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# THE DEVELOPMENT OF EDUCATION AND SCIENCE – AN IMPORTANT WAY FOR INCREASING THE INFLUENCE OF SMALL COUNTRIES IN THE EU. THE CASE OF BULGARIA

*The report concerns the issue of the significance of education and science for the socio-economic development. The accent is put on their progress as an important way for increasing the influence of small countries in the EU. The study is focused on the case of Bulgaria. Some of the most important problems in the education and science fields in the country are outlined and analysed, such as the absence of strategies for their development, the existing financial barriers, difficulties with the personnel, output and quality, etc. Possibilities for overcoming the existing problems and barriers are presented as a conclusion.*
*JEL: O32; O33; I2*

The world socio-economic practice and the economic development trends show that in conditions of deep transformations the resources directed to intellectual branches increase. The statistical data demonstrate that the expenditures on education and science grow. The process of globalization that is characteristic for the contemporary stage of development of human society is a process of substantial social and economic transformations. Today one of the main factors of development becomes knowledge.

The economic theory and practice outline the main stages of development of the world economy. That process passes through agricultural, industrial, post-industrial, technological, etc., and now we speak about knowledge, economy, where knowledge becomes the most important factor for fast and sustainable development, for raising competitiveness.

There are many theoretical studies which prove that knowledge increases productivity as well as the capacity of the economy to develop and implement new technologies. The results of a number of econometric investigations demonstrate that

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a higher capacity for absorption of new technologies is related to a higher educational level.[2]

The main components of the knowledge economy are knowledge and information. Countries that make more investments in knowledge (which means in education, skills and science) gain more benefits in economic and social aspects. These investments ensure benefits for the society as a whole and not only for the individuals. That is why the most effective modern economies are those that create most knowledge and information.[3] Many of the economic studies, including recent ones, prove that the R&D expenditures generate a significant part of the labour productivity growth, determine considerable positive developments in other areas of the economy, and have markedly positive influence on the GDP dynamics.

These are the conditions in which the European Union (EU) determines its goals and directions for development. One of the main goals of the EU for its economic and social development is the building of knowledge economy. It is presented and described in the main documents, such as the Lisbon strategy (2000) and its revision (2005), Europe 2010, Europe 2020, etc.

The main goal of the Lisbon strategy is to become the most competitive knowledge-based economy by encouraging research and establishing a favourable climate for innovation (by dedicating 3% of the national GDP to R&D – one of the main permanent goals of the Lisbon Agendas). One the EU headline targets of the new European strategy for jobs and growth (Europe 2020) is "improving the conditions for research and development, in particular with the aim of raising combined public and private investment levels in this sector to 3% of GDP". Another important target is "improving education levels, in particular by aiming to reduce school drop-out rates to less than 10% and by increasing the share of 30-34 years old having completed tertiary or equivalent education to at least 40%".

The development and improvement of education and science are indispensable for the achievement of these goals. This is so, because knowledge which is the basis of knowledge economy can be created, accumulated, disseminated, and put into practice in and through the systems of education and science.

The world economic trends and the EU goals for future development are directed towards improving competitiveness, building knowledge economy, increasing investments in human capital, in education, science, innovations, etc.

In these conditions for small countries, such as Bulgaria, the development of education and science should become a national priority. Some important reasons for making such a conclusion are:

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[2] See for example Crespo-Cuaresma, J., N. Foster, J. Scharler. On the Determinants of Absorptive Capacity: Evidence from OECD Countries. Workshops, Proceedings of OeNB Workshops, Current Issues of Economic Growth, 5 March, 2004.

[3] See Schleicher, A. The Economics of Knowledge: Why Education is Key for Europe's Success. Lisbon Council Policy Brief, The Lisbon Council, Brussels, 2006.

- On a world scale, the process of economic development goes through different stages. Today, it reaches the stage when knowledge becomes the main factor for economic and social development, for competitiveness and welfare.

- The main (economic) goal of the EU is the building of competitive knowledge economy.

