

The Role of Education in a Knowledge-Based Economy

Abstract

The term “knowledge-based economy” has in recent years been firmly established in the word stock of politicians, economists and sociologists. Nevertheless, this term is still ambiguous and vague. In relevant literature “knowledge-based economy” is variably defined. The following features of such an economy are common for all the definitions and have been most often pointed to: (a) low participation of both industry and agriculture in employment rate and GDP, but a very significant participation of the services sector, (b) high participation in the investments in knowledge and “software”, (c) considerable participation of modern techniques and technologies in production.

It is worth pointing out that the process whereby an economy of new quality develops is not autonomous. It needs, at least to a certain extent, to be interfered with. This results from the fact that an efficient functioning of an economy based on knowledge is determined by utilisation of human knowledge, intellect and competence. The first step should be the development of an information society. Education, understood here as an umbrella term covering all types of intellectual activity, plays a special role in this process. It is evident that the investments in human resources are, primarily, the result of individual decisions of people and their realisations. Since putting these decisions into practice necessitates suitable conditions, both local and national authorities together with integration committees should be held responsible for creating such conditions.

The aim of this paper is to portray the role of education in the development of information society and in the process of building a knowledge-based economy in Poland and European Union.

1. Introduction

The term “knowledge-based economy” has in recent years been firmly established in the word stock of politicians, economists and sociologists. Nevertheless, this term is still ambiguous and vague. In relevant literature “knowledge-based economy” is variably defined. The following features of such an economy are common for all the definitions and have been most often pointed to: (a) low participation of both industry and agriculture in employment rate and GDP, but a very significant participation of the services sector, (b) high participation in the investments in knowledge and “software”, (c) considerable participation of modern techniques and technologies in production (Kudrycka 2003, p. 16). The definition of “the knowledge-based economy” which has been published in the ground-breaking paper of OECD entitled “The Future of Global Economy” highlights the increase in employment rate of the knowledge-oriented/ consuming sector. It also emphasises the well-known fact that better education becomes indispensable for people who want to work in such sectors and that such jobs are better paid (Woroniecki 2000, p. 693–694). These definitions lay much stress on the importance of knowledge as a significant economic resource of both an economy and a company (Woroniecki 2001, p. 47–48). Still such an interpretation of an economy based on knowledge is not precise. It is worth noting that knowledge also played an important role in the processes of economic increase in the past. Hence, it seems more reasonable to define “the knowledge-based economy” as an economy in which knowledge in all its forms plays a key role in facilitating the socio-economic development. In this sense, knowledge becomes the dominant factor in the determination of the level and rate of the economic development. It is an even more important factor than the costs of the permanent funds.

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The aim of this paper is to portray the role of education in the development of information society and in the process of building a knowledge-based economy in Poland and European Union.

2. The meaning of education in economic development

Over the last two centuries the economists have been propagating the view that economy functions thanks to the traditional factors of production – work, capital and land (the natural resources). However, in recent years it has been more and more often stressed that the wealth of nations depends on the development and efficient utilisation of knowledge. Productivity, competitiveness and effectiveness are to a much greater extent dependent on the level of technical, economic and organisational knowledge which enables to create new technologies and products and to manage a modern company in an efficient way. The level of competitiveness and innovative potential is determined by the range of up-to-date knowledge, the quality of work, the ability to constantly think in an innovative way and to implement new solutions into economic processes. It seems obvious that both globalisation and integration make the investments into knowledge and education indispensable. They are a prerequisite to transform an economy into one based on knowledge and to help this economy gain competitive superiority on a global scale. The strategic aim of education should be the development of both human resources and knowledge which, in turn, facilitates the growth of modern, innovative branches of economy, the acquisition of new qualifications, the ability to work in an efficient and creative way as well as the creation of new constructions and modern products (Kabaj 2001 p. 165).

The existence of a direct relationship between the investments in knowledge and the rate of economic growth is proved by the outcome of numerous research projects dealing with the factors of such growth. The results of these researches which have been carried out in different countries and time periods are as follows:

- The research project aimed at measuring the rate of economic growth in the United States in the years 1929–1969 has revealed that 58% of productivity growth was directly related to an increase in the knowledge and qualifications of the workers (Denison 1974, p. 127).
- The European Economic Commission UN has tried to modify the traditional Cobb-Douglas production function by introducing knowledge, the technical and organisational progress and innovations. In the modified model the growth of national income has been treated as a function of three rather than only two production factors which were included in the previous model.

$$\Delta Y/Y = \Delta L/L \cdot a + \Delta K/K \cdot b + R$$

where: Y is national income, K – capital expenditure, L – workload and R – effects of education, technical and organisational progress, $a = 0,75$; $b = 0,25$; $a + b = 1$.

