MACROECONOMIC ANALYSIS OF THE FINANCING OF EDUCATION SYSTEM IN THE REPUBLIC OF SERBIA

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Abstract: *Knowledge is one of the key factors of economic growth, as well as of sources of competitiveness in the global marketplace. Educational policy directly shapes and creates human capital that is the backbone of the future development of each country. Therefore, there is a need for planning, good design and comprehensive financing this important social field. The purpose of this article is to determine the trends of public expenditures on education in the Republic of Serbia (RS), as well as their impact on the development of Serbian society. The article first provides a detailed analysis of the higher education system in Serbia, monitoring the trends in the share of education expenditures in gross domestic product (GDP) and total public expenditures in the country. The paper applies the desk research methodology as it analysis the professional literature, articles, relevant reports and databases of leading international institutions such as the European Union, OECD, Statistical Office of RS, UNESCO, World Bank, UNDP and Eurostat. The article studies the evolution, values and Human Development Index (HDI) ranks of Serbia, Gross Expenditure on Research and Development (GERD) in the Serbian higher education sector, as well as their correlations with Serbian public expenditures for education, in the period from 2009 to 2019. The article also applies linear regression analysis between the observed variables. Finally, it concludes that public expenditures on education could not contribute to social development in Serbia due to the small regression coefficients and weak correlations among these indicators. Therefore, Serbia should invest continuously and more intensively in its higher education if it wants to prosper. This article is useful for policy makers, but also for a wider readership who want to be acquainted with the education and social development trends in Serbia.*

Keywords: knowledge, higher education in Serbia, education financing, social development, Human Development Index (HDI), Gross Expenditure for Research and Development (GERD).

JEL classification: H52, I22, O30.

1. Introduction

Economic development changes the structure of the economy and society, which is the reason it encompasses a wide range of economic, humanistic, social, political, environmental, educational and other goals. These goals primarily relate to the growth of social welfare and living standards, reduction of economic and social inequalities, eradication of poverty, ensuring equal access to education, reducing unemployment (Dimitrijevic, and Mijailovic, 2021: 173), curbing inflation, stabilizing balance of payments,

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raising the quality of education, etc. The economic system and the dynamics of its development are essentially connected with the educational system because knowledge is one of the key factors of economic growth. Education policy directly shapes and creates human capital, which appears as the cornerstone of each country`s future development. Therefore, there is a need for its harmonization with the needs of the economy and the labour market, as well as all sectorial policies relevant to the development of the economy and society. Knowledge, training and the education system also appear as one of the key determinants of economic performance, as well as the sources of competitive advantage in the global marketplace. Education is a very complex system, both because of its mission and size, and because of the formal rules on which it basis, the diversity of educational practices, long-term perspectives, and often conflicting goals. It is a bureaucratic and hierarchical system, with many participants, aims and strategies, which is way there is a need for its carefully planning and management (Bogdanovic and Pozega, 2014: 124-126). The Sustainable Development Goal 4 is also dedicated to the importance of education, which insists on providing inclusive, equitable, accessible and quality education, as well as on encouraging the concept of lifelong learning for all (UNESCO, 2021).

Experience points to the fact that no country has achieved steady and sustainable economic growth without investing in its education and human capital. Ozturk (2001: 39-40) states that education increases productivity, economic efficiency, trade, creativity and social consistency, it encourages entrepreneurship and innovations, and reduces poverty and social inequalities. Therefore, it improves people`s quality of life and social wealth, at the same time leading to wider individual and social benefits. Societies with higher education rates have a longer life expectancy of their population, healthier individuals, higher rates of economic stability and growth, lower crime rates and higher equality (Argyle, 2021). Finally, Dimitrijevic and Mijailovic (2021: 173) highlight that the role of higher education reflects in the acquisition of new theoretical and practical knowledge, while at the same time contributing to social cohesion, poverty eradication, and the essential overall development of the economy and society. Therefore, a planned, well-designed and comprehensive approach to financing this important area is crucial for the further development of the economy, science and society as a whole.

The aim of this article is to determine trends and the impact of public expenditures for education on the development of Serbian society. The next section describes the used research methodology in detail, while the third section is dedicated to the analysis of the higher education system in the Republic of Serbia (RS), as well as the accompanying problems of financing the national education. The fourth section of the article considers the results of the evaluation of the Serbian Human Development Index (HDI) and its ranks, while the fifth one presents the results of correlation and multiple linear regression analysis of the relation between the HDI values and the general educational and research and development (R&D) expenditures in the Serbian higher education sector. The last section provides conclusions on the necessity of further growth of financing of this important social field, as an elementary precondition for the further development of the Serbian economy and society as a whole.

