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Analysis of Knowledge-based Economy Development in Poland in the Light of Strategic Documents

Abstract

After the European Union summit in spring 2005, the member countries were obliged to implement the Lisbon Strategy on the national level and to prepare national strategies to fulfil its goals. Due to this, the goals and tasks of building knowledge-based economy were entered into the strategic documents and operational programs included in the National Strategic Reference Framework 2007-2013 (NSRF), prepared by successive governments after 2005. However, it needs to be mentioned that also scientific institutions (e.g. the Polish Academy of Sciences, PAN) introduced various strategic documents in which issues of knowledge-based economy and its role in the social and economic development of Poland were included. However, a study of a holistic knowledge-based economy was not made.

The aim of article is to present and assess the most important documents referring to the strategy of knowledge–based economy development in Poland.

1. Introduction

After Poland's accession to the European Union the Polish government was obliged to prepare and implement various economic strategies, especially the strategy to develop knowledge-based economy. After the European Union

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summit in spring 2005, the member countries were obliged to implement the Lisbon Strategy on the national level and to prepare national strategies to fulfil its goals. Due to this, the goals and tasks of building knowledge-based economy were entered into the strategic documents and operational programs included in the National Strategic Reference Framework 2007-2013 (NSRF), prepared by successive governments after 2005. However, it needs to be mentioned that also scientific institutions (e.g. the Polish Academy of Sciences, PAN) introduced various strategic documents in which issues of knowledge-based economy and its role in the social and economic development of Poland were included. However, a study of a holistic knowledge-based economy was not made.

2. Review of strategic documents

Among the documents and programs the ones that should be mentioned are:

- The National Development Strategy 2007-2015
- The National Strategic Reference Framework 2007-2013 (NSRF) and the programs functioning within it: Operational Programme Innovative Economy 2007-2013 (OP IE) and Operational Programme Human Capital 2007-2013 (OP HC)[1];
- The Science development strategy in Poland until 2015;
- The "Poland 2030: Development Challenges" report,
- The Foresight Programme prepared by the Polish Academy of Sciences.

"The National Development Strategy 2007-2015" (NDS) is the basic strategic document, which has the primary nature in comparison to other strategies and programmes that will be functioning in Poland in the next few years. In this strategy, building knowledge-based economy is one of the most important elements in the vision of Poland until 2015. The following statement included in this document serves as evidence for this assumption (*Strategia Rozwoju Kraju na lata 2007-2015 2007)*: "Poland has to develop knowledge-based economy and economy based on a broad use of information and communication technologies in all fields, including social services available for every citizen. The country will promote the development of intellectual capital..."

[1] NSRF consists of operational programs which, apart from OP IE and OP HC, include 16 Regional Operational Programmes, OP Infrastructure and Environment, OP Development of Eastern Poland and OP Technical Assistance.

In the National Development Strategy, the development of economic innovation, increased employment, and quality of human capital were considered as priority directions of actions serving the social and economic development of the country. Table 1. shows the indexes illustrating innovation development and employment growth between 2007 and 2015.

Table 1. Selected indexes of Poland's development strategy in the years 2007-2015

Goals and priorities of the National Development Strategy	**Indexes**	**EU-25**	**Poland**		
		Value of the index in the base year (2005)		**Assumed value of the index**	
				2010	**2015**
Goal	Average annual GDP growth rate (%) GDP per capita according to PPS (EU-25 = 100)	1.7 (2001-05) 100	3.0 (2001-05) 50	5.1 (2006-10) 58	5.2 (2011-15) 66
Priority Growth of competiveness and innovation of the economy	Total expenditures on R&D (% of GDP)	1.9 (2004)	0.56 (2004)	1.5	2.0
	Business involvement in R&D expenditure (%)	54.3 (2003)	22.6 (2004)	30	40
	The share of high and medium-high technology in industrial production sold (%)	-	30.1 (2004)	35	40
	Export of goods per 1 resident (thousands EUR)	6.5 (2004)	1.9	3.5	4.9
	Work efficiency per 1 employee (EU-25 = 100)	100	62.7	70	80
	Inflow of direct foreign investments (USD billion, according to the Polish National Bank, NBP)	x	9.6	10.0	10.0
	Number of patents granted to Polish residents (per 1 million residents)	134.5 (2001)	20 (2004)	40	65
	IT and telecommunication expenditure in % of GDP	6.4 (2004)	7.2 (2004)	8.0	8.5
	Number of broadband connections in relation to number of population (%)	10.6	1.9	10	25