It can be stated that the economic growth is the function of workload's growth $\Delta L/L$ (assuming that 1% of workload's growth leads to 0,75% of national income's growth) and an increase in capital $\Delta K/K$ (assuming that that 1% of capital's growth leads to 0,25% of national income's growth). The study of factors behind the economic growth in Western European countries was carried out in the years 1950–1960 and was supervised by the European Economic Commission UN in Geneva. It enabled to come to the conclusion that knowledge and technical-organisational factor (R – factor which is left out of the work and capital's growth) exerted in most countries the greatest influence on the rate of economic growth. The contribution of this factor to the overall economic growth was: in Germany – 61%, in Italy – 69%, in Holland – 54%, in France – 62%, in Norway – 53%, in Sweden – 73% and in Great Britain – 46% (UN, ECE Economy Survey of Europe, 1964, p. 46).

- The extended research carried out in the 1980's in 29 countries suggests that the investments in education have contributed to economic growth by almost $\frac{1}{4}$ (Psacharopoulos 1984).
- The studies of World Bank over the factors behind economic growth which were carried out in the 1990's highlighted the significant role of qualified human resources in economic development. According to Bank's experts, the contribution of capital resources in the global wealth remains at the level

of 16%, the participation of natural resources at 20% whereas the contribution of qualified human resources at as much as 64% (World Bank 1995, p. 52–53);

- At the beginning of 1990's the study was carried out which analysed the influence of the development of human resources, qualifications and competence on effectiveness and remunerativeness in individual companies. Particular emphasis was laid on the analysis of the influence of training at workplaces on the productivity and wages. This analysis resulted in the conclusion that the development of training at workplaces made it possible to improve the productivity by 5–15% (in one of the big American companies the increase in expenditure on training enabled to extend the company's income from 20% to 35% (Partel 1995).

All things considered, it should be observed that undoubtedly there is a positive relationship between investments in knowledge, in education and the rate of economic growth¹. The fastest increase in productivity, welfare and

¹ In most of OECD countries the fastest developing sector (from the point of view of employment dynamics as well as added value) is the service sector which is rich in knowledge. The Management of Knowledge in Learning Society, The Centre of Studies over Education and

technical progress is observed in these countries where the rate of growth in expenditure on the development of both human resources and qualifications as well as of competence of workers is the fastest. Nevertheless, it should be added that only the investments in knowledge which correspond to the needs of economy and which fulfil the criteria of economic effectiveness are the most successful. A current and perspective co-ordination of the education sector and job market seems indispensable. What is even more important is the creation of a system based on co-operation between schools and companies, which will enable to improve the structures and contents of education, its economic and social effectiveness (Kabaj 2001). In economies based on knowledge one tries to find optimal structures of education (theoretical and practical) which will enable to achieve high quality of work, productivity and competitiveness of economy. In order for this to happen, it is necessary to fulfil the following criteria: (a) the system of professional education and constant training should take into consideration the needs of dynamic job market and the structural changes in economy, (b) education should be multidimensional, enabling to work in different professions and specialisations, (c) education must be practical (one should develop dual educational systems) and at the same time it should shape a wide range of skills and develop innovative attitudes, (d) economy must be aimed at employment growth and such utilisation of human resources which would not result in their being wasted in the form of widespread and structural unemployment (Kabaj 2001). Nevertheless, we should remember that the rate of changes causes the continuous moral depreciation of knowledge and skills. It can be assumed then that the economic success of individuals, businesses, regions and countries depends in the first place on their ability to learn². The increase in the speed of changes is connected with the development of information technologies, the expansion of markets, their destabilisation and the occurrence of new competitors (Drucker 1993).

Innovation, OECD 200, p. 27.

² Nowadays it is believed that learning is a process whose essence is based on the acquisition of competence and skills which help individuals succeed in achieving personal aims or the aims of an organisation to which this person belongs. Learning is connected with the change of context of the knowledge already acquired by an individual. This type of learning is the most vital for the economic success. It differs from certain non-standard definitions in the theory of economy where learning is associated with "acquiring information" or it is being treated as a "black box" category which influences the productivity growth. The Management of Knowledge in Learning Society, The Centre of Studies over Education and Innovation, OECD 200, p. 26.

3. Measures of the level of education

The success in shaping the economy based on knowledge and the level of socio-economic development is dependent on many factors connected with human capital. Some of these factors include among others: the level of education of human resources (including the members of education and science sector), the system of education or the level of funds allocated to education.

