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THE SERVICE SECTOR IN THE ECONOMY IN POLAND AND EUROPEAN UNION COUNTRIES

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K e y w o r d s: service sector, market services, non-market services, employment, value added.

A b s t r a c t

The role of the service sector in the economy is increasing in the process of socio-economic development. This tendency has been confirmed and explained by the three-sector theory formulated by A.G.B. Fisher, C. Clark, and J. Fourastie.

The main goal of the paper is to show development tendencies in service sectors in Poland and the EU countries and assess them in view of the three-sector theory. The share of the service sector in the total employment and in the total gross value added in the years 2005–2013/2014 will be analysed together with two sub-sectors including market and non-market services.

The research shows that the share of the service sector in total employment and total gross value added has been recently increasing in Poland as well as in other EU countries, but there is a gap in this process between Poland and the most developed EU countries. Moreover, in Poland, the role of market services has been recently increasing much faster than the role of non-market services.

SEKTOR USŁUGOWY W POLSCE I KRAJACH UNII EUROPEJSKIEJ

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S ł o w a k l u c z o w e: sektor usługowy, usługi rynkowe, usługi nierynkowe, zatrudnienie, wartość dodana.

A b s t r a k t

Celem opracowania jest ocena poziomu rozwoju sektora usługowego w Polsce oraz przedstawienie zmian w jego wewnętrznej strukturze na tle innych krajów Unii Europejskiej w latach 2005–2013/2014. Podstawą oceny znaczenia sektora usługowego w gospodarce jest zbadanie jego udziału w ogólnej liczbie pracujących i tworzeniu wartości dodanej brutto.

Przeprowadzone analizy pozwalają pozytywnie ocenić wzrost znaczenia sektora usługowego w polskiej gospodarce. Świadczy o tym rosnący jego udział w wytwarzaniu wartości dodanej brutto i wzrost odsetka pracujących w tym sektorze, a także w ogólnej liczbie podmiotów gospodarczych. Nadal jednak dość znaczny jest dystans rozwojowy w obszarze sektora usługowego między gospodarką polską a krajów wysoko rozwiniętych.

Introduction

The process of socio-economic development involves specific changes in the structure of all rapidly changing economies. The three-sector theory, developed by A. Fisher, C. Clark, and J. Fourastie, provides a theoretical basis for the analysis of these changes. The authors have divided economic activities into agricultural, industrial and service sectors. This concept and its subsequent modifications demonstrate the growing importance of the service sector in the process of structural changes in the economy.

This article aims to evaluate the level of development of the service sector in Poland and to identify the changes in its internal structure viewed against other EU countries in the years 2005–2013/2014. The study examines the sector's share in the overall employment and in the total gross value added.

The article has the following structure: Section 2 discusses the key determinants of the development of the service sector in the context of the three-sector theory. Section 3 examines and evaluates the changes in the three-sector structure of employment in Poland in the years 2005–2014 and in other EU countries in 2014. Section 4 provides an analysis of the service sector's contribution to gross value added and Section 5 presents the structure of employment within the service sector. The paper ends with conclusions.

The development of the service sector and its determinants in the context of the three-sector theory

The three-sector theory accentuates the importance of the service sector in the process of socio-economic development. Its authors, ALLAN FISHER (1945), COLIN CLARK (1957), and JEAN FOURASTIE (1954) analysed growth patterns and factors for the three identified sectors of the economy, i.e. agriculture, industry, and services. This concept has become a basis for investigation of the economic structure and its structural changes. The structural changes in the developing economy result from the different intensity of growth of particular sectors, which consequently changes their share in total labour resources and in the creation of GDP.

According to the three-sector theory, in the course of economic development the share of the agricultural sector in overall employment tends to decrease, then the share of the industrial sector tends to increase, it becomes stable and then declines, and the share of the service sector in overall employment steadily increases (FISHER 1945, p. 8, CLARK 1957, p. 492, FOURASTIE 1954, p. 126–137). These tendencies change the three-sector structure of employment and the main focus of an economy's activity shifts with the development process from the agriculture sector through industry to services (KWIATKOWSKI 1980, p. 59 et seq.). According to the authors of the three-sector theory, the above trends are determined, *inter alia*, by the changes in the structure of consumer demand and the effects of technological progress. The changes in the structure of demand result from the hierarchy in which the needs are met, from differences in income elasticity of demand and market saturation. The income elasticity of demand for agricultural products is low, because demand for these basic products falls as needs are being satisfied in the course of economic development. The demand for industrial goods initially increases and the income elasticity of demand for these goods is high. However, along with economic development the relative importance of this demand for meeting needs decreases, and the market for these goods even shows signs of being saturated. In contrast, the demand for services is increasing along with the development process, without any signs of being satisfied (see FOURASTIE 1954, p. 86). The changes in the structure of demand affect the structure of employment. Due to a decreasing share of goods and an increasing share of services in the overall demand the countries at a higher level of socio-economic development are characterized by a higher share of employment in the service sector than the less developed countries.

Technological progress is the second factor determining the direction of structural changes in the economy (from agriculture through industry to services). This factor is particularly emphasised in the three-sector theory by J. FOURASTIE (1954, pp. 47–48), who argues that technological progress increases the productivity of labour and at the same time decreases demand for labour. Technological progress is diversified in particular sectors of the economy. Its rate is moderate in agriculture, high in industry, and low in the service sector and hence the process of labour displacement is much weaker there than in the other two sectors. According to Fourastie, this is another major reason, next to the increase in demand, for the increase in employment in the service sector.

The main arguments of the authors of the three-sector theory about the direction of structural changes and the essential role of demand as a determinant of the structure of production and employment contain rational elements. Many studies, particularly in the highly developed countries, confirm the occurrence of a servicisation processes, meaning the increased role of services

in the economy, manifested by the service sector's increasing share in employment and gross value added, as well as in the implementation of service functions in the agricultural and manufacturing sectors (SZUKALSKI 2004, p. 48). However, the opinion about the low rate of technological progress in the service sector raised numerous criticisms. The opinion is difficult to accept, especially as today many services use electronics and computer science, e.g., banking, communications, telecommunications, transport, insurance, education, science, and healthcare (KWIATKOWSKA 2007, p. 29–31). This is an argument for the need to improve and modify the concept of three-sector economy, which is characterized by excessive aggregation and to shift disaggregated research of the service sector, analysing its various sections and departments.

The service sector consists of many different service activities, both traditional (trade, transport) and those using the latest technologies, leisure services, and health and environmental protection services (*Serwicyzacja polskiej gospodarki*... 2013). By delivering modern knowledge-based services the sector provides the basis for the development of an information society. Thanks to the development of knowledge services, including services based on high technologies, the productivity of the entire service sector increases and the economy is more competitive in the global market (BAUMOL 1985, pp. 301–317). The growth of employment in the service sector is driven by the internationalisation of services. Global markets arise in the field of services, e.g., tourism services, IT services, transportation, financial, logistic and communications services (SKÓRSKA 2012, p. 55–58). Preferences for the development of the service sector arise from its ability to create jobs which require very different skills, the highest e.g., in finance, education, and healthcare, and the lowest for simple jobs, such as delivering newspapers or cleaning. The development of services increases employment opportunities for women and young people. Employment opportunities exist especially in services where interpersonal contacts are important, such as social welfare, healthcare, and education, hotels and restaurants, tourism, and public administration.

It can be concluded that the dynamic development of the service sector is a prerequisite for the development of the modern economy. It should be emphasized that services play an important role in the development of human capital and enhance the welfare of society (SASAKI 2007, pp. 438–459).

Evaluation of the three-sector employment structure in Poland and other countries of the European Union

To assess and verify the changes in the three-sector structure of the Polish economy Table 1 presents the share of agriculture, industry, and services in overall employment in the years 2005–2014. As mentioned before, the changes in the structure of employment, i.e., the growing share of the service sector in overall employment, should be seen as an important indicator of the level of economic development and maturity of the market system.

Table 1
The structure of employment by economic sector in Poland between 2005 and 2014 (Q4), in %

Year	Agricultural sector*	Industrial sector**	Service sector***
2005	17.3	29.0	53.7
2006	15.3	30.1	54.5
2007	14.0	31.2	54.8
2008	13.4	32.0	54.6
2009	12.9	30.8	56.3
2010	12.9	30.5	56.6
2011	12.5	30.9	56.6
2012	12.2	30.6	57.2
2013	11.9	30.7	57.4
2014	11.5	30.8	57.7

* The agricultural sector includes agriculture, hunting, forestry, and fishing;
** The industrial sector includes manufacturing and construction;
*** The service sector includes other economic activities.
Source: *Kwartalna informacja o rynku pracy* (2007, p. 4), *Kwartalna informacja o aktywności ekonomicznej ludności* (2011, p. 4, 2012, p. 6, 2013, pp. 4, 5), *Aktywność ekonomiczna ludności Polski* (2014, p. 28).

Comparing the sectoral structure of employment in the years 2005–2014, it is clear that in the period under study the share of employment in agriculture declined (by 5.8 percentage points – pp), the share of employment in the industrial sector slightly increased (by 1.8 pp), while the service sector steadily increased its share in the stock of employment (by 4.0 pp). The changes in the structure of employment are particularly evident if we compare them to the early transition years in the Polish economy. In 1993, the share of employment in agricultural was still 25.9%, 31.1% in the industrial sector, and 43% in the service sector (*Aktywność ekonomiczna ludności Polski* 2002, p. 98). The data confirm, therefore, that in accordance with the three-sector theory, today, the

service sector has become the most important source of jobs and demand for labour.

The data in Table 2 illustrate the changes in the number of employed in the service sector in Poland.

Table 2
Changes in the number of employed in the service sector in Poland, in the years 2005–2014 (Q4)

Year	Employment (thousands)	Growth rates	
		previous year =100	2005=100
2005	7.727	–	100.0
2006	8.126	105.2	105.2
2007	8.502	104.6	110.0
2008	8.739	102.8	113.1
2009	8.943	102.3	115.7
2010	8.798	98.4	113.9
2011	8.835	100.4	114.3
2012	8.940	101.2	115.7
2013	9.023	100.9	116.8
2014	9.205	102.0	119.1

Source: As for Table 1, author's own calculations.

Compared to 2005, the number of people working in services increased in 2014 by 1,478 thousand people, i.e., by 19.1%. Given the year-on-year growth rates it can be seen that with the exception of 2010, despite the economic slowdown in the years 2009–2011, the number of people working in services slowly started to increase after 2011. In 2012, employment in the service sector came close to the 2009 level. The service sector is therefore quite resistant to cyclical fluctuations (SZCZUKOCKA 2013, pp. 35–37). In order to evaluate the three-sector employment structure in Poland, it seems necessary to compare it with the structures in other countries of the European Union 28. The data on this subject are presented in Table 3.

By analysing the data in Table 3, it can be observed that in 2014 the structure of the three-sector employment in Poland differed quite significantly from the structure characteristic of the EU28, EA19, and highly developed countries. The proportion of workers in the agricultural sector in Poland was 2.5 times higher than the EU28 average and 3.6 times higher than in the EA19. Only in Romania, the share of employed in this sector exceeded by 14.2 pp the proportion of people employed in the agricultural sector in the Polish economy. Despite the downward trend in the share of the agricultural sector in Poland in the total number of employed, the gap between Poland and particular Member

Table 3

Employment by economic activity, 2014, in %

Country	Agriculture	Industry incl. construction	Services		Total market and non-market services
			market	mainly non-market	
EU28	4.4	24.5	40.2	30.9	71.1
EA19 (Euro area)	3.1	24.0	41.0	31.9	72.9
Belgium	1.1	21.5	40.3	37.1	77.4
Bulgaria	6.9	30.3	40.3	22.5	62.8
Croatia	8.7	27.3	38.9	25.1	64.0
Czech Republic	2.7	38.3	35.1	23.8	58.9
Denmark	2.3	19.4	39.4	38.9	78.3
Germany	1.3	28.3	39.4	30.9	70.3
Estonia	3.9	30.5	39.5	26.0	65.5
Ireland	4.7	18.5	45.3	31.4	76.7
Greece	13.0	15.1	43.0	28.2	71.8
Spain	4.2	19.5	45.8	30.5	76.3
France	2.8	20.7	39.2	37.3	76.5
Italy	3.5	27.1	40.9	28.6	69.5
Cyprus	3.9	16.5	47.8	31.8	79.6
Latvia	7.3	24.1	42.4	26.2	68.6
Lithuania	9.0	24.8	39.8	26.0	65.8
Luxembourg	1.3	11.1	44.8	42.8	87.6
Hungary	4.6	30.6	36.7	28.0	64.7
Malta	1.2	21.6	45.5	31.6	77.1
Netherlands	2.1	16.4	45.9	35.6	81.5
Austria	4.3	26.1	41.5	28.2	69.7
Poland	**11.2**	**30.8**	**34.5**	**23.4**	**58.0**
Portugal	5.5	24.9	38.7	30.8	69.5
Romania	25.4	30.1	28.8	15.7	44.5
Slovenia	7.7	31.7	35.6	25.0	60.6
Slovakia	3.5	35.5	34.5	26.4	60.9
Finland	3.9	22.1	39.4	34.6	74.0
Sweden	1.7	18.9	41.2	38.3	79.5
United Kingdom	1.1	19.1	44.1	35.7	79.8

Source: Eurostat, Labour Force Survey, http: //ec.europa.eu/Eurostat, 25//08/2015.

States is still large, e.g., in relation to the UK and Belgium it is 10.1 pp, Germany, Malta, the Netherlands, Denmark, and Luxembourg it is 8.9–10 pp. The differences regarding the share of the industrial sector in employment are

much smaller. In Poland, the share was higher by more than 6 pp than on the average in the EU-28 and EA-19. Higher shares, ranging from 30 to 38%, occurred in countries which have recently become members of the EU, e.g., the Czech Republic, Hungary, Slovakia, Slovenia, Estonia, and Bulgaria. In other Member States the share of the industrial sector in employment did not exceed 29% of total employment.

In Poland, the share of services in total employment is small. In relation to the average rates for EU-28 and EA-19, in 2014, the difference was respectively 13.1 pp and 14.9 pp. In Romania, the share of service employment was smaller than in Poland (44.5%). In 12 EU Member States (the UK, Sweden, Denmark, Belgium, Ireland, France, Spain, Cyprus, Malta, Finland, Greece and Germany), the share of service employment was above 70% (70.3–79.6%). In two countries, Luxembourg and the Netherlands, the share of this sector even reached a level of above 80%. It can therefore be concluded that despite the increase in employment in services, the gap between the development of the service sector in Poland and in the highly developed Member States is still significant. The share of services in employment in Poland is also lower than in the countries which have recently become members of the EU, with the exception of Romania.

The data in Table 3 show the share of market services and non-market services in employment. Market services include: wholesale and retail trade, transportation, accommodation and food service activities, communication, financial and insurance activities, real estate activities, professional, scientific, and technical activities, administrative and support service activities. Non-market services include: public administration, education, health, arts, entertainment and recreation, other services activities, activities of households as employers, activities of extraterritorial organisations.

In all Member States the share of market services in employment is higher than the share of non-market services. Poland is also among these countries, with the 34.5% share of market services in employment, higher by 11.1 pp than the share of non-market services. The average EU-28 share of market services (40.2%), is higher by 9.3 pp than the share of non-market services. In many countries the proportion of people employed in the services market exceeds 40%. In some countries the share of market and non-market services is very similar, e.g., in Belgium, Denmark, France, and Luxembourg, the difference is 1–2 pp. The major share of people working in market services confirms the market nature of economies of EU Member States.

In many countries, there are economic structures which confirm a relatively high stage of economic development, namely the post-industrial development stage (BELL 1973, pp. 343–345), which is characterized by the dominance of the service sector, whereby the production of goods gives way to the

production of services. To reduce Poland's development gap in relation to the medium and highly developed member countries, it is necessary to maintain the growing pace of economic growth, support the creation and development of new jobs in services, and efficiently use EU funds and continuously improve the quality of human capital.

This will direct migration workers from the agricultural sector into the service sector, the development of which is also needed in rural areas due to the need to minimize the hidden unemployment. Also, the industrial sector is increasingly connected with service activities, which is a prerequisite for the development of the service sector, e.g., the growing significance of services in the field of education, training, law, finance, management consulting, research, marketing, and information technology.

Importance of the three sectors of the economy in the creation of gross value added in Poland and other EU-28 countries

To assess the significance of the service sector in the economy it is necessary to determine its role in the creation of gross value added viewed against the background of agricultural and industrial sectors. The data for the Polish economy are presented in Table 4.

Table 4

Gross value added by economic sector in Poland, in the years 2005–2013, in %

Year	Sector		
	agriculture	industry	services
2005	4.5	30.7	64.8
2006	4.3	31.1	64.6
2007	4.3	31.8	63.8
2008	3.7	31.5	64.7
2009	3.6	31.8	64.6
2010	3.8	32.0	64.2
2011	3.6	33.4	63.0
2012	3.2	32.8	64.0
2013	3.1	33.2	63.7

Source: Author's own calculation based on the Statistical Yearbook of the Republic of Poland, years: 2011 (pp. 682–683) and 2014 (pp. 706–707).

Analysis of data on the gross value added in the three-sector system in the years 2005–2013 confirms the decreasing importance of the agricultural sector in favour of other sectors of the economy. This is reflected by the declining

share of the agricultural sector in the production of gross value added from 4.5% in 2005 to 3.1% in 2013, and by the declining (but still relatively high) percentage of those working in the sector.

The industrial sector accounted for ca. 31–33% of gross value added. It may be recalled that in the first year of the transformation of the Polish economy (1990), this sector accounted for half (53.1%) of the gross domestic product. Thus, in comparison to the initial years of transition, the share of the industrial sector decreased quite significantly. To assess the significance of the industrial sector in the economy, it is necessary to determine the nature of changes in its internal structure from the point of view of the degree of development of modern manufacturing sectors which have a positive impact on the modernization of the economic structure, competitiveness and development of the knowledge economy in Poland (ECHEVARRIA 1997, pp. 431–452).

In the period under study, the service sector dominated. In the years 2005–2013 it accounted for ca. 64–65% of gross value added. In 2011 and 2013, compared to 2005 the share slightly declined by 1.8–1.1 pp. The share of the service sector in value added was twice higher than the share of the industrial sector. It can therefore be concluded that the increase in the proportion of employment in services and its relatively high share in value added confirm the dominant role of the service sector in Poland's economic structure.

The dominance of the service sector is also reflected by a relatively high share of economic entities in this sector. In the years 2005–2011 these entities accounted for 76–77% of all entities registered in the REGON register (see SZCZUKOCKA 2013, p. 79). The share of entities in the industrial sector in the period under study ranged between 21 and 22% and entities in the agricultural sector accounted for only ca. 2.5%. The distribution of entities among the three sectors confirms the important role of the service sector in the creation of jobs in the Polish economy.

A more comprehensive evaluation of changes in the three sectors of the Polish economy can be made by analysing how much the sectors contribute to gross value added in other EU-28 countries. The data for 2013 are shown in Table 5.

In all EU Member States the service sector accounts for the largest part of gross value added. In the year under study, in four countries; Luxembourg, Malta, Greece and Cyprus, the service sector accounted for more than 80% of gross value added. The lowest part of gross value added is generated by services in Romania (51.2%) and Czech Republic (60.8%) and therefore the industrial sectors account for a relatively large share of gross value added (over 40%). The share of the service sector in value added in Poland (over 63%) was similar to that of Slovakia (62%) and slightly higher than in the Czech Republic (2.6 pp). In other Member States, these indicators ranged from 65%

Table 5

The share of the three sectors of the economy in gross value added in the EU28 in 2013, in %

Country	Sector		
	agriculture	industry	services
Belgium	0.8	26.0	76.6
Bulgaria	5.5	34.3	66.5
Croatia	4.3	33.4	69.2
Czech Republic	2.6	40.3	60.8
Denmark	1.4	27.6	76.0
Germany	0.9	30.2	68.4
Estonia	3.6	33.4	67.5
Ireland	1.6	34.6	74.4
Greece	3.8	23.1	82.2
Spain	2.8	33.3	73.8
France	1.7	23.2	78.5
Italy	2.3	28.2	74.4
Cyprus	2.5	22.6	85.9
Latvia	3.6	26.4	73.0
Lithuania	3.8	36.5	65.6
Luxembourg	0.3	16.8	87.6
Hungary	4.4	35.8	65.4
Malta	1.6	25.1	81.1
Netherlands	2.0	25.6	75.9
Austria	1.4	31.7	70.3
Poland	**3.3**	**33.3**	**63.4**
Portugal	2.3	26.9	76.6
Romania	6.3	42.3	51.2
Slovenia	2.1	36.2	65.9
Slovakia	4.0	40.1	62.7
Finland	2.7	36.2	70.5
Sweden	1.4	31.1	72.6
United Kingdom *	0.7	23.2	76.1

* In 2011

Source: Statistical Yearbook of the Republic of Poland (2014, p. 891).

(Lithuania, Hungary) to 78.5% (France). Greece, with a relatively high share of the service sector in value added (82.2%), surviving the financial and economic crisis, should take special care to develop this sector in the economy, through diversification and new types of services in the structure of the service sector.

The structure of employment in the service sector in Poland and other EU Member States

The service sector includes various activities, in the form of separate sections, based on the Polish Classification of Activities (PKD) 2007, in line with international statistical classifications, including the EU classification. The overall classification of market and non-market services and their subsections are presented in Table 6. These sections show the different tasks performed by the service sector in the economy. These are the services related to the functioning of the state, business and financial services, services which contribute to development of human capital, production services, and consumer services.

Table 6

The structure of employment in the service sector in Poland in 2010 and 2014 (IV Quarter) (in % of total employment)

Specification	2010		2014	
	thousands	%	thousands	%
Total employment	15,557	100.0	16,018	100.0
Market services, including	5,158	33.2	5,460	34.1
Wholesale and retail trade; repair of motor vehicles and motorcycles	2,284	14.7	2,320	14.5
Transportation and storage	862	5.5	913	5.7
Accommodation and food service activities	311	2.0	314	2.0
Information and communication	319	2.1	355	2.2
Financial and insurance activities	349	2.2	366	2.3
Real estate activities	164	1.1	166	1.0
Professional, scientific, and technical activities	470	3.0	555	3.5
Administrative and support service activities	399	2.6	471	2.9
Non-market services, including	3,619	23.3	3,726	23.3
Public administration and defence; compulsory social security	1,030	6.6	1,068	6.7
Education	1,211	7.8	1,253	7.8
Human health and social work activities	921	5.9	952	5.9
Arts, entertainment and recreation	194	1.2	219	1.4
Other service activities	263	1.7	234	1.5

Source: Labour force survey in Poland (2014, pp. 74–75, 2015, p. 86).

The data in Table 6 confirm the growing importance of market services in the Polish economy. This is evidenced by the increase in the number of people working in these services by about 409 thousand people between 2010 and

2014. In the period under study the highest percentage of people worked in the „Wholesale and retail trade; repair of motor vehicles and motorcycles", although their share in this section a little declined by 0.2 pp. The share of people working in the infrastructure services, such as „Transportation and storage" is quite large. The number of employed in this section increased by about 51 thousand people in the period under study, and their share in the stock of employment increased to 5.7% in 2014.

„Professional, scientific, and technical activities" play an increasingly important role in market services. These services are closely associated with science, modern technologies, and innovations. Despite the increase in the number of employees (by 85 thousand people) and their share (up to 3.5%) in the total number of employees, one should expect that this section will grow in importance in the process of socio-economic development.

Modern services, of increasing importance among market services, include also the following sections: „Information and communication", and „Financial and insurance activities". These services underlie the development of the information society, related to computer and telecommunications services and to the use of modern technologies in the financial and insurance activities. In both of these sections, in the years 2010–2014, the number of employed increased by about 53 thousand people, and their share increased to 4.5% of the total working population.

The increasing number and share of employment (up to about 3% in 2014) also took place in „Administrative and support service activities", including advisory services in the field of running business and management, e.g., security services, office administrative services, cleaning services, recruitment of employees and job search. On the other hand the share of „Real estate activities" (1.0%), and „Accommodation and food service activities" (2.0%), in employment was stable between 2010 and 2014, despite a slight increase in the number of employed in these sections, respectively, by 2 thousand and 3 thousand people. It can be assumed that with increasing wealth of the society the importance of these services will show an upward trend. The increased leisure time resulting from labour productivity growth and the development of tourism will contribute to the development of „Accommodation and food service activities".

Analysis of non-market services demonstrates its lower importance in the structure of employment in the Polish economy. The share of employment in this sector in the period under study was approximately 23%, while the number of employed increased by 107 thousand people, as a result of increased employment in all sections of the sector (the highest in „Education" by 42 thousand people and smaller in „Human health and social work activities by" 31 thousand people). The employment structure is dominated by „Education"

Table 7
The structure of employment in selected sections of the services sector in the EU in 2013, in% (based on ISIC)

Country	Trade, repair of motor vehicles and motorcycles	Transportation and storage	Financial and insurance activities, real estate activities
Belgium	13.9	5.3	4.2
Bulgaria	17.9	6.2	2.1
Croatia	13.7	6.4	2.9
Czech Republic	12.3	6.1	3.8
Denmark	14.1	4.7	3.8
Germany	14.4	4.9	3.8
Estonia	13.0	7.6	3.5
Ireland	14.5	4.7	5.3
Greece	17.9	5.0	3.1
Spain	16.6	4.9	3.2
France	12.4	5.3	4.6
Italy	14.8	4.7	3.5
Cyprus	18.6	4.1	6.7
Latvia	14.9	8.6	4.9
Lithuania	17.6	7.3	2.6
Luxembourg	8.4	4.2	13.4
Hungary	13.7	6.7	2.9
Malta	14.3	5.7	5.1
Netherlands	14.7	4.4	4.0
Austria	14.6	5.1	6.6
Poland	**14.3**	**5.9**	**3.3**
Portugal	14.6	4.1	2.6
Romania	13.1	4.9	1.6
Slovenia	12.7	5.4	3.2
Slovakia	12.8	6.4	3.0
Finland	12.0	5.8	2.9
Sweden	11.7	5.2	3.5
United Kingdom	13.4	5.0	5.0

Source: Statistical Yearbook of the Republic of Poland (2014, p. 794). Author's own calculations.

(7.8% share in both years under study), „Public administration and defence; compulsory social security" (the share increased to 6.7%), and „Human health and social work activities" (the share was stable – 5.9%). The share of employment in „Arts, entertainment and recreation" increased to 1.4%, while in „Other service activities" declined to 1.5%.

„Education" and „Human health and social work activities" should be seen, in the broad sense, as investment in human capital. Their growing importance is a result of their increasing role in the process of socio-economic development, and will continue to grow, but also due to demographic changes associated with the aging of society. It appears that the progress of civilization will create the demand for cultural, entertainment, and recreational services.

To evaluate the structure of employment in selected sections of the service sector in Poland it was compared with the corresponding structures in other countries of the EU28 Member States in 2013. The results are presented in Table 7.

The following conclusions can be drawn from the data:

Firstly, in all countries the section „Wholesale and retail trade; repair of motor vehicles and motorcycles" accounted for the largest share of employment. The largest share of employment in this section was found in Cyprus (18.6%), Bulgaria (17.9%), Greece (17.9%), and Lithuania (17.6%). In most countries, including Poland, the share stood at 12–15%. The smallest proportion of people employed in trade and repairs was in Luxembourg (8.4%). Secondly, the share of people working in „Transportation and storage" in most countries was in the range of 4 to 6%. The smallest percentage of people employed in this section was found in Cyprus (4.1%), Portugal (4.1%), and Luxembourg (4.2%) and the highest in Latvia (8.6%), Estonia (7.6%), and Lithuania (7.3%). The share of employment in this section in Poland (5.9%) corresponds to the share in Finland (5.8%) and Malta (5.7%).Thirdly, the proportion of people employed in the sections: „Financial and insurance activities" and „Real estate services" was highest in Luxembourg (13.4%) and Cyprus (6.7%) and the lowest in Romania (1.6%). In Poland, employment in these sections (3.3%) was less favourable compared with other member states, where it stood in the range of 4 to 5%. It can be concluded that the differences in the structure of employment in Poland compared to other EU countries are not significant in the first two sections under study, while larger differences concern financial and real estate services.

Final conclusions

These observations allow for the following conclusions:

1) The division of the economy into three sectors is the basis for research of the economic structure and structural changes that occur therein.

2) Based on the theory of the three sectors, the transformation of the economic structure is a prerequisite for socio-economic development. These transformations take place at a different pace, but in line with certain

regularities. The economic structure of developed countries is dominated by the service sector, the share of the industrial sector is smaller and the share of the agricultural sector is relatively small.

3) The growing importance of the service sector in the Polish economy is a positive element; since it shows that economic structure in Poland becomes similar to the structure of the highly developed countries, although there is still quite a significant development gap in this area. In the highly developed EU countries, the share of the service sector in employment and the gross value added fluctuated around 70-80%.

4) The predominant importance of the service sector in the Polish economy is reflected by its high share in gross value added (63.7% in 2013) and an increase in the proportion of workers in this sector (up to 57.7% in 2014), as well as the increase in the total number of economic entities (77% of all entities). The assessment of the level of development of the service sector should take into account changes occurring within the sector. Poland's economy, as other countries' of the EU28, is dominated by market services, but unfortunately in Poland there is a high share of services which do not contribute to the strengthening of the competitive position of the country. In market services, the structure of employment is dominated by trade and repairs (14.5% in 2014), and transportation and storage (5.7%). Knowledge-based services associated with R&D, and with financial and insurance activities, and with new technologies and innovations, of such importance to modern information and communication services, are still, however, relatively absent.

5) Education, health care and social assistance, which are the basis for the development of human capital; public administration and defence, and compulsory social security, important for the smooth functioning of the state and security of society, are important sections among non-market services.

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THE EU MACRO-REGIONS: APPROACHES AND PATTERNS

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K e y w o r d s: macro-regions, cooperation, EU, economic planning.

A b s t r a c t

With the decline of the nation state and the increasing importance of regionalisation, the EU has launched macro-regions, i.e., areas, including territories from several countries, that share common goals and operating under multi-level governance.

This paper focuses on the EU territorial cooperation strategy, utilising the concept of „macro--region" and the perspective of the macro-regional approach.

Following the first macro-regions (such as the Baltic Sea Region and the Danube Region), the EU recently launched the Adriatic-Ionian Macro-regional Strategy, which was seen as an additional tool for cooperation between local and regional authorities that overlooks the Adriatic Sea. Nevertheless, future developments in the region appear at the present to be quite uncertain, owing to structural industrial decline, rural marginalisation and a lack of infrastructure adequate to support the entire cooperation area.

To overcome these constraints, the concept of macro-region must be strengthened by creating alternative ways to engage in cross-border cooperation between areas subject to similar conditions. Matching among regions that belong to different Euro-countries within the framework of a macro--region may be the best way to forge a consistent path towards territorial, economic and social integration. This will help to create a common pole of cooperation characterized by various strategies that can act as accelerators in creating territorial capital.

MAKROREGIONY UE – STRATEGIE I FORMY

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S ł o w a k l u c z o w e: makroregiony, współpraca, UE, planowanie gospodarcze.

Abstrakt

W obliczu malejącej roli państwa narodowego i coraz większego znaczenia regionalizacji UE zaproponowała koncepcję makroregionów, czyli obszarów obejmujących terytoria wielu różnych państw, które łączą wspólne cele i które funkcjonują w warunkach wielopoziomowego sprawowania rządów. W artykule główną uwagę zwrócono na unijną strategię współpracy terytorialnej, z wykorzystaniem koncepcji makroregionu i perspektywy podejścia makroregionalnego.

Po utworzeniu pierwszych makroregionów (jak region Morza Bałtyckiego i region Dunaju) UE niedawno przyjęła makroregionalną strategię dla regionu adriatycko-jońskiego, którą postrzegano jako dodatkowe narzędzie współpracy między władzami lokalnymi i regionalnymi obszarów nad Morzem Adriatyckim. Przyszły rozwój regionu wydaje się jednak obecnie niepewny na skutek strukturalnego upadku przemysłu, marginalizacji terenów wiejskich i braku infrastruktury, która mogłaby wesprzeć współpracę w regionie.

Aby przezwyciężyć te ograniczenia, należy wzmocnić koncepcję makroregionu przez stworzenie alternatywnych metod angażowania we współpracę transgraniczną regionów, które funkcjonują w podobnych warunkach. Dopasowanie regionów, które należą do różnych państw europejskich w ramach koncepcji makroregionu, może się okazać najlepszym sposobem na wytyczenie drogi ku integracji terytorialnej, gospodarczej i społecznej. Pomoże to stworzyć wspólną płaszczyznę współpracy na podstawie rozmaitych strategii, które mogą znacząco przyspieszyć tworzenie kapitału terytorialnego.

Introduction

The process of regionalisation in the EU is continuously changing: each time a new EU Region is introduced, the impact is very difficult to measure and quantify.

Certainly, the increasing roles and competencies of regional actors inside and outside cooperation areas are enabled by territorial cooperation processes and related tools (SVENSSON, OSTHOL 2001) that have given regions additional abilities to implement policy (KELLEHER et al. 1999). In the past, this model was based on the decision making process, and the EU autonomously determined which countries would form regions within the framework of regional cooperation policy (see Alps, Baltic South-East or Mediterranean Euro-regions). Conversely, macro-regionalisation is territorially embedded and limited, and each bordering region can enter into an enhanced international region because macro-regions are formed by choice within larger regions.

The modern approach to macro-regions has gained attention, as it had increased focus on inter-regional integration based on the assumption that the macro-regional strategy can enhance territorial cohesion and existing cooperation in performing tasks at a supranational level and increase other forms of cooperation at subnational levels.

Examples of macro-regions are the Baltic Sea Region, the Danube Region and the Adriatic-Ionic Initiative, to name a few. The purpose of macro-regions is to improve territorial cooperation and increase EU competitiveness and integration.

Neither inter-regional integration nor regional networking to implement transnational economic networks are new topics. Nevertheless, difficulties in overcoming administrative divisions remain. Moreover, territorial cooperation spaces are often overlapping because of fuzzy boundaries and the presence of intricate sets of actors and institutions characterized by different goals and interests.

In this paper, some preliminary issues related to macro-regional strategy are discussed. First, the extent to which the new idea of macro-regionalisation within the EU is innovative and different from previous processes of regionalisation is addressed.

This consideration is suggested by the fact that geographical belonging and proximity remain the main criteria of aggregation among regions. Furthermore, a better understanding on whether the overlapping of several macro--regions at the territorial level is the right strategy and whether there may exist other methods of macro-regionalisation within the EU is sought. Finally, a preliminary assessment of policies is formulated, intended to further the current process of regionalisation in Europe.

EU Macro-regions in the past, present (and future)

The current socio-economic outlook is characterized by greater level of uncertainty than in the past. Within this framework, the weakness of political, financial and economic assets in the EU has become increasingly evident. In the recent crisis, European Regions have been stressed by new social challenges and deepening economic disparities that cannot be managed through individual actions within administrative boundaries.

The importance of cross-border and inter-regional cooperation arises because of the increasing economic exchange of goods and services among states with different cultures, and different social, economic and political organisations (such as the former central planning socialist countries).

Thus, to pursue this goal, a territorial cooperation policy is needed to reduce economic divergences and barriers between national and regional levels (KEATING 2004, ARGUELLES et al. 2011) and increase the role of regional and local actors in driving development among regions.

During the 1990s, the idea of macro-regions spread to political and economic issues in response to the emerging concept of „Euro-regions". The first EU macro-region (the NUTS system) was based on a three-level hierarchical classification. The NUTS classification (Nomenclature of Territorial Units for Statistics) is a hierarchical system for dividing up the economic territory of the EU for the purpose of the collection and harmonisation of European regional

statistics and for the socio-economic analyses of the regions. Currently, EU territories are clustered into NUTS 1, which included major socio-economic regions; NUTS 2, formed by basic regions for the application of regional policies and NUTS 3 characterised by small regions for specific diagnoses. For approximately 30 years, the NUTS system was managed exclusively on the basis of an agreement between member states.

At the same time, many cooperative efforts between member states, regions and municipalities took place through informal intergovernmental committees (DÜHR et al. 2007), and several cooperative activities between (border) regions have been subsequently replicated by specific interregional cooperation programmes. A stronger notion of macro-regions arose at the end of the 1990s with Transnational Cooperation Programmes (INTERREG IIC 1996–1999, INTERREG IIIB 2000–2006 and INTERREG IVC 2007–2013), which promoted trans-national cooperation among local, regional and national actors. Whereas in the NUTS system macro-regions were regional units that cooperated within the borders of one member state, INTERREG includes areas from non-member states, enabling asinter-regional, inter-national and cross-border cooperation.

Beginning in 2000, due to the forthcoming enlargement to Eastern European countries, territorial cooperation suddenly became a goal of EU policy, reflecting the larger goal of „territorial cohesion" (CAMAGNI 2006). Within the framework of territorial cohesion, the European Grouping of Territorial Cooperation (EGCT) may be considered the first manifestation of the underlying principle. The EGCT aims to form a type of partnership in the governance and management of public and private entities; it is the first experience of the macro-regionalisation process within the EU and the forerunner of modern macro-regions.

Nevertheless, the EGCT has had limited success, due to the large number and complexity of the procedures adopted. However, thanks to the INTERREG and Espon Programmes, territorial cooperation is one of the milestones of the territorial cohesion policy to date.

The 2004 EU enlargement amplified the challenges of cooperation for both new member states within the EU and neighbouring regions outside the EU, triggering a transition from a model based mainly on partnership to a model based on cooperation.

Thus, EU cooperation has become a goal of territorial cohesion, leading to the formation of social and institutional capital among various actors involved (NADIN, STEAD 2008).

The concept of „macro-region" involves a debate similar to debates over issues such as the „Global City Region", „Euro-region" and the above mentioned „INTERREG programmes". First, the concept of a Global City Region

relates to metropolitan areas in which cities manifest physical and demographic characteristics that affect polarisation over a wider regional area and, at the same time, become part of a socio-economic network.

Second, Euro-regions indicate a more institutionalised approach in terms of cooperation, using the tools of the EGTC to promote and spread interests beyond administrative boundaries. In this context, the meaning of macro-region resembles that of Euro-region. However, in contrast to Euro-regions, macro-regions do not have an institutional structure but foreshadow the need to use existing structures to push cooperation to a larger territorial scale.

Finally, INTERREG is a programme that specialises in specific projects, while the macro-regional approach is a policy scheme for the achievement of the goals of Horizon 2020. In fact, macro-regions display different characteristics from o*ther territorial cooperation forms* (NACCHIA 2011) because they are characterised by a multi-sectoral, multi-instrumental and multi-actor approach and are formed to coordinate cooperative tasks through the concept of „functional regions", that are territorial configurations suitable to the development of transnational cooperation within the EU and aimed at strengthening common cross-border cooperative initiatives.

Territorial belonging and the boundaries of interaction

With the Baltic Sea and the Danube strategies, the European notion of macro-region is becoming increasingly important in the academic debate (GROENENDIJK 2013).

In fact, by combining old member states, new member states and non-member states, the EU macro-regional strategies can contribute to improving the territorial and geographical cohesion process in Europe (SCHYMIK 2011). More specifically, in the case of the Baltic Sea and the Danube Basin, EU enlargement has altered geopolitical configuration in terms of centre and periphery.

Given the first experiences of macro-regions, territorial belonging and geographical proximity appear to be the main prerequisites for implementation of a macro-regional strategy. Indeed, both the Baltic Sea Region and the Danube Region were established around natural entities (a sea and a river) that favour linkages between areas within macro-regions. Thus, when considering geographical boundaries for possible collaboration (CAPELLO 1999, BOSCHMA 2005), proximity may be an important factor, as it stimulates learning and spillovers through direct communication and knowledge transfer.

However, due to continuous economic and social change, territorial boundaries of cooperation cannot be static and fixed but must be dynamic in relation

to different regional features and policy measures (*Regions and Innovation*... 2013). Indeed, some authors (LUNDQUIST, TRIPPL 2013) note emerging dissimilarities between different cross-border areas, located in more populated economic areas, and peripheral areas characterised by discontinuous and poorly populated territories.

Thus, it can be suggested that geographical proximity and territorial belonging are not the only requirements that justify the establishment of a macro-region.

Conversely, different forms of proximity may also be useful. For example, the „functional proximity" can *increase the probability of collaboration and cooperation* (MAGGIONI, UBERTI 2009). According to the OECD (*Regions and Innovation*. 2013), a functional region is a more appropriate configuration because it displays a high density of internal interaction in economic activities such as innovation. Furthermore, a type of „functional belonging" other than „functional proximity" is suggested since it enhances the more restrictive hypothesis of geographical proximity. For this purpose, CAPPELLIN (1998) notes that cooperation can potentially spread its relational power beyond territorial interdependence to cooperation based on mutual knowledge exchange. Thus, „a macro-region may also be built on heterogeneous units".

The formation of a macro-region requires time because integration through cooperation depends on the intensity and frequency of the socio-economic relationships that generate permanent cross-border and transnational spaces (STEAD 2014). This is also the obvious consequence of central level management failure, indicating a need for a more dynamic vision of regionalisation (PERKMANN, SUM 2002).

Table 1

Old regionalism and macro-regional approach

Specification	Old vision to regionalism *territorial approach*	Macro-regions *functional view*
Interaction	hierarchic	networks
Sectoral approach	public vs. private	inter-sectoral-policy integration
Collaboration	many tasks	specific asset
Geographical dimension	specific boundaries	no pre-defined boundaries

Source: adapted from BLATTER (2004).

It is clear that the transition phase of a macro-region is characterized by dynamic patterns within regions in the same cooperation areas. In addition, this change will occur at different scales and in varying degrees within specific cross-border regions.

However, both territorial and functional approaches have increased our knowledge of the path to cooperation, although the intensity of the inter--regional scale could play a more important role in applying this new form of territorial cooperation.

Overlapping functions within the EU macro-regional strategy

Territorial cooperation among EU countries and regions is viewed as temporary and insufficient. Moreover, the emergence of European macro--regions indicates that the EU planning space and governance should be implemented according to different spatial dimensions. Nevertheless, the different scale of macro-regional collaboration may trigger some overlapping due to the different characteristics of member and non-member states, governance models and institutional organisations at the regional level (STEAD 2011).

DEAS and LORD (2006) refer to the existence of a natural overlapping of European cooperation areas and strategies, which in turn depend on the characteristics of connections established over time and the maturity of cooperation (*Baltic Sea Region*... 2009). However, the authors note that the mismatch between territorial boundaries with regard to cooperation may represent a push factor, increasing inter-regional labour mobility within the same cooperation space.

To date, the EU has not set a limit on Euro-regions. Thus, a region can belong to more than one Euro-region and may be a candidate for entry into additional macro-regions as well, as is the case with Germany, a member of both the Central Europe Euro-region of the Baltic Sea Macro-region and the Danube Macro-region (*Communication concerning*... 2012).

Nevertheless, overlap is a foregone result of macro-geographical aggregation. In fact, if the INTERREG Programmes could focus on several goals simultaneously, the large number of issues considered would lead to significant overlap of actors and membership in regional institutions. PERKMANN (2005) argues that the success of regional institutions is affected by an environment of policy entrepreneurship, in which actors develop strategies that fit their policy backgrounds.

Other authors (MIRWALDT et al. 2010) note similarities between the macro--regional approach and transnational projects such as the Baltic Sea Region, where a transnational Baltic Sea Programme 2007–2013 overlaps geographically with the Baltic Sea Strategy.

Among EU macro-regions, the Baltic Sea region focuses on the environment and the role of Russia as a massive energy supplier to the cooperation area. These organisations created greater visibility for the macro-region and

the economic opportunities afforded by local industry. Starting from 80's up today the Baltic Sea macro-region has been characterized by several cooperation schemes, various INTERREG programmes (including Baltic Sea Region Programme) and projects.

Although all EU Programmes contribute to the implementation of the Baltic Sea Region Strategy, the Baltic Sea Region Programme is the only one able to cover the entire macro-region (while the Baltic Sea Strategy is, conversely, a strategic document on issues that are of particular importance for the region). However, both the Baltic Sea Region Programme for 2007–2013 (INTERREG IV B Programme for the Baltic Sea region) and new Baltic Sea Programme for 2014–2020 (Interreg Baltic Sea Region) cover eleven countries.

Also during the current EU planning phase (2014–2020) INTERREG Baltic Sea Region shows geographic overlaps with the Programme areas of some cross-border Programmes. A big part of cross-border programmes has a very limited programme area and supports bilateral character. Furthermore, the INTERREG Baltic Sea Region programme area overlaps with three transnational cooperation programmes (such as the North Sea Programme and the Central Europe Programme).

In general, the likelihood of overlaps between national and transnational programmes is mitigated by the fact that, whereas transnational programmes are based on supporting territorial integration, national programmes focus on concrete implementation measures and investments. For the 2014–2020 the linkages between the Baltic Sea Programme and the Baltic Sea Region Strategy will be strengthened. In fact, the Programme has been better aligned with the goal of the strategy to maximise the synergies on other financing sources in the programme areas. Further tensions concern relations between macro-regions and other forms of transnational and trans-border cooperation such as Euro-regions and the EGTC.

The EU Macro-regions. Experiences and perspectives

The emergence of new EU macro-regions depends on the specific characteristics of the regions involved: although territorial proximity and similar physical features are important determinants, the degree of cooperation at the macro-regional level depends on the types of economic interdependencies that exist among territories within a macro-regional area and the involvement of subnational actors within the region over time.

GIFFINGER and SUITNER (2010) assume that the Danube basin is formed by countries with divergent approaches to cooperation and is characterised by a less macro-regional experience, as the region was formed only at the end of

the previous EU planning phase. Nevertheless, the region alongside the Danube River is also an important example of a European macro-region and encompasses 14 countries to date. Among these countries eight are EU member states which have to face similar infrastructural problems and socio-economic disparities.

Despite differences (for example, while the North-German federal provinces assume a crucial role within the Baltic Sea Strategy, in the Danube Strategy a more important political and economic role is covered by Baden Württemberg and Bavaria, located in southern and historically more important in that area), Baltic sea regional strategy and Danube region strategy also exhibit similarities.

Which of these similarities are most notable? Both strategies focus on the place-based approach, as strictly connected to EU Member States and non-EU countries located within the same geographical area. The two macro-regions share the same strategy in terms of coordination among policies and are both financed by EU, national and regional funds as well as based on a more integrated approach through cross-sectoral coordination actions and interlinks among several stakeholders.

Finally, they are facing similar challenges mostly on energy sector. In fact, the lack of a strong energy networks weakens market integration and, then, represents a priority for implementing their strategies, though both regions made massive efforts in this respect. More specifically, in the case of the Baltic Sea Region Strategy, the main issue is the isolation of the three Baltic States from other states of the EU; and this situation slows down a more dynamic networking process in the above mentioned energy and transport sectors as well.

Furthermore, the new Adriatic-Ionian Macro-regional Cooperation Strategy, recently launched by the EU, may be an additional tool for countries to reach European standards with neighbouring countries and cross-border regions. The goal of this strategy is to enhance links between the Adriatic area, the EU and the Balkans, through the intervention of different territorial actors. The main EU tool to support the Macro-regional Strategy is the Adriatic-Ionian Cooperation Programme (ADRION), that is a new European transnational cooperation programme for the 2014–2020 planning phase.