- Small countries have less and limited resources (such as oil, gas, gold, etc., including even human resources), so knowledge could be a good advantage for improving competitiveness, achieving sustainable growth, raising welfare, etc.

Bulgaria is an example of a small country with relatively limited resources, negative demographic developments and perspectives. The main indicators for its economic and social development (such as GDP, productivity, incomes, etc.) are below the European average. Under such circumstances the development of its education and science could be a real advantage and good possibility for achieving sustainable growth, rise in productivity and competitiveness, increase in its influence, etc.

*What is the situation of education and science in Bulgaria at present?*

There are many and deepening *problems* in these fields in the country. Some of the most important that should be mentioned as needed to be overcome are:

- There are no national priorities for economic development, and there are no strategies for the development of education and science in accordance with national priorities (which is connected to the legal bases of these spheres and their imperfections). This absence creates difficulties with the directions for the development of science and of education, especially of vocational and higher education, with the personnel, financial provision, output and quality, etc.

  For the last ten years three drafts of national strategies for the development of these spheres have been initiated. The draft of a National strategy for scientific studies 2005-2013 declares that there is no overall complete policy in the area of science in the country and that there is a necessity of adopting such national strategy. However, in the next version of a draft of such strategy for the period 2009-2019 it was not mentioned anything about the importance of science for the strategic development of the country. There was also a draft of national strategy for development of higher education in the country (1999). However, none of them was adopted.

- The substantial structural changes of the economy for the last two decades and the absence of national priorities for its future development create problems before the adaptation of these systems to the necessities of the economy, especially of education. The existing mismatch on the labour market, the

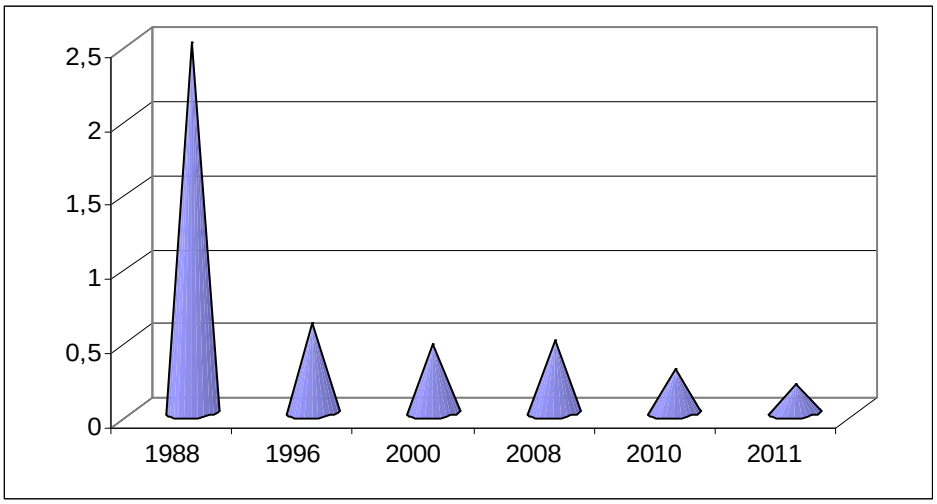
unsatisfied necessities of the employers, and the results of some inquiries[4] are indicative of that.

- There are financial barriers before the development of education and science. The financial resources directed to them are very limited. The EU goal is to achieve 3% of the GDP directed to the development of science. In Bulgaria this percentage is below 0.5, and moreover, it has dropped significantly for the last 20 years. The draft budget for 2011 envisages a new drop to 0.2% of the GDP (fig. 1). The political explanation given is that in time of crisis all public expenditures should be cut down. The world practice however shows that exactly in periods of crisis or deep transformations the funds directed to education and science increase or at least do not decrease, and such a recommendation has been made to Bulgaria by famous international economists.

However, a significant decrease in the expenditures for the Bulgarian Academy of Sciences is observed – its budget was lessened from BGN 84 to 59 million just during 2010 (with the revision of the budget in July 2010).