One of the factors of the socio-economic development is the level of education of human resources. The structure of employment according to the level of education in Polish economy in the years 1958–2001 was shaped as follows:

Table 1. The structure of employment according to education in the years 1958–2001

Years	Employment*	Level of Education				
		Higher	Tertiary and technical	Comprehensive	Basic technical	Primary
		Structure (in %)				
1958	6351	3,8	6,9	4,4	8,3	76,6
1970	9408	5,3	13,6	5,6	17,0	58,5
1980	11634	8,1	20,9	6,4	24,2	40,5
1992	8514	13,2	27,2	6,4	30,0	23,2
1999	9947	19,6	45,8	10,3	48,8	22,0
2001	9165	24,0	45,7	10,4	51,9	21,3
Increase 2001–1958	44%	815%	854%	244%	810%	-60%

*Full-time workers employed on the basis of work relationship.

Source: M. Kabaj, *The development and utilisation of human resources. Towards an economy based on knowledge*, (in:) *Economy based on knowledge. The challenge for Poland in the 21st century*, KBN, Warsaw 2001, p. 172; *Statistical Annual*, Central Statistical Office (CSO), Warsaw 2002, p. 135, 136.

From the data presented in table 1 it follows that only in the group of the employed with primary education there has been a considerable decline (by 60%). At the same time, the participation of the employed in other groups increased: the participation of the employed with higher education was nine times bigger. In the group of working people with tertiary and secondary technical/vocational education was also over nine times what it used to be. The number of the employed who have graduated from grammar schools

increased three times and the participation of the employed with vocational education was nine times bigger.

The next table (table 2) presents the data which illustrate the structure of the working people according to education in the years 1995–2003.

Table 2. The structure of the employed in national economy according to the level of education in the years 1995–2003

Specification	Structure in %					Increase 1995–2003
	1995	1999	2001	2002	2003	
In total	100,0	100,0	100,0	100,0	100,0	
Higher	11,4	13,4	15,6	17,1	19,1	48%
Tertiary and secondary technical	27,9	31,2	29,8	29,9	29,1	-7,7%
Secondary	6,0	7,0	6,8	7,1	7,6	12,8%
Basic vocational	33,5	33,3	33,6	32,7	32,3	-14,5%
Primary/technical	21,2	15,0	13,1	13,2	11,8	-50%

Source: Statistical Annual 1996, CSO, Warsaw 1996, p. 333; Small Statistical Annual 2000, CSO, Warsaw 2000, p. 276.

On the basis of the data mentioned in the table 2 it can be said that in the years 1995–2003 there was a quick further growth of the number of the employed with higher education (48%), of the number of people with secondary education (12,8%). In the analysed period there was a decline in the number of people with the tertiary and secondary technical education (–7,7%), basic vocational education (–14,5%) and primary and not complete vocational education (–50%).

Against the background of the discussion about the condition of education in Poland at the turn of the last century and at the beginning of the 21st century it seems also reasonable to illustrate the tendencies which have developed in the system of secondary and higher education.

Table 3. The evolution of the post-primary education in Poland

Specification	1990/1991 in 1000 of people	2002/2003 in 1000 of people	Growth (%)
<i>Teachers:</i>			
Grammar schools			
Secondary schools	110,6	41,3	-62,7
Comprehensive schools	25,1	4,5	-82,1
Technical and vocational schools	85,5	36,8	-57,6
Undergraduate and postgraduate studies	64,5	88,5	37,2
<i>Pupils and students:</i>			
Grammar schools		1709,9	
Secondary schools	1896,1	1249,6	-34,1
Comprehensive schools	445,0	487,2	9,5
Secondary technical and vocational schools*	1451,1	726,5	-49,9
*with basic vocational schools	814,5	171,1	-79,0
Tertiary schools	108,3	236,5	118,4
Undergraduate and postgraduate studies	403,8	1800,5	345,9
Schools for grown-ups	224,9	369,5	64,3
<i>Graduates:</i>			
Secondary schools	443,5	543,3	22,5
Comprehensive schools	92,5	229,1	147,7
Secondary technical and vocational schools*	351,0	314,3	-10,5
*with basic vocational schools	238,1	142,6	-40,1
Tertiary schools	41,9	85,7	104,5
Undergraduate and postgraduate studies	56,1	366,1	552,6
Schools for grown-ups	65,0	106,8	64,3

Source: *Small Statistical Annual 2004*, CSO, Warsaw 2004, p. 219–220; M. Kabaj, *The Development and Utilisation....*, p. 174.