2. Research Methodology

The research methodology of this article bases on desk research, i.e. on the analysis of professional literature, articles and reports of the European Union (EU), OECD, Statistical Office of RS, UNESCO, World Bank and UNDP, as well as on the quantitative evaluation of statistical data from Eurostat, World Bank, OECD and UNDP databases. This article uses methods of trend analysis, comparison, study and research of professional articles, reports and relevant websites related to the development of public expenditures on education,

evolution of components and values of the Human Development Index (HDI) and Gross Domestic Expenditure on Research and Development (GERD) in Serbian higher education sector. After that, induction and deduction methods were applied in drawing conclusions. While the article investigates the trend of public education expenditures and HDI values in the period from 2007 to 2019, the trend of GERD is only covered from 2009 to 2019, because 2009 was the first year in which R&D expenditures began to be statistically monitored in Serbia. It should also be noted that for 2013 there are no available data on the share of public education expenditures in GDP and in total public expenditures of the country, which is way this year was omitted from the analysis of relevant indicators, as well as of Pearson`s correlation coefficients` and standard multiple linear regression calculation.

The OECD`s Frascati Manual for collecting and reporting data on R&D defines GERD as the total intramural, i.e. internal expenditures on R&D activities incurred in the territory of a country during a certain reference period. GERD is a main aggregate statistical indicator used to describe a country`s R&D activities, covering all R&D expenditures made in its economy (OECD, 2015:111). This article analyses GERD in the higher education sector, which also appears as the basic and most important indicator used for international comparisons of R&D activities in the field of education.

The HDI was first published in 1990 with the aim of becoming a more comprehensive indicator of human development in comparison with common measures of economic progress such as GDP or Gorss National Income (GNI). HDI is a synthetic statistical indicator used to assess and measure a county`s overall economic and social achievements. As a unique indicator of the level of the country`s economic and social development, HDI is a composite indicator of long-term progress in assessment of contemporary human development three basic pillars (UNDP, 2020b: 2): a) healthy and long life, b) access to knowledge and c) decent standard of living. By measuring the life expectancy of a country`s population, level of knowledge, access to learning and knowledge, as well as its standard of living, the calculated HDI values enable the ranking of 189 countries and recognized territories by the UN around the world.

The Pearson`s correlation coefficient (r) describes the strength and direction of the linear relationship between the two variables. While this coefficient can take values only in the range of – 1 to + 1, its sign indicates the direction of correlation. Its positive sign indicates that the variables are moving in the same direction, while its negative sign indicates that the given variables are flowing in the opposite direction. While its values around the number of ± 1 indicate an almost perfectly correlated relationship, its values around the number 0 show the absence of correlation between the observed variables (Pallant, 2010: 128).

Finally, the last part of this study uses a standard multiple linear regression model to determine the impact of GERD in the higher education sector (in millions of EUR) and Total public expenditure on education (in % of GDP) on HDI values in Serbia. Therefore, this section starts from the following defined hypotheses:

H_0: GERD in the higher education sector and Total public expenditure on education have no impact on the HDI values` trend in Serbia and

H_1: GERD in the higher education sector and Total public expenditure on education affect the HDI values` trend in Serbia.

The linear interdependence among these variables can be described by the following regression equation:

$$HDI = \alpha + \beta_1 GERD + \beta_2 Exp + \varepsilon_t \quad (1)$$

Where α is an intercept, β_1 and β_2 are the regression coefficients; Exp are Total public expenditures on education in Serbia and ε_t is a random error term.

3. Financing Higher Education System in Serbia

The Republic of Serbia is the country of Southeast Europe and the Western Balkans region, home to about 6.9 million of inhabitants. In 2020, Serbia had a gross domestic product (GDP) of $52.96 billion, a real annual growth rate of -0.1% (World Development Indicators Database, 2021) and an official unemployment rate of 11.1% (Republicki zavod za statistiku, 2021). The last census from 2011 indicated that there is a little more than 10% of highly educated population in the country. Serbia is a higher-middle income country with many public and private higher education institutions. The functioning of the country`s higher education system is under the direct jurisdiction of the relevant RS Ministry of Education, Science and Technological Development. While private higher education institutions are financed from student tuitions fees and while their funding is completely independent of the state, the Ministry is directly responsible for funding the state higher education institutions in the country. Serbian higher education institutions are independent in managing the spending of their funds. In addition to funds from the state budget, public higher education institutions may have other sources of funding such as tuition fees, donations, gifts, projects, contracts for consulting and research services, etc. Finally, the financing of the public higher education system is input based, meaning that the distribution of financial resources is implemented bases on the institutions` real costs in relation to the expected number of enrolled students in the next school year, as well as the expected number and structure of teaching staff (Eurydice, 2021). While in the RS higher education sector there are the following three study levels: a) Bachelor studies, b) Master and specialist studies, and