Figure 1

Expenditures on R&D, % GDP (Bulgaria)




Source: Ministry of Finance.

About 2/3 of the expenditures for R&D comes from state sources. Before 1990 industry[5] ensured about 65-70% of the expenditures on R&D. Between 2000-2005 this percentage was about 20% and after that it decreases. At present this is

[4] See for example the results of an inquiry carried out in 2007 among teachers, lecturers and students that show a comparatively low and unsatisfactory level of adequacy of education to the necessities of the economy and of the labour market. Matev, M., I. Zareva. Education and Science in Bulgaria. The View of Teachers, Lecturers, Students and Researchers. S., 2010.

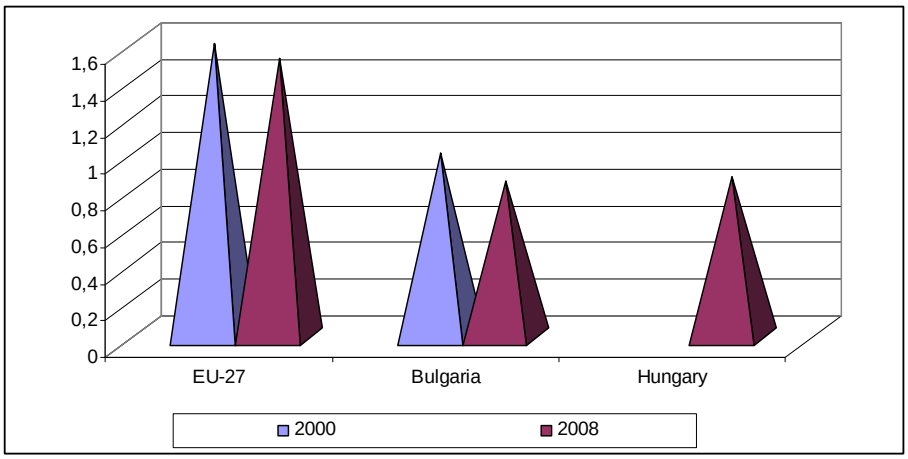
[5] The business enterprise sector.

connected of course with the economic crisis to a great extent. Before the crisis about 90-95% of these resources go for wages and salaries, and insurances. Now, it is nearly 100%.

The predominant part of the financial resources for R&D in Bulgaria comes from the government budget, for one or another reason. However these funds are absolutely not sufficient not only for the development but even for maintaining the existence of this sphere. The share of government budget appropriation or outlays on research and development (as % of total general government expenditure) is about half of the EU average and despite of that it even decreases during the last years (fig. 2). The foreseen percentage for 2011 is about two times lower than that in 2008. These expenditures are not sufficient for generating growth and competitiveness. This conclusion is made in many other studies on the Bulgarian R&D sphere. One such inference is that "… the governmental expenditures in the country … are not expenditures for growth but rather expenditures for maintaining a minimum operational level of the existing state R&D."[6]

Figure 2

Share of Government Budget Appropriation or Outlays on Research and Development (% of total general government expenditure)



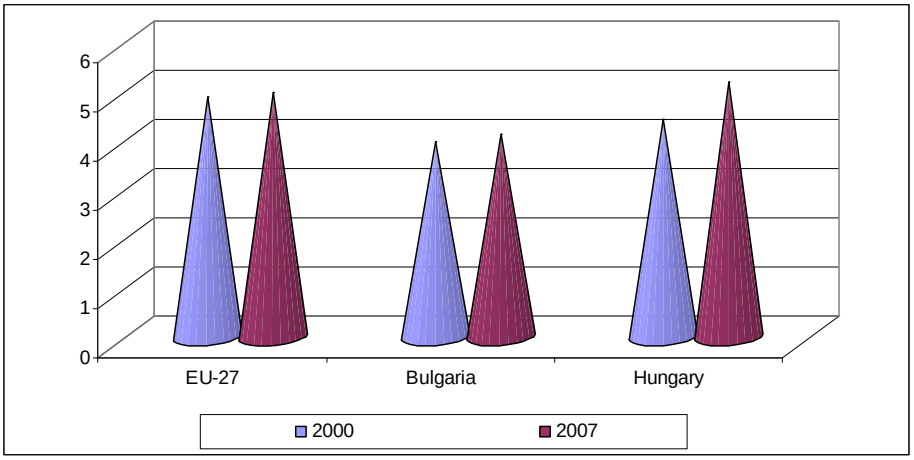

Source: Eurostat.