The presented data allow to formulate the conclusion that in the years 1990–2003 in Poland one could observe fundamental changes in the structure of education. The fastest-developing sector was higher education. The number of students increased by 345,9% and graduates by 552,6%. At the same time the number of teachers in higher education grew only by 37,2%. On the one hand it can mean the increase in “efficiency” of the work done by teachers, on the other the deterioration of the quality of education. The number of students at tertiary schools (118,4%) and schools for grown-ups (64,3%) also grew

considerably. The number of students in secondary technical and vocational schools declined by almost 50% (the number of students at vocational schools decreased by almost 80%). The progressive tendency, apart from the higher education, was also revealed by the students of secondary schools (22%), of comprehensive schools (148%), tertiary schools (104,5%) and schools for grown-ups (over 64%). The number of graduates of secondary technical and vocational schools (−10,5%) as well as basic vocational schools (−40,1%) decreased. On the basis of the presented data it can be assumed that in the period 1990–2003 there was a shift of emphasis from the vocational education at secondary level towards the direction of the general education at the secondary and higher level.

In the context of the assumptions presented so far it is interesting to analyse the structure of human resources according to education and the shaping of the number of students in Poland in the 1990's presented against the background of the data from OECD countries. These data are included in the tables 4 and 5.

The analysis of data presented in tables 4 and 5 allows to draw the following conclusions:

First, the people with higher education comprise in Poland 74% of all human resources; this percentage is comparable to participation characteristic for highly-developed countries, e.g. Austria (71%), Sweden (also 74%), Great Britain (76%) and Canada (76%). It is worth pointing out that these countries (in comparison with Poland) have achieved a three times higher level of GDP per capita (calculated according to purchasing force). Moreover, Poland has found its place among the countries which have the biggest number of students for 10 000 inhabitants. This number has increased from 142 in 1990 to 371 in 1998. Only countries such as USA, Canada, South Korea, Finland, Spain and Norway have had a bigger number of students, whereas most of the high developed countries have educated less students than Poland. Among these countries we find: Switzerland (207 students for 10 000 inhabitants), Sweden (311), Germany (260), Holland (302), Japan (314), Denmark (319), Czech Republic (200), Austria (299), Hungary (193) and Slovakia (190).

Table 4. Education of human resources in the OECD countries in 1996

Country	The structure of in population aged 25–64 with post-primary education in 1996 (in general = 100)				The participation of people with secondary and higher education in %	GDP per capita (in thousands USD, PPP)
	Below secondary	Secondary	Higher non-academic	Higher academic		
Canada	24	29	31	17	76	22,5
USA	14	52	8	26	84	29,2
Austria	29	63	2	6	71	22,8
Belgium	47	30	13	11	53	22,9
Czech Republic	16	74	.	10	84	.
Denmark	34	44	7	15	66	23,2
Finland	33	46	9	12	67	19,8
France	40	41	9	10	60	21,2
Germany	19	60	9	13	81	22,5
Greece	56	25	7	12	44	13,9
Hungary	37	50	.	13	63	.
Ireland	50	28	12	11	50	20,9
Italy	62	30	.	8	38	20,0
Holland	37	40	.	23	63	21,4
Norway	18	55	11	16	82	25,9
Poland	26	61	3	10	74	6,7
Portugal	80	9	3	7	20	14,2
Spain	70	13	5	13	30	15,9
Sweden	26	47	14	13	74	20,3
Switzerland	20	58	12	10	80	25,1
Turkey	83	11	.	6	17	6,5
Great Britain	24	55	9	13	76	20,1
In sum OECD (average)	40	40	10	13	60	.

Source: OECD, *Education at a Glance 1988*; *Statistical Annual 1998*, CSO, Warsaw 1998, p. 136.

Table 5. Students of higher education schools in chosen countries in 1990's

Country	1990/91	1997/98	1990/91	1997/98	1990/91	1997/98
	Total				with foreigners in thousands	
	in thousands		in 10 thousand			
Austria	206	241	267	299	18,4	27,2
Belgium	276	353	278	353	27,4	35,0
Bulgaria	188	263	216	310	8,8	8,5
Czech Rep.	118	207	115	200	3,1	3,9
Denmark	143	175	278	319	6,7	9,0
Finland	166	226	332	442	1,6	3,8
France	1699	2062	300	353	136	138
Greece	283	363	191	347	1,5	.
Spain	1222	1684	311	429	10,3	21,4
Ireland	90,3	135	258	371	3,3	6,0
Japan	2899	3918	234	314	45,1	53,5
Canada	1917	1763	690	600	35,2	35,5
South Korea	1691	2542	395	561	2,2	2,1
Holland	479	469	320	302	8,9	.
Germany	2049	2132	258	260	107	166
Norway	143	185	336	423	6,9	11,2
Poland	541	1432*	142	371*	4,3	5,4
Portugal	186	320	188	322	3,8	6,1
Russia	5100	4458	344	300	.	73,2
Rumania	193	412	83	182	.	14,2
Slovak Rep.	.	102	.	190	.	1,7
Slovenia	33,6	51,0	175	276	1,0	0,4
USA	13710	14262	540	534	408	454
Switzerland	137	148	201	207	22,6	24,1
Sweden	193	275	225	311	10,7	12,2
Turkey	750	1434	134	233	7,7	14,7
Hungary	102	195	99	193	3,3	6,4
GB	1258	1821	219	314	80,2	199
Italy	1452	1893	255	330	21,8	24,9

*Data from year 1999/2000. In the year 2003/2004 the number of students in higher education schools in Poland was 1858,7. Compare, Small Statistical Annual 2004, CSO, Warsaw 2004, p. 235.

