowledge management scheme in an organisation is to use it in such a way so it can be fully understood and re-produced. One of key components of knowledge management is the process of “spreading” the knowledge-making all information as accessible to everyone as it is only feasible. Information is an integrating factor in the organisation. Knowledge management in organisations has been growing in importance as strategic asset ever since the beginning of information technology revolution (Nonaka, Takeuchi, 1995). The knowledge-based perspective argues that an organisation can gain competitive advantage thanks to operations of non-tangible nature that can be only performed by proper use of its integrated, accumulated internal knowledge made open (Wiig, 1997).

A special facet of knowledge management is the management of information resources. It includes three stages: identification of the source of information, establishing the value of information and classification, processing and storage. On this basis, different kinds of information are later presented to insiders and outsiders (Choo, 2002). Expert knowledge, and especially the information submitted by independent experts, is evaluated as most trustworthy and valuable for external communication.

Knowledge management is a concept widely used in internal management of an organisation. Even within organisation information can be blocked because of decisions of discretionary nature (Choo, 2002, pp. 75-76). What about relations with outside stakeholders? When the government as an organisation is concerned, its stakeholders include all citizens. As the government acts as the representative – an agent – of the citizens, the effects of management of all available internal knowledge (excluding confidential data) should be communicated to the public. However, the governments have priorities and goals which are of political nature which impedes presenting the society with all available information. Tension is created between the information resources known to the government and the load of information that the government wishes to communicate. Therefore it chooses strategies of presenting only data that is in favour of the decisions undertaken by the government. All available resources are selected and only few are highlighted and chosen to stand as a proxy for the whole accumulated knowledge. In other words, the government manages knowledge from the position of power which influences how it treats knowledge resources.

3. Public discourse analysis – role of government, role of experts

The concept knowledge used as an attribute of power invokes the discourse theory. Discourse theory is a general term for an approach in social studies that engages analysing social events in terms of social contexts and circumstances in which they happen and in which they are presented. The phenomenon of interest of any discourse study is a social event seen as a process of communication. Therefore every semiotic (meaningful) element of this communicative process can be analysed. Such elements can include specific language used, means of communication chosen (e.g. television, press, social media, personal meeting), social position of the speaker and so on (Wetherell, Taylor, Yates, 2001, pp. 2-6).

As presented by the most influential discourse analysis philosopher, M. Foucault in “The archeology of knowledge”, capacity of individuals’ knowledge resources is embedded and driven by institutionalised structures that reflect the relations of power and submissiveness which historically created roots of organisation of society. Sociologically, knowledge is associated and connected with social position and its power and it is a tool of control over an individual and over societies. Knowledge is what structures the society and ascribes everyone to a certain role. In discourse analysis, knowledge management, especially used by the two most powerful institutions – the government and the experts scientists – is traditionally a means to “discipline” and “punish” (Foucault, 1972, 1975) society. When “scholar” knowledge is aligned and subordinated to “political” purposes it is a means of oppression that blocks any potential expression of opposition. Structures of power are “deep”, which means that people are generally not conscious of them. However, these are the structures which help to discern what is “important” and what is “trivial” in the processes of knowledge management in organisations.

The discursive aspect of implementing policies and all the deliberative practices surrounding the decision-making process of setting up policies by government has been growing in importance in research that aim at evaluating policies. Discursive analysis of policy is considered to adopt a critical perspective and is usually presented as being born in opposition to empiricist approach of policy evaluation, which is based on the comparison between the assumed goals of a policy and their execution. The measurement of direct outcomes of adopted policy is not satisfying for the overall evaluation of a government whose role is not only to act effectively but also according to philosophy of democracy. From the point of view of democracy, the method chosen by a government to communicate its actions and its plans to the public can be of bigger importance than the immediate effectiveness of the execution of the policy (Fischer, 2003). This approach to policy analysis, which framework is presented in seminal and comprehensive work by F. Fisher, invokes a long-term and multifaceted perspective on the proceedings of democratically elected governments. The core aspects of this approach focus around the analysis of how policy problems are presented, narrated, what is the dialectics of policy argumentation and role left by the government to citizens’ participation. Even such aspects as the design of discursive spaces and the place of emotional expression are treated as meaningful and important. The discourse-oriented analysis in research aimed at evaluation of policies sets the role of a researcher as a facilitator of democratisation. Discourse analysis of policy facilitates increased citizens’ participation in preparing and executing policies through increasing their awareness. Therefore, the role of a researcher is to reveal to the public the broader context of the knowledge that was disclosed and retained

by the government and how this knowledge was tackled by media in the process of performing public discourse on a given topic.