For education Bulgaria spends 5.4% of the GDP at the beginning of the transformations. After 2000 this percentage stays in the range of 4-4.4%. For 2009 it is 4.1%. It is nearly 1% lower than the EU average. The Eurostat data show that in 2007 the EU average was 4.96%, In Bulgaria this percentage was 4.13%, and in Hungary – 5.20% (fig. 3). The foreseen percentage for 2011 is only 3.3%.

[6] See Expenditures on R&D and Economic Growth – an International Comparison. – Economic studies, 4/2007.

Figure 3

Total Public Expenditure on Education (% of GDP)

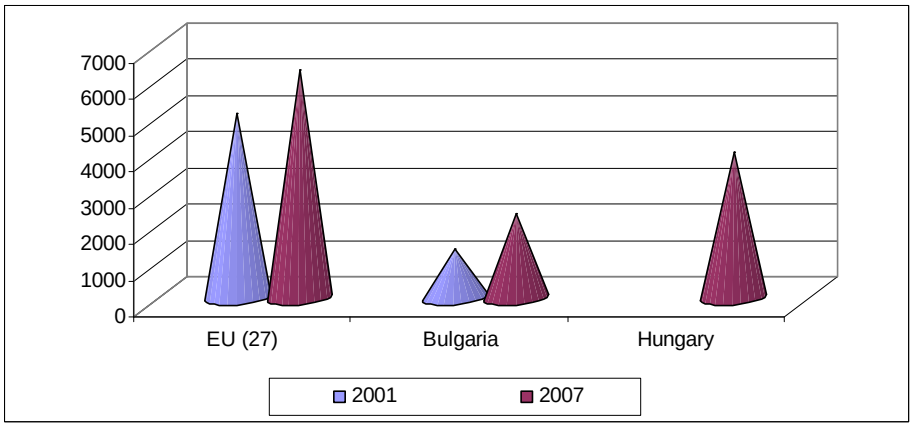



Source: Eurostat.

The lagging behind is more obvious when the expenditures per student are compared. The data demonstrate that the Bulgarian students receive nearly three times fewer resources than the EU average (fig. 4). That limitation creates barriers for the quality of education and the possibilities for its improvement.

Figure 4

Annual expenditure on public and private educational institutions per pupil/student (PPS based on full-time equivalents)




Source: Eurostat.

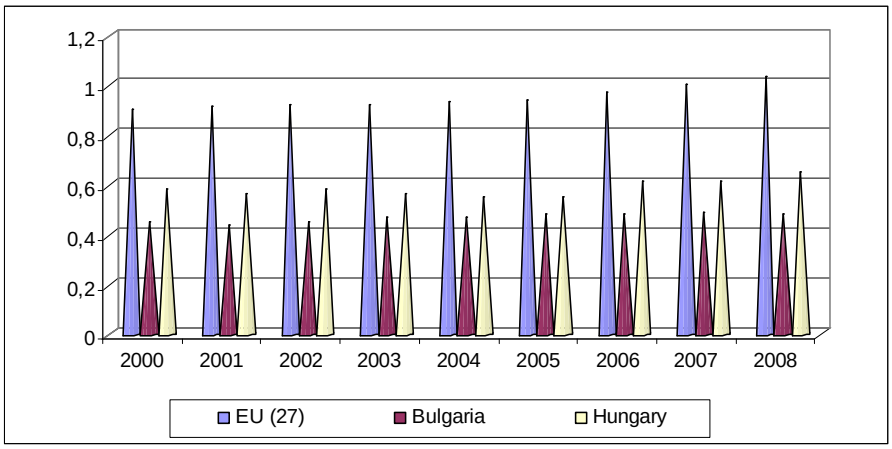
- There are significant difficulties with the staff in education and in science. Its number decreases continuously for the last 20 years. For the education this process can be explained to some extent with the demographic changes in the country (at present the share of the population over working age is around 22-