Source: M. Kabaj, *The Development and utilisation...*, p. 174.

Second, taking into account the percentage of students with education below secondary level, it can be said that in Poland this percentage is relatively low – it is only 26%. In the majority of analysed countries it remains at a higher level. A smaller percentage is found only in: Canada (24%), Great Britain (24%), Switzerland (20%), Germany (19%), Norway (18%), Czech Republic (16%) and the United States (14%).

To sum up, it must be concluded that in the analysed period two phenomena could be observed: there was an increase in the number of higher education schools, of students and graduates. At the same time, however, the quality of education deteriorated. The number of students and schools increased much faster than the number of teachers (academics), which can only lead to the growth of the teacher's efficiency at the expense of the quality of education. In addition, the increase in the number of schools and students was not accompanied by the increase in the public expenditure on education sector. The participation of public expenditure on education in relation to GDP in the 1990's was as follows (table 6):

Table 6. The percentage of public expenditure on education in GDP in the years 1991–1999

Years	Education	Higher Education	Total
1990	4,09	1,05	5,14
1991	4,29	0,82	5,11
1992	4,53	0,88	5,41
1993	4,60	0,81	5,41
1994	4,81	0,77	5,58
1995	4,74	0,84	5,58
1996	4,37	0,77	5,14
1997	4,54	0,80	5,34
1998	4,37	0,77	5,14
1999 (a)	4,57	0,82	5,39
1999 (b)	3,97	0,71	4,69
2001	3,7	0,9	4,6
2003	3,7	0,9	4,6

(a) without the deduction of the tax from individuals which was not present in the years 1990–1991;

(b) net data compared with the years 1990–1991.

Source: Statistical Annual 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000.

It follows from the data presented in table 6, the contribution of gross expenditure (with the tax from individuals introduced in 1992) has decreased from 5,14% GDP in 1990 to 4,6% GDP in 2003. There has also been a decline in the funds for higher education (from 1,05% to 0,9% GDP) and the participation of expenditure for education and the school system. Consequently, public expenditure on education and higher education has not grown proportionately to the increase in GDP. There has been much fastest growth in expenditure on private education, particularly on private schools³.

In order to compare the range of education financing by national budget in Poland and in the developed countries, it seems worthwhile to present the following data (table 7):

Table 7. The expenditure on education as percentage of GDP in chosen countries in mid 1990's

Country	Expenditure on education as percentage of GDP		The participation of public expenditure in general expenditure (in %)
	Only public	Public and private together	
Canada	7,2	7,4	97
USA	5,7	7,0	81
Japan	3,6	4,8	75
Denmark	6,2	6,7	92
France	5,1	5,9	86
Germany	3,7	4,9	76
Ireland	5,7	5,7	100
Holland	5,0	6,7	34
Portugal	5,2	.	.
Spain	4,2	5,2	81
Great Britain	4,1	.	.
Finland	7,3	7,9	92
Sweden	6,7	6,8	99
Hungary	7,3	7,3	100
Poland	5,4	6,4	84

Source: The OECD Observer, No 13, April–May 1998, p. 9.

³ It has been estimated that 50–60% of all academic income comes from private sources. In the whole system of education (together with primary and secondary education) the private expenditure comprises around 16% of public funds. Compare, M. Kabaj, *The Developments and utilisation...*, p. 178–179.

The analysis of data presented in table 6 gives rise to optimism, because, when taking into account the expenditure on education, Poland is not a far cry from the average in the EU or the United States. In Poland 5,4% of GDP (1993) was designated for this purpose. In USA it was 5,7% and in Portugal and France 5,2%, 5,1% of GDP respectively. The countries which showed the biggest expenditure on education were the Scandinavian countries (from 6,2% to 7,3% of GDP), Canada (7,2% of GDP) and Hungary (7,3%). Nevertheless, it has to be observed that the level of expenditure on education is in Poland not equivalent to its efficient utilisation. The permanently high unemployment rate is a sign of the lack of convergence between the system of education and job market. What also follows from the data included in table 6 is the fact that in most economically developed countries the costs of education are in greater part covered by national budget and in some of them education is financed exclusively from public resources (Ireland, Hungary). It has to be added that in these countries the investments which facilitate economic and social development are considered to be the most effective (Kabaj 2001, p. 178–179). In Poland the contribution of national budget to financing education amounts to 84% of all expenditure and is comparable with the budget expenditure on education in France, USA and Spain.