Priority Employment growth and improvement of its quality	Employment index: (%) - people aged 15-64 - women aged 15-64 - people aged 55-64 - people with disabilities	63.8 56.3 42.5 .	52.8 46.8 27.2 13.1 (2004)	57.0 51.0 31.0 18	62.0 53.0 37.0 25
	People with secondary education in the population aged 15-64 (without vocational technical education) in %	.	35.2	38.0	41.0
	Graduates of first stage of tertiary education in the population aged 15-64 (%)	.	13.9	15.0	18.0
	Graduates in mathematics, natural sciences, and engineering (% of total university graduates)	24	15 (2004)	20	25
	Learning and gaining further education aged 25-64	11.0	5.5	7	10

Source: *Strategia Rozwoju Kraju na lata 2007-2015*, Ministry of Regional Development, Warsaw 2007, p. 76.

Directions of activities set in the 2007-2015 National Development Strategy are consistent with the assumptions and objectives of the Lisbon Strategy to the extent of the possibilities of the economy catching up the leaders of the European Union. It is assumed that the average GDP growth in Poland between 2007 and 2015 will amount to slightly more than 5%, which will set the GDP per capita in 2015 according to the purchasing power at 66% of the average in the European Union (in 2005 the index was 50%).

The first priority adopted in the National Development Strategy is to increase the competitiveness and innovation of the economy, yet a significant improvement in this area should not be expected, as appears from the analysis of indexes included in table 5.1. Although an almost fourfold increase in the share of R&D expenditure in GDP was assumed, from 0.56% to 2% in 2015, yet this index will be still lower than the (3%) target set in the Lisbon Strategy. Moreover, in 2015, the involvement of business (40%) in this expenditure will be lower, than the (54.3%) EU-25 baseline in 2005.It is also assumed that the share of high and medium-high technology in industrial output will increase up to 22.6% in 2005, to 30% in 2010, and to 40% in 2015. The number of patents granted to the Polish residents will also increase; in 2015 there will be 65 patents per 1 million of residents which represents an increase of 45 patents in comparison to the year 2004. It is worth mentioning that this increase will only

slightly improve the position of Poland in this field, given the fact that the average index for the EU-25 was 134.5 in 2001.

In the context of the above-mentioned indicators, the target indicators concerning information technology and broadband connections look relatively promising. A high level of expenditure on information and communication technologies in relation to GDP was assumed: an increase from 7.2% in 2004 to 8.5% in 2015, with the average level in EU-25 countries at 6.4% in 2004. In the case of the number of broadband connections in relation to population, a surge was assumed in this index, from 1.9% in 2005 to 25% in 2015; while for the EU-25 this indicator was 10.6% in 2005.

The assumptions concerning employment growth and improvement of the quality of human capital defined in the strategy vary considerably. The employment rate in Poland for people of working age in the initial year was lower than the EU-25 average by 11 percentage points, for older people (aged 55-64) it was lower by more than 15 percentage points and the assumed employment rate in 2015 will amount to 62% and will be lower than the EU-25 average rate from 10 years ago (63.8%).

In terms of improving the quality of human capital, a moderate, with one exception, growth of indicators illustrating the level of education was assumed. The share of people with secondary education in the population aged 15-64 will increase from 35.2% in 2005 to 41% in 2015, and the share of university graduates in the population aged 15-64 will increase from 13.9% to 18%. The percentage of people aged 25-64 who are gaining further education will almost double, from 5.5% in 2005 to 10% in 2015.