23% and that of the population under working age is less than 15%) and with the constantly decreasing number of youngsters. However this tendency was broken in the last 2-3 years which means that new teachers will be needed after some years.

Many of the scientists and researches went abroad and now Bulgaria has a very low number of R&D personnel (as % of the labour force). (Fig. 5.)

Figure 5

Research and development personnel (% of the labour force)




Source: Eurostat

Another negative phenomenon in Bulgaria in this aspect is the lagging behind the EU average with the doctorate students in the science and technology fields. Despite the relative increase Bulgaria is still behind the EU average figures (fig. 6). This situation premises limitations before the future development of science and the pool of human resources in science and technology fields.

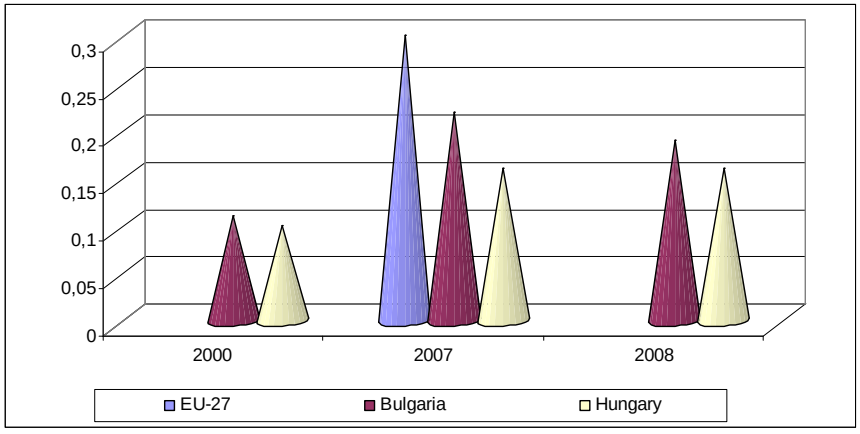
The data about the mobility of the Bulgarian students outline a risk for the future availability of sufficient human resources in science and technology. A challenge is the drastically increasing number of Bulgarian students going abroad to study. The Eurostat data show that for the period 2000-2007 the number of Bulgarian students who study abroad increases by about 270%, which is more than 2 times higher than the EU average (fig. 7).

Whether these young people will turn back to Bulgaria is a question. The results of the above mentioned inquiry among the Bulgarian students, made in 2007, show that about 20% of the interviewed students declared that they will go abroad to continue their study or to look for a job. They said that they probably would come back to Bulgaria if the socio-economic conditions in the country and their possibilities to find an appropriate job become better, when their work would be valuated in a proper way and their families will have better ("normal") conditions of life (that

means higher living standards). A significant part of them foresee that they probably will be engaged in scientific and research work.