To conclude the discussion of the state of education in Poland in the 1990's the following assumptions can be made:

First, in the analysed period two phenomena could be observed: an increase in the number of higher education schools (colleges), students and graduates with parallel deterioration of the education quality. The number of students and schools increased faster than the number of academics, which can be equivalent to the growth of teachers' efficiency at the expense of the education quality. Moreover, the increase in the number of schools and students was not accompanied by the growth of public funds on education.

Second, in the period under discussion the contribution of public expenditure on education decreased as did the participation of expenditure on higher education and education in general. Therefore, the public expenditure on education in general and higher education in particular did not rise proportionately to the GDP growth. The expenditure on private education, especially private schools exhibited a much faster tempo of development.

Third, the level of public expenditure on education in Poland (when compared with the economically developed countries) and the permanently high unemployment rate reveal the fact that Polish educational system is not in keeping with the structure of job demand.

It seems necessary to develop such an educational policy which would take into account the effects of quick structural changes that Polish economy undergoes and, as a result, would enable to turn it into an economy based on knowledge.

4. The programmes of education development in the European Union

The need to develop an economy based on knowledge in an intensive way is one of the challenges which the integrating Europe will have to face. The range and importance of this challenge means that the necessary changes must take place in many aspects of economic and social life of the EU countries. In numerous official EU documents the development of the EBK and of the associated information society is considered to be one of the top priorities and a major direction of EU activities at the beginning of the 21st century. These documents highlight the fact that the efficient functioning of both: the EBK and the information society depends on the reasonable utilisation of human resources. It also is dependent on the development of knowledge which enables to gain new qualifications, to acquire the ability to work in an efficient and creative way as well as to build new constructions and modern products.

An extremely significant step in the developments of EBK within the EU was the fact that the European Commission (on 11th of December 1993) accepted the White Book entitled “Growth, competitiveness, employment – the challenges and ways forward into the 21st century”(Woicka 2000). This document, for the first time in the EU history, presented a scheme of the creation of the widespread information society. In July 1994 the European Commission presented a report entitled “European way towards an information society. A scheme of activities” which contained a general outline of the future EU steps aimed at developing information society in the years 1994–1995. This plan covered the following actions:

- initiating and supporting projects within the domain of Trans-European nets;
- the hastening of works connected with legal and administrative regulations designed to facilitate the development of information infrastructure;
- conducting research on social aspects of the development of information society;
- the dissemination and popularising of the knowledge concerning the chances and dangers of transformations within ICT domain.

Since mid 1990's the EU has concentrated on the implementation of many detailed programmes in given sectors of information and telecommunication technologies. The most significant progress has been made within the telecommunication which has undergone liberalisation. The effect of this operation has been a complete and simultaneous opening of the telecommunication markets in EU member countries in order to increase competitiveness in this area. One of the key undertakings has also been the elaboration of the fifth General Programme of Research and Development which put forward top priorities in technological research and development for years 1998–2002 (Łuszczuk, A. Pawłowska 2000).

The next important stage in the process of advancing an information society was the publication made by the European Commission in 1999 of the Green Book entitled "Information about public sector: Europe's basic resource" which had been worked out with a view to initiating a debate on subjects connected with convergence. "Convergence" is understood here as the ability of various nets to carry similar services and as the process of connecting such devices as computers, television sets and telephones. In the Green Book the European Commission also presented the familiar catalogue of the issues which needed to be taken under consideration and solved, such as: the reliability of information and its protection, obeying the rules of free competition on telecommunication and audio-visual market, protecting authorship rights in new technological conditions, the safety of the transactions made via the Internet.

The EU Council's summit in Helsinki which took place in December 1999 played an important role in accelerating the process of the development of information society. During that summit the statutory document entitled "e Europe" was presented. Its characteristic outline consists of laying out very ambitious plans whose essence boils down to making it possible for each EU citizen to co-participate in the development of information society and to derive benefits from it. The proposed projects concern many fields – ranging from the information education and healthcare to solutions facilitating the development of electronic trade. The tenth chapter of this document entitled "Government Online" seems to be particularly significant. It contains the statement that the use of the Internet creates an excellent opportunity to accomplish one of the main aims specified in the Amsterdam Treaty, i.e. the guarantee of full transparency of decisions and actions undertaken by the EU institution.