Fischer, especially in “Democracy and Expertise” (2009) brings up the question of tension between the power of the discourse that lies in the hands of politicians and the power of discourse that lies in the hands of scientists/researchers. The discourse theory implies that science can be also considered a socio-political activity and can be – deliberately or not – manipulated for political purposes. The threat of politicising science in social sciences is especially possible in societies with low levels of participation and where the public discourse is autocratic, communication is performed in a top-down manner and especially where science is affiliated with politics and communicated in an authoritarian approach. The effects of twofold nature of politicised experts has been lately described by R. Post and J. Blocher. Blocher claims that in democratic countries where the government usually sets up and conducts narrations about important issues through the use of mass-media, it is usually ascribed automatically with “democratic competence” – media treat government as legitimised agent expressing society’s needs. Independent scholar-expert knowledge, when disseminated into public discourse through the media, often changes its appearance. Media, in the process of releasing information into public discourse create such an interface for scholar-expert knowledge that transmutes the claims of “expertise” into statements of opinion (Blocher, 2012). In the effect, independent, scholar experts and government are equally weighted.

4. The Impact Report – assumptions and narration analysis

The ex-ante study evaluating the possible long-term cost-benefit analysis of the organisation of UEFA EURO 2012 on Polish side was commissioned by the Ministry of Sport and Tourism to a team of experienced economists from several Polish leading universities. The chosen professionals were experts mainly in theories of growth, transition economies and general equilibrium analysis. However, there was no distinguished tourism or marketing theoretician on the team. The scope of research covered years 2008-2020 to establish both short as well as long-term effects.

In the preface of the Report it is said that “the decision of UEFA committee is met with expectation for growth in Poland”. Later on, these “expectations” are broken down into two and constitute theses of the Report that are elaborated throughout the paper. The first expectation was that the organisation of the event would increment to acceleration of economic development in Poland through development and modernisation of the existing transport infrastructure (roads, railways, public city transport) as well as through an increase in spending on football stadiums. The second expectation was connected to increasing national revenue from incoming tourism that would be obtained by the expansion of sport-and-cultural offer due solely to EURO 2012 investments and the strengthening of positive image of Poland as attractive destination globally. The goal set for the “Impact Report” research was to identify the channels of influence of EURO 2012 on the economy and their quantitative aspect (Raport Impact, 2010, p. 12).

The first aspect of the Report that could raise questions as to its objectivity is that from the very first page “sport infrastructure”, understood as large-capacity football stadiums, is treated as an “investment”. Whereas, e.g. research conducted by Humphreys and Prokopowicz (2007) pointed to low levels of participation in the already existing football stadiums in Poland and to numerous cases of economic austerities caused to local governments by over-investing in stadi-

ums in other countries. The Impact Report did enumerate some evidence of many cases of sport stadiums being financial burden but this did not affect the approach to building same-scale stadiums in Poland for EURO 2012 (Impact, 2010, p. 29).

The calculations of benefits from the event were prepared in three versions: most probable, positive and negative. It reflected the options of the event to be: moderately successful, unpredictably successful or disastrous. The benchmark for the results of each of screenplays was the situation in which “EURO 2012 did not happen”. In such a case, it was predicted that no additional funding for road and railway infrastructure would be obtained and that all infrastructural investments would be done exactly at the pace of the previous years. Emphasis was put on possibilities for obtaining additional inflows of funding and therefore, mitigating unemployment. No remark was made as to alternative possibilities. The option that Poland could have accelerated its investments through other “special” undertakings was not taken into consideration and not even mentioned, although in the years preceding the UEFA decision, many positive, unpredicted external shocks had happened (thanks to rapid absorption of funds from EU). In the same time, all undertaken investment (including all stadiums) was treated as inevitable and that would be completed by 2020 even without EURO 2012 (Impact, pp. 16, 25-28).

Similarly, no remark was issued in the matter of alternative costs of subordinating infrastructural investments to the organisation of EURO 2012. The funds dedicated to “investment” in sport stadiums could have been allocated to completely different – and possibly more profitable – goals. Especially given the fact that within the country, cities had to compete for hosting the event and a bigger portion of financing the construction of stadiums was incurred by local governments rather than by central government. These funds could have been otherwise divided between such local needs as supporting child-nurseries, or promoting tourism through cultural events. Krakow’s budget incurred probably biggest losses in this aspect, which was completely ignored by the Report. The particularity of the city is that it owns its popularity to rich culture. Krakow was finally rejected as a host city after the municipality had invested 70% of its total investment budget in stadiums for three years in a row that diminished spending on culture (Wilkońska et al., 2012, p. 8). Also, the roads and railway tracks nominated to modernisation on the occasion of organising EURO 2012 might not have been the ones that would objectively bring biggest difference to Polish economy potential – the Report did not delve into comparing various options regarding evaluating social and economic priorities altered by EURO).

Impact Report deliberately out-scaled the impact of EURO to Polish economy compared to previous research conducted by former EURO host countries like Portugal, Austria and Switzerland. The official reasoning was that the above-mentioned countries had not invested so heavily in infrastructure on those occasions, and therefore, they could not benefit from it in the long term. Whereas in parallel analyses made in Switzerland or Portugal the accrued effect of hosting the event was counted in the horizon of three years and did not exceed 0.5% of GDP in total, it was Polish initiative to leverage the effects: they were supposed to linger for 8 years after the event and increase GDP by 2.0% in this period. On the other hand-side, the estimates for the overall 2005-2016 impact of London Summer Olympic Games 2012 on British GDP indicated that the Games would induce only a 0.01% GDP increase (Impact, 2010, p. 18, 33, 228).

The aspect of the Impact Report that raises most doubts is especially the feasibility of obtaining positive results in incoming tourism for 8 consecutive years following the EURO 2012. Especially that, given the limitations of tourism expansion in Europe due to the economic crisis started in 2008, according to the prognosis of Impact Report, the full effect of improving Polish

image abroad could only be consumed after 2015. Between 2012 and 2015 the originally higher results were supposed to be mitigated by the generally adverse economic situation. The source of enhanced tourism was supposed to be the increase in Polish national brand. The problem of assuming that positive image change will be sustainable is the credibility of whether actually a one-time event could have any repercussions so far into the future. The Report claimed that the effect expected from EURO 2012 to tourism would be the second “Barcelona effect”, not mentioning that the sustained positive and sport-associated image of the Catalan capital is connected to constant improvements in infrastructure (including building up the waterfront) and being home of one of most renowned football teams in the world, not only to the one-time feast (Brunet, 2005). Moreover, what could have been attained for the brand of the city does not easily translate into branding country.

Finally, the calculation of the impact of hosting EURO 2012 on Polish tourism image abroad was based on the assumption that in the year of the organisation of EURO the tourism attractiveness index of Poland in the annual Anholt GfK Roper National Brand Index would rise year-to-year by 0.8 points. This level was assumed so that Poland could surpass its highest-ranking local central-european rival, Hungary. The only reason why this should be feasible was that Hungary did not host any important sport event this year. No other factors or external shocks to tourism attractiveness were considered. The forecasted 0.8 points surge in index was completely ascribed to the organisation of the football championship, excluding a possibility of other factors influencing the final result of Polish attractiveness index. It was later computed that in previous years an increase of 0.1 point in country’s tourism attractiveness year-to-year resulted in average 16% growth in number of incoming tourists. An successful event enhances the image of a country in the eyes of (1) football fans coming to the country for the games, (2) football fans watching TV transmissions and (3) through word of mouth (Impact, 2010, p. 100). However, the Report went further than only noting this possible year-to-year change and assumed that a one-time surge of 0.8 points would be sustained at the average level of 16% for the whole period of 2012-2020 rather than assume that it would gradually fade-out over the coming years (Impact, 2010, pp. 105-108; 136). Altogether, the one-time organisation of football championship was supposed to attract to Poland over 3.5 mln additional incoming visitors.

5. Conclusion

The integrity of facts presented in report as exhaustive and objective can be questioned in view of many expert ex-post reports on the economic effectiveness of organisation of mega sport events and prognosis for Poland known and published in academic circles before 2007. The set of information provided by Impact Report can be read in the perspective of deliberate management of knowledge for use in public debate for political purposes. The fact of preparation and announcement of Impact Report as *independent* and *objective* represents a top-down approach to structuring public discourse. Expert knowledge, especially in the field of economics, can be manipulated and used as a powerful tool for political purposes of acquiring the domination in the public discourse and shaping attitudes.

The aim of this Paper was by no means to criticise the whole project of Impact Report, which in the large part was methodologically impeccable in its computable general equilibrium approach that included factors such as changes in unemployment rate, inflation, currency rate, and

nuances such as different types of guests coming for the event. The sole aim of the Paper was to show that even if some facts, well known to the experts in scholar circles, are mentioned in a text written by experts, but commissioned for political purposes, the importance attached to them can vary basing on the requirements of the commissioner of the text. The knowledge, fully managed and originally “owned” by the experts can be manipulated through its distribution in public discourse and in this way create what is later repeated as the “public knowledge”.

Bibliography

1. Blocher J. (2012), Public Discourse, Expert Knowledge and the Press, *87 Washington Law Review*.
2. Borowski J., Boratyński J., Czerniak A., Plich M., Rapacki A. (eds.) (2012), *Raport Impact*, Warsaw, Polish Ministry of Sport and Tourism.
3. Brunet F. (2005), *The Economic Impact of the Barcelona Olympic Games, 1986-2004: Barcelona: The Legacy of the Games, 1992-2002*, Centre d’Estudis Olímpics, http://olympic-studies.uab.es/pdf/wp084_eng.pdf.
4. Chalip L. (2005), Marketing, Media and Place Promotion [in:] *Sport Tourism Destinations: Issues, Opportunities and Analysis*, (ed.) J. Higham, Oxford, Elsevier.
5. Choo Ch.W. (2002), *Information Management for the Intelligent Organization: The Art of Scanning the Environment*, Medford, American Society for Information Science and Technology.
6. Davenport T.H. (1994), Saving IT’s Soul: Human Centered Information Management, *Harvard Business Review*, March-April, Vol. 72(2).
7. Fahey L., Prusak L. (1998), The Eleven Deadliest Sins of Knowledge Management, *California Management Review*, Vol. 40 (3).
8. Fisher F. (2003), *Reframing Public Policy: Discursive Politics and Deliberative Practices*, Oxford University Press.
9. Fischer F. (2009), *Democracy and Expertise: Reorienting Policy Inquiry*, Oxford University Press.
10. Foucault M. (1972), *The Archaeology of Knowledge*, New York, Routledge.
11. Foucault M. (1975), *Discipline and Punish: The Birth of the Prison*, New York, Random House.
12. Humphreys B., Prokopowicz S. (2007), Assessing the Impact of Sports Mega-events in Transition Economies: EURO 2012 in Poland and Ukraine, *International Journal of Sport Management and Marketing*, Vol. 2(5-6).
13. Lepp A., Gibson H. (2011), Reimaging a Nation: South Africa and the 2010 FIFA World Cup, *Journal of Sport & Tourism*, Vol. 16(3).
14. Preuss H. (2009). Opportunity Costs and Efficiency of Investments in Mega Sport Events, *Journal of Policy Research in Tourism, Leisure and Events*, 1(2).
15. Nonaka I. (1994), A Dynamic Theory of Organisational Knowledge Creation, *Organization Science*, Vol. 5(1).
16. Nonaka I., Takeuchi H. (1995), *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*, New York, Oxford University Press.

17. Wetherell M., Taylor S., Yates S.J. (2001), *Discourse Theory and Practice: A Reader*, London, SAGE.
18. Wiig K.M. (1997), Knowledge Management: Where Did it Come From and Where Will It Go?, *Expert Systems with Applications*, Vol. 13(1).
19. Wilkońska A., Rotter-Jarzębska K., Jarzębski M. (2012), KR. 2012. *Przygotowania i realizacja EURO 2012 w Krakowie*, Kraków, Krakow City Hall.

Chapter 49

Assessment of the Results of the Program: My Sports Field Orlik 2012 in Malopolska Province – Some Selected Issues

Jadwiga Berbeka, Krzysztof Borodako, Michał Rudnicki

1. Introduction

In 2012 ended a five-year program “My sports field Orlik 2012”, whose main task was to provide the public, in particular children and young people, with a modern sports infrastructure, which would result in doing sport, physical development and popularization of active lifestyle. It seems important – from a cognitive: the economic and social point of view to examine to what extent these assumptions have been achieved.

The aim of the article was to evaluate the selected effects of program “My sports field Orlik 2012” in the Malopolska province¹. The following partial objectives were formulated:

1. Evaluation of the financial aspects of the operation of sports fields.
2. Analysis of functionality of sports grounds “Orlik”.
3. Evaluation of the impact of sports complexes “Orlik” on the integration of the local community. Secondary data were used – obtained from the State Treasury and individual local councils and primary sources, collected as a result of in-depth interviews and direct surveys, in municipalities where Orliks were created.

The results have enabled a positive evaluation of both recreational and social consequences of the program “My sports field Orlik 2012”. The results have application value, are a prerequisite for decision-making of city councils, counties and municipalities. Applications may be used in planning further actions, for example “Activity organiser program – My sports field Orlik 2012”.

¹ The article is a result of the project: Badania Statutowe Katedry Turystyki 071/WZ-KT/01/2013/S/3071.

2. The importance of physical activity

Physical activity, very broadly defined in the literature (Drabik, 2006, p. 122; Mynarski et al., 2012, p. 11; Kulmatycki, 2003, p. 172) is a necessary condition for health and well-being of man (Blair et al., 2001; Kuński, 2003; Corbin et al., 2007; Haskell et al., 2007; Eberhardt, 2008), which in turn, determines the quality of life of an individual, and the macro scale – society. Moreover, it has an impact on socialization of individuals, enables the exchange of information and views fulfilling the role of a formative medium shaping valuable human attitude, constitutes an important factor in integrating human groups as well as a means of social therapy and rehabilitation (Toczek-Werner, 2005). Conducting physical activity promotes certain infrastructure, which can include sports and recreation facilities. Hence their possession in the area and efficiency of use is important both in economic and social aspects.

3. Methodology

Within the framework of the study program “My sports field Orlik 2012” the research objectives were formulated. In formulating them the team took into account, *inter alia*, their categories in terms of practical and cognitive approach. Practical aims included the use of standardized research tool which is a questionnaire (three different versions for different respondents) and an attempt to determine the impact of the operation of Orlik facilities on local communities. The second group of the objectives referred to the cognitive aspects:

- knowledge of factors affecting the attractiveness of facilities,
- determining the forms of use of facilities,
- defining the social significance of facilities.

The main objective of the study was to determine the role and importance of the program in Orlik 2012 in Malopolska Province by means of analysis of sites in operation in the region.

In the research process there was also formulated a major research hypothesis as follows: Implementation of the Program “My sports field Orlik 2012” in Malopolska Province influenced in a positive way local communities. Within this hypothesis two specific hypotheses were identified:

1. The program has a positive enhancement from the financial point of view.
2. The functioning of the program in Malopolska Province can be assessed positively in social terms.

Verification of the hypotheses adopted in the project have enabled empirical studies carried out using a questionnaire survey

In the process of implementation of research the scholars encountered some difficulties with having a definite impact on both the course of this process, as well as the results obtained. The main obstacle was very poor cooperation with the representatives of public administration while gathering data using questionnaires forms. The second was the situation with regard to the activities of the sport facilities and activity organisers. Surprising seemed situations where it was not possible to contact these people, which in some cases could suggest concerns about their competence and experience of sports.

Characterizing the test sample one should in the first place mention that the general sample in Malopolska Province, Orlik facilities, were created within the framework of the investment

program “My Sports Field – Orlik 2012”. It was a total 195 sports fields situated in different municipalities throughout the province. For each of these facilities were assigned three groups of people: users of the facilities, activity organisers working in these facilities and officials responsible for them in offices of municipality. Selection of respondents in these groups varied and depended primarily on the desire to participate in the study by the respondent.

A group comprising users of facilities came from selection through a purposive selection of facilities. By using this method of selection, the following prerequisites were established. First, it sought to ensure geographical diversification of the community in which these facilities operate. Secondly, facilities qualified to study in different metropolitan areas (cities: large, medium and small, and villages). The third aspect was a varied position with respect to infrastructure in the field – facilities in or around schools or freestanding facilities. Activity organisers and employees of municipal offices (the second and third group) were enrolled in the study with all facilities. All of them received by e-mail survey questionnaires. The study began in September 2013 and was completed the next month. The study used questionnaire method (for data collection), and at a later stage of the research process also used correlation analysis and significance test Chi-square. The final result of these studies is presented solely, depending on which level of the test probability p , based on Chi-square statistics, the level was lower than 0.05.

Implementation of empirical studies was based on data acquisition using the form survey. For statistical analysis was used a total of 913 surveys of users of Orlik and 114 questionnaires from the authorities of these facilities (municipal offices), as well as 72 surveys of activity organisers working in these facilities.

4. Evaluation of the financial aspects of facilities

An important focus of research was due to the community character of a created sports infrastructure which is the subject of “My sports field Orlik 2012”, it is to assess the financial aspects of operation of these facilities.

The first element to be assessed from the point of view of public spending is the cost of construction of a sports complex. The estimates assumed in the program foresaw that these costs should not exceed approx. 1 million Polish zlotys net, and each party participating financially (Marshal Offices, Ministry of Sport and Tourism and the municipalities) should be equally involved. The study showed that the highest percentage (nearly 40%) were municipalities in which the proportion of grants from the Ministry of Sport and Tourism ranged from 30% to 40% of the total construction costs. This result suggests that in 4 out of 10 municipalities Orlik construction costs were in line with estimates of the Ministry and grant accounted for approx. 1/3 of the actual costs incurred. It is surprising that for the next nearly 40% of the surveyed municipalities, the share of the above, grants accounted for nearly a half, or even more than 50% of the cost. This situation can attest to the excellent management skills of local authorities of surveyed municipalities, by means of negotiation of favorable agreements with contractors of Orliks (sports complexes construction costs less than expected estimates of the Ministry), and diligence in spending public money. On the other hand, lower than anticipated construction costs can indicate that savings made in the construction of Orliks, which may be reflected in shortages of equipment, faults, converting materials and execution of the project defaulting cases where misconduct of this type have been diagnosed through the monitoring of the Supreme Chamber

of Control (NIK report, 2011) at selected sites in Poland. Respondents were also asked about other co-financing the construction of Orliks: nearly 9 out of 10 responses pointed out (beyond the obvious participation of municipalities) Marshal Office of the Malopolska Province. It follows that none of the surveyed municipalities used the ability to explore other sources of funding such as Regional Operational Programmes and Rural Development Fund.

An important aspect is also to maintain the constructed sports complex and the most efficient use of the potential of the facilities. Analysis of the results showed that an average amount spent by local authorities on the ongoing operation of Orlik was 37,721 Polish zlotys per year. This was achieved with a median value at 24,000 Polish zlotys, which means that for half of the surveyed municipalities the average monthly operating costs of Orlik do not exceed 2,000 Polish zlotys. At the same time the municipality has also been noted that annually spent between 50 to 80 thousand Polish zlotys (less than one in five tested community) as well as those that spend over 80 thousand Polish zlotys. These resources, as revealed by the study, are allocated mainly for maintenance services (75% of respondents indicated this as the primary goal) and their share is on average approximately 40% in the structure of expenses related with football, thus making it the most “capital intensive” category. The second objective indicated by the representatives of the municipalities was the organization of events on the facility. Despite the popularity of this category (which proves the need for their implementation and awareness of the authorities of the social effects of such events) the amount spent on their organizing are much smaller – account for less than 20% of total expenditure.

The huge disparity in spending earmarked for the ongoing operation of Orliks and discrepancies in the allocation of these resources in the long term may affect the differences to maintain an adequate physical infrastructure standard and the quality of the actions taken reflected in the perception of usefulness of these facilities by local communities. There is a serious risk that 1/3 of the newly built sports complexes in Malopolska province was influenced by the nationwide “fashion” and further actions of local authorities will lead to their degradation, without providing adequate financial support. These findings confirm the results in terms of strategic policy of Orliks municipalities – nearly 95% of municipalities did not have a sponsor, worse, half of activity organisers working on these facilities and undertaking care of them opted for the lack of need for its ownership. Lack of vision as to further development and exploitation of the potential of sports complexes resulting confirm further results – representatives of municipalities asked about the objectives, tasks, etc. contained in the strategic documents and the associated maintenance and development field in the future of Orlik pointed out (more than half of the respondents!) no such records in existing documents. Only fewer than a fifth of the representatives of the municipality indicated the existence of such records, and another 27% only planned their introduction.

5. Analysis of functionality of sports facilities “Orlik”

The evaluation of functionality of the program “My sports field Orlik 2012” was carried out based on the following criteria: overall availability of the facility, the quality of the facility (aesthetics, cleanliness, order), offered a variety of physical activities, the amount of sports equipment, sports equipment quality and harnessing of a potential Orlik. The survey was carried out deliberately in two ways – to assess the functionality of sports facilities according to the above

criteria asked both the benefiting from these fields, as well as activity organisers conducting classes and taking care of the facilities. The adopted strategy allowed the research of the opinions of both the demand side (the participants and using sports infrastructure) as well as the supply side (activity organisers recreation services and sport activities for the above facilities).

Top assessed by “using” the criterion was the quality of the Orlik facility (its aesthetics, cleanliness, order). Nearly 8 out of 10 respondents awarded good and very good grades. In second place there was the general availability of the field (70% of responses good and very good), the third use of the potential of a field (by 1% point less than the previous criterion). The following places recorded variety of offers of exercise classes (slightly more than 60% above average ratings) and quality sports equipment (a similar percentage indicated good grades and very good ones as before). The worst evaluated criterion of 3.53 grade point average was the number of sports equipment. Ranking criteria for assessing the animation is slightly different from assessments using what is mainly determined by relativism to look at the data aspects of functionality. Activity organisers rated highest availability of the object (95% of responses good and very good). Further criteria involving ratings of good and very good exceeding the level of 85% were: the breadth of the course (nearly 90%), use of the potential field (over 85%) and quality of the object (the percentage of 85%). Other criteria were evaluated in a manner similar to using: 6 out of 10 respondents rated the quality of sports equipment for a good or very good, and the worst part was evaluated again the amount of equipment, which clearly indicates some deficiencies in terms of equipment of sports complexes.

It is worth emphasizing that all the criteria distinguished themselves by a median with a value of 4, which is a very good result, considering the 5-point scale. This means that within each criterion half of the respondents always exhibited, the best – very good score.

6. Social significance of facilities

Recreation and sports services, by which it is meant to be useful in terms of economic and social immaterial product produced by human labour in the production process, through effects on man (his state of health, psychological, physical, emotional state) again aimed at activating the potential to meet human needs (Marciszewska, 1999, p. 70) play an important role in the use of leisure time units, but also its social inclusion.

To objectify measuring the social importance of the program using both the facility, activity organisers, as well as officials responsible for the field were tested.

According to the data obtained from officials on almost all of the facilities (95.4%) the municipality organizes various events, among others: Tournament for the Orlik Cup of Donald, Tennis Olympic Games, Coca Cola Cup game for the Cup of Mayor, Europreschooler, farewell holiday, Children’s Day with sports, family feasts, the League of Orliks and many others. Assessment of the role of Orliks in integrating the local community by officials was overwhelmingly positive, more than 95% of respondents admitted with conviction that the objects are of great importance in this regard.

Similarly positively the social role of activity organisers was perceived, 93% of them said they organized the event in the building accumulating not only participants, taking an active part in recreational activities, but also others. At nearly 90% of the tested facilities appeared parents with children, which is quite obvious. Socially very important is the fact that more than half

of Orliks were visited by grandparents of playing children. This is a great proof of a three-generation integration. Activity organisers from nearly half of the objects also admitted that people, spend time in this way in the fields. At approximately 7% of Orliks also single people and people with disabilities come.

Activity organisers were asked the question whether there is a local community with initiatives of some activities or events at Orlik? Almost half of activity organisers acknowledged that local communities sometimes exhibit such initiatives, however, nearly a quarter determined that this happens very rarely, and every seventh respondent assessed that did not happen at all. Only 12% of activity organisers estimated that local communities often occur with initiatives of activities or events at Orlik.

The culmination of the discussed social issues in activity organisers research was the direct question about Orlik's assessment as a factor of social integration. Surveyed activity organisers were unequivocally for yes. More than 80% expressed the belief that Orlik is a factor in integration, and every tenth respondent thought that it rather is. Only 5% were unable to express their views in this regard. It should be noted that there were no negative responses.

Very interesting is to identify the relationship between views on the role of Orliks in integrating the environment and the characteristics of activity organisers. Statistically significant ($p < 0.05$) relationship occurred with the size of the place of residence of an activity organizer. Comparing the results obtained in this area it can be regarded that a resident animator points to the location of Orlik. Under this assumption, it should be understood that the role of integration facilities is especially high in villages and small towns. Overall, there was inversely proportional relationship between Orliks' significance in relation to the size of the place of residence of animator, if in fact 93% of activity organisers living in the village expressed an opinion about the important role of integration of a field, 77% lived in a small town, it is merely a quarter of large cities.

The question of the integrative role of Orliks was also addressed at people who use them. The answers showed that 2/3 of the function of this group discerned sports facilities in connecting the local community. In addition, nearly 1/3 of the respondents were fully satisfied. Only 3% felt that definitely does not have such an effect, and 8% thought that unlikely. Almost a quarter had no opinion on the subject.

Very interesting is the study of the relationship between opinion on the sports field Orlik as a factor of integration and socio-demographic characteristics of users. Statistically significant correlations case marked the age of the respondents. The results show that with age increased conviction about the significant role of Orliks in building ties among the local community. More than half of older people (over 60 years) strongly expressed such an opinion, and more than 1/3 of people aged 21-60 and middle school students. They pointed to the link between the material and the assessment integrating role of Orliks. The higher one's status, the more people overlooked the positive impact of objects.

Another issue considered was snapping at Orliks people who do not take an active part in recreational activities. Over one third of respondents felt that such a phenomenon is taking place. Only 8% claimed that this is not the most savvy and had no opinion about the matter.

The study also sought to identify which non-exercising individuals personally, show up at Orliks. Users of the facilities mentioned, thus people spending time (almost a quarter) and parents who train children (more than 1/5). In addition, every eleventh pointed grandparents of amused children, and every twelfth – families.

Efforts were made to determine what demographic characteristics influence the perception of Orliks as well as the assembly of people, on non-exercisers, clearly marked by the influence of age on the perception of the situation. Elderly (over 60 years) to a much greater extent overlooked the integrative role of sports fields Orlik: almost 70% confirmed presence of non-exercisers and the accompanying on the premises. This can probably be attributed to their more mature perception of reality.

To assess the situation, the respondent's place of residence also had an impact. The integration value for the non-training perceived more strongly inhabitants of small (more than half) and medium-sized cities (over 1/3).

It pointed to the relationship between family situation and the perception of attracting non-exercisers to Orliks. More than half of respondents, who are family people with disabilities, noticed that Orliks attract such people. It can be assumed that the answers are through the prism of the experience of the family and the fact of coming, for example, their family members to Orliks. Besides, being sensitive to perceived disability issues such people focus on facilities. It should be noted that the fact of attracting people with disabilities, even if they do not exercise on facilities, is another proof of the social function performed by fields.

The results obtained allow to assess that Orlik facilities play an important role in integration of a local community. Stronger such a belief was expressed by officials and activity organisers of recreation, users of facilities, which can be warped by the sense of their own position and value of the function.

7. Conclusion

Physical activity has a significant impact on maintaining good health and well-being. One of the elements conducive to engaging in physical activity is appropriate sport and recreation infrastructure. One of the examples are multifunctional fields completed within the framework of the program "My sports field Orlik 2012". A survey carried out on three groups of respondents provided important and interesting results relating to the evaluation of the program.

Carried out on the basis of the collected material analysis showed that construction of sports fields Orlik in Malopolska was financed according to the assumption of the program (co-funding). Surprising was the fact that none of the municipalities participating in the study took advantage of the ability to explore other sources of funding within the framework of European funds. The managerial implication is that financial management of sports fields Orlik should be amended.

The aesthetics, cleanliness and order on the sports field were assessed high, followed by availability of the sports ground.

Except for the important recreational role, sport fields Orlik are of high social significance. They are meeting points of local communities, gathering also those that do not do sports. Sports fields Orlik are a factor of social inclusion. The smaller the city and less educated local community the more important the social role of Orlik.

It can be mentioned that there were some obstacles for the research: poor cooperation with municipalities' officials in the process of data gathering, problems with contacting activity organisers.

Summing up, studies have provided interesting information on the program Orlik, that should be taken into account by policy-makers at the municipal level responsible for these programs, as well as public institutions and NGOs type associated with popularizing sports and recreation areas of the surveyed municipalities.

Bibliography

1. Blair S.S., Dunn A.L., Marcus B.H. (2001), *Active Living Every Day*, Champaign, Human Kinetics Publishers.
2. Corbin C.B., Corbin E.R., Welk K.A. (2007), *Fitness i Wellness. Kondycja, sprawność, zdrowie*, Poznań, Zysk i spółka.
3. Drabik J. (2006), Ruch i wysiłek fizyczny, *Antropomotoryka*, No. 34.
4. Eberhardt H. (2008), *Fizjologiczne podstawy rekreacji ruchowej z elementami fizjologii ogólnej człowieka*, Warszawa, Almamater.
5. Haskell W.L., Lee I., Pate R.R. (2007), Physical Activity and Public Health: Updated Recommendation for Adults from the American College of Sports Medicine and the American Heart Association, *Medicine & Science in Sport & Exercise*, (39)8.
6. Kulmatycki L. (2003), *Promocja zdrowia w kulturze fizycznej*, Wrocław, AWF.
7. Kuński H. (2003), *Trening zdrowotny osób dorosłych, Przewodnik lekarza i trenera*, Warszawa, MedSportPress.
8. Marciszewska B. (1999), *Konsumpcja usług rekreacyjno-sportowych*, Gdańsk, Akademia Wychowania Fizycznego w Gdańsku.
9. Mynarski W., Rozpara M., Królikowska B. (2012), *Jakościowe i ilościowe aspekty aktywności fizycznej*, Opole, Politechnika Opolska.
10. Najwyższa Izba Kontroli (2011), *Informacja o wynikach kontroli realizacji przez jednostki samorządu terytorialnego rządowego programu "Moje Boisko – Orlik 2012"*, Lublin, <https://www.nik.gov.pl/aktualnosci/nik-o-orlikach.html> [28.04.2015].
11. Toczek-Werner S. (2005), *Podstawy rekreacji i turystyki*, Wrocław, AWF.

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