Figure 6

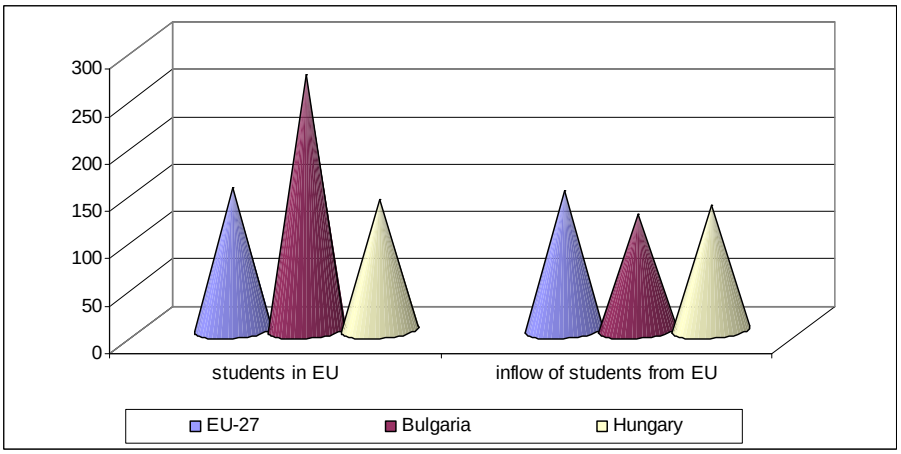
Doctorate Students in Science and Technology Fields
(% of the population aged 20-29)




Source: Eurostat

Figure 7

Mobility of students in Europe (tertiary students studying in another EU-27, EEA or Candidate country) percentage change for the period 2000-2007




Source: Eurostat

The age structure of the personnel in education and science is worsening. The share of the teachers of the age group above 50 years increases and that of the younger ones decreases. The biggest percentage is of the age group 40-60 years (about 40-48% are at the age of 50 and over – for the different grades of education), and among the professors even of the age group 60-69 years.

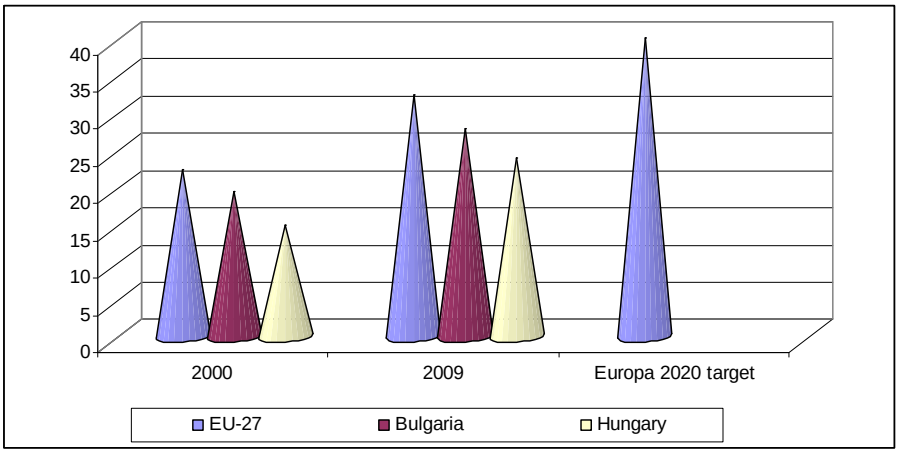
The latest data indicate that about 2500 teachers go on pension each year. Simultaneously, during the closure of around 400 schools during the last 2-3 years almost 6000 teachers were dispensed. At the same time, according to the data of the teachers syndicate and the regional employment service, in one town of Varna, alone, there are 152 vacancies for teachers at the moment. All these figures show that there is an insufficiency of teachers at present and that in the near future this problem could deepen even more.

- All such barriers lead to problems with the output of these systems.

One of the five main targets for the EU in Europe 2020 is to achieve at least 40% of 30-34–year-olds completing third level education. Despite the constantly improving educational structure of the population in Bulgaria, the country still has problems with the younger cohorts. An example is the lagging behind in the share of the population aged 30-34 years who have successfully completed tertiary or equivalent education compared not only with the target 2020 but also with the contemporary situation in Europe (fig. 8).

Figure 8

Tertiary Educational Attainment of the Population Aged 30-34 Years (%)



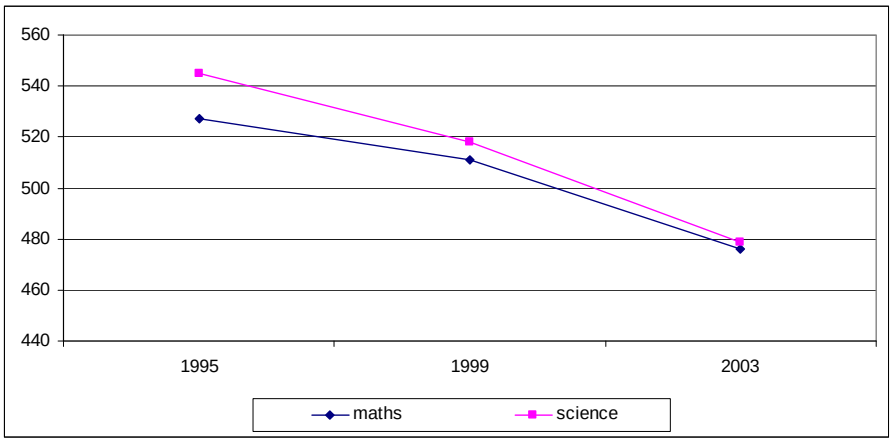

Source: Eurostat

Negative phenomena are observed not only in quantitative but also in qualitative aspect. The quality of education in the country decreases (fig. 9) An important premise for that are the restricted financial resources.

The truth is that the Bulgarian students win prizes at almost all Olympiads and international competitions but the average quality of education decreases. This situation suggests that the problems are not related to the abilities of the Bulgarian youngsters but to the transformations and the financial insufficiency of the education system.

Figure 9

Change in the Scores of 8th Grades in Mathematics and Science




Source: TIMSS, results for the corresponding years.

The quality problems in education are not problems only of the system itself. The process of education is a long-term one and its results will be obvious after five, ten, or even more years. This means that in the near and/or mid-term future problems could appear with the quality of the labour force in the country, with the adequacy of the labour force to the needs of the economy and of the labour market. On its part this suggests that problems could appear with the competitiveness of the Bulgarian economy and of course with the possibilities and perspectives for the development of science. The pool of highly educated and qualified specialists (human resources) that are able to create, disseminate, and implement knowledge and science will be reduced.

The accumulation of such difficulties could lead to many efforts, resources (including financial), and for a long period of time for their overcoming. That would eventually mean real and significant losses for the economy, for its competitiveness and for the welfare of the nation.

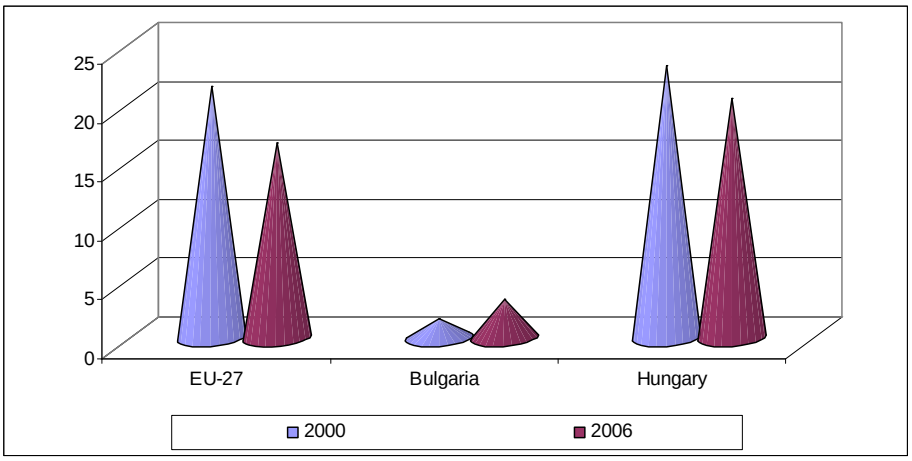
Indicative of the negative consequences from the problems with the outputs of the systems of education and science are the data about the high-tech employment and exports.

The figures about the employment in high- and medium-high-technology manufacturing sectors and in knowledge-intensive service sectors, and especially about the high-tech exports are significantly lower that the EU average and than those in Hungary. The employment in high- and medium-high-technology manufacturing sectors in Bulgaria (as % of the total employment) is 1.6 percentage points lower than the EU average and 3.7 points lower than that in Hungary. The employment in knowledge-intensive service sectors is about 2/3 of that in the EU (average figure) and in Hungary. The share of high-tech exports (as % of total

exports) is negligible compared to those in the EU (average) and in Hungary (fig. 10).

Figure 10

High-Tech Exports (% of total exports)

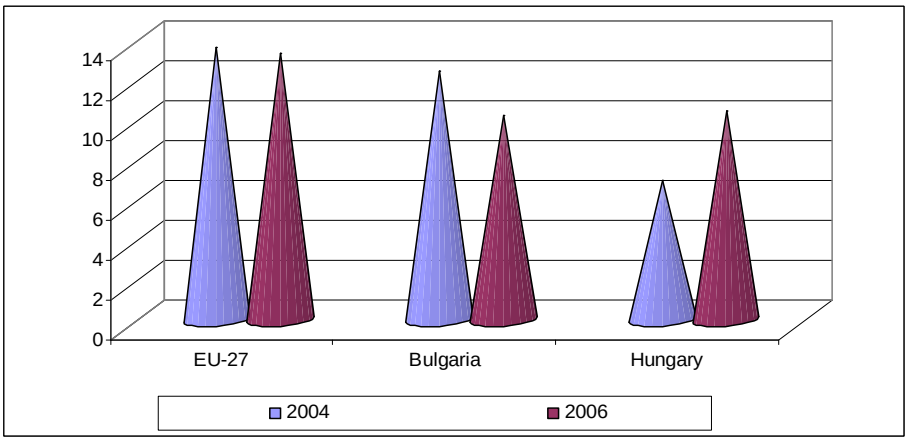



Source: Eurostat

Another negative phenomenon in this respect is the lower and moreover decreasing share of the turnover from innovation[7] in the country. The Eurostat data are indicative for this lagging behind (fig. 11).

Figure 11

Turnover from Innovation (% of the total turnover)




Source: Eurostat

[7] Eurostat defines this indicator as the ratio of turnover from products new to the enterprise and new to the market as a % of total turnover. An innovation is a new or significantly improved product (good or service) introduced to the market or the introduction within an enterprise of a new or significantly improved process.

Remarkably in these conditions the Bulgarian scientists and researchers succeed to work and to do their job in a proper way. A good example is the Bulgarian Academy of Sciences (BAS).

The BAS was assessed by the European Science Foundation and the European Federation of National Academies of Sciences and Humanities at the end of 2009. The general observation is: "The Review Committee has come to the unambiguous conclusion that the majority of BAS Institutes perform valuable research as judged by international standards. In some cases the panels found research groups that operate at the forefront worldwide. This overall result is regarded by the review team as an impressive achievement, considering the particularly difficult circumstances for research in Bulgaria."

However the absence of national strategy for the development of science and the ongoing restructuring of the Academy in such a situation as well as the existing financial restrictions pose substantial challenges before its future functioning and development, and even existence, thus creating serious problems to scientific activity in the country.

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The development and improvement of education and science is one important way for increasing the influence of small countries in the EU. In the case of Bulgaria however, there are many problems and barriers that should be overcome for that purpose.

Education and science should become national priorities for future development. The most important premises for achieving that goal are: attaining political will and support, and getting legal and financial provision.

The society as a whole and especially politicians should realize that education and science must be one of the most important national priorities for the future economic and social development of the country. That will be in accordance with the economic development trends of the developed countries, with the main goals of the EU, with the national needs and interest in fast and sustainable growth and competitiveness. This is the way to ensure possibilities and resources for the development of education and science. If they become national priorities and get sufficient financial provision they will get the opportunity to improve their material basis, to attract younger qualified personnel, to increase their output and quality. Consequently, the country will obtain better chances for sustainable development, for improving the competitiveness and raising the welfare, for developing knowledge economy.