The idea of transforming Western Europe into an area of dynamic economy based on knowledge was strongly supported by the decisions made by EU Council within the framework of the Lisbon Strategy during the Lisbon summit in March 2000. During that summit a report was presented which contained the evaluation of the progress made in the realisation of the "e-Europe" project. Important decisions concerning new initiatives within the scope of EBK development in EU countries were reached. The main aim of the Lisbon Strategy is turning the EU economy based on knowledge into the most competitive one by 2010. This economy would be characterised by greater than before level of social integrity and would, at the same time, create more workplaces. The realisation of this goal has to be supported by the following actions (Szomburg 2003):

- A quick transformation into an economy based on knowledge which would entail the development of an information society, research and innovation as well as developing suitable qualifications and skills (through, among other

things, the development within the European Parliament of short legislative procedures concerning legal acts electronic trade, authorship rights, e-money, selling of finance service at a distance, the increase in competitiveness

of the Net access, the lowering of the costs of the Internet use);

- Liberalisation and integration of telecommunication, energy sector, transport, post office and financial services;
- A development of an initiative based on deregulation and better support from administration (radical limitation of restrictive regulations for companies, especially for small and medium companies) and limitation of public help which disorganises competitiveness;
- An increase of employment rate and a change in the social model, i.e. growth of professional activity, making the job market more flexible, improvement of education, modernisation of the system of social benefits, limitation of poverty and social ostracism;
- Special concern for permanent groundwork, for development and for natural environment.

The above-mentioned actions form a strong basis in EU's strive for a better utilisation of existing potential – work, knowledge, capital and scope of activity, through deregulation, creating new markets and active creation of new competitive superiorities.

The evaluation of the realisation of the assumptions that have been put forward leads to following conclusions. In March 2000 when the EU authorities accepted the Lisbon Strategy the EU economy was in good shape, there were optimistic attitudes among the investors and the stock market prices of the companies representing the so-called new economy reached record levels. Nevertheless, in 2000 the income for one EU inhabitant comprised only 67% of that of the USA citizen and the annual rate of the EU development in the last twenty years was 2,3% (whereas in the USA it reached 3,3%). The collapse of the favourable economic situation, political divides within the EU (connected with the war in Iraq) resulted in the reduction of the rate in which the Lisbon Strategy assumptions were implemented. All this led to an even greater economic slow down of the EU in comparison with the USA.

In March 2004 a special Group of High Rank was set up whose leader was the former Prime Minister of Holland, Wim Kok. This group attempted to evaluate the realisation of the Lisbon Strategy assumptions. Main opinions and recommendations concerning the realisation of the strategy which have been formulated by the Group are as follows:

First, slower tempo of economic growth in relation to the United States is brought about by, among other things, lower efficiency of work which is

connected with the over-extended systems of social security (not flexible work codex limits the natural adjustment process in economy).

Second, the EU does not supply enough funds for education and R+D sector. The result is lower innovativeness of businesses and delays on the part of companies representing “new economy” in relation to American companies. The investments of European companies into new technologies are insufficient. For this reason the EU loses on average 0,3–0,5 percentage point of GDP growth (annually) in comparison with the USA. Moreover as much as 40% of biggest Union’s consortia carry out research outside the EU, first of all in the USA. It stems from the lack of co-ordinated research between the EU member countries and from the lack of suitable financial stimuli. As a result, the Community assigns about 1,9% of its GDP for research and developmental schemes whereas in the USA it is 2,7% (Brzezicki 2004). Moreover, a requirement concerning the European Research Space has been put forward. Till the end of 2005 the European Parliament and the EU Council should set up an autonomous Council of Scientific Research for financing and co-ordination of the long-term EU research schemes. For the Group the term “economy based on knowledge” is equivalent to transformations in the economic and social structure which would exert influence on all the spheres of economic activity, especially on industry and services. The tool in realisation of the above-mentioned goal is to be raising the level of Europe’s innovativeness as a research area. It should protect against the efflux, effluence of the scientific and research stuff cross the ocean.

Third, the service market in its broad sense is still sufficiently monopolised to constitute an obstacle for investments and the development of economies. Since 2000 liberalisation has only been carried out in the telecommunication sector and the sector of energy for the business consumers. The liberalisation of the energy market for individual consumers has been postponed to the year 2007 (Brzezicki 2004). In 2005 integration of finance market should be completed and in 2006 the liberalisation of the market of postal services.

Fourth, in the past four years there was no significant progress in the employment sector. In 2000, i.e. in the period of a slow down in the economy, only 500 000 new workplaces were created and the ratio of the employed to the general population of people in productive age was (in May 2004) 63% whereas in the United States it is 75%. According to the High Rank Group, the recipe for a reform of job market is dynamism combined with the adaptive ability and development of human resources. The policy in question must be based on *flexicurity* principle, i.e. a combination of *security* of employment and its *flexibility*. An important tool here is an active policy of job market with its

programmes of professional retraining/reskilling and training. The increase in employment of women in the pre-retirement age and of people professionally inactive is a prerequisite for the reforms of the pension systems or of healthcare. The report calls for the adoption by the EU member countries of the strategy based on the development of education through lifetime. By 2006 all EU members should develop a framework for a strategy promoting active life in the retirement age. In some countries this would necessitate a change in the direction of socio-economic policy, i.e. a departure from the policy of pre-retirement benefits towards action of threefold kind: legal and financial incentives encouraging people in the retirement age to take up jobs, an increase in participation of grown-ups in educational programmes (also among the elderly) and the improvement in working conditions and quality of employment.