The Programme involves four EU Member States (part of Italy, Slovenia, Greece and Croatia), four non member states (Albania, Bosnia and Herzegovina, Montenegro and Serbia) and focuses mostly on R&D and innovation issues. This macro-region is an area defined by the Adriatic and Ionian Sea basin and populated by more than 60 million inhabitants, that make it a strategic bridge for eastern and western european territories.

Motivations for engaging in the macro-regionalisation process in the Adriatic-Ionian cooperation area vary among countries. For example, some countries, such as Albania, are particularly interested in the formulation of the macro-region's goals and guidelines to formalise standards that are closer to EU standards.

Despite having shared economic difficulties, countries belonging to Adriatic-Ionian initiative (Croatia, Greece, Italy, Slovenia, Albania, Bosnia and Herzegovina, Montenegro and Serbia) exhibit wide gaps among them. In this regard, a strong constraint is represented by EU Commission decisions, which impede new opportunities, new institutions and additional resources. Such decisions should be replaced by strong political initiatives to implement European Programmes, such as structural funds, IPA and other initiatives.

Expectations towards the Adriatic-Ionian macro-region are significantly increasing, as it could represent a new „techno-tool" for coordination policy at the EU and regional levels and stimulate the integration of different regional policies in that area. Certainly, the result of this new cooperation process would lead to a reconfiguration of the EU, which will be different than the current one. To the achievement of a wider integration process among regions, the political integration also plays a key role, although a number different components slows down this complex process (such as the location of the macro regional area among eastern Asia and eastern Mediterranean; the increasing localism and nationalism in some areas of the Balkans region; the emerging political divisions and the deterioration of the security in the southern and eastern Mediterranean area and the role of Russia after the independence of Kosovo).

Thus, we can see that there is the existence of two different development dimensions: the internal dimension exhibit an integration around the centre of the Europe and from the Baltic to the Adriatic-Ionian; and the external dimension looking at a stronger cooperation with the Danube region and Black Sea region. The Adriatic-Ionian Macro-region takes place in an extremely uncertain historical context, characterized by a wide instability inside and outside the macro-region. The overall Adriatic-Ionian space is clearly compressed between the incomplete transition path of the candidate members, the decreasing attractiveness of the European Union and the simultaneous emergence of new instabilities outside the Union.

This new form of territorial cooperation may be a useful tool to strengthen and accelerate the process of stabilisation in this area, although the application of maritime and sustainable development policies (that are priority goals for EUSAIR macro-region) requires the participation of all political institutions overlooking the Adriatic Sea which, consequently, need to draw and share common rules.

In this framework, forecasts of the future of the region are quite uncertain owing to industrial decline, rural marginalisation and a lack of adequate infrastructures to support an economic turnaround in the cooperation area. Such decisions should be replaced by strong political initiatives to implement European Programmes, such as structural funds, IPA and other initiatives and a better consistency between European policy and regional strategy. Otherwise, the risk is that the macro-region may implement only projects within circumscribed areas, neglecting the increasing infrastructural gap and environmental problems in the region. Thus, the so called „bottom-up complementarity" is possible when intense cross-border interaction induces demand for macro-regional institutions as a result of a common set of historical, cultural, institutional, political or economic variables. As far as the EUSAIR is concerned, it is important that the macro-regional strategy operates as a tool to facilitate matching between political choices and governance actors and institutions.

Conclusions

This paper observes that cooperation and cross-border actions through macro-regional strategies are crucial. In the past, this process could only be achieved through direct coordination with the EU and the central State of each country. To date, sustainable macro-regionalisation among cross-border cooperation regions has not been easy to achieve.

However, to achieve regionalisation, it is necessary to create suitable ways for territories subject to similar conditions beyond geographical belonging and proximity to engage in cross-border cooperation. This requires the creation of innovative forms of collaboration because macro-regional cooperation could be viewed as a strong accelerator for local resources and actors. For example, improvement in mutual collaboration in the Balkans region will improve local specialisation, speed up the innovation process and enhance the benefits of comparative advantage (cross-border interaction with the neighbouring European space). This process is important to the EU Cohesion Policy and the role of territorial cooperation in the 2014–2020 period.

Nevertheless, the coordination of macro-regional strategies and EU policies, including funding under the INTERREG programmes, probably needs to be further improved.

Some goals must be achieved in the near future, as it will be important to understand whether macro-regions can function as an effective new level of governance or are a „project entity". Instead of forming a „self-referring project" – a type of project often characterized by low quality and widespread

overlapping areas – a possible way could be to implement a complex networking system, characterized by variable aggregation of regions/countries as they pursue a cooperative path.

Probably, interactions and matching among regions belonging to different macro-regions may be a way to forge a diversified path towards territorial, economic and social integration, that is the main goal of cooperation at different levels.

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CONDITIONS AND SCALE OF FOREIGNERS' EMPLOYMENT IN POLAND

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Key words: immigrants, foreigners, demand for foreigners' labour, labour market in Poland.

Abstract

Free movement of production factors is one of the main conditions of effective economy. This applies to capital as well as knowledge and labour. However, an influx of foreigners to the given country may lead to consequences which are compatible or incompatible with its economic and social interests. These consequences depend on the specific situation of the given country in various areas connected with the state of labour resources, economic trends and strategy, or the situation on the labour market.

The principal aim of the present article is to provide an insight into the rules for offering jobs to foreigners in Poland and to describe the phenomenon of their employment based on the data aggregated by the Ministry of Labour and Social Policy.

On the basis of the research conducted, a systematic increase in foreigners' employment in Poland could be observed in recent years (particularly as a part of the so-called simplified procedure applied to short-term employment). The largest group of foreigners are Ukrainians, who work mainly in agriculture, forestry, fishery, hunting, construction, retail and in household employing workers.

UWARUNKOWANIA I SKALA ZATRUDNIENIA CUDZOZIEMCÓW W POLSCE

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Słowa kluczowe: imigranci, cudzoziemcy, popyt na pracę cudzoziemców, rynek pracy w Polsce.

Abstrakt

Swobodny przepływ czynników produkcji jest jednym z głównych warunków efektywnego gospodarowania. Dotyczy to zarówno kapitału, wiedzy, jak i pracy. Napływ cudzoziemców do konkretnego kraju może jednak wywoływać następstwa zgodne lub niezgodne z jego interesami gospodarczymi i społecznymi. Zależy to od konkretnej sytuacji danego państwa w różnych obszarach

związanych ze stanem zasobów pracy, koniunkturą i strategią gospodarczą, czy też sytuacją na rynku pracy.

Nadrzędnym celem artykułu było przybliżenie zasad powierzania pracy cudzoziemcom w Polsce oraz scharakteryzowanie zjawiska ich zatrudnianiana, na podstawie danych agregowanych przez Ministerstwo Pracy i Polityki Społecznej.

Na podstawie przeprowadzonych badań stwierdzono systematyczny wzrost skali zatrudnienia cudzoziemców w Polsce notowany w ostatnich latach (szczególnie w ramach tzw. procedury uproszczonej dotyczącej krótkoterminowego zatrudnienia). Największą grupą cudzoziemców są Ukraińcy świadczący pracę głównie w rolnictwie, leśnictwie, rybactwie, łowiectwie, budownictwie, handlu oraz w gospodarstwach domowych zatrudniających pracowników.

Introduction

The demand for foreigners' labour in Poland and the principles of employing them have recently become a topic interest taken up more and more frequently, both by the academia, and by the representatives of state authorities. The phenomenon of the influx of labour immigrants and the interest in the work they offer from the representatives of the demand side of the labour market seems to be an incredibly interesting research topic. The questions very often asked in the public debate concern the present and the future role of foreigners on the labour market in Poland, and the justification for either stimulating the immigration processes or limiting their scale. Those questions invite an analysis of the scale and structure of foreigners' employment.

In the relevant source literature the multifarious consequences of the phenomenon of labour immigration are identified from the point of view of the receiving country. A frequently tackled issue is that of assessing the impact of foreigners' employment on the wages of the domestic workers, the size of employment or the unemployment rate. It should be emphasized that there is no consensus among scholars as regards the issue of the role labour immigrants play on the labour market – do they constitute a complimentary or substitutive resource compared with domestic workers? In one of his models, T.J. Hatton indicated that the influx of foreigners into the given labour market ultimately leads to the growth of labour resources and the resulting decrease in the wages obtained in the given economy (HATTON 2010). Other authors highlight, among other things, the diverse consequences of transferring labour resources, depending on whether the labour market of the receiving country is balanced or on the scale of unemployment characterizing it (JOŃCZY, KUBICIEL 2010, DILEO et al. 2013, LOSURDO et al. 2013).

Source literature argues that predicting the consequences of the phenomenon of foreigners' employment is a very difficult task. R.M. Friedberg and J. Hunt drew the conclusion that, as regards the impact of migration phenomena on the basic indexes characterizing the situation on the labour market,

prognoses to a large degree depend on the research models, which, obviously enough, are based on considerable simplifications and top-down assumptions (FRIEDBERG, HUNT 1995). This state of things encourages the academia to engage in empirical research. The multifaceted nature of the consequences of foreigners' employment was noted by, among others, S. CASTLES and M.J. MILLER (2009), T. BAAS, H. BRUCKER and A. HAUPTMANN (2010), G.J. BORJAS (1990), P. CORTES (2008), or M. KLEINMAN (2003).

Employing foreigners on the labour market in Poland is a phenomenon strictly regulated by the applicable laws and regulations, as a result of which a distinct tendency can be observed to categorize foreigners and at the same time to diversify the rules of access to the labour market for individual categories.

The aim of the present article is to provide a characteristics of the phenomenon of foreigners' employment in Poland as regards its rules, scale and structure. In the first part of the article the attention will be focused on defining the legal framework which establishes rules for employing foreigners in Poland. Next, the available data concerning the scale of foreigners' employment in Poland will be analysed and interpreted, and the methodological problems will be indicated as regards the comprehensive assessment of the phenomenon. The subsequent part of the article will be focused on analysing the structure of foreigners' employment in Poland from the point of view of individual sections of PKD in order to determine in which sector immigrants are employed most frequently. The article ends with a conclusion.

Foreigners' employment in light of Polish laws and regulations

From the vantage point of the receiving country, of great importance for the scale and nature of labour migrations is its immigration policy, whose rules are introduced via specific legislation.

In this part of the article an attempt will be made to present the most relevant rules for foreigners' employment in Poland. The laws regulating the granting of work permits to foreigners in Poland will be analysed as well as the cases where offering a job to a foreigner does not entail the necessity of obtaining a permit to employ him/her. Among the laws and regulations specifying the rules for foreigners' employment, the Act of 20 April 2004 on Employment Promotion and Labour Market Institutions, hereinafter referred to as the Act, and the most relevant implementing acts will be discussed.

As a member state of the European Union, Poland is obliged to respect the EU legal system, which entails full freedom of access to the Polish labour

market for the citizens of EU, other member states of the European Economic Area and Switzerland.

The second category comprises the so-called third country nationals, whose employment in Poland requires obtaining a work permit (DUSZCZYK 2012). In addition, the Act specifies in art. 87, item 2, points 1–9, the categories of foreigners exempt from the obligation to obtain a work permit (ustawa z 20 kwietnia 2004 r. o promocji zatrudnienia i instytucjach rynku pracy, DzU z 2004 r., nr 99, poz. 1001).

The work permit is required if the foreigner:

– carries out work within the territory of the Republic of Poland on the basis of a contract with an entity whose registered office or place of residence, or branch, establishment, or other form of organized activity, is located within the territory of the Republic of Poland;

– performs duties on the board of a legal entity entered into the Register of Entrepreneurs or of a corporation, and resides in the territory of the Republic of Poland for a period exceeding 6 months in total in the course of 12 consecutive months;

– carries out work for the foreign employer and is delegated to the territory of the Republic of Poland for a period exceeding 30 days in a calendar year, to a branch or establishment of a foreign entity or a related entity, under the Act of 26 July 1991 on Personal Income Tax, with the foreign employer;

– carries out work for the foreign employer who does not have a branch, establishment or other form of organized activity within the territory of the Republic of Poland and is delegated to the territory of the Republic of Poland in order to provide a temporary and occasional service (export service);

– carries out work for the foreign employer and is delegated to the territory of the Republic of Poland for a period exceeding 3 months in the course of 6 consecutive months for a purpose other than indicated in points 2–4 (ustawa z 20 kwietnia 2004 r. o promocji zatrudnienia i instytucjach rynku pracy, DzU z 2004 r., nr 99, poz. 1001).

Article 90 of the Act enumerates factors and criteria for an obligatory specification of situations in which employing foreigners within the territory of the Republic of Poland is allowed without the necessity of granting a work permit. They refer to the specific aspects of the job performed, the nature of the labour and its duration, international contracts and agreements or international training and consulting programs (ustawa z 20 kwietnia 2004 r. o promocji zatrudnienia i instytucjach rynku pracy, DzU z 2004 r., nr 99, poz. 1001).

Among the exceptional situations specified in the notice by the Minister of Labour and Social Policy, in which employing a foreigner is allowed without the necessity of granting a work permit, several professional and social groups were singled out. These include:

– teachers of foreign languages, academic teachers, persons providing trainings;

– foreign correspondents of mass media;

– students, under circumstances specified in the regulation;

– sportspersons and persons carrying out work in connection with sports events;

– persons performing artistic services;

– clergymen carrying out work in connection with their religious duties;

– members of the armed forces or civil personnel who work in international military structures within the territory of the Republic of Poland;

– workers delegated for a period not exceeding 3 months;

– persons carrying out work for members of the European Parliament;

– citizens of Armenia, Belarus, Georgia, Moldova, Russia and Ukraine carrying out work during a period not exceeding 6 months in the course of 12 consecutive months based on the employer's declaration of willingness to employ a foreigner (the so-called simplified procedure).

A detailed list of professional groups, together with clearly defined criteria, is included in the above mentioned notice (obwieszczenie ministra pracy i polityki społecznej z 30 grudnia 2014 r....).

Scale and structure of foreigners' employment in Poland

A general assessment of the scale of foreigners' employment in Poland is currently not possible. This is due to the impossibility of estimating the scale of employment of citizens of European Union member states, the remaining countries of the European Economic Area and the Confederation of Switzerland, who have free access to the labour market in Poland (PIOTROWSKI, ORGANIŚCIAK-KRZYKOWSKA 2014).

The number of the citizens of European Economic Area and Switzerland in Poland can be estimated only on the basis of the number of registered residence exceeding three months and on the basis of the number of insured persons who, in a relevant insurance form, indicated citizenship other than Polish (*Informacja w sprawie zatrudnienia obywateli*... 2011). However, one should be aware of the limited reliability of the above data as regards the scale of employment of this group of foreigners on the labour market in Poland.

The basic source of the partial information on the scale and structure of foreigners' employment in Poland are the data aggregated by the Ministry of Labour and Social Policy. They include the category of foreigners who do not have freedom of access to the labour market in Poland, and therefore can carry out work on the basis of work permits or on the basis of employers' declarations of their intention to employ them.

In the graph below changes were presented as regards the number of work permits for foreigners in Poland (Fig. 1).

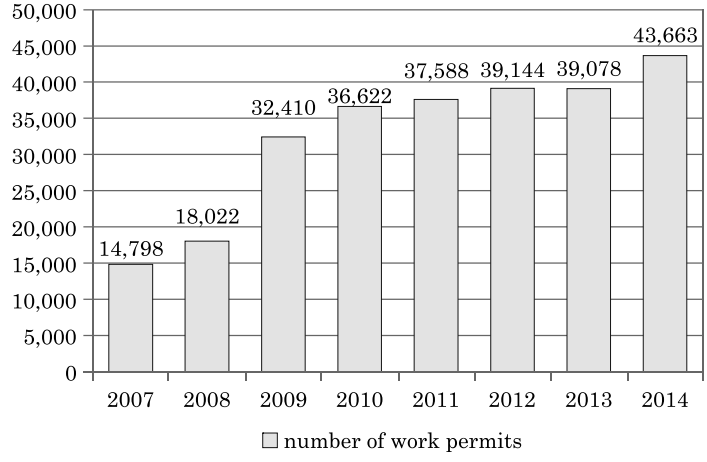

Fig. 1. Work permits for foreigners issued in Poland in the years 2008–2014
Source: based: Ministerstwo Rodziny, Pracy i Polityki Społecznej, Cudzoziemcy pracujący w Polsce – statystyki, http://www. mpips.gov.pl/analizy-i-raporty/cudzoziemcy-pracujacy-w-polsce-statystyki/ (access: 11.12.2015).

In the past seven years Poland saw a distinct increase in the number of foreigners employed on the basis of work permits. In 2008 more than 18 thousand work permits were granted, while the year 2014 brought a record-breaking number of 43 thousand work permits.

The graph below shows the changes in the number of employers' declarations of intention to employ foreigners, submitted in district employment offices (Fig. 2).

Taking up employment by foreigners in Poland on the basis of the so-called simplified procedure is clearly much more popular than doing it on the basis of a work permit. The simplified procedure was intended to meet the seasonal shortages of work supply quickly (KUBICIEL-LODZIŃSKA 2013). In the first year after the above mentioned procedure was introduced, nearly 157 thousand employers' declarations of intention to employ a foreigner were registered in district employment offices. In the years 2012–2013 the number of submitted declarations stabilised at ca 240 thousand annually. However, the year 2014 saw an unprecedented increase in the number of submitted declarations. Particularly relevant information can be gathered from an analysis of mid-year data for 2015. It turns out that from January to June more than 410 thousand declarations were submitted in district employment offices by employers interested in employing foreigners on the basis of the simplified procedure.

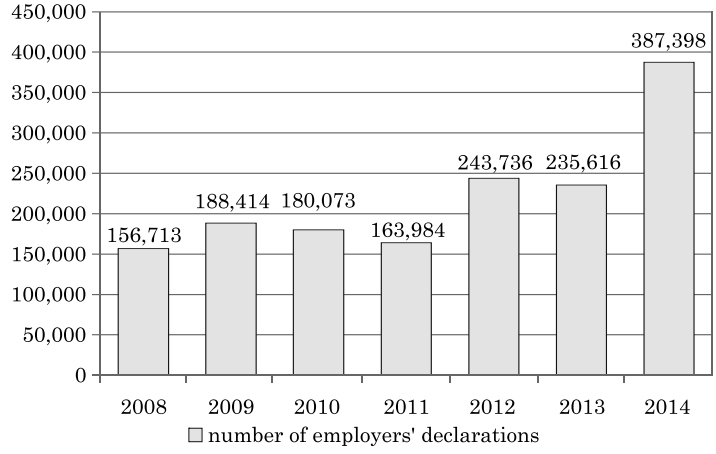

Fig. 2. Employers' declarations of intention to employ foreigners in Poland in the years 2008–2014
Source: based: Ministerstwo Rodziny, Pracy i Polityki Społecznej, Cudzoziemcy pracujący w Polsce – statystyki, http://www. mpips.gov.pl/analizy-i-raporty/cudzoziemcy-pracujacy-w-polsce-statystyki/ (access: 11.12.2015).

In order to find reasons for such a dramatic increase in the number of registered declarations, one should, above all, point out to the unstable political and economic situation in Ukraine, as a result of which the citizens of this country got even more interested in carrying out work in Poland (372,946 declarations submitted in 2014, compared to 217,571 declarations submitted in the preceding year) (PIOTROWSKI, MACHNIS-WALASEK 2014). The increase in the total number of employers' declarations of intention to employ foreigners was not influenced by the prospective employment of citizens of Russia, Belarus, Moldova and Georgia; all of the above mentioned countries saw an actual decrease in the number of declarations submitted in 2014 compared to the preceding year). The addition of the Republic of Armenia to the list of countries whose citizens are allowed to work in Poland on the basis of the simplified procedure did not have a significant impact on the phenomenon under discussion, either (in 2014 774 employers' declarations concerning foreigners' employment in Poland were submitted, which constituted ca 0.2% of the total number of declarations).

In order to provide a characteristics of the structure of foreigners' employment in Poland, the following diagrams juxtapose sections of PKD in which the biggest increase of foreigners' employment is noted (Tab. 1, 2).

Foreigners carrying out work in Poland on the basis of work permits are most frequently employed in construction, trade and households employing workers.

Table 1
Work permits for foreigners according to selected sections of PKD in Poland in the year 2014

Section of PKD	Number of permits granted	The percentage share of section in the total number of permits granted
Construction	7,084	16.2%
Wholesale and retail trade	6,610	15.1%
Households employing workers	5,780	13.2%
Transport and warehouse management	4,291	9.8%
Accommodation and food service activities	2,835	6.5%
Agriculture, forestry, hunting, fishery	2,333	5.3%

Source: based: Ministerstwo Rodziny, Pracy i Polityki Społecznej, Cudzoziemcy pracujący w Polsce – statystyki, http://www. mpips.gov.pl/analizy-i-raporty/cudzoziemcy-pracujacy-w-polsce-statystyki/ (access: 11.12.2015).

Table 2
Employers' declarations of intention to employ a foreigner according to selected sections of PKD in Poland in 2014

PKD Section	Number of submitted declarations	The share of sections in the total number of submitted declarations [%]
Agriculture, forestry, hunting and fishery	178,246	46.0
Construction	54,775	14.1
Industrial processing	44,151	11.4
Administrative and support service activities	33,007	8.5
Wholesale and retail trade	16,172	4.2
Households employing workers	12,783	3.3

Source: based: Ministerstwo Rodziny, Pracy i Polityki Społecznej, Cudzoziemcy pracujący w Polsce – statystyki, http://www. mpips.gov.pl/analizy-i-raporty/cudzoziemcy-pracujacy-w-polsce-statystyki/ (access: 11.12.2015).

Foreigners carrying out short-term work in Poland (in accordance with the so-called simplified procedure) are employed most frequently in the sections characterised by seasonal peaks. In 2014, similarly to the previous years, the „Agriculture, forestry, hunting and fishery" section played a dominant role.

Conclusion

The systematically increasing demand for foreigners' labour observed in recent years probably results from a number of various determinants. Among them there are factors connected with the demand side of the labour market (employers' growing interest in offering jobs to foreigners), factors related to the supply side (the growing influx of foreigners due to, among other things, Poland's membership in the Schengen area and a relatively stable economic and political situation), demographic and structural factors (the segmentation of the labour market and related reluctance on the part of domestic workers to perform jobs in the so-called secondary segment jobs). Factors of an institutional nature – e.g., a distinct liberalization of the rules governing foreigners' access to the labour market in Poland – play a significant role in stimulating the scale of influx of labour immigrants, too.

It should be stressed that immigrants employed on the basis of the so-called simplified procedure constitute a decidedly largest group of foreigners carrying out work in Poland. 96% of the group are Ukrainians, which means that the share of other nationalities entitled to work in Poland on the basis of the employer's declaration of intention to employ a foreigner can be considered marginal. Employment on the basis of work permits amounted to ca 40 thousand in the course of the last year, which can be justified above all by time-consuming administrative procedures involved in granting them.

Foreigners working in Poland are employed predominantly in agriculture, forestry fishery, hunting, construction, trade, and in households employing workers.

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A STUDY OF THE FINANCIAL ACCOUNTING SOFTWARE USED BY SMALL ENTERPRISES IN OLSZTYN

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Key words: financial-accounting software, accounting, small enterprise.

Abstract

The objective of this paper is to assess the financial-accounting software used in small enterprises operating business in the area of Olsztyn in Warmińsko-Mazurskie voivodship. The research material was acquired by means of the questionnaire-based survey targeted at selected small enterprises situated in Olsztyn. Out of 50 questionnaires distributed 18 (36%) were returned.

Based on the survey conducted, it was determined that the majority of the enterprises surveyed use standard, generally accessible financial-accounting software. The extensive choice of standard software in the market is the most frequently indicated factor determining the purchase of software of that type. The acquisition of accounting software is decided less frequently on the price, and more on the standard software being known to the employees and the software availability. Small enterprises use both the obligatory registers (functions) and numerous optional registers available in the financial-accounting software they possess.

WYKORZYSTANIE OPROGRAMOWANIA FINANSOWO-KSIĘGOWEGO W MAŁYCH PRZEDSIĘBIORSTWACH W OLSZTYNIE

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Słowa kluczowe: oprogramowanie finansowo-księgowe, rachunkowość, małe przedsiębiorstwo.

Abstrakt

Celem artykułu jest ocena wykorzystania oprogramowania finansowo-księgowego w małych przedsiębiorstwach prowadzących działalność gospodarczą na terenie Olsztyna w województwie warmińsko-mazurskim. Materiał badawczy zgromadzono za pomocą kwestionariusza, który skierowano do wybranych małych przedsiębiorstw znajdujących się na terenie Olsztyna. Z rozesłanych 50 kwestionariuszy zwrócono 18 (36%).

Na podstawie przeprowadzonych badań stwierdzono, że większość spośród badanych przedsiębiorstw wykorzystuje standardowe, ogólnodostępne oprogramowanie finansowo-księgowe (są to jednocześnie podmioty prowadzące uproszczoną księgowość). Duży wybór standardowego oprogramowania na rynku jest najczęściej wskazywany jako czynnik decydujący o zakupie tego typu programów, rzadziej natomiast o jego pozyskaniu decydują: cena, większe prawdopodobieństwo, że standardowe oprogramowanie będzie znane pracownikom oraz jego dostępność. Małe przedsiębiorstwa korzystają zarówno z rejestrów (funkcji) obligatoryjnych, jak i wielu różnych rejestrów fakultatywnych, dostępnych w programach finansowo-księgowych.

Introduction

A basic problem of contemporary small enterprises is their low survivability. One of the key factors influencing this situation is an insufficient access of small enterprises to the reliable and properly prepared information on their status and conditions of business operation (NOGALSKI et al. 2004, p. 132–136). In the information-economic paradigm accounting is the supporting system of decision-making process, providing managers with the financial information about an enterprise (JAWORSKI, SOPIŃSKI 2010, p. 65, 66). In the era of information revolution in the XXI. century, the computers and software took over the role of accounting ledgers and paper (see: JAWORSKI 2006, JAWORSKI 2007). The quantity and quality of financial information that is gathered and processed in financial evidence and accounting systems depend on system organisation and use of functions of modern technologies (JAWORSKI 2011, p. 148).

Currently the majority of processes in accounting is carried on with an application of computers and professional software, and almost all businesses use computers in accounting (ANDRZEJEWSKI et al. 2006, p. 39, HEJNAR 2014, p. 119). The level of application of IT devices in accounting is also rapidly growing is small enterprises (KACZMAREK, STĘPIEŃ 2001, p. 83). Currently an offer of IT solutions for accounting purposes in the Polish market totals to several hundred products (DYNOWSKA, KES 2014, p. 92). The dynamic development of IT technologies responds to the growing needs of a business (KUŻDOWICZ, KUŻDOWICZ 2013, p. 329). In choosing the IT solutions for accounting purposes we should consider first the size of business and its specific characteristics, the form of accounting maintained (full or simplified) as well as the information needs of the enterprise's management (see: DYNOWSKA, KES 2014, p. 93, JAWORSKI 2011, p.148). This choice must be based upon the precise recognition of the company's needs compared to the features of the systems offered in the market (KOWALSKA, SKWARNIK 2008, p. 164, 165). A producer of the system is also an important consideration. The company should choose the software of the established producer, whose products are well recognised and recommended in the market (LUTY et al. 2010, p. 16–19).

The Notion and Classification of Information Systems in Accounting

According to KRÓL-STĘPIEŃ (2013, p. 75), the information system is the most important tool aimed at supporting the accounting. The system should be designed in the way that the solutions and procedures applied in it:

– are compliant with the accounting principles,
– help satisfying the statutory requirements,
– improve enterprise management.

Technology developments as well as the needs resulting from the increasing demand for information results in continual changes in the information systems in which the existing functions are developed or new functions are added. From the perspective of the level of integration (interlinking the systems allowing mutual use of their resources (e.g. files, hardware) and the complexity of the individual elements, RUTKOWSKI (2007) identifies:

– registration-transaction systems,
– information-decision taking systems,
– decision support systems,
– expert systems,
– management information systems,
– artificial intelligence systems,
– integrated information systems.

The registration-transaction systems enable the recording of current events in the selected area of activity. Financial-accounting or human resources-payroll systems are included in that category. Supporting management at the operational-tactical level as well as controlling and coordinating activities in short time periods are the roles of the information-decision taking systems. The production control systems and sales forecasting systems also belong to that group. The strategic decision support systems are mainly used for long-term forecasting as well as production volume optimisation. The expert systems are expected not only to support the manager in the decision-taking processes by providing information, but also of imitating the decision of a manager in relation to specific aspects of activities of the enterprise. Choosing the solutions for the given problem is the main role of such systems and they are used mainly for strategic diagnosing and planning. Management information systems allow the highest-level of management to obtain rapid answers to important questions. Such systems are created or adjusted (in case they represented universal solutions) to the needs of specific persons. On the other hand, the task of the artificial intelligence systems is to draw conclusions in the situation when the complete knowledge necessary for solving a given problem is not available. Those systems are applied in widely understood

financial services. Integrated information systems are modular information systems dealing with all aspects of the enterprise operations (RUTKOWSKI 2007).

Among the registration-transaction systems, three particularly important ones can be identified:

– human resources-payroll systems,
– stocks management systems,
– financial-accounting systems.

Considering the generation within which they were created (the first generation of IT systems), such systems are usually characterised by low levels of complexity. The human resource's payroll system serves to maintain the human resource registers, computation of wages and benefits, recording the work time and settlements with the public-legal bodies, i.e. the Tax Office and the Social Insurance Institution. The stock management systems on the other hand service the goods and materials management requirements. They offer the possibility of processing warehouse documents, registration, analysis of stocks status and warehouse transactions as well as taking periodic or continual inventory.

Nature and Functions of the Financial Accounting Systems

„The financial-accounting systems are systems aimed at supporting the accounting containing the reporting components and the financial analysis tools" (KASZUBA-PERZ 2012, p. 265). That opinion is confirmed by RUTKOWSKI (2007) stating that the most important task of the financial-accounting systems is to provide „effective support to the work of the accounting departments and other units in the area of maintaining the accounting documentation in compliance with the effective legal regulations". The financial-accounting systems also allow current analysis of the status of the enterprise finances and facilitate tax settlement by computing and printing out the tax statements as well as generating and printing financial reports, specifications and statements. Such systems that form the core component of the integrated management systems, with the IT development, transformed from the tool that served recording economic events into systems supporting management in taking decisions concerning both the current enterprise functioning and important from the point of view of the enterprise development (EBISCH-STENZEL 2013, p. 38).

By combining different modules, the individual system components have the ability to access the data input from other modules in the other areas covered by the system (Fig. 1).

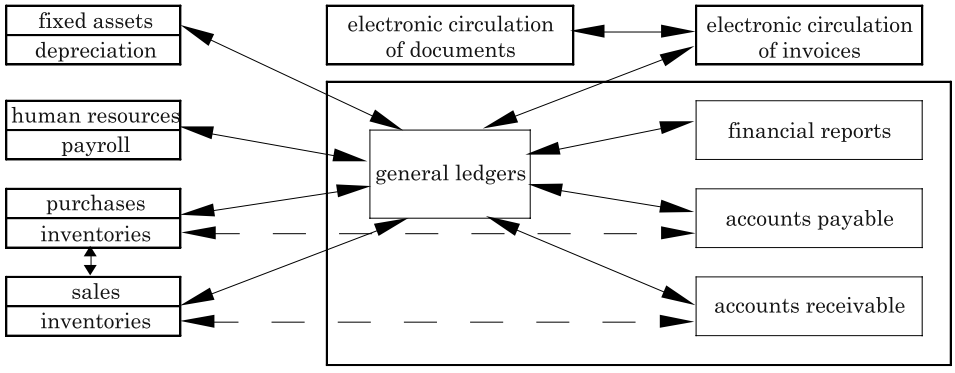

Fig. 1. Diagram of the financial-accounting system
Source: own work based on EBISCH-STENZEL (2013, p. 39).

The general ledgers are in the centre of the system and they govern the sub-ledgers, i.e. fixed assets, human resources-payroll module, sales, purchases, accounts receivable, accounts payable, financial reports generating module and electronic circulation of invoices module. Input of the data to any of the auxiliary ledgers will result in generating a record in the general ledgers and the other way round, the data input into the general ledgers will appear in the defined appropriate auxiliary module. That correspondence is also possible between some auxiliary modules, e.g. sale or purchase of products will influence the status of stocks as well as accounts receivable or accounts payable.

A good accounting system should possess certain characteristics. BARAN (2011, p. 14) lists four major characteristics that an effective accounting system should possess. The possibility of controlling the resources of the entity understood as assuring effective use of those resources and providing the information on managing them is the first of them. Compatibility, i.e. satisfying the needs of the users by the specified system functions is the second. It is important that compatibility is also defined as the possibility of simultaneous work of many people with the system and efficient performance of the routine as well as non-routine operations. Flexibility of the accounting software (the third characteristic) is the possibility of adjustment to the changes taking place in the organisation and outside it (in its environment). Finally, the cost effectiveness is understood as the advantage of benefits from use of the given system in relation to the costs required for its maintenance.

The financial-accounting system has a determined basic goal, which is to provide economic information. The information generated by the accounting system should, in addition to being understandable and useful, be characterised by timeliness (the information that has not lost its ability to influence the decisions taken), prognostic reliability (based on the information generated

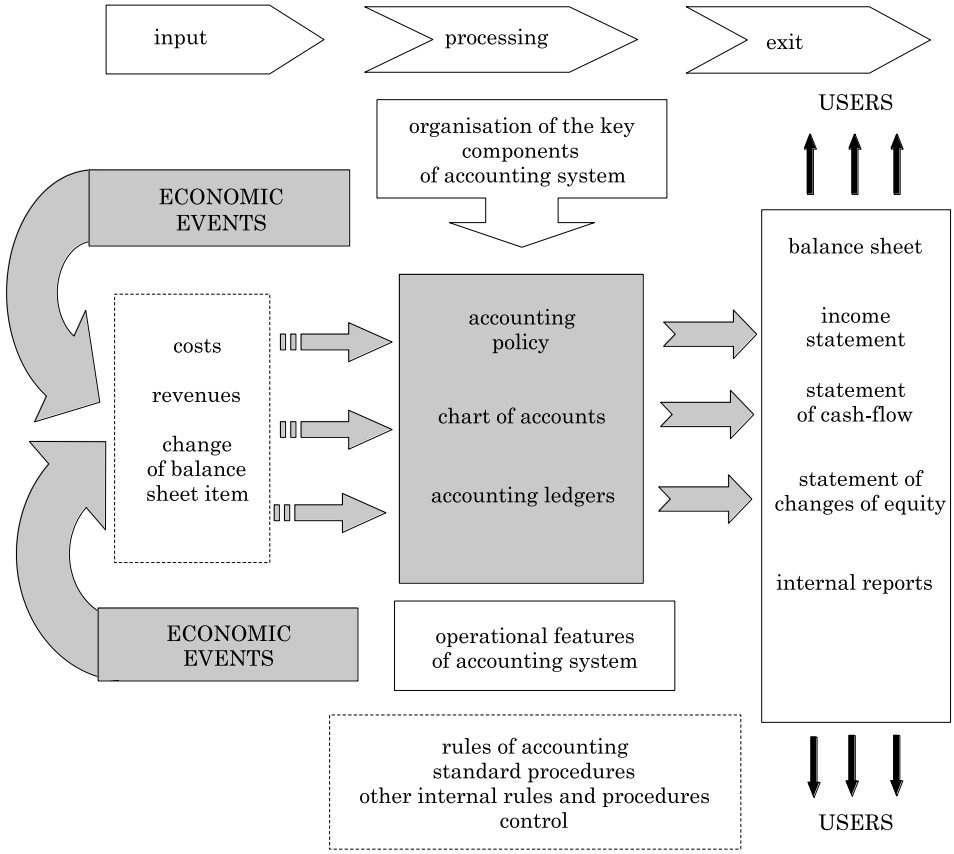

Fig. 2. IT accounting system operation
Source: own work based on GAD, WALIŃSKA (2008, p. 41).

the data concerning the future states of the phenomenon studied can be generated) and usefulness for feedback (mutual adjustment of assumptions made in the planning process) (Gad, WALIŃSKA 2008, p. 41, 42). The defined economic event is input into the system according to the principles of booking and the chart of accounts effective in the enterprise thanks to which new economic information contained in the accounting documents such as internal reports and financial specifications is obtained (Fig. 2).

Information systems as tools facilitating human work should fulfil specified functions. RUTKOWSKI (2007) considers information gathering, processing, storage and presentation to represent the most important functions of every information system, including the accounting system.

BYTNIEWSKI (2005, p. 102) in turn identified the following key functions of the financial-accounting system:

– information function,
– management function,
– communication function,
– reporting function.

The information function is represented by the financial accounting system providing the information to the internal recipients (the owner, management, employees) and the external recipients (agencies and financial institutions) according to their needs. Within the framework of the management function, the financial-accounting system is to deliver data in the form of financial statements, reports and indicators as well as stimulate the management to improve the future economic activity results.

The communication function requires the timely delivery of information at the defined level of detail and accuracy.

Generating financial statements required by legal regulations and compliant with such regulations as well as transmitting them to the external recipients is the main objective of the reporting function (BYTNIEWSKI 2005, p. 102).

Objectives, Hypotheses and Methodology of the Study

The main objective of the study was to assess the use of financial--accounting software in small enterprises conducting business in the area of Olsztyn in Warmińsko-Mazurskie voivodship.

The following specific objectives were formulated to obtain a more specific presentation of the main research problem:

– identification of the software used by small enterprises in accounting,
– identification of factors determining the choice of financial-accounting software,
– identification of areas of application of financial-accounting software by small enterprises.

The following research hypotheses were formulated as concerns the main objective:

– small enterprises in Olsztyn use standard financial-accounting application the most frequently,
– in selecting the financial-accounting software small enterprises rely mainly on the price and ease of operation,
– small enterprises use mainly the obligatory registers (functions) while the optional registers of the financial-accounting software possessed are used to a minor extent.

The research material was obtained through a questionnaire survey consisting of 20 questions (closed, half-open and open) concerning:

– financial-accounting software used in the enterprises,
– the areas of its application,
– premises for the financial-accounting system implementation,
– planned changes in the financial-accounting software in the foreseeable future.

The survey was conducted among selected small enterprises from the area of Olsztyn using the survey questionnaire. Out of 50 copies of the questionnaire distributed, 18 (36%) were returned. In the survey results analysis the method of horizontal comparisons (external, spatial, geographic) concerning the same elements occurring in different economic entities was applied (STACHAK 1997, p. 203).

Results of the Study

The survey indicates that the majority of small enterprises (16 out of 18) used computer based accounting. Only two enterprises apply mixed accounting, which is a combination of manual, and computer accounting. In the most enterprises (10 cases) the owner keeps the accounting records (Fig. 3). It should be pointed out, however, that those enterprises maintain simplified forms of accounting; seven of them maintain the revenue and expense ledger (PKPiR), and three just the records of revenues (registered lump sum tax). The remaining eight enterprises maintain full accounting. In the case of five, this is done by employed accountants while three entities outsource the activity to accounting bureaus.

The fact that in the enterprises surveyed the owner was in most cases the person responsible for accounting may, on the one hand, indicate the willingness to limit costs (no remuneration has to be paid to employees or outsourced accounting bureau) while on the other hand it indicates the appropriate level of knowledge and skills of entrepreneurs in the field of accounting in the simplified form. At the same time, it can be noticed that owners of small businesses do not assume responsibility for managing the full accounting.

The surveys conducted indicate also that the majority (10) of the enterprises surveyed use standard, generally available financial-accounting software (those are at the same time the entities maintaining simplified accounting). Amongst the eight enterprises maintaining full accounting, six entities use tailor-made software developed to their individual orders while only two entities use software made available by accounting bureaus. The standard software usually works according to similar, reproduced formats

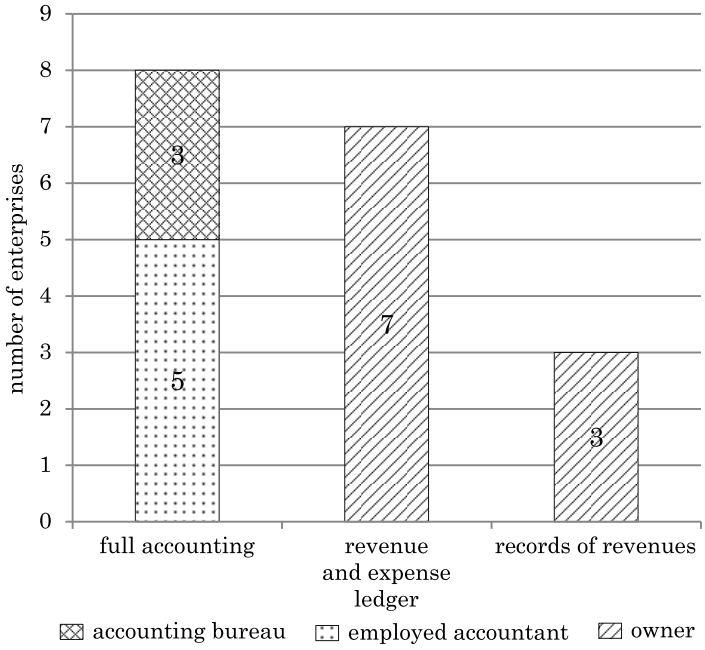

Fig. 3. Form of accounting and the person or entity responsible for accounting in the surveyed enterprises

Source: questionnaire survey.

and allows performance of the basic financial-accounting operations that are sufficient for efficient management of accounting, particularly in the simplified form. Established entrepreneurs or people with a longer history of operation in the market frequently need software that is more elaborate and better adjusted to their activities. Such entrepreneurs, maintaining full accounting records, turn to developers for customised accounting software.

Thus, the results confirm the hypothesis that small enterprises surveyed use mainly the generally available (standard) software although, to be more precise, those are entities maintaining simplified accounting.

Given that the majority of the enterprises surveyed use standard, generally available financial-accounting software, an attempt was made to determine the factors that make those enterprises purchase the software of that type.

The respondents had the opportunity to indicate more than one factor. As indicated by Figure 4, the large range of standard software available in the market was indicated as the most frequent factor determining purchase of that software type by enterprises surveyed (34.62% of responses). This allows small entrepreneurs, among others, to choose software appropriate to their needs and capacity.

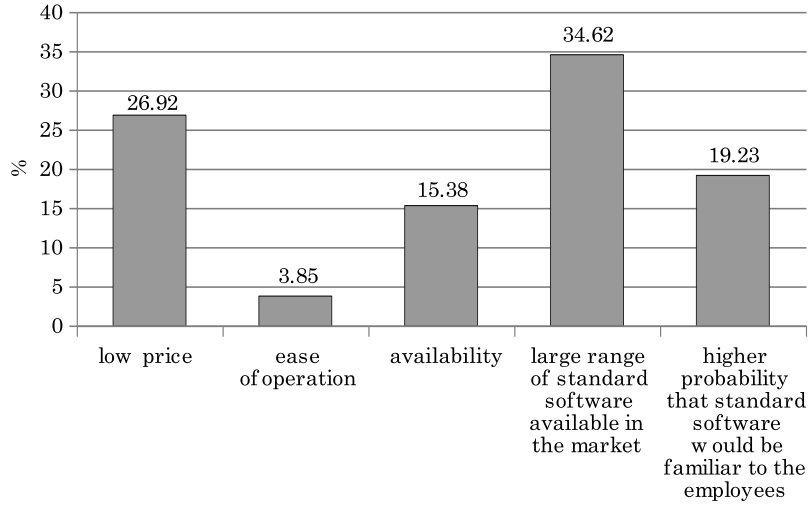

Fig. 4. Factors conditioning the choice of standard financial-accounting software (% of responses, n=26)

Source: questionnaire survey.

The less frequently indicated factors that make owners of small enterprises choose generally available software are the low price (26.92% of responses), higher probability that standard software would be familiar to the employees (19.23% of responses) and availability of such software (15.38% of responses). The ease of operation of such software was the least frequently indicated factor for choosing standard software, which may result from significant standardisation of the basic functions of such systems.

Thus, it should be concluded that the hypothesis according to which small enterprises base their choice of standard financial-accounting software is mainly on the price and ease of operation was confirmed only partly.

The financial-accounting software producers want to maximise their market share so they develop applications containing numerous modules (registers). The vast majority of the enterprises surveyed (16) declare that in addition to the obligatory registers related to the chosen form of business they also maintain additional registers. The other two enterprises maintain no optional registers.

Given the possibility of indicating numerous responses, the respondents declaring maintenance of additional registers in most cases marked the majority of the possible options. Consequently, the differences between the individual optional registers are minor (Fig. 5). The register of cash status and turnover is the least frequently maintained optional register. This was unexpected given the role cash plays in the enterprise activities. The fact that the

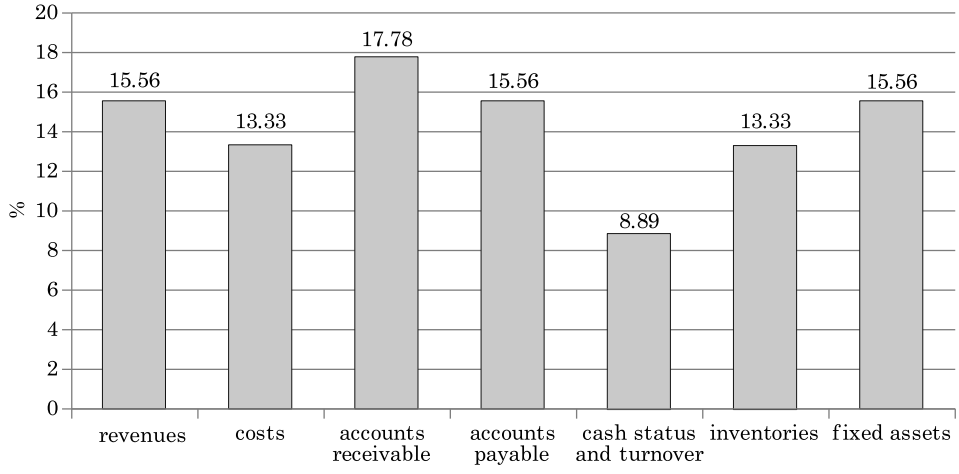

Fig. 5. Optional registers (functions) of the financial-accounting software in the surveyed enterprises (% of responses, $n=45$)

Source: questionnaire survey.

monthly turnovers generated from business activities of the business are small might be the reason for such low use of the modules supporting registration of cash status and turnover.

In the light of the results of this study, it can be concluded that the hypothesis that small enterprises use mainly the obligatory registers (functions) and only to a minor extent use the optional registers of the financial-accounting software in their possession was not confirmed.

Summary and Conclusions

The technological progress and the pace at which the environment of enterprises changes means that information systems are vital component to the prosperity of the enterprise.

The following conclusions were formulated based on the research undertaken into the accounting systems used in small business enterprises:

1. The majority of small enterprises surveyed use standard generally available financial accounting systems. It should be pointed out, however, that they are at the same time entities maintaining simplified accounting. Small enterprises maintaining full accounting records in most cases acquire software customised to their needs.

2. The vast choice of financial-accounting software in the market is the most frequently indicated factor determining the choice of standard generally

available software of that type used by the enterprises surveyed. The price, higher probability that the employees will know such software operation and software availability are less frequently indicated factors for choosing such software.

3. Small enterprises use both the obligatory registers (functions) and many different optional registers available in the financial-accounting software in their possession. This indicates the search by the entrepreneurs for the methods of making the best use of the software they have and the skills of using various items of information that can be obtained through it.

The continual development of the internet contributed to the development of numerous portals offering accounting e-services. Consequently, the entrepreneurs may not only outsource accounting ledgers to a chosen accounting bureau via the internet but they may also use on their own the chosen accounting software on-line. That possibility has initiated the new stage in the development of IT accounting where the people running a business have access to its data files at any time using the mobile computers, tablets or even advanced mobile phones.

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THE DIGITAL ECONOMY, ICT AND ECONOMIC GROWTH IN THE CEE COUNTRIES

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K e y w o r d s: ICT, digital economy, economic growth, CEE countries.

A b s t r a c t

This paper focuses on the relationship between Information and Communication Technologies, GDP growth and productivity in the Central and Eastern European (CEE) countries. It elaborates on measures of the digital economy/information society, emphasizing the role of complementary factors to ICT that are crucial for the productive use of these General Purpose Technologies. The paper discusses the impact of technical progress, induced by the development of ICT, on sources of economic growth by describing changes in the contribution of ICT capital and non-ICT capital, labour and TFP to GDP growth in the CEE and EU-15 countries.

GOSPODARKA CYFROWA, TIK I WZROST GOSPODARCZY W KRAJACH EUROPY ŚRODKOWO-WSCHODNIEJ

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S ł o w a k l u c z o w e: TIK, gospodarka cyfrowa, wzrost gospodarczy, kraje Europy Środkowo-Wschodniej.

A b s t r a k t

Artykuł koncentruje się na zależnościach między technologiami informacyjnymi i komunikacyjnymi (TIK), wzrostem PKB i produktywności w krajach Europy Środkowo-Wschodniej (EŚW). Omawia różne mierniki rozwoju gospodarki cyfrowej/społeczeństwa informacyjnego, podkreślając rolę czynników komplementarnych wobec TIK, które są najważniejsze dla produktywnego wykorzystania tych technologii ogólnego zastosowania. W artykule przedstawiono wpływ postępu technicznego, indukowanego rozwojem TIK, na źródła wzrostu gospodarczego, opisano zmiany we wkładzie kapitału TIK, pozostałego kapitału, nakładów pracy i TFP we wzrost PKB w krajach EŚW i UE-15.

Introduction

Information and Communication Technologies (ICT) have become ubiquitous in the modern world – they are present in virtually all areas of economic and social life, noticeably changing how people behave and interact with each other, how companies run their businesses and how governments provide public services. It has been emphasized that ICTs are assumed to be, through the channel of technical progress, one of the major determinants of economic changes in the developed and developing countries. These profound changes in work organization, the structure of labour demand, in enterprise business processes, should ultimately result in productivity increases, thus enhancing GDP growth. This in turn, may play a crucial role in the convergence processes between developing and developed economies, by creating a leapfrogging effect related to ICT utilization in developing countries.

The aim of this paper is to elaborate on the sources of economic growth in selected Central and Eastern European (CEE) countries that are Member States of the European Union, to identify in which countries the potential of ICT has been utilized in the most productive way to enhance economic growth. The paper refers to the concept of the digital economy and ICT-driven convergence processes. A special focus was put on human capital, which is a complementary factor required to unlock the potential of ICT. The analysis was conducted at the macro-level, however some remarks also concern micro and meso levels as well.

ICT, productivity and economic growth – literature review

The impact of ICT on economic growth and productivity has often been analyzed with the use of growth accounting methodology as proposed by SOLOW (1957), which was further developed by JORGENSON and GRILICHES (1967), OLINER and SICHEL (2000), and JORGENSON and STIROH (2000). In this approach, the aggregate production function takes the form:

$$Y = Af(K^{NOICT}, K^{ICT}, L^{U}, L^{S}) \tag{1}$$

where:

Y – Gross Domestic Product (GDP),

A – an index of the aggregate state of technology – Total Factor Productivity (TFP),

K – input of physical capital decomposed to K^{NOICT}: non-ICT capital and K^{ICT}: ICT capital,

L – the input of labour decomposed to L^{U}: unskilled labour and L^{S}: skilled labour.

GDP increases when capital accumulation and labour inputs are growing, or when TFP comes into play[1]. Changes in TFP indicate shifts in the relation between measured aggregate inputs (K and L) and outputs (Y), which are assumed to be caused by changes in technology (technical progress) (LIPSEY, CARLAW 2001, pp. 7–11).

ICT may influence GDP (in line with equation 1), in different ways. Firstly, investments in ICT (software, hardware, and infrastructure) lead to capital deepening and growth of the stock of ICT-capital. Secondly, according to the Skill-biased Technical Change hypothesis, implementation of ICT requires highly qualified personnel – as demand for highly educated employees is increasing, the skill structure of the labour force is changing towards a growing share of high quality human capital. This influences the stock of labour, as well as the TFP. Thirdly, technical progress in the ICT-producer sectors (exogenous to the rest of the economy) is transferred to the other sectors (ICT-users) in the form of lower prices (financial external effects) – this in turn should cause higher efficiency of all the production factors and the growth of Total Factor Productivity. Fourthly, ICT is regarded as a General Purpose Technology (GPT) – it generates significant non-financial external effects – the spillover effects, which influence TFP. And finally, higher capital stock, with a better quality of labour resources and technical progress should enhance labour productivity.

Although this framework from neoclassical growth theory provides a solid theoretical background to explain the relationship between technical progress, caused by ICT development, and productivity and economic growth, the statistical data up to the mid 1990s did not confirm it. Discussion and analysis of this phenomenon (called the Solow paradox or productivity paradox) emerged when Robert SOLOW (1987) stated *You can see the computer age everywhere but in the productivity statistics*. The results of research studies on the productivity paradox brought important insights into the mechanism of ICT diffusion, explaining the potential reasons for the paradox. One of the explanations focuses on the concept of complementary factors to ICT investments[2]. It refers to seminal work of MILGROM and ROBERTS (1990), who

[1] The growth accounting methodology, based on this neoclassical framework and widely used in the research studies analysing ICT impact on GDP and productivity growth, enables calculating contribution of each production factor inputs to the economic growth. Technically, the growth rates of production factors are weighted with their respective share in total costs. For example, the contribution of ICT capital to GDP growth is measured as the speed with which ICT capital input grows, multiplied by the share of ICT capital in total costs (for detailed description on the growth accounting methodology see: *Productivity and growth*... (2011) or DE VRIES, ERUMBAN (2015). The review of literature and analysis based on data from the Total Economy Database presented in this paper relates to this methodological approach.

[2] The other explanations emphasise the measurement issues, problems of lags, redistribution and dissipation of profits, and mismanagement of ICT – see (BRYNJOLFSSON, SAUNDERS 2010, YANG, BRYNJOLFSSON 2001).

developed the conceptual model of interrelated changes connected with the introduction of CAD/CAM technology in one of the American companies. In general, the complementarity hypothesis states that utilization of the full potential of new technologies (including ICT) requires complementary changes (investments) at the micro-level (work organization, investing in employees' skills, introducing changes into business processes) as well as at the macro--level (increasing the stock of available human capital, introduction of institutional changes supporting the flexibility of the markets and thus, the diffusion of new technologies). Consequently, the introduction of these complementary changes to ICT takes time – thus the positive outcomes of ICT investments may be recorded in the statistics with some delay, which is consistent with the „lags" argument explaining the Solow paradox.

Provided that these arguments are correct, we could expect that a positive relationship between ICT and productivity would be confirmed at first in highly developed economies, which are leaders in ICT implementation, and then in developing countries. Indeed, the first research studies pointing out the positive impact of ICT on productivity and economic growth were focused on the highly developed economies – mainly the United States (see: JORGENSON, STIROH 2000, JORGENSON 2001, OLINER, SICHEL 2000, STIROH 2002).

This positive relationship has been revealed relatively recently also for developing countries, including CEE economies. PIATKOWSKI (2003, 2004) proved that ICT had a noticeable contribution to GDP and labour productivity growth in Central and Eastern European countries[3] between 1995 and 2001. His analysis showed that the contribution of ICT capital to GDP growth was higher by 0.61 pp than the EU-15 average in five CEE countries that joined the EU in 2004 (Czech Republic, Hungary, Poland, Slovakia and Slovenia). These countries (except Slovenia) were also characterised by a higher than EU-15 average total contribution of ICT to economic growth. VAN ARK and PIATKOWSKI (2004) demonstrated that ICT capital contributed to the labour productivity growth in CEE countries to the same extent as in EU-15 countries. Consequently, a significant role for the convergence of ICT and for labour productivity between CEE and EU-15 countries was confirmed. DIMELIS and PAPAIOANNOU (2010) found a positive and significant impact of ICT on productivity growth in 42 developed and developing countries (albeit larger in the group of developed countries) in the period 1993–2001. Finally, JORGENSON and VU (2010)[4] found that exceptionally high GDP growth rates between 2000–2004 in Eastern Europe was a result of dynamic TFP growth

[3] The analysis covered Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia, Slovenia, and Russia (CEE countries), EU-15 and the US.

[4] They analyzed the impact of ICT equipment and software on the resurgence of world economic growth in 122 economies between 1989 and 2008, distinguishing seven regions and 14 major world economies.

– in this period TFP contribution to GDP growth was estimated at 5.2% ppa. This value was unreachable for the other regions of the world, even to Developing Asia („only" 2.64% ppa). While in 2004–2008, the contribution of capital and labour to GDP growth increased substantially (to 1.1% ppa and 0.91% ppa respectively), and changes in TFP were still the main source of economic growth. Moreover, research studies on the relationship between ICT, productivity and GDP growth (in developed as well as developing countries) have been focusing more and more on the role of ICT complementarities that may enhance productivity. It became evident, that the productive utilization of ICT is dependent on a wide availability of skills – or more broadly, human capital (BRESNAHAN et al. 2002, ARVANITIS, LOUKIS 2009, ACEMOGLU 2002).

Taking into consideration the specific situation of the formerly centrally-planned economies, PIATKOWSKI (2004, p. 27), stressed the ICT potential would not be fully utilised in CEE countries without changes in the institutional and regulatory environment (macro scale), as well as without changes in the structure, organization and business model of companies – especially an improvement of the digital skills of the labour force (micro scale). Similar conclusions were presented by VAN ARK and PIATKOWSKI (2004, p. 238).

Measuring the digital economy and the role of ICT complementarities

Although there are a number of approaches to measuring the digital economy/information society, we will focus on two indexes: NRI and DESI. The first one – Networked Readiness Index (NRI) – covers around 140 countries and measures the extent to which the economy is prepared to apply the benefits of ICT to promote economic growth and well-being (including the ICT impact on productivity). NRI comprises 4 sub-indexes which are known as the: environment, readiness[5], usage and impact sub-indexes. The overall value of the NRI (between 1 and 7) is calculated as the average of these four sub-indexes. The ranking created on this basis enables researchers to analyse the distance travelled by each country in real and relative terms.

The relative changes are measured by the position of each country in terms of the ranking in consecutive years. From this point of view, we may distinguish three groups of economies within the CEE countries. The first group consists of Lithuania, Slovenia, Czech Republic and Poland, which maintained

[5] Within this subindex, one pillar is devoted to the skills readiness that is measured by four variables: quality of the educational system, quality of math and science education, secondary education gross enrolment rate and adult literacy rate. The detailed description of the NRI methodology may be found in (*The Global Information*... 2014, p. 3–8, 323–328).

their positions in the ranking. The second group – countries that improved their relative situation – includes Latvia (moved from 41st to 33rd place), Slovakia (64th to 59th), Romania (67th to 63rd) and Estonia (the best performing CEE country in this ranking, at 22nd place in 2015). In the third group – countries which lost some ground – we find Hungary (moved down by 10 positions to 53rd place), Croatia (dropped 9 positions to 54th place), and Bulgaria (from 70th to 73rd place).The real changes may be calculated as the difference between NRI values in 2015 and 2012. From this perspective, it should be emphasised that all CEE countries improved their performance[6], however perceptible differences between countries are noticeable. The biggest steps forward were achieved by Latvia (an increase in NRI of 0.4) and Slovakia (0.29), the slightest steps forward were by Slovenia (0.06) and Hungary (0.04). Relatively high increases of NRI were reported in Estonia and Romania (0.25), and in Poland (0.22). Although we witnessed slow convergence in NRI numbers between the CEE and EU-15 countries, the NRI value in 2015 for almost all CEE economies was still below the EU-15 average – except for Estonia (Fig. 1). Estonia was the only CEE country with an NRI exceeding 5 points. Next to Estonia, in the group of best performing CEE countries we may include Lithuania, Latvia, Slovenia and the Czech Republic. By contrast, Bulgaria and Romania, which together joined the EU in 2007, are classified as the worst performing CEE economies.

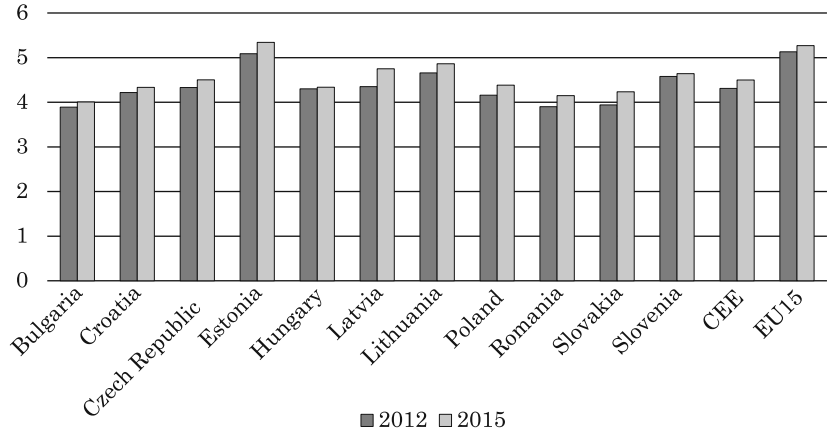
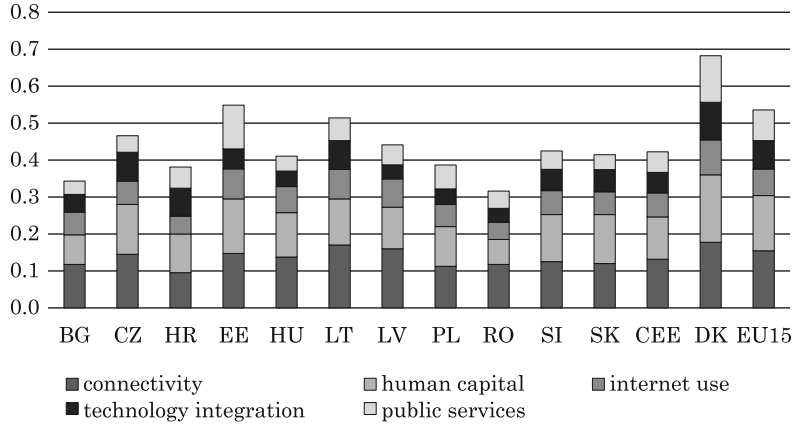


Fig. 1. NRI indexes in selected countries (2012, 2015)
Source: own elaboration based on NRI data.

[6] The average growth of NRI for CEE countries amounted to 0.19, while in EU-15 it was 0.14.

The other index – DESI – is related to the Digital Agenda for Europe (DAE). The DAE (2010) adopted in March 2010 is an EU-wide initiative within the framework of Europe 2020 Strategy. DAE consists of 7 pillars – each one defines goals and actions required to meet these goals[7], ranging from typical technological issues (e.g. development of fast, broadband infrastructure) to soft, but crucial ICT complementarities (e.g. development of digital literacy and ICT skills). To inform stakeholders about the progress of DAE, a tool – the Digital Agenda Scoreboard – was developed. However, in February 2015 the European Commission presented the Digital Economy and Society Index (DESI), that captures 30 indicators on EU digital performance within 5 dimensions: connectivity, human capital, use of Internet, integration of Digital Technology, and Digital Public Services[8]. The results show that although the individual Member States made progress towards a digital economy, there are still perceptible differences between countries. Analysis of DESI leads to similar conclusions as in the case of the NRI index. The best performing CEE country is Estonia – the only one with a DESI higher than the EU-15 average (Fig. 2).



BG – Bulgaria, CZ – Czech Republic, HR – Croatia, EE – Estonia, HU – Hungary, LT – Latvia, LV – Lithuania, PL – Poland, RO – Romania, SI – Slovenia, SK – Slovak Republic

Fig. 2. DESI 2015 by dimensions

Source: own calculations based on DESI results: https://ec.europa.eu/digital-agenda/en/progress-country.

[7] 101 specific policy actions altogether: 78 taken by the European Commission, 23 proposed to the Member States.

[8] DESI is a weighted average of performance scores in these five dimensions, where connectivity and human capital account for 25% of the total score (each), technology integration for 20%, and the use of Internet and digital public services for 15% (each). It is measured on a scale of 0–1, with higher values representing better performance. Up to now, DESI covers two years: DESI 2014 (based on data available mostly from 2013) and DESI 2015 (based on data available mostly from 2014).

The reason behind this is twofold: Estonia is one of the best in Europe in terms of the utilization of digital public services (they are second place in the EU-28 as a leader in the availability of pre-filled online forms and the use of ePrescriptions) and Estonians make wide use of the Internet (fourth place in EU-28). The least performing CEE country – Romania – is the last one in the EU-28 ranking, with a score less than half of Denmark (the best EU-28 country). It shows the scale of the gap from one side, and the unexploited potential of the digital economy in countries like Romania, Bulgaria or Croatia, from the other side. Most of the CEE countries (Latvia, Slovenia, Hungary, Slovakia, Poland, Croatia, Bulgaria and Romania) have been categorised as low-performing economies. Only Estonia, Lithuania and the Czech Republic have entered the group of medium-performing countries. The biggest gap between the CEE and EU-15 counties is related to the availability of digital public services (0.18 difference in scores), which is a crucial factor from the point of view of businesses and individuals. The other important ICT complementarity – human capital – is also not a strong asset of CEE countries (a 0.14 difference in scores). It seems, that connectivity is still weaker in CEE countries, which combined with low digital skills translates into relatively low levels of business digitalization and e-commerce readiness.

Sources of economic growth in CEE countries – the role of ICT

Impact of ICT on economic growth was analyzed in selected CEE countries[9] for two periods: 1995–2003, and 2004–2014. The first period covers the post-initial stage of transition of the CEE to a market economy that took place after introducing the main reforms, and the recession of early 2000. The other period starts in the year of the accession of 5 CEE countries into the EU (on the 1st of May 2004, Bulgaria and Romania joined on the 1st of January 2007) and captures the effects of the financial crisis and the global recession[10].

Although between 1995 and 2003 average GDP growth in CEE countries was slightly below the EU-15 average, this situation reversed in the next period. Nevertheless, there were perceptible differences between CEE countries – Hungary and Slovenia faced relatively slow GDP growth, while Poland, Slovakia and Romania registered exceptionally high growth rates (Tab. 1).

[9] The analysis covers Bulgaria (BG), Czech Republic (CZ), Hungary (HU), Poland (PL), Romania (RO), Slovak Republic (SK), Slovenia (SI) in the group of CEE countries, and EU-15 countries (as a point of reference). Estonia, Latvia, Lithuania and Croatia were excluded from analysis due to lack of data on ICT capital in the Conference Board 2015 database.

[10] Years 1990–1994 (the very beginning of the transition process) were intentionally excluded from the analysis, because of the remarkable instability of CEE economies at that time and the low reliability of available statistical data for that period.

Changes in labour quality were quite similar in the EU-15 and CEE countries in both periods, while changes in labour quantities followed different patterns. Between 1995 and 2003 employment rose in the EU-15, while CEE countries witnessed shrinking labour numbers (an increase in employment was registered only in Hungary).

In 2004–2014 the average growth in employment was comparable in the EU-15 and CEE countries, with large discrepancies within the CEE (a relatively high increase in Poland and Slovakia, and a decrease in Romania and Hungary). The characteristic feature of the CEE countries is much higher growth of ICT capital in both periods in comparison with the EU-15, which shows that CEE countries focused on investing in ICT infrastructure to catch up to the more developed economies. The growth of non-ICT capital was also higher in the CEE during both periods[11].

Table 1

Growth rates (log change) in EU-15 and CEE countries

Specification	EU-15	CEE	BG	CZ	HU	PL	RO	SK	SI
GDP rate of growth 1995–2003	3.14	3.10	1.01	2.56	3.12	4.35	2.39	4.08	4.17
GDP rate of growth 2004–2014	0.93	2.67	2.85	2.32	1.23	3.89	3.12	3.83	1.48
Growth of Labour Quality 1995–2003	0.50	0.44	0.60	0.36	0.46	0.24	0.35	0.27	0.80
Growth of Labour Quality 2004–2014	0.34	0.43	0.63	0.29	0.60	0.32	0.39	0.30	0.51
Growth of Labour Quantity 1995–2003	1.30	-0.90	-1.05	-0.72	0.25	-0.44	-3.11	-1.05	-0.19
Growth of Labour Quantity 2004–2014	0.14	0.12	0.33	0.32	-0.68	1.12	-0.99	1.04	-0.33
Growth of ICT capital 1995–2003	13.36	22.14	17.62	22.18	20.54	30.29	23.93	22.81	17.61
Growth of ICT capital 2004–2014	10.24	16.85	19.05	8.98	15.49	18.12	24.02	21.12	11.16
Growth of non-ICT capital 1995–2003	2.77	3.03	4.59	4.43	3.72	2.95	-1.82	2.29	5.04
Growth of non-ICT capital 2004–2014	1.80	3.21	7.79	3.74	1.55	3.34	1.51	1.53	3.03

Source: own elaboration based on the Total Economy Database. Average for each period.

The main source of economic growth in CEE countries between 1995 and 2003 was TFP – its average growth accounted for half of GDP growth in that period (for the EU-15 it was „only" 17%), which means that spillover effects, including those connected with ICT, played an important role in the development of CEE economies. However, this process was not distributed evenly – in Romania large relative TFP growth balanced the negative contribution of labour and non-ICT capital, while in Bulgaria TFP contribution was large, but negative. A positive impact of TFP on economic growth was present in Poland, Slovakia and Slovenia (Tab. 2).

[11] Romania is an interesting example – it registered the highest growth of ICT capital in years 2004–2014, and was the only CEE country with negative growth of non-ICT capital between 1995 and 2003.

As a result of the high dynamics of ICT investments in the years 1995–2003, the average contribution of ICT capital to GDP growth in CEE countries exceeded EU-15 results. However, non-ICT capital was still more important for economic growth than ICT capital (even in Bulgaria, where the contribution of both types of capital was extraordinarily high). Although in 2004–2014 TFP did not contribute as much to GDP growth as in the previous period, it was still positive in CEE countries (with the exception of Bulgaria and Hungary), while in the EU-15 it became negative. The main drivers of economic growth in the EU-15 countries were non-ICT and ICT capital. The same happened in CEE countries – the contribution of ICT capital to GDP growth was crucial in Hungary and highly important in Bulgaria, Slovenia and Slovakia.

Table 2

Contribution of production factors to GDP growth in EU-15 and CEE countries

Specification	EU-15	CEE	BG	CZ	HU	PL	RO	SK	SI
1995–2003									
Labour Quality	0.31	0.27	0.3	0.21	0.27	0.16	0.22	0.11	0.59
Labour Quantity	0.81	-0.54	-0.54	-0.45	0.14	-0.29	-2.02	-0.42	-0.19
ICT capital services	0.61	0.72	1.09	1.00	0.94	0.44	0.36	0.65	0.55
Non-ICT capital services	0.92	1.10	1.97	1.77	1.27	0.96	-0.64	1.32	1.05
TFP growth	0.52	1.55	-1.82	0.03	0.50	3.08	4.46	2.42	2.17
2004–2014									
Labour Quality	0.21	0.25	0.34	0.17	0.36	0.18	0.25	0.11	0.37
Labour Quantity	0.07	0.00	0.1	0.19	-0.41	0.65	-0.66	0.39	-0.26
ICT capital services	0.48	0.93	1.43	0.26	1.63	0.75	0.39	1.48	0.59
Non-ICT capital services	0.62	1.18	3.07	1.36	0.46	1.31	0.52	0.83	0.73
TFP growth	-0.42	0.30	-2.09	0.33	-0.82	1.00	2.62	1.01	0.05

Source: own elaboration based on the Total Economy Database. Average for each period.

Positive changes in labour quality were often counterbalanced by the negative contribution of shrinking employment numbers – as in the case of Hungary, Romania and Slovenia. Generally, the contribution of labour quality to GDP growth was higher in the EU-15 than in CEE countries.

Human capital and labour productivity

The modern, technology-savvy economies require high and strong qualifications in science and technology. Thus, the concept of Human Resources for

Science and Technology (HRST)[12] seems to be an appropriate approach to assess the potential of human capital in the CEE and EU-15 countries, treated as complementarity to ICT investments[13]. Data shows that although HRSTE levels in the group of CEE countries were lower than in the EU-15[14] both in 2003 and 2013, the convergence process was in place. The best performing CEE countries are Estonia and Lithuania (the only countries above the EU-15 average). Poland, Slovakia and the Czech Republic registered a dynamic increase in the percentage of individuals who completed tertiary education (by 86%, 72% and 71% respectively). However, Slovakia and the Czech Republic, along with Bulgaria and Romania, were still the worst performing CEE countries in 2013 when taking the HRSTE into account (Fig. 3*a*).

Analysis of HRSTO reveals the existence of a divergence processes between the EU-15 and CEE countries, which may imply that demand for highly skilled individuals grew faster in the EU-15 than in CEE economies[15], as a consequence of weaker ICT readiness in the latter group of countries. The best performing CEE countries in 2013 were Lithuania, Slovenia, Estonia and the Czech Republic, but none of these economies reached the average of the EU-15 (Fig. 3*b*). The lowest share of individuals working in S&T occupations was registered in Slovakia, Bulgaria and Romania[16]. A large gap between the EU-15 and CEE countries remains in the case of HRSTC. The share of individuals who have completed third level education and are employed in S&T occupations in the EU-15 was 5.8 pp higher than in CEE economies in 2013[17]. A significant increase of this statistical share was recorded in Latvia, Lithuania and Poland between 2003 and 2013 (Fig. 3*c*). Even in the best performing CEE countries (as well as in the EU-15) a relatively large part of the S&T positions

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[12] *Canberra Manual* (1995) presents concepts, methods and definitions related to Human Resources in Science and Technology. From the point of view of this paper, the following categories are most important: HRST – persons who successfully completed third level education or are employed in S&T occupations (the broadest category); HRSTE – people who successfully completed third level education (since 2014, according to ISCED 2011 – levels 5 to 8); HRSTO – persons who are employed in science and technology occupations as „Professionals" or „Technicians and associate professionals" (ISCO-08 major groups 2 and 3), HRSTC – individuals who have successfully completed a tertiary level education and are employed in S&T occupations.

[13] Skorupinska and Arendt (2015) argued that human capital in CEE countries is the main complementary factor to ICT investment enhancing ICT-driven labour productivity.

[14] The percentage of the population in the age groups 25–64 years in 2003 and 2013 is taken into account in the analysis. The age group is consistent with the employment goal of Europe 2020. Differences between 2003 and 2013 (2003 is the last year of the first period used in the analysis of sources of GDP growth, 2013 is the last year in the other period, for which data is available in the Eurostat database) describe developments in each country.

[15] Growth of HRSTE and HRSTO led, by definition, to an increase in HRST in the EU-15 and CEE countries (Fig. 3*d*).

[16] The dynamics between 2003 and 2013 were also poorest in these three countries, especially in Slovakia, where the percentage of people working in S&T occupations dropped from 19.9% to 19.6%.

[17] Only Lithuania reached the EU-15 average.

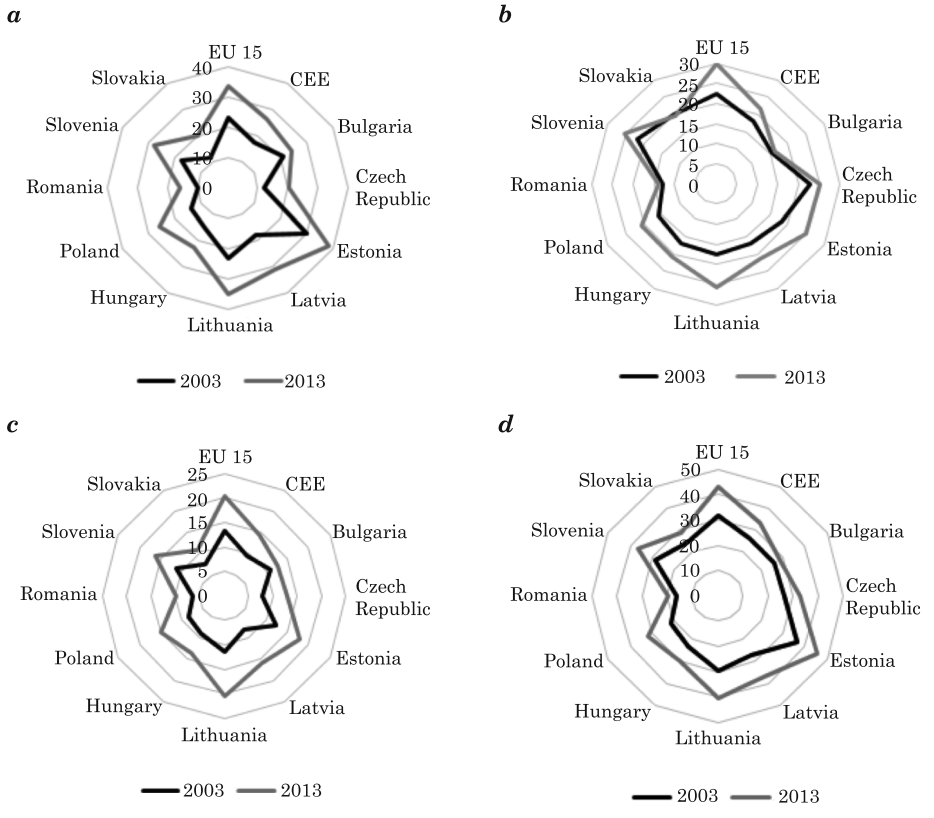

Fig. 3. Human Resources in Science and Technology: *a* – HRSTE, *b* - HRSTO, *c* – HRSTC, *d* - HRST
Source: Eurostat database.

are occupied by individuals who do not possess tertiary education, which means that some portion of highly educated people were (formally) underemployed.

Although CEE countries are still lagging behind the EU-15, as far as the HRST measures are concerned, undoubtedly the quality of human capital (at least formally) has improved in recent years, which shall (in line with theoretical assumptions) result in an increase of labour productivity. Simultaneously, the growing importance of ICT utilization for economic growth in these countries also should, as growth theory argues, enhance labour productivity. Indeed, labour productivity data shows a significant improvement of GDP per person employed in CEE countries between 1995–2003 and 2004–2015 (Fig. 4).

Productivity in CEE economies increased on average by 47%, while only by 10% in the EU-15 countries. As a result, the productivity gap between the two

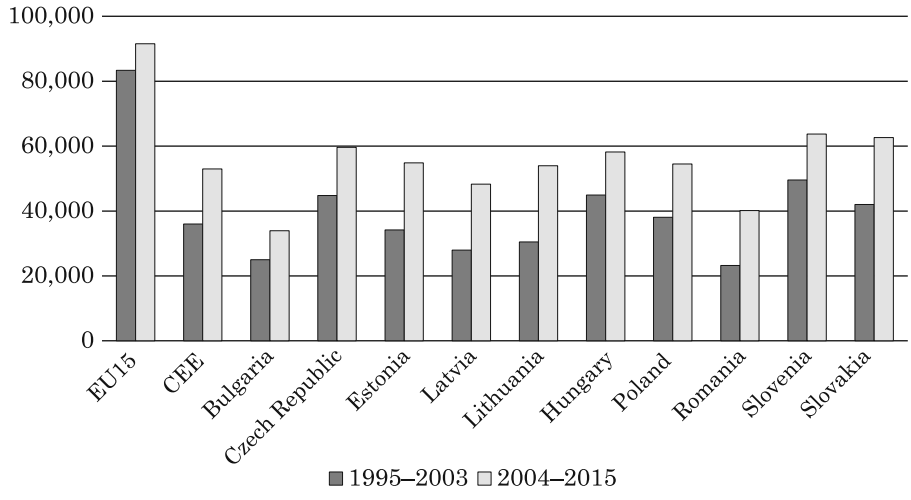

Fig. 4. Labour productivity per person employed (in 2014 US$ – converted to 2014 price level with updated 2011 PPPs)
Source: Total Economy Database. Average for each period.

regions was reduced by 8,756 USD. Lithuania, Latvia, Romania and Estonia gained most (productivity growth by 77%, 73%, 73% and 61%, respectively). However, even the best performing CEE countries – Slovenia and Slovakia did not reach the EU-15 average (63,704 USD and 62,616 USD compared to 91,551 USD respectively[18]), while in the worst performing CEE economies – Bulgaria and Romania – labour productivity was more than two times lower than the EU-15 average (2.7 and 2.3 times respectively). Undoubtedly, we can see a positive relationship between the growth of ICT-capital and human capital as an important complementarity to ICT. Furthermore, it should provide an improvement in labour productivity for CEE countries.

Conclusions

Since the beginning of the transition, ICT investments and utilization of these modern technologies have had a positive impact on the economic growth of CEE countries – directly through the contribution of ICT capital, and indirectly through spillover effects captured by TFP. Leaving aside the differences between the analyzed CEE economies, we may conclude that the stock of ICT capital grew faster in these countries in comparison to the EU-15

[18] Taking as the reference year 2015, only these two CEE countries had higher labour productivity levels than Portugal, which was the worst performing economy in the EU-15.

average, which means that the CEE tried to close the existing ICT-infrastructure gap. ICT-capital was also an important factor contributing to GDP growth in CEE countries, especially between 1995 and 2003. Moreover, TFP growth reached extraordinarily high levels in these economies, enabling them to maintain a high rate of GDP growth, even during the time of the latest world economic crisis.

However, the analysis of different measures of the digital economy shows that although investments in ICT infrastructure are crucial, complementary investments that create a digital friendly environment in which ICT may be used more efficiently are even more important. The underperformance in the area of ICT complementarities may be perceived as the main weakness of CEE countries, as it hampers their readiness to become a digital economy. The NRI and DESI indexes unequivocally point to Estonia as the best performing CEE country, that is followed by (depending on the index) Lithuania, Latvia, Slovenia and the Czech Republic. By contrast, Bulgaria and Romania are classified as the worst performing CEE economies. Similar conclusions stem from the analysis of HRST indexes that describe the quality of human capital. The best performing CEE economies are Estonia and Lithuania, while the worst performers are Bulgaria and Romania.

This relatively poor performance of most CEE countries (in comparison with the EU-15 average) translates into the less efficient use of available ICT and potentially lower enhancement of GDP and productivity growth. Although it was not possible to assess the ICT contribution to economic growth in Estonia, Lithuania and Latvia, where theoretically ICT should have been utilized more efficiently than in other CEE countries, there is no doubt that Bulgaria and to some extent Romania did not take full advantage of what ICT had offered to their countries.

This paper focused on these macro-level ICT complementarities, which are usually analyzed in the literature. It seems, however, that other determinants may play an important role regarding the enhancing of ICT-driven GDP and productivity growth (in developed and developing countries). One of those is a Business Digital Divide, defined as disparity between the effective use of ICT for productivity gains between small and medium-sized enterprises (SMEs) and large companies (WIELICKI 2008, WIELICKI, ARENDT 2010). Some research studies have shown that the use of ICT-based solutions at too low and at insufficient levels by SMEs is one of the main reasons for their relatively low performance when compared to large corporations, especially in the less developed countries (ITC 2015). While SMEs generate a substantial part of GDP, the Business Digital Divide may have a major macroeconomic effect; with its scale related to the size of the economy (this could explain to some extent, why Estonia and Slovenia achieved better results than Bulgaria or Romania). Obviously, this problem requires thorough research.

In summary, ICT-capital has become an important production factor in the CEE countries, and although there is still a gap between the EU-15 and CEE economies as far as ICT infrastructure is concerned, CEE countries have recently witnessed a perceptible development in this area. However, more productive utilization of available ICT is limited by an insufficient level of ICT complementarities, which is especially noticeable in lower-performing countries such as Bulgaria, Romania and Hungary. Without further investment in ICT complementarities, CEE countries will continue to lag behind the EU-15 economies.

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REINSURANCE IN MANAGING CATASTROPHE AND FINANCIAL RISK IN THE POLISH MARKET DURING THE YEARS 2010-2014

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K e y w o r d s: reinsurance, financial insurance, catastrophe insurance.

A b s t r a c t

Reinsurance plays an important role in managing the risk in an insurance company. Its crucial importance is especially visible in the situation when there is a growth of catastrophic and financial risks on the market. Such a situation has occurred in the Polish market since 2010. In order to achieve financial stabilisation, insurance companies apply reinsurance more frequently so they cede the risk on the reinsurer together with an appropriate part of the premium for the given risk. Catastrophic risk includes, among others, the following groups of insurance: class II- 5, 8, 9, 11 and financial risk in groups 14 and 15. In those insurance groups, the range of reinsurance applied (measured with a percentage of premium given to reinsurers by insurance companies and the percentage of damages received from them in relation to total paid out compensations) was the highest in the analyzed period of time. Research confirmed the hypothesis that together with the growth of catastrophic and financial threats in the Polish economy the range of reinsurance applied in insuring those risks also increases.

REASEKURACJA W ZARZĄDZANIU RYZYKIEM KATASTROFICZNYM I FINANSOWYM NA RYNKU POLSKIM W LATACH 2010–2014

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S ł o w a k l u c z o w e: reasekuracja, ubezpieczenia finansowe, ubezpieczenia katastroficzne.

A b s t r a k t

Reasekuracja odgrywa ważną rolę w zarządzaniu ryzykiem w zakładzie ubezpieczeń. Szczególne jej znaczenie uwidacznia się w sytuacji, gdy na rynku występuje wzrost m.in. ryzyka katastroficznego i finansowego. Taka sytuacja występuje na rynku polskim już od 2010 roku. Zakłady ubezpieczeń

w celu m.in. stabilizacji swoich wyników finansowych stosują w takim przypadku w coraz szerszym zakresie reasekurację, czyli proces cedowania ryzyka do reasekuratora wraz z odpowiednią częścią składki pozyskanej za dane ryzyko. Ryzyko katastroficzne obejmują m.in. następujące grupy ubezpieczeń działu II – 5, 8, 9, 11, natomiast ryzyko finansowe – grupy 14 i 15. Właśnie w tych grupach ubezpieczeń zakres stosowanej reasekuracji (mierzony wielkością procentową składki przekazanej przez zakłady ubezpieczeń reasekuratorom oraz wielkością otrzymanych od nich odszkodowań w stosunku do całości wypłaconych odszkodowań) w analizowanym okresie był największy. Badania potwierdziły przyjętą hipotezę, że wraz ze wzrostem zagrożeń katastroficznych i finansowych w gospodarce polskiej rośnie też zakres stosowanej reasekuracji w ubezpieczeniach tych ryzyk.

Introduction

The business slowdown that began in 2009 has been observed in many countries including Poland. This has been the result of the world financial crisis which started in the USA in 2008, and has had a direct influence on all the business entities in the market, including the insurance companies. In such a situation, the risk of doing business grows substantially which leads to the growth of a loss ratio of financial influence, for example credit insurance and insurance bonding. What is more, due to the fact that insurance companies being in a difficult situation on the market have not been able to achieve satisfactory results with their own investments and have been forced to cede the risk onto other entities, namely reinsurers. In previous years, when it was possible to get high rates of return on investment, insurance companies often decided to resign from reinsurance and leave the risk as a sum deductible. Apart from the fact that the probability of financial risks increased, catastrophic events which directly influenced the profitability of the technical activity of insurance companies also escalated. Catastrophy is defined as „an event which happens suddenly and brings tragic effects" (KOPALIŃSKI 2000). Catastrophic risk appears when „two factors appear simultaneously – threat and vulnerability to dangers" (HOFFMAN 2002). In practice, catastrophic risk is referred to as an unexpected and sudden event of massive proportions caused by natural factors which endanger human lives and their activities (PAJEWSKA-KWAŚNY, TOMASZEWSKA 2002). Basic terms connected with catastrophic risk are defined in the state of emergency act (*State of Emergency Act... 2002*). In Poland between 1997–2011 floods were of a catastrophic character. They resulted in losses estimated at up to 12 million PLN (year 1997 and 2010)[1]. These losses were financed mainly by the emergency relief system and insurance scheme. Especially in the year of 2010, the losses turned out to be burdensome for insurance companies as the amount of damage reported was

[1] Estimates presented by The Ministry of Internal Affairs and Administration of that time (website: www.mswia.gov.pl, retrieved: 04.06.2011).

over 270 thousand and the degree of dispersion covered a huge area starting from the basin of the upper source of the Vistula up to the lower course of the Odra and Bogatynia where the loss was especially severe. Insurance companies and reinsurers estimate the total damage caused by the disaster at about 1.7 million PLN[2]. Consequently, the insurance system participation in compensation for damage was only about 14%. Therefore, almost 86% of the property was not covered by the insurance system. The loss was covered by the national government or from local government budgets. Such a structure of funding calamity loss means that all tax-payers finance the loss of people or institutions which have not taken out any insurance. Such a situation seems to be unfair and unacceptable in the long run. From the point of view of insurance companies, such considerable loss is connected with the necessity to reinsure catastrophic risks significantly in order not to lose the capability to cover any loss.

Reinsurance

Reinsurance is one of the basic tools in the process of risk management in insurance companies. It is „an agreement concluded between the insurer and reinsurer on the basis of which there is a division or waiver of risks in such a way that the insurer remains solely responsible directly for the insured" (MONKIEWICZ 2000). There are both outward and inward types of reinsurance (the second type of reinsurance will not be presented in the article due to the very limited scope of application on the market in class II). Outward reinsurance is „an agreement in which an insurance company cedes the whole or part of the insured risk together with the appropriate part of the premium to another insurance company which undertakes to pay this insurance company a certain part of losses and claims paid to the insurer" (GĄSIORKIEWICZ 2014). The scope of outward reinsurance applied in property insurance with reference to the gross premium written as well as gross losses and claims paid is presented in Figure 1. The gross premium in insurance class II for the years 2010–2014 was 124.318 billion PLN and the reinsurance amount of the gross premium was written for 17.522 billion PLN (14.09%), while gross losses and claims paid were 68.33 billion PLN and the reinsurance amount constituted 10.768 billion PLN (15.75%). The reinsurance amount of the gross premium was the highest in the year 2013 – 14,2% and was the lowest in the year 2010 – 12.2%. The reinsurance amount in losses and claims paid was the highest in the year 2013 – 17.9% and was the lowest in the year 2011 – 14.2%.

[2] Data presented by Polish Financial Supervision Authority (website: www.knf.gov.pl, retrieved: 01.10.2015).

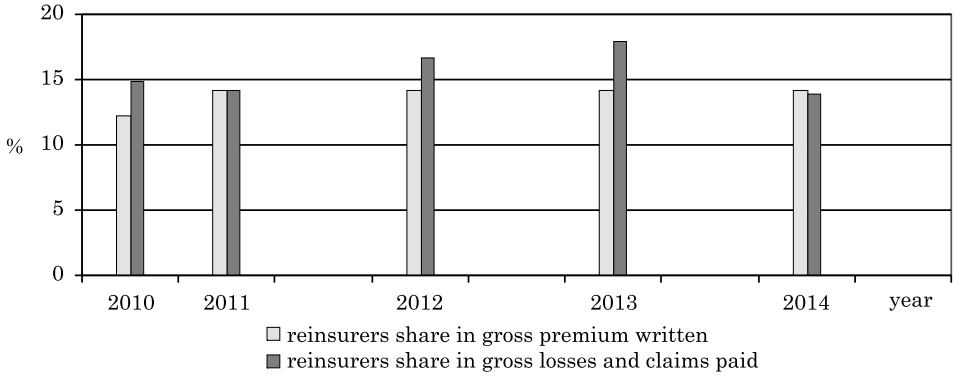

Fig. 1. Outward reinsurance – reinsurers share in the premium and gross losses and claims paid in class II

Source: own elaboration based on: *Opracowania – rynek ubezpieczeń*, available on the Internet: <www.knf.gov.pl/opracowania/rynek ubezpieczeń> (access: 1.10.2015), PFSA, Warsaw.

From the class II groups, the highest level of outward reinsurance was observed during the years 2010–2014 and it appeared in groups 4, 5, 7, 8, 9, 11, 12, 14, 15 (Fig. 2), especially in the case of aircraft insurance, both aircraft liability (group 11 – 72.9% in year 2011, 68.3% in year 2013, 67.2% in year 2014), and aircraft hull insurance (group 5 – 70.7% in year 2014, 61.9% in year 2013). The lowest level of reinsurance was in financial insurance; when compared to the remaining groups of class II, it was considerably higher. In group 14 (credit insurance), during the year 2014 outward reinsurance (the reinsurance amount for the gross premium written) amounted to about 48.3% and in the year 2012 44.1%. In group 15 (eligible cover), 47.9% in the year 2013 and 47.8% in the year 2011.

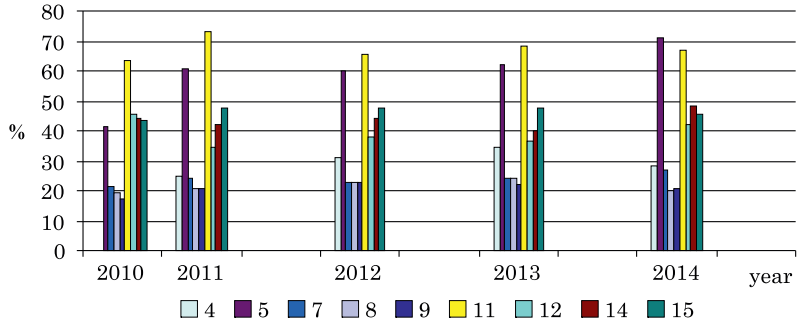

Fig. 2. Groups of class II with the highest reinsurers share in gross premium for the years 2010–2014

Source: own elaboration based on: *Opracowania – rynek ubezpieczeń*, available on the Internet: <www.knf.gov.pl/opracowania/rynekubezpieczen> (access: 1.10.2015), PFSA, Warsaw.

The particular involvement of reinsurers during the years 2010–2014 in group 5 (aircraft hull insurance, insurance covering damage in aircraft) and in group 11 (general liability insurance, aircraft liability, together with carrier insurance) is presented in Figure 3, which illustrates the reinsurer share of the gross premium written. This share is constantly growing. This is most likely due to the fact that every day over 25000 aircraft operate in European airspace and the number is rising. Such growth obviously influences the probability of accidents occurring (*White Paper*... 2001).

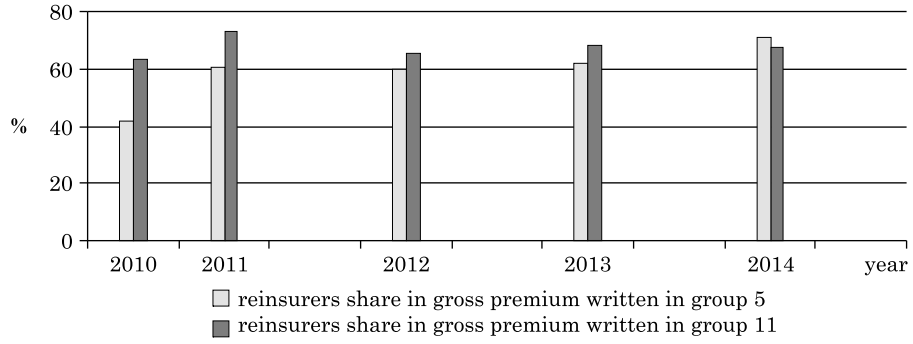

Fig. 3. Outward reinsurance – reinsurers share in the gross premium written for groups 5 and 11
Source: own elaboration based on: *Opracowania – rynek ubezpieczeń*, available on the Internet: <www.knf.gov.pl/opracowania/rynek ubezpieczeń> (access: 1.10.2015), PFSA, Warsaw.

What is more, in such situations the number of casualties is relatively high (not to mention the damage caused to property) and the total number of insurance indemnities and claims paid by the insurers amounts to between several million and tens of millions of dollars per each event. Taking into consideration the fact that over the past two years about 2.3 billion people per year worldwide travel (the trend remaining upward), there can be assurance that the number of victims of car accidents will rise, although when translated into the number of flights the figure is declining (*Press Release IATA*... 2011). Gross losses and claims paid in group 5 between 2010–2015 amounted to a total of 154.566 million (Fig. 4), an on sum deductible of 33.320 million PLN (21.56%), and a reinsurers share of 121.246 million PLN (78.44%). The highest reinsurers share was in the year 2012 – 21.225 million PLN (94.83%) and the lowest was in the year 2013 – 3.119 million PLN (89.75%). Gross losses and claims in group 11 between 2011–2014 were on a much lower level and amounted to 30.049 million PLN (Fig. 5), an on sum deductible of 9.571 million PLN (31.8%) and a reinsurers share of 20.478 million PLN (68.2%). The highest reinsurers share was in the year 2014 – 79.2% and the lowest was in 2012 – 26.5%. Groups 8 and 9 class II include risks which according to

insurance companies cause catastrophic events. Within group 8, these include hurricanes, heavy rainfall, earthquakes, floods (and other elements), storms, explosions and fires; and within group 9 these include hail or frost as well as a „different causes" definition that includes spring ground frosts and the negative effects of overwintering and droughts. In about 94% of insurance policies these constitute main types of insurance risks[3].

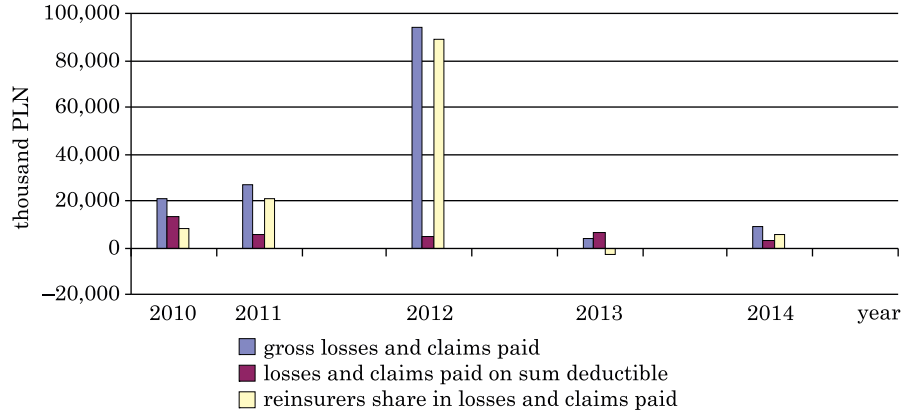

Fig. 4. Losses and claims paid in group 5
Source: own elaboration based on: *Opracowania – rynek ubezpieczeń*, available on the Internet: <www.knf.gov.pl/opracowania/rynek ubezpieczeń> (access: 1.10.2015), PFSA, Warsaw.

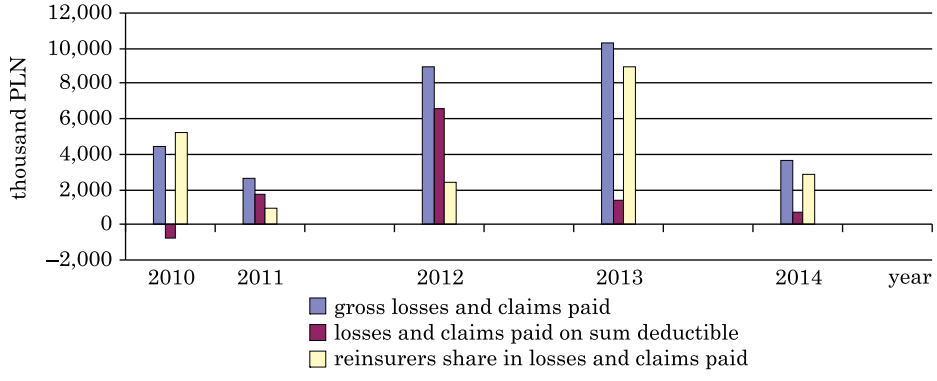

Fig. 5. Losses and claims paid in group 11
Source: own elaboration based on: *Opracowania – rynek ubezpieczeń*, available on the Internet: <www.knf.gov.pl/opracowania/rynek ubezpieczeń> (access: 1.10.2015), PFSA, Warsaw.

[3] Data presented by The Ministry of Agriculture and Rural Development (website: www.minrol.gov.pl/Ministerstwo, access: 01.10.2015).

The risk of traffic accidents is also included into catastrophic risks by insurance companies. According to statistical annual and quarterly reports on the insurance market which are posted on the internet by the Polish Financial Supervision Authority, the exact amount of total direct damage caused by disasters in individual years cannot be directly read. However, sometimes the PFSA includes such information as additional data. Accordingly, the gross amount of claims from catastrophic events in the year 2013 was estimated in class II at 478.85 million PLN which constitutes 3.1% of all gross losses and claims paid in 2013. Calamity losses to insurance companies, net of reinsurance, amounted to 67.5% in the year 2013 and on the reinsurers share – 32.5%. In the year 2012, gross losses from catastrophic events reached 1.07 billion PLN (with 56.1% net of reinsurance and with 44.9% being the reinsurers share) out of which the negative effects of overwintering and spring ground frosts caused damage totaling 589.94 million PLN. In the year 2011, the damage amounted to 681.69 million PLN (with the net of reinsurance being 60.2% and 39.8% being the reinsurers share)[4]. The situation is somewhat different when it comes to the reinsurers share in premiums and losses and claims paid in all the insurance from groups 8 and 9 class II in which premiums and calamity loss constitute only a certain part. Figure 6 shows data concerning the reinsurers share in gross premium written in groups 8 and 9. A small increase of the reinsurance level both in group 8 and 9 is visible.

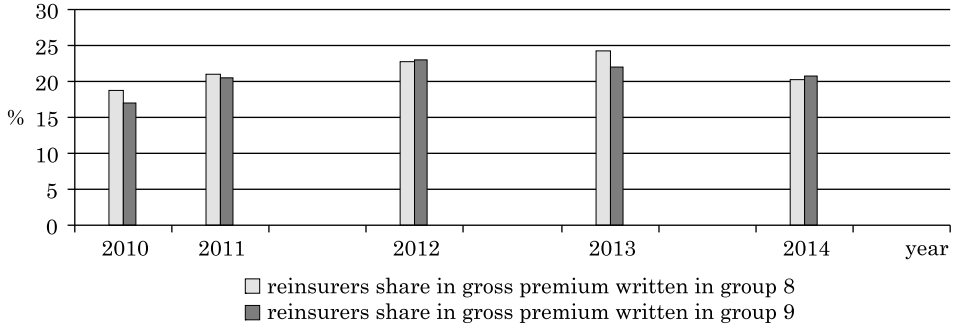

Fig. 6. Outward reinsurance – reinsurers share in gross premium written in groups 8 and 9
Source: own elaboration based on: *Opracowania – rynek ubezpieczeń*, available on the Internet: <www.knf.gov.pl/opracowania/rynek ubezpieczeń> (access: 1.10.2015), PFSA, Warsaw.

In group 8, the reinsurers share of the gross premium written in the analyzed period of time was the highest in 2013 and amounted to 24.2%. In comparison to the year 2010, which was the last year when large-scale flooding

[4] Data presented by Polish Financial Supervision Authority (website: www.knf.gov.pl, access: 01.10.2015).

occurred in Poland, outward reinsurance increased by almost 30%. The situation is slightly different in class 9 where the reinsurers share in the gross premium written, which was the highest in the year 2012 and amounted to 22.9%. In comparison to the year 2010, it increased by almost 40%. In both groups 8 and 9, a small but constant growth of the reinsurers share in gross premium written can be observed. Similarly, reinsurers share in the rising losses and claims paid in groups 8 and 9, which is reflected in the illustrations of Figures 7 and 8.

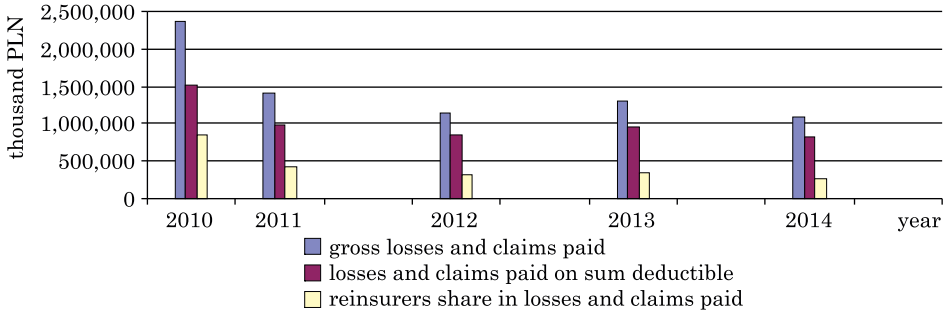

Fig. 7. Losses and claims paid in group 8
Source: own elaboration based on: *Opracowania – rynek ubezpieczeń*, available on the Internet: <www.knf.gov.pl/opracowania/rynek ubezpieczeń> (access: 1.10.2015), PFSA, Warsaw.

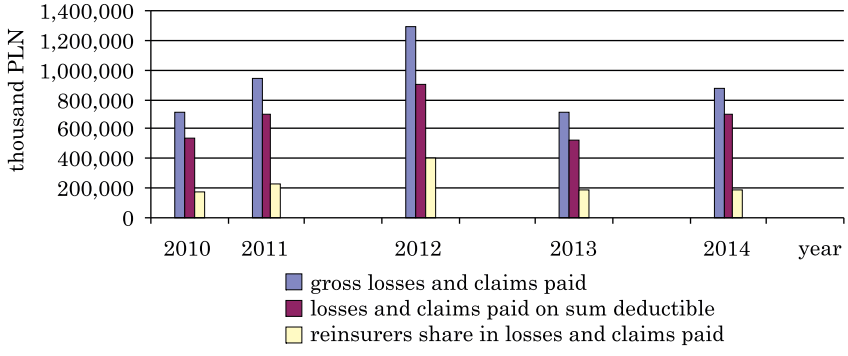

Fig. 8. Losses and claims paid in group 9
Source: own elaboration based on: *Opracowania – rynek ubezpieczeń*, available on the Internet: <www.knf.gov.pl/opracowania/rynek ubezpieczeń> (access: 1.10.2015), PFSA, Warsaw.

The highest reinsurers share in losses and claims paid in group 8 appeared in the year 2010 and amounted to 35.8% (which means that the net of reinsurance was 64.2%) and the lowest in 2014 amounted to 24.4%. In group 9,

the reinsurers share was the highest in the year 2012 (31%) and the lowest in 2014 and amounted to 21.1%. Taking into consideration the entire analyzed period of 2010–2014, it can be stated that there is a relatively stable growth in the reinsurance level in this scope of insurance sector activity.

Financial insurance is placed in group 14 (credit insurance), 15 (insurance guarantee) and 16 (all financial risk insurance). However, only in groups 14 and 15 was there a significant increase of reinsurance in the period considered (Fig. 2). In credit insurance, the insurance company covers property losses on the crediting party side as a result of not receiving from the credited party credit receivables in situations specified in a contract of insurance. Increasing market competition also increases the risks connected with economic activity, and as a result the risks concerning lendings and eligible covers for society grows too. That is why the reinsurer shares in gross premiums written in groups 14 and 15, which is illustrated in Figure 9. In the case of insurance from group 14, the reinsurers share for the year 2014 was the highest – 48,3% and was almost 10% higher than in the year 2010 and 15% higher than in the year 2012. However, in insurance from group 15 reinsurers had the highest share in the year 2013 – 47.9%, and it was comparable to the share during the years 2011 and 2013.

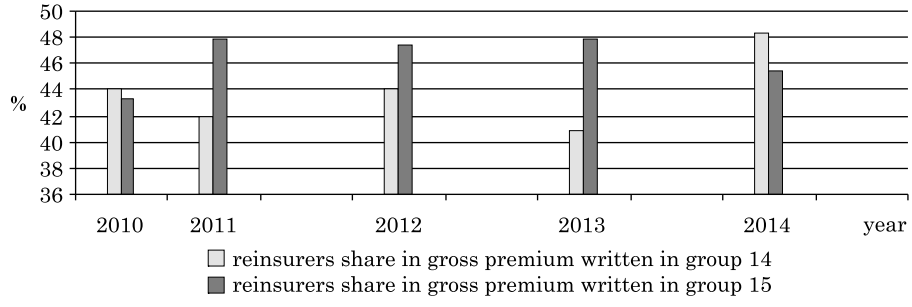

Fig. 9. Outward reinsurance- reinsurers share in gross premium written in groups 14 and 15
Source: own elaboration based on: *Opracowania – rynek ubezpieczeń*,
available on the Internet: <www.knf.gov.pl/opracowania/rynek ubezpieczeń> (access: 1.10.2015), PFSA, Warsaw.

When it comes to the reinsurers share of losses and claims in insurance from group 14 (Fig. 10), it can be stated that it has grown as in the year 2010 where the share amounted to 58.3%, in the year 2013 – 61.9% and in the year 2014 – 65% (with the exception of the year 2011 in which the share amounted to 49.3% which means that insurance companies financed 50.7% of losses and claims).

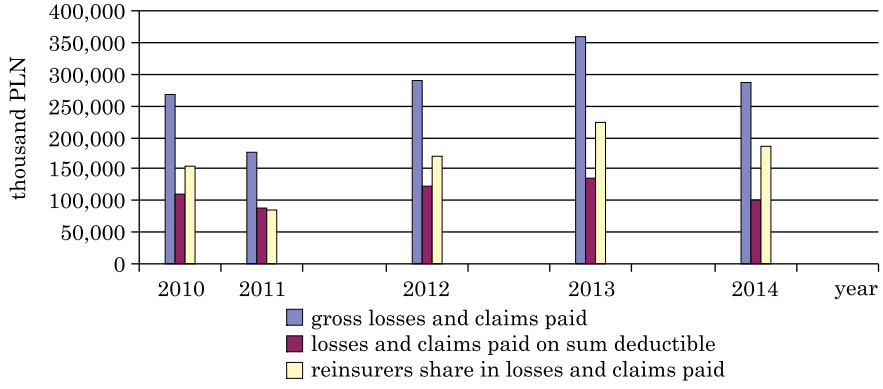

Fig. 10. Losses and claims paid in group 14
Source: own elaboration based on: *Opracowania – rynek ubezpieczeń*, available on the Internet: <www.knf.gov.pl/opracowania/rynek ubezpieczeń> (access: 1.10.2015), PFSA, Warsaw.

When it comes to insurance from group 15, the reinsurers share in losses and claims is shown in Figure 11. The share was the highest in the year 2012 – 73.2% and the lowest in the year 2014 – 48%.

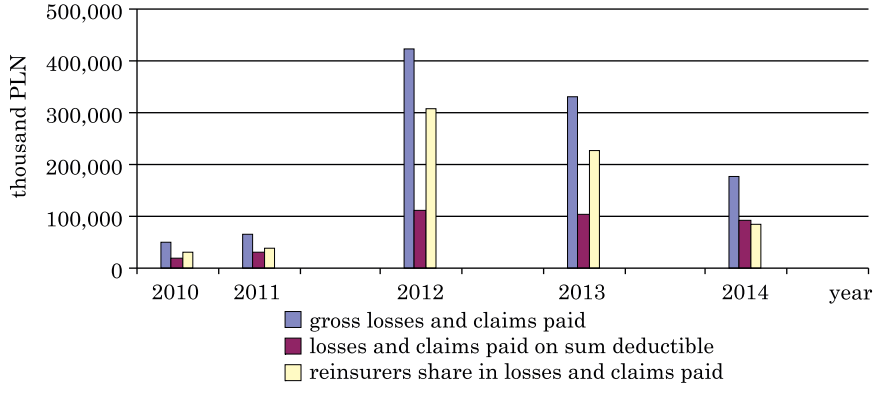

Fig. 11. Losses and claims paid in group 15
Source: own elaboration based on: *Opracowania – rynek ubezpieczeń*, available on the Internet: <www.knf.gov.pl/opracowania/rynek ubezpieczeń> (access: 1.10.2015), PFSA, Warsaw.

Summary

Two basic functions are of primary importance in the above mentioned situations where reinsurance is applied. The first is the technical function connected with protection against an excessive increase in loss ratio in

a certain period as a consequence of severe damage or accumulation of moderate damage. The second is the financial function connected with strengthening the financial basis of an insurance company and its financial stability (RONKA- CHMIELOWIEC 2010). The technical function is realized by secondary risk sharing, which provides approval of the higher premium income for an insurance company at the static value of own funds and the margin of the solvency (MAŁEK 2011). Next, the financial function is realized by providing the insurance company with part of the reinsurer capital. In this way, it is participating in the costs of the functioning of an insurance company, which in the end leads to the stabilization of financial results for an insurance company (GASTEL 2004). Such participation is connected with the previous sharing with a reinsurer a certain part of the insurance contribution due to transferring part of the risk admitted to insurance by an insurance company and materialisation of the risk. Reinsurance is one of the methods of risk management and is an important part of the insurance industry's economic activity. The role of reinsurance especially increases with the number of catastrophic events or with the risk of economic activity connected with commercial or political risks. Catastrophic events included in class II of insurances, e.g. in classes 5, 8, 9, 11 together with commercial risks in classes 14 and 15 in recent years have been within the highest scope of reinsurers, not only in gross premium but also in claims incurred. The reinsurance cover for insurance companies is mainly realized by proportional reinsurance treaties (70–80% of all) and less frequently non-proportional (18–28%) and supplementing facultative reinsurance (1–2%)[5]. On the basis of proportional treaty, an insurance company and reinsurer share the risk, premium and losses in the same proportion according to a previously agreed index. A non-proportional treaty is one according to which part of the loss which is covered by the reinsurer does not remain in relation to the total damage compared to the reinsurer premium. Facultative agreement is concluded and negotiated individually for each of the risks. According to data analysis concerning the scale of catastrophic and financial risks, the involvement of insurance companies in reinsurance contracts, which is the process of ceding at least part of those risks onto the reinsurer, increases with the growth of the risks. Therefore, according to the data presented, the above stated thesis has been confirmed.

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[5] Data presented by Polish Reinsurance Company (website: www.polishre.com, access: 01.10.2015).

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EFFECTIVENESS OF FLOOD PROTECTION PROJECT VALUATION METHODS

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K e y w o r d s: effectiveness, indifference curve, flood protection, net present value.

A b s t r a c t

Projects for flood protection are increasingly the subject of investment projects in the field of water management. This is related to the increasing frequency of worldwide threats caused by extreme weather conditions, including extremely high rainfall causing floods. Technical and non-technical flood protection measures are also increasing in importance. In the decision-making process, it is necessary to take into account both the costs and benefits of avoiding losses, including an analysis of social benefits, whose valuation of non-market goods is an essential element. A comprehensive account of projects in the field of flood protection based on the estimated costs and benefits of the investment allows the economic efficiency from a general social point of view to be determined. Previous evaluations of the effectiveness of investment projects have mainly taken into account only categories and market values. The aim of the article is to identify the possibilities to expand the values of non-market assessments and categories formulated on the basis of the theoretical economics of the environment.

METODY OCENY EFEKTYWNOŚCI PRZEDSIĘWZIĘĆ Z ZAKRESU OCHRONY PRZECIWPOWODZIOWEJ

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S ł o w a k l u c z o w e: efektywność, krzywa obojętności, ochrona przeciwpowodziowa, wartość bieżąca netto.

A b s t r a k t

Przedsięwzięcia dotyczące ochrony przeciwpowodziowej coraz częściej stanowią przedmiot projektów inwestycyjnych z zakresu gospodarki wodnej. Ma to związek ze zwiększającą się częstotliwością występowania na całym świecie zagrożeń wywołanych ekstremalnymi zjawiskami klimatycznymi, w tym ekstremalnie wysokimi opadami deszczu, które prowadzą do powodzi. W ramach ochrony przeciwpowodziowej są wykorzystywane zarówno środki techniczne, jak i nietech-

niczne, które zyskują coraz większe znaczenie. Podczas podejmowania decyzji dotyczących wyboru rozwiązań konieczne jest wzięcie pod uwagę zarówno kosztów, jak i korzyści wynikających z uniknięcia strat, w tym przeprowadzenie analizy korzyści społecznych, których integralną podstawę stanowi wycena dóbr nierynkowych. Całościowy rachunek przedsięwzięcia z zakresu ochrony przeciwpowodziowej na postawie oszacowanych kosztów i korzyści wynikających z realizacji inwestycji pozwala określić efektywność ekonomiczną z punktu widzenia ogólnospołecznego.

W dotychczasowych ocenach efektywności przedsięwzięć inwestycyjnych brano głównie pod uwagę kategorie i wartości rynkowe. Celem artykułu jest wskazanie możliwości poszerzenia tych ocen o wartości i kategorie pozarynkowe formułowane na gruncie podstaw teoretycznych ekonomii środowiska.

Introduction

Recent decades have witnessed an increase in threats caused by extreme climatic events all over the world. They have caused an increasing risk to human safety and result in significant losses to the economies of individual states. In Poland, as in many European states, the greatest threat of all climatic events is related to extremely high rainfall. More and more frequently, intensive, multi-day rainfall tends to cover large areas causing floods, while short but heavy rains lead to sudden swelling of small streams and brooks, causing local flash floods (LORENC et al. 2012, p. 7).

Large floods occur in Poland once in about a dozen years. However, it seems that this frequency has significantly grown in recent years. This has been accompanied by systematic growth of economic losses, the volume of which depends on the intensity of human activity in areas at risk. For this reason, one of the basic principles of flood control is to limit business activity in these areas. Only as a second step should activities consisting in construction of preventive structures be taken (JOHNSON 1976, pp. 273–274). Progressive urbanization processes have resulted in a loss of retention properties held by natural areas and an increase in the surface runoff. The surface runoff index in undeveloped areas is 10%, while in areas with hardened surfaces it can reach 60–90% (MANTEUFFEL, BUKOWSKI 2010, p. 55). Table 1 presents the approximated estimates of losses caused by large floods occurring in Poland in recent decades.

One of the most significant reasons for increasing flood losses is the deteriorating condition of protective facilities, caused by their unsatisfactory maintenance. Before the largest flood of recent decades in 1997, which brought about the highest economic losses and the deaths of over 50 people, 25% flood control dams existing at that time were in urgent need of restoration. The condition of 20 out of 240 retention reservoirs was similar (AMBROŻEWSKI 1997, pp. 166, 167). In March 2010, the Supreme Audit Office found that a half of the flood control dams in the Lesser Poland Province (the region that suffered the greatest losses as a result of floods of May and June 2010) did not guarantee safety due to their poor technical condition (*Znowu*... 2010).

Table 1

The extent of losses caused by floods in selected years in Poland

Type of loss	Year											
	1934*	1958	1970	1977	1979	1980	1981	1982	1983	1997	2001	2010
Flooded area [thousand ha]	250	352	156	215	470	1745	80	111	14	521	402	400
Destroyed and damaged buildings [thousands]	22.0	27.0	23.0	10.0	17.7	26.0	7.5	6.6	1.07	2.39	25.9	2
Destroyed and damaged bridges	102	1207	1,400	612	147	135	29	617	47	4,048	2254	1,469
Destroyed and damaged national roads [km]	100	596	751	2321	478	348	68	618	140	14,432	56343	81,160
Destroyed and damaged dams [km]	100	330	100	38	118	14	47	94	29	721	450	185
Number of evacuated persons [thousands]	0.1	55.6	35.0	20.0	33.2	4.0	1.3	16.0	2.0	150.0	20	23
Victims	x	x	x	x	x	x	x	x	x	54	18	9
Losses in PLN mln, price level of 2013	1,096	1345	1,777	2990	2,102	6,028	660	984	490	23,635	4,600	11,197

x – no data

* Losses of 1934 recalculated to the 1999 price level by dividing the losses by the exchange rate to the USD in 1934 (5.3 PLN/USD), multiplied by the average rate in 1999 (3.98 PLN/USD) and by the USD inflator in the years 1934–1999 equal to 12.42 (U.S. Department. 2003). Other losses were recalculated with the Polish consumer price index.

Source: Own study on the basis of the Borowski (1984), *Powódź 2010 będzie...* (2010), *Już...* (2010); *Ochrona...* (1995–2009 passim), *Środki...* (2010).

Flood protection measures can be divided into technical and non-technical means (KLEDYŃSKI 2011, p. 244). Technical means primarily include hydrotechnical structures and engineering operations. They are classified as:

– active protection means – facilities and operations that may affect flow and water levels in water courses, such as retention and balancing reservoirs or polders,

– passive protection means – measures and facilities aimed at preventing water flooding beyond the designated area, such as embankments.

Apart from technical means, non-technical measures, including activities and regulations discouraging people from settling on or developing flood plains, or encouraging them to leave those lands and withdraw intensive forms of economic use from those areas, are increasingly gaining in importance. This group of measures include spatial planning, construction law, insurance, education, etc. (KLEDYŃSKI 2011, pp. 244, 245).

Traditionally, while choosing the flood protection variant, the guiding principles were, first of all, technical parameters of facilities required to ensure the assumed level of safety, such as the elevation of the embankment, or the capacity of the retention reservoir. However, since such an approach does not take into account the value of protected areas, it does not include the efficiency of the protective measures applied. While taking decisions concerning the choice of solutions, their costs are taken into account, but the benefits resulting from avoidance of losses are not considered.

The previous evaluations concerning the efficiency of investment undertakings mainly focused on categories and market values. The aim of this article is to demonstrate the possibilities of extending those evaluations with non-market values and categories established on the basis of theoretical foundations of environmental economics.

Research methods

The basis for conducting an economic evaluation of the protection of polders against floods can be provided by the model developed by MANTEUFFEL (1987, p. 102). It assumes the following effects resulting from the growth of flood control expenditures:

– reduction of flood losses in properties located in the protected area, taking into account the change in its value over the period covered by the calculation;

– reduction of losses caused by interruption or deterioration of economic activity during the flood and removal of its effects;

– intensified development of protected areas resulting from an improved safety level;

– savings in operating costs of flood control facilities;

– savings in costs of flood control actions.

As results from observations of social behaviour during the flood in the Żuławy region in 1983 and the flood in the south of Poland in 1997, it would advisable to include, as a flood control improvement effect, the feeling of safety of persons inhabiting, temporarily staying at or carrying out their business activity in protected areas (LIZIŃSKI 2007, p. 36). The feeling of safety of persons related to polders should be considered an additional effect of flood control, although its evaluation is difficult.

The starting point for evaluating non-market goods is to determine the source of the economic value of goods. The neo-classical theory of economics assumes that this value results from the usefulness provided by the consumption of those goods (consumption can also be non-material) – i.e. goods are valuable when they contribute to satisfying (certain) human needs. The value of goods is composed of two aspects: functional – if a consumer directly uses the goods or has such a possibility (use value), and non-functional – if the satisfaction is derived not from using the goods, but from the mere fact of their existence (non-use value) (ŻYLICZ 2009, p. 8).

The total economy value concept of natural resources is applied in the environmental economics (called. The total economy value concept) which is based on the assumption that each resource has its value, which gives it depending on the method and the effect of its use (WOŚ 1995, p. 71). PIERCE and TURNER proposed the following distribution of the total economic value:

1. Use value, including:

– the value arising from direct use,

– the value arising from the indirect use of the resource.

2. Non-use value:

– optional value,

– bequest value,

– existence value (PIERCE, TURNER 1990).

An example of direct utility value may be the market price of wood or water consumption or for irrigation. From the forest functions it is resulted that an indirect use value of the forest need to recognize as the value of landscape, biodiversity, oxygen production and carbon dioxide reduction. Water used for consumption or irrigation also form the landscape, can be used in sport and transport, create conditions for biodiversity, namely have a value resulting from indirect consumption.

The optional value follows from the shift in consumption over time and towards future needs. Additional values may result from prolonged function-

ing of ecosystems, as well as better opportunities to use resources in the future as a result of the development of science and scientific and technical progress.

The bequest value as part of the natural resources total value which can be passed to future generations. The altruism of the present generation and solidarity with future generations is noted in this value. This value implements intergenerational solidarity, which underlying the sustainable development. For some groups it has utility value because it gives them satisfaction with transfer of resources to other, endowments them.

Existence value is assigned to the fact of the natural resources existence regardless of the benefits that they bring now or will bring in the future. This value is particularly high in the case of rare, unique objects. It can therefore in theory and in practice skip division of use and non-use, and the total economic value (TEV) represented as the sum of direct consumer value (W_{kb}), indirect consumer value (W_{kp}), optional value (W_o), bequest value (W_{dz}) and existence value (W_e)(LIZIŃSKI 2010, p. 121):

$$\text{PWE} = W_{kb} + W_{kp} + W_o + W_{dz} + W_e$$

Many investment, in particular in the sphere of flood protection investments affect the state of protected resources including human capital and natural resources. It is therefore appropriate to take into account non-market effects of these investments.

The starting point for evaluating non-market goods is to determine the source of the economic value of goods. There are several methods leading to an approximate evaluation of effects for which no market exists where their prices could be determined. The most popular of them include:

– contingent valuation method,
– travel cost method,
– hedonic prices method.

The assessment of all values of environmental resources and services is based on the assumption that the maximum amount that individuals are willing to pay for given environmental goods or services (at a given level of income and other features) provides a proper evaluation of the economic value of these goods or services.

Figure 1 presents the consumer's indifference curves for environmental goods and for market goods purchased for financial income at their disposal. Going from point A of the indifference curve U_2, to Point B, the consumer can pay an amount equal to $D_0 - D_1$ for improvement of the environment from status S_0 to S_1, which is described as willingness to pay (WTP). This is an amount which may be deducted from the initial level of income, leaving the total usefulness at the same level as before the improvement of the environ-

mental quality. Additionally, the consumer retains the same total usefulness while passing from Point A to C . However, deterioration of the environmental quality requires compensation in the income equal to $D_2 - D_0$, which is the so-called willingness to accept (WTA).

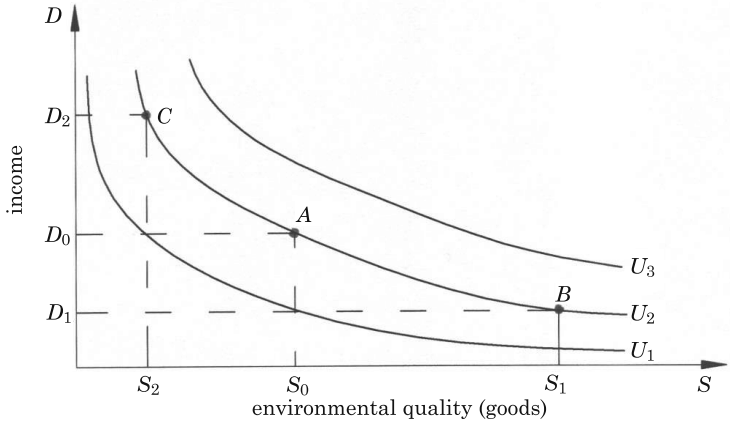

Fig. 1. Customer indifference curve for two types of goods: income D and environmental quality S
Source: own study.

The above general model can be also applied to evaluate the usefulness of flood protection safety, or to evaluate the acceptance of flood risk. WTP and WTA provide a financial measure for non-market goods for the consumers. For various reasons, theoretical and technical, most economists support the application of WTP in empirical research.

Assuming that the feeling of safety of persons related to polders at risk of flood is a good or a service resulting from improvement in flood control measures, the model of economic evaluation proposed by MANTEUFFL (1987, p. 101) can be extended as follows (LIZIŃSKI 2000, pp. 69–71):

$$\mathrm{NPV} = \sum_{t=0}^{m} \frac{1}{(1+r)^t} \left[\sum(S_{it} + \mathrm{RT}_{it} + \mathrm{KEB}_{it} + \mathrm{KAP}_{it}\,\mathrm{WPB}_{it} - \mathrm{KI}_{it} - \mathrm{KEZ}_{it}) - \mathrm{KW}_t\right] \tag{1}$$

where:

NPV – net present value of the project (with NPV > 0 as a condition of effectiveness),

m – calculation period,

t – current index denoting the number of the year,

i – index denoting the number of the protected area,

r – discount rate,
S – expected value of flood losses in the property in the protected area,
RT – effect of intensifying the development of the area,
KEB – costs of operating flood control facilities avoided as a result of the project,
KAP – probable saved costs of flood control operations,
WPB – value of the increase in the feeling of safety as a result of the undertaking, calculated with the use of the CVM or HPM method,
KI – investment expenditures in the protected area,
KEZ – current (operating) expenditures in the area,
KW – expenditures related to the undertaking as a whole, which cannot be assigned to only one protected area.

Research results

The proposed computational model was used to evaluate the economic effectiveness of investments planned to be carried out as a part of the project entitled „The Comprehensive Flood Protection of the Żuławy Marshlands – Stage I – the City of Elbląg".

The project is one of the elements of the first stage of the program entitled „The Comprehensive Flood Protection of the Żuławy Marshlands – 2030 (including the 2015 stage)" also known as the „Żuławy Programme – 2030" commissioned by the Director of the Regional Water Management Board in Gdańsk. The project involves reconstruction of the flood protection system, reconstruction of technical flood control infrastructure and ensuring efficient operation of the drainage system for polder buildings in the Elbląg city area. Technical solutions applied within the project are based on embankments and sheet piling, while reconstruction of the drainage system involved reconstruction of drainage ditches, main courses of stormwater drainage systems based on the commonly-applied system of pipelines and ducts, with pre-treatment facilities and pumping stations. As part of the project, a Local System of Flood Risk Monitoring and Response Support was constructed, including construction of telemetry measurement stations with flood forecasting modules. The Local System covers the city of Elbląg and the entire Elbląg Żuławy. The total value of investment expenditures amounted to PLN 42,320,000.

While calculating operating costs, the schedule of investment implementation was taken into account, assuming that operating costs will rise in the year following the completion of a given task. The structure and the amount of operating costs of the pumping stations was established on the basis of operating costs related to maintenance of flood control facilities obtained from

the Żuławy Authority for Land Improvement and Water Facilities. Information about the amount and the structure of operating costs related to stormwater drainage system maintenance was derived from the study of the Elbląg Water Supply and Sewage Works prepared at the request of the City Hall in Elbląg. The maintenance costs for the monitoring system were calculated on the basis of operating costs of the Crisis Management Department of the City Hall in Elbląg. Table 2 presents unit operating costs at current prices of 2010 and the cost structure.

Table 2
Unit annual gross costs of operating individual new elements of the system, arising as a result of project implementation

Specification	Unit	Quantity	Unit cost [PLN]	Total annual costs [PLN]	Structure [%]
Payment for monitoring operation services	pcs	1	300,000	300,000	100
– energy costs	PLN			120,000	40
– labour costs	PLN			120,000	40
– service costs	PLN			30,000	10
– material costsąpcs	PLN			30,000	10
Payment for pumping station operation	pcs	1	60,00	60,000	100
– energy costs	PLN			18,000	30
– labour costs	PLN			18,000	30
– service costs	PLN			12,000	20
– material costsąpcs	PLN			12,000	20
Payment for cleaning separators and settling tanks	pcs	twice a year	4,000	8,000	100
– energy costs	PLN			1,600	40
– labour costs	PLN			2,000	50
– service costs	PLN			0	0
– material costsąpcs	PLN			400	10

Source: the City Hall, the Elbląg Water Supply and Sewage Works, the Żuławy Authority for Land Improvement and Water Facilities.

The forecast of operating costs took into account only the difference between operating costs related to maintenance of the designed system and the currently incurred costs. The calculations were carried out at variable prices, assuming an increase in costs consistent with the estimated increased inflation rate, and an increase in payroll costs consistent with the estimated real wage growth rate.

Investment implementation does not involve any additional source of income for the city. Its main aim is to improve flood safety of inhabitants, achieved by modernization of existing and construction of new facilities and structures (embankments, sheet piling) and by modernization of the stormwater drainage system in selected areas of the city. The result of

the Project is improvement of flood safety in the area of more than 23,000 ha, affecting more than 65,500 people.

The analysis of social benefits resulting from the project included the following elements:

– reduction of flood losses in the property of inhabitants;

– reduction of flood losses in industry, taking into account property losses as a result of disrupted production and costs suffered in relation in flood control operations;

– reduction of flood control operations suffered by the city,

– reduction of costs related to psychological losses caused by the possibility of evacuation and suffering property losses (both with regard to natural persons and enterprises),

– improvement of environmental (life) quality, evaluated with the use of the hedonic price method – the value of the improvement was evaluated on the basis of an increase in the value of land situated in the areas covered by modernization of stormwater drainage system,

– improvement of tourist and recreation value of the river as a result of engineering water conditions in the drainage area within the town boundaries and as a result of engineering the outflow of significant amounts of pre-treated (desandings, separators) of rainwater.

While establishing social benefits, which are the external effect of project implementation, the following assumptions were made:

– as regards the benefits concerning improvement of the river water quality – it was assumed that this effect would be fully perceptible from 2016; until then, the value will increase every year starting from 2012. This increase will be linear, until the target value is reached in 2016;

– as regards benefits concerning reduction of property losses and costs of flood control operations – the flood that affected Elbląg in 2009 provided a basis to calculate those effects. It was assumed that the water level occurring at that time corresponded to a 100-year high. Due to the fact that it is not possible to determine when a flood of this magnitude will take place, it was assumed that the probability of its occurrence in each consecutive year equals 0.01 (it results from the probability of a 100-year water). Additionally, it was assumed that the constructed flood protection system will contribute to reducing property losses proportionally to the growth of the protection system elevation (from 2.20 to 2.80, i.e. by 27.3%);

– as regards benefits concerning reduction of psychological losses – it was assumed that the feeling of anxiety and resulting mental discomfort is a constant phenomenon accompanying inhabitants of flood areas. A fear of evacuation and of possible loss of property occurs continuously and concerns every year, regardless of the fact of whether a flood occurred in a given year or

not. News about new floods occurring increasingly more frequently in Poland and in other countries intensifies the feeling of anxiety. The feeling of threat can be reduced by constructing (modernizing) flood control facilities. The analysis assumed that benefits concerning a reduction of psychological losses would be proportional to the growth of the embankment elevation in the municipal flood control system. The value of the effect concerning reduction of psychological losses was calculated with the use of the WTP method. To determine the WTP amount, a survey questionnaire was used, created for the purpose of the research carried out in the Żuławy Research Centre ITP, concerning evaluation of intangible value of goods and services. The survey was carried out on a representative sample of 155 persons. In this group, six persons did not provide a response to the question concerning willingness to pay for the improvement of flood safety. In the first stage of selection, of the respondents who answered, persons inhabiting the area of the Żuławy region were selected from this group as potentially threatened with floods caused by water courses or water reservoirs at risk of an inside-polder flood. A further analysis was carried out for the selected group of 72 respondents. In the second stage, persons with household income per capita exceeding PLN 1,500 were eliminated from the group (it was assumed that the area of Project implementation was inhabited mainly by persons of low and medium income) and who declared amounts exceeding 30% income per capita (as it was assumed that responses in which the declared amounts accounted for a significant part of monthly income proved that the respondents did not understand the question correctly). The WTP amount was calculated as the arithmetic mean for the 55-person sample. Thus, the calculated index amounted to PLN 540/person/year;

– improvement of life quality was determined using the hedonic price method, on the assumption that environmental quality, being one of the components of total life quality, is one of the elements affecting real estate prices. Consequently, a change in environmental quality (both negative or positive) is reflected in the price of real estate in the area affected by the change. When other parameters remain unchanged (the size of the flat, the type of the building, the number of rooms, etc.), the change in price results from the change in the environment. In the analysis, an increase in the unit price of one square meter of plot in the area covered by the investment was assumed to be a carrier of benefits concerning the improvement of environmental quality (and of life quality in general). This benefit will occur on a one-time basis (the growth process is not continuous, the growth that emerges may be sustained only by a certain period), in the second year after the completion of a given investment task.

Table 3 presents the values of social benefits related to project implementation for selected years, updated to the current level of prices using the inflation rate based on the forecasts of the Ministry of Economy.

Table 3

Social benefits resulting from the project

Type of benefits	Unit	2010	2011	2012	2013	2014	2024	2034	2039
BENEFITS FROM LIFE QUALITY IMPROVEMENT									
Value of the effect	[PLN '000]	0	0	0	32,797	0	0	0	0
Total	[PLN '000]	0	0	0	32,797	0	0	0	0
IMPROVEMENT OF WATER QUALITY IN THE RIVER									
Value of the effect	[PLN '000]	0	0	306	626	964	2,076	2,684	3,052
Total	[PLN '000]	0	0	306	626	964	2,076	2,684	3,052
REDUCTION OF PROPERTY LOSSES									
Inhabitants	[PLN '000]	0	0	0	0	1	1	2	2
Industrial plants	[PLN '000]	0	0	0	0	1	5	6	7
Total	[PLN '000]	0	0	0	0	2	6	8	9
REDUCTION OF COSTS OF FLOOD CONTROL OPERATIONS									
Value of the effect	[PLN '000]	0	0	0	0	0	1	1	1
Total	[PLN '000]	0	0	0	0	0	1	1	1
REDUCTION OF PSYCHOLOGICAL LOSS RELATED TO									
Evacuation of inhabitants	[PLN '000]	0	0	0	0	73	151	151	151
Property losses of inhabitants	[PLN '000]	0	0	0	0	7	18	24	27
Property losses in industry	[PLN '000]	0	0	0	0	4	4	4	4
Total		0	0	0	0	84	173	179	182

Source: own study.

On the basis of estimated costs and benefits resulting from implementation of the investment, its economic effectiveness from the perspective of general society was determined. The basic index of effectiveness evaluation, which is NPV (calculated from formula 1) was supplemented with additional indices such as internal rate of return, payback period and the benefit-cost ratio. According to guidelines provided in the „Methodology of determining economical effectiveness of investments concerning water, land reclamation and water supply for rural areas. In the industry instruction of the Ministry of Agriculture and the Institute for Land Reclamation and Grassland Farming", the social discount rate was assumed at the level of 8%. Social discount rate in the economic analysis reflects the social point of view on future benefits and costs measure method in relation to the present. Its height is dependent on macroeconomic conditions in the country, the type of the investor or sector, whose investment concerns (eg. transport, environment, energy).

Figure 2 presents the development of the net present value of the investment depending on the length of the period for which the evaluation is made. It shows that the payback period for the project described is seven years. Such a short period necessary to obtain the total return of the expenditure results from a one-time benefit in the form of improving life quality, which, according to the assumptions made for calculation purposes, will occur in the second year after the completion of a given investment task. This is the reason for the significant growth of NPV observed in 2013.

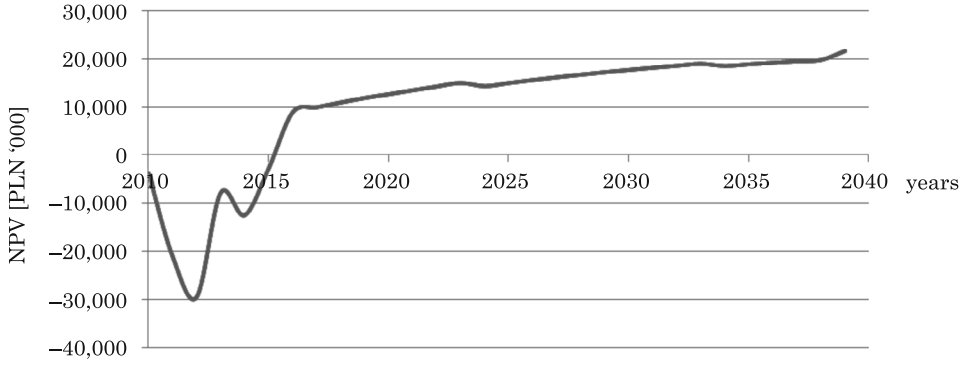

Fig. 2. Variation of net present value of the investment in the 30-year period of the analysis
Source: own study.

Summary

Apart from technical means of flood protection, non-technical measures, including activities and regulations discouraging people from inhabiting and from intensive development of flood plains, or encouraging inhabitants to leave those areas and withdraw intensive forms of economic use, are increasing in importance. However, since a „technical" approach does not take into account the value of protected areas, it does not include the efficiency of the protective measures applied. When choosing a solution, its cost are taken into account, although the advantages resulting from avoidance of loss are not considered.

Investments in flood protection area affect all of them protected resources including human capital and natural. By economic assessment of these investments valuation of protected resources based on the total economic value concept is justified. It contains an use value, including the value resulting from the direct use and value derived from an indirect use of the resource and the non-use value consisting of an optional value, bequest and existence value.

According to the proposed calculation model in assessing the effectiveness of projects in the field of flood protection should be considered the following social benefits resulting from the implementation: reduction of flood losses in inhabitants' property, reduction of flood losses in industry, reduction of costs related to flood fighting operations, reduction of costs related to psychological losses, improvement of environmental (life) quality evaluated with the hedonic price method, improvement of the tourist and recreational value of the river.

Overall calculations concerning a flood control project, based on estimated costs and benefits resulting from investment implementation, can be used to determine the economic effectiveness from the perspective of general society. The basic ratio of effectiveness evaluation – NPV – may be supplemented with additional ratios such as internal rate of return, payback period and benefit--cost ratio. An important issue is the choice of the discount rate, the value of which depends on the type of the project.

The obtained values of indices describing the effectiveness of the investment are:

- discount rate $r=8\%$
- economic internal rate of return ERR=21.64%
- economic net present value ENPV= 21,542,000 PLN
- payback period 5 years
- benefit-cost ratio $B/C=1.45$

The presented results show that the investment is justified from the social point of view (calculated ENPV is higher than 0, while ERR exceeds the assumed discount rate). On the other hand, comparison of the results of the economic analysis with the results of the financial analysis justifies the need to support the investment with public funds. The above-presented results prove the economic effectiveness of the investment from a social perspective.

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