To summarize the previous discussion devoted to the 2007-2015 NDS, it should be noted that the assumptions concerning innovation in the economy and employment adopted in this document do not guarantee a breakthrough in building knowledge-based economy in Poland. This statement can be justified with the following:

- the implementation of the NDS assumptions on the share of R&D expenditures in GDP casts doubt on the possibility of achieving a rate of 2% of GDP in 2015; in 2008 this indicator amounted to 0.61% (*Nauka i technika w Polsce w 2008 roku*, 2010, p. 39*)*;
- the increase in the share of high and medium-high technology in industrial output to 40% in 2015 will not improve significantly the position of Poland's economy on the international markets in the field of modern technologies;
- the slight increase in employment rates among people of working age will not cause a breakthrough in the management of labour resources and may adversely affect the acceleration of economic growth.

The weaknesses of the 2007-2015 NDS mentioned above explain why the average GDP per capita in Poland will be a mere 66% of the EU-25 average in 2015.

"The National Strategic Reference Framework 2007-2013" (NSRF) is a document supporting economic growth and development of knowledge-based economy (Wisła 2007, p. 42). It provides a basis for granting Poland funds from European Union funds. The main goal of the NSRF is inspired by the assumptions of the Lisbon Strategy. The goal has been set as follows (*Narodowe Strategiczne Ramy Odniesienia 2007-2013*, 2007, p. 40): "The strategic goal of the National Strategic Reference Framework for Poland is to create conditions for better competitiveness of knowledge - and entrepreneurship - based economy ensuring employment growth and an increase in social, economic, and spatial cohesion."

The NSRF comprises two operational programmes, which include a list of priorities of activities and appropriate financial resources assigned to them, concerning two main elements of knowledge-based economy, i.e. innovation and human capital. These programmes are: the Operational Programme Innovative Economy (OP IE) and the Operational Programme Human Capital (OP HC).

The main goal of the Innovative Economy Operational Programme is "the development of the Polish economy on the basis of innovative enterprises" *(Program Operacyjny Innowacyjna Gospodarka 2007-2013*, 2007, p. 58). This goal was developed in the form of six detailed goals (Ibidem, s. 61):

- improved enterprise innovation,
- improved competiveness of Polish science,
- increased role of science in economic development,
- increased share of Polish innovative products on the international market,
- creation of more permanent and better working places,
- increased use of information and communication technologies in the economy.

Implementation of the objectives is performed within the activities grouped into nine the so-called priority axes: research and development of modern technologies, R&D infrastructure, capital for innovation, investment in innovative projects, diffusion of innovations, the Polish economy on the international market, information society - establishment of electronic administration, information society - increasing economic innovation and technical assistance. The list of those priorities and the sources of their financing are shown in table 2.

Table 2. OP IE 2007-2013 priorities and their financing (EUR million, current prices)

Priority axes		Total (million EUR)	Investment (million EUR)	
			EU	Poland
I.	Research and development of modern technology	1 299.3	1 104.4	194.9
II.	R&D infrastructure	1 299.3	1 104.4	194.9
III.	Capital for innovation	340.0	289.0	51.0
IV.	Investments in innovative undertakings	3 429.7	2 915.3	514.4
V.	Diffusion of innovation	399.0	339.1	59.9
VI.	Polish economy on the international market	410.6	349.0	61.6
VII.	Information society - establishment of electronic administration	788.2	670.0	118.2
VIII.	Information society - increase in the innovation of economy	1 415.9	1 203.5	212.4
IX.	Technical assistance	329.6	280.2	49.4
Total		9 711.6	8 254.9	1 456.7

Source: Program Operacyjny Innowacyjna Gospodarka 2007-2013, [Operational Programme Innovative Economy, 2007-2013], Ministry of Regional Development, Warsaw 2007, pp. 146-149.

The analysis of the data included in table 5.2 shows that the most of the resources were assigned for the most urgent activities which yield quick results i.e. for investments in innovative enterprises (35.3% of all resources). Second place in terms of outlays value falls to the combined outlays for strengthening the information society (22.6%), i.e. establishment of electronic administration and increased innovation in the economy. At the same time, it is worth noting that over 25% of the outlays were allocated for activities important to the development prospects of the knowledge-based economy, i.e. on scientific research and development of modern technologies, and on R&D infrastructure.

When assessing the OP IE it must be stressed that this document is part of a development line laid out in the Lisbon Strategy. The program offers activities that will boost economic growth, based not, as often before, on the factor of cheap labour, but on innovation and human capital (Piech 2009, p. 244). Moreover, the positive side of OP IE is the fact that this document provides the basis for granting EU funds to Poland and must therefore arouse interests of central and local governments in issues of economic innovation (Płowiec 2008, p.720).

The OP IE's shortcoming is that it does not take into account the best international experience in building an innovative economy. The OP IE does not point to any country model whose strategy, after the necessary corrections, could be applied in Poland (Finland, South Korea, etc. could serve as an example). Besides, although the OP IE refers to the concept of knowledge-based economy, does not result from a particular strategy for building knowledge-based economy in Poland.

The Operational Programme Human Capital (OP HC) is focused on the implementation of the chief purpose which is the increase in employment and social cohesion. In addition to this goal, the OP HC also includes specific objectives (*Program Operacyjny Kapitał Ludzki 2007-2013*, 2007, p. 238):

- to increase economic activity and ability to employ the unemployed and economically inactive;
- to reduce areas of social exclusion;
- to improve the adaptability skills of employees and enterprises to changes in the economy;
- to disseminate public education at every stage of education while increasing the quality of educational services and their stronger association with the needs of knowledge-based economy;
- to increase the capacity of public administration in developing policies and providing high quality services and strengthening partnership mechanisms;
- to increase territorial cohesion.

These above mentioned objectives are carried out within ten priorities, which are listed along with the distribution of the funds provided for their financing in table 3.

Table 3. The OP HC 2007-2013 priorities and their financing (EUR million, current prices)

Priority		Total (UE + Poland) (million EUR)	Public (million EUR)	
			Communities	Poland
		1	2	3
I.	Employment and social integration	506.2	430.3	75.9
II.	Development of human resources and the adaptation potential of enterprises and improving the health condition of working persons	778.0	661.3	116.2
III.	High quality of the educational system	1 006.2	855.3	150.9

IV.	Tertiary education and science	960.4	816.3	144.1
V.	Good governance	610.9	519.2	91.6
VI.	The labour market open to all	2 256.9	1 918.4	338.5
VII.	Promotion of social integration	1 552.9	1 320.0	232.9
VIII.	Regional human resources for the economy	1 588.5	1 350.2	238.3
IX.	Development of education and competence in the regions	1 703.4	1 447.9	255.5
X.	Technical assistance	456.8	388.3	68.5
Total		11 420.2	9 707.2	1 713.0

Source: Program Operacyjny Kapitał Ludzki 2007-2013, [Operational Programme Human Capital 2007-2013], Ministry of Regional Development, Warsaw, September 2007, p. 238.

Analysis of the priorities and financial resources allocated for their implementation leads to a few conclusions.

Firstly, the OP HC's drawback is the excess of priorities, which results in dispersal of funds. Relatively large sums have been allocated on immediate needs, which are: improvement of human capital management in the regions (28.8% of the funds were allocated for the VIII and IX priorities) and the development of the labour market open to all (priority V - 19.8%).

Secondly, only 17.2% was assigned for the long-term activities directly related to the development of innovation in the economy, i.e. the modernization of the education system, as well as tertiary education and science. It should be noted that EU funding for OP HC comes exclusively from the European Social Fund and therefore the co-financing by the EU is extremely high and reaches 85%.

Thirdly, the objectives of OP HC, called "human capital", include actions that are not strictly pro-development, but are of social nature (e.g., reduction of areas of social exclusion, increase of territorial cohesion) (Piech 2009, p. 239).

The "Strategy of development of science in Poland until 2015" is another document important for the development of structures of knowledge-based economy in Poland. It was prepared by the Ministry of Science and Higher Education (*Strategia Rozwoju Nauki w Polsce do 2015 roku*' 2008). The document, which takes into account the provisions of the "National Development Strategy 2007-2015", was adopted by the Council of Ministers in November 2006. The document is a framework and sets out general objectives and research priorities. Due to the time horizon, the document will be updated after four years of being in force.

Underlying the development of this document is the assumption that the sector of science is an important pillar of the knowledge-based economy and its development will contribute to reducing the civilization gap between Poland and the economically developed countries. The main objectives of the strategy of scientific development are (Ibidem, s. 21):

- to raise the level and effectiveness of science in Poland and increase its contribution to world science;
- to improve performance of scientific potential for education, culture and raise the civilization level of the country;
- to stimulate the growth of the Polish economy;
- to integrate better with the European Research Area.

Construction of goals is consistent with existing trends in the world in the field of science and innovation policy. There is a view in the European Union countries and the OECD that human capital, knowledge, and innovation are the decisive factors of economic growth.

The implementation of the ambitious objectives of the strategy of scientific development requires changes in financing the R&D. The Strategy assumes that these changes should include increased budgetary and business outlays on R&D and modified budget resource allocation. It is assumed that the share of total expenditure on R&D in GDP will increase from 0.56% in the base year 2006 to 2% in 2015. The increased involvement of business in R &D outlays which will increase from 32% of GDP in 2006 to 40% of GDP in 2015 (Ibidem, s. 31) will be of primary importance. Despite the expected increased involvement of business in R&D outlays it still remains relatively low compared with most European Union countries and the OECD. In the highly developed economies the business is the main source of R&D funding which accounts for 60-70% of the total expenditure on R&D. The average index is about 64% for the countries of the European Union and about 70% for Sweden and Finland (*European Innovation Scoreboard 2008*, 2009, p.52).

The increase in expenditures on R&D will be accompanied by change in the structure of spending, which will be allocated only for research projects settled in the form of competitions (primarily the priority research programs), infrastructure development, training of young staff and restructuring costs of research units. As a result, there should be a reverse in the unfavourable ratio between the size of subjective and objective financing (the competition) in favour of the latter.

One of the key solutions designed in the “Strategy of development of science in Poland until 2015” is a significant change in the system of organizing research funding from public funds. These solutions are reflected in the package

of five laws – "Building on Knowledge – The Reform of Science for the Development of Poland". The package consists of the following acts: the Act on principles of financing science (*Ustawa z 30 kwietnia 2010 r. o zasadach finansowania nauki,* item 615*)*, The Law on the National Centre for Research and Development (*Ustawa z 30 kwietnia 2010 r. o Narodowym Centrum Badań i Rozwoju* item 616), The Law on the National Centre for Science (*Ustawa z 30 kwietnia 2010 r. o Narodowym Centrum Nauki,* item 617), the Act on research institutions, (*Ustawa z 30 kwietnia 2010 r. o instytucjach badawczych,*item 619*)* and the Act on the Polish Academy of Sciences (*Ustawa z 30 kwietnia 2010 r. o Polskiej Akademii Nauk,* item 618*)*. These acts of law, which came into force on 1 October 2010, were complemented with the amended Law on Tertiary Education passed by the Government to the Parliament in September 2010 (*Ustawa z 18 marca 2011 r. o zmianie ustawy – Prawo o szkolnictwie wyższym, ustawy o stopniach naukowych oraz o stopniach i tytule w zakresie sztuki oraz o zmianie niektórych innych ustaw,*item 455). For the first time since 1989 these two related sectors; research and higher education have been almost simultaneously and comprehensively reformed.

The foremost aim of the Act on principles of financing science is to introduce a transparent system of research funding, more effective use of budgetary funds allocated for science and concentration of these funds in the units conducting scientific activities at the highest level. New regulations should result in increased share of funds for science in the budget, the funds which will be spent on a competitive basis, as well as in the comprehensive system for the quality assessment of activities of scientific institutions.

Pursuant to new regulations, the Minister of Science and Higher Education will no longer divide the funds for research. These two institutions will deal with this matter: The National Centre for Research and Development (NCRD) and the National Science Centre (NSC).

The NCRD is a state legal entity whose tasks involve:

- funding applied research,
- defining strategic research programs,
- encouraging entrepreneurs to fund applied research and development work.

Unlike the NCRD, the National Science Centre was established in order to finance basic research that is the original research works oriented to achieve the progress in knowledge, without the requirement of direct practical application of these research works. The NSC allocates grants from the budget in a competition mode. The tasks of the NSC involve also funding doctoral scholarships and post-doctoral internships.

The intention of establishing these institutions was also to cut red tape and de-politicize the process of allocation of public funds for R&D. The power to allocate grants for specific projects was moved from the ministerial level to the executive level supervised by the Minister of Science and Higher Education. While implementing the remaining tasks the Minister is supported by an appointed by him a consultative and advisory Scientific Policy Committee, consisting of over a dozen members, who will take over the existing powers of the Committee for Scientific and Technological Research Council, excluding the functions transferred to the NCRD and the NSC. The main tasks of the Committee are (*Ustawa z 30 kwietnia 2010 r. o zasadach finansowania nauki*, item 615):

- assisting the Minister with the development of strategy documents relating to the development of science, and scientific and innovative policies,
- giving opinions on the plans of action of the NCRD and the NSC,
- giving opinions on bills on the development of science and innovation,
- giving opinions on and evaluating applications for grants in major research infrastructure,
- assisting the Minister with the development of the draft budget for science and financial plan of science.

The Committee for Evaluation of Scientific Institutions is a second advisory body to the Minister of Science and Higher Education. The Committee will (*Ustawa z 30 kwietnia 2010 r. o zasadach finansowania nauki*, item 615):

- conduct, not less frequently than every 4 years, a comprehensive evaluation of the quality of scientific, research and development activity of scientific institutions;
- present to the Minister proposals for classification of specific scientific institution;
- indicate to the Minister the leading scientific, development, and research institutions which after the evaluation stand out in terms of quality of their research and development work in order to take their achievements into account when allocating funds for research potential in subsequent years;
- prepare the proposal of detailed parameters and criteria for evaluation of research institutions;
- examine reports of evaluation teams.

The main criteria for a comprehensive assessment of the quality of work of scientific and R&D institutions involve the effects of their work in relation to international standards (publications by employees of these institutions in

reputable scientific journals and monographs, development of new technologies, products, implementation, patents, etc.).

An important element in the reform of the R&D system is the restructuring of research and development institutions (RDIs). The reform aims to consolidate the institutions and to use their potential more efficiently to improve the innovation of Polish economy, knowledge and technology transfer. Pursuant to the Law on research institutions, all R&D institutions which conduct research, development, and implementation work and the National Research Institutes which perform tasks of public service, particularly important for the country and society will be transformed into research institutions subject to strict rules of control and systematic audit. Other RDIs will be put on a commercial basis. These proposals for change should lead to a smaller number of strong institutes capable of implementing large and complex R&D projects, the results of which will serve the economy. One of the latest government documents - reports, which presents a vision for the development of Poland, taking into account the importance of knowledge-based economy in the process, is the "Poland 2030. Development Challenges" report, developed by a team of Prime Minister's strategic advisors (*Polska 2030. Wyzwania rozwojowe)*

The authors of the report assume that to avoid the situation in which the development of the Polish economy would go adrift, necessary is a modern strategic project which will determine the motive forces (factors) of competitive advantages. The report assumed very ambitious predictions - until 2030 Poland will be the sixth economy in Europe and the sixteenth in the world, the most competitive in Central and Eastern Europe and its GDP per capita will reach the European Union average. From over a hundred developmental recommendations those of strategic importance for building a knowledge-based economy are prominent: increase in expenditures on R&D up to 4% of GDP in 2030, new technologies will account for up to 25% of GDP and high-tech products' share in exports will increase up to 40% (today 3.2%), Internet will reach hundred per cent penetration rate, and children will be provided with early education. The words "innovations" or "innovativeness" appear over 120 times in the report; the terms "knowledge-based economy" and "intellectual capital" also appear quite often. It should be noted that the report does not contain specific well-tried proposals.

Another document which incorporates the issues of knowledge-based economy and its role in socio-economic development of Poland is the National Foresight Programme "Poland 2020" prepared by the Polish Academy of Sciences in 2008. The program reflects the concept of knowledge-based economy, the key factor in the five scenarios of economic and social

development of Poland. The scope of the program includes three fields of investigation and twenty specific topics pertaining to the individual fields:

- sustainable development of Poland (quality of life, sources and utilization of energy resources, key environmental issues, technologies for environmental protection, natural resources, new materials and transport, the integration of environmental policy with industry policies, product policy and sustainable development of regions and areas);
- information and communication technologies (ICT), (access to information, ICT and the society, ICT and education, e-business, new media);
- security (economic security, intellectual security, social security, technical and technological security and development of civil society).

The National Foresight Programme "Poland 2020" aims at (*Narodowy Program Foresight „Polska 2020"*, pp. 2,3):

- defining the development vision of the country until 2020,
- defining - through consensus with the main stakeholders - the priority directions of scientific research and development work, which, in the long run, will have an impact on the acceleration of socio-economic development,
- rational use of research in economic practice and preferential treatment for research in the allocation of budgetary resources,
- defining the importance of research for economic development, as well as the possibility of their absorption by the economy,
- making the principles of national science policy similar to the EU requirements,
- developing science and innovation policy towards knowledge-based economy,
- rationalizing expenditure incurred from public funds,
- defining the language of public debate and culture of thinking about the future, in order to coordinate joint activities for socio-economic development and improved quality of life in the country.

There are five possible scenarios in the Foresight Programme "Poland 2020":

- civilisation leap,
- hard adaptation,
- difficult modernisation,
- weakening development,
- collapse.

The civilization leap scenario assumes that the political elites together with the active society formulate a vision for the country's development, a key element of which are the modern science and technology sector. The leading idea of this scenario is to transform the Polish economy to a knowledge-based economy. It is anticipated that there will be a systematic increase in outlays for the development of strategic technology directions and Poland will skilfully combine endogenous growth factors with foreign investments and help from the European Union, which, after 2013, will focus on innovation support. As a result of these processes, the structure of the Polish economy will change permanently and Poland will develop its own industries and advanced technology services. Implementation of this scenario will increase the active participation of Poland in the processes of European and global integration and at the same time will consistently extend Poland's development potential (Ibidem, p. 4).

The hard adjustments scenario assumes that political elites will attempt to reform public institutions. However, the reforms are slowed down by the lack of social interest, and often by resistance to more radical changes. As a result, the inefficient public finance system will not able to meet all needs. State authorities will manage to carry out reforms in politically less sensitive sectors, such as the system of science, education and higher education. These reforms will bring high quality of human capital and research capacity which will favour the development of selected industries based on indigenous technologies. This development is not on a par with the Polish intellectual potential, which may result in emigration of many skilled employees. Despite the loss of development potential in the form of intellectual capital, Poland will slowly develop institutions and structures of the knowledge-based economy.

The difficult modernization scenario assumes that the world economy will not overcome the crisis in 2013. This situation will trigger a positive shock in Poland and will mobilize the political elites to formulate a strategy for modernization. The society will support the need for deep reforms and development policy. Despite the high cost of the crisis, the growing unemployment and slackening economic growth it will be possible to carry out important reforms and modernize the system of science and education. Manufacturing industry which sells its products mainly in the internal market does not need the latest technology; there prevails medium-tech manufacturing based on the achievements of native scientific and technical thought. The main driving force for economic development is the mobilization of endogenous factors through a program of profound reforms of public institutions, development of knowledge-based economy infrastructure and investment in intellectual capital.

The striving of the government to reform public institutions is a characteristic feature of the scenario of weakening development. Government's actions meet with public resistance. The overloaded system of public finance is no longer able to meet all needs. These deficiencies are initially alleviated by the inflow of foreign investments, efficient absorption of EU funds, and savings in expenditures on R&D and education. However, in subsequent years (2014-2020), the Polish economy will lose most of its competitiveness factors i.e. the reserves of cheap labour and high-skilled workers. This will be followed by the reduced inflow of EU funds and withdrawal of foreign capital. This scenario assumes a lack of understanding of the role of knowledge as a key factor for economic development, which in turn will inhibit the development of knowledge-based economy.

The collapse scenario assumes continuation of the international crisis, development of protectionist policy, and weakening of political, economic, and scientific cooperation. Polish political elites will be unable to develop a program of reforms and the public will not see the necessity to make reforms, being content with the existing effects of integration with the European Union. Due to the lack of reforms, science and education systems will deteriorate, the quality of intellectual capital will decrease and brain drain to countries with developed knowledge-based economies will enhance. The Polish economy loses most of the existing factors of competitiveness, including, in particular, the low labour costs. In addition, the inflow of EU funds earmarked for infrastructure development and modernization of rural areas is decreasing and foreign capital is gradually withdrawing from Poland and is mainly interested in exporting to Poland "dirty" industry investment, harmful to the environment. These unfavourable factors slacken the already weak economic and social development and deepen the civilization gap between Poland and the highly developed countries, the centre of a globalized economy.

In conclusion, it must be mentioned that the concept of foresight can be used in the development of far-reaching economic development strategy. This concept implies getting to know, forecasting, and active influence on the future. The foresight process and its results are useful primarily as a way to create and then implement country's science, technology, and innovation policy. Foresight enables the construction of an effective long-term working strategy for the government, enterprises, and research institutions. The foresight research covers both economy and technology in a holistic approach, as well as certain sectors of the economy, selected companies and regions (*Innowacje w strategii rozwoju organizacji w Unii Europejskiej*, 2009, p. 30) The results of foresight inform decision makers about new development trends, allow to determine development scenarios, help harmonize the activities of social partners (government,

academia, business and various sectors of the economy), and also help set criteria for the funding of science and technology (*Narodowy Program Foresight „Polska 2020*").

3. Summary

Despite numerous documents (programs, reports, and projects) which have been produced over the last several years and formulated the goals and objectives of the strategy for building knowledge-based economy and innovation of the Polish economy none of them provided a program with a clear and internally coherent strategy in this field or instruments for the implementation of this strategy. This demonstrates the lack of strategic thinking among the Polish ruling elites. Moreover, the negative practice of the Polish political life should be considered, with every change of government there is a change in the long-term development programs for the knowledge-based economy and innovation. As a result, many of the programs of strategic nature, calculated for a few or several years, have not survived longer than one parliamentary term.

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Streszczenie

ANALIZA ROZWOJU GOSPODARKI OPARTEJ NA WIEDZY W POLSCE W ŚWIETLE DOKUMENTÓW STRATEGICZNYCH

Przystąpienie Polski do Unii Europejskiej spowodowało nałożenie na rząd obowiązku opracowania i realizowania różnych strategii gospodarczych, w tym przede wszystkim strategii kształtowania gospodarki opartej na wiedzy. Po wiosennym szczycie Unii Europejskiej w 2005 r. kraje członkowskie zostały zobowiązane do wdrażania Strategii Lizbońskiej na poziomie narodowym i opracowywania narodowych strategii służących realizacji jej celów. Dzięki temu cele i zadania budowy gospodarki opartej na wiedzy zostały zapisane w dokumentach strategicznych i programach operacyjnych wchodzących w skład Narodowych Strategicznych Ram Odniesienia 2007-2013 (NSRO), przygotowanych przez kolejne rządy po 2005 roku. Niemniej trzeba zaznaczyć, że również instytucje naukowe (np. PAN) przedstawiły różne dokumenty strategiczne, w których uwzględniono zagadnienie gospodarki opartej na wiedzy i jej roli w rozwoju

społeczno-gospodarczym Polski. Nie powstało jednak opracowanie poświęcone całościowej strategii rozwoju GOW.

Celem artykułu jest prezentacja i ocena najważniejszych dokumentów dotyczących strategii rozwoju gospodarki opartej na wiedzy w Polsce, tj. Strategii Rozwoju Kraju 2007-2015 (SRK), Narodowych Strategicznych Ram Odniesienia 2007-2013 (NSRO) i funkcjonujących w ich obrębie programów: Programu Operacyjnego Innowacyjna Gospodarka 2007-2013 (POIG) i Programu Operacyjnego Kapitał Ludzki 2007-2013 (POKL), jak również Strategii rozwoju nauki w Polsce do 2015 roku, Raportu „Polska 2030. Wyzwania Rozwojowe" i Programu Foresight, przygotowanego przez PAN.

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