Despite the existence of many difficulties/obstacles on the way leading to the creation of a dynamic economic capable of permanent development, the European Union can boast about its achievements in the realisation of the Lisbon Strategy. These achievements are as follows:

Primo, in the years 2002–2003 there was an observable improvement in the access to the Internet in European households. The index of access to the Internet increased from 18% of households in 2000 to 43% at the beginning of 2003. A new net and a new e-mail address .eu. have been created. This step has enabled to create a pan European name for the addresses of websites and in-boxes⁴.

Secundo, a concept of Community's patent has been worked out which plays a significant role in the liberalisation of the market of technical thought⁵. According to this conception the inventor gains legal protection in all the countries belonging to the EU and the patent-theft charge, supported/authorised by the European Patent Bureau/Office, can be brought against someone in any country of the Community. The introduction of a uniform patent should result in 0,5 billion € annual saving. Still, it is worth pointing out that in accordance with the Lisbon regulations the Community's patent was to be introduced already in 2001. In reality, this issue (blocked by some countries losing the suitability of language, i.e. the ability to conduct the whole procedure in a given

⁴ The .eu. domain provides a supplement for the existing family of national domains as well as general domains such as .com. or .org. The companies which operate within the European borders can make use of it. Before the websites of EU institutions used to have a domain .int. which came for Los Angeles and was only reserved for the inter-governmental institutions such as UN or NATO. Dick Leonard, *A guide through the European Union*, EMKA, Warsaw 2003.

⁵ The patent costs in the fragmented European system are five times greater and the time of the procedure is twice as long. J. Szomburg...

language) was accepted not until March 2003 after a compromise had been reached⁶.

Tertio, in the years 2000–2003 the support for businesses from public money was reduced from 105 to 82 billion Euro annually. A positive contribution is also lending public support within the horizontal programmes such as fighting with environmental solution or help for the poor regions instead of individual grants for a given company.

It follows from the issues discussed so far that fulfilling the criteria of the Lisbon Strategy is riddled with numerous obstacles. They are the result of the coming together of many phenomena such as: stagnation tendencies in world economy, budgetary tensions in EU countries or the serious dangers resulting from the ageing of societies. Nevertheless, the Lisbon Strategy is still the best answer to these challenges. Therefore, on 5th November 2004 during the meeting in Brussels the European Council acknowledged the validity of the Lisbon process. The leaders of EU's "25" commissioned the preparation of such a proposal of strategy's modification which would "entail the challenges which the Union would have to face in 2005–2010." They also announced accomplishing the goal of superseding USA by EU, not in 2010, but in a slightly more remote period.

5. Conclusions

The societies of highly developed countries are nowadays members of a transformation comparable with the industrial revolution which began over two centuries earlier. Knowledge plays a key role in this transformation since knowledge has become the most significant economic resource and the central component of production. Consequently, learning has achieved the status of a most important economic process. The main aim of the authors of economic policy should be contributing to the understanding of the essence of knowledge and education in the context of economic development and international co-operation. This hypothesis is implemented in the programmes of the development of an economy based on knowledge which were prepared in recent years by EU countries.

The evaluation of the level of education indexes in Poland in 1990's and the beginning of the 21st century is not straightforward. On the one hand, we can observe a significant increase in the number of colleges and students,

⁶ The patent would basically work in three languages – English, German and French, but part of the documentation will be prepared in national languages. Compare, J. Szomburg...

the percentage of people with higher education is comparable with the one in the developed countries of the EU and the participation of people with education below secondary is adequately low. The ratio of expenditure on education has been shaping on the level corresponding to the EU average. On the basis of these phenomena one can hypothesise about the quantitative, not qualitative, development of education. The increase in the number of colleges, students and graduates is accompanied by the worsening of the quality of education and the decline in public funds on education, which gives rise to certain risks, especially in the context of the need to create an economy based on knowledge. A disturbing sign is also lack of convergence between the system of education and the needs of the job market. In these conditions further dynamic development of the higher education may come across the barrier of the demand for the academic graduates and this can, in turn, lead to the increase of unemployment and the lack of staff with lower vocational education. In the context of these disturbing phenomena there is a need for the reform of the educational system which would take into account bigger co-ordination of learning with the needs of the job market, the preparation of the long-term forecast and strategy of shaping the structure of the graduates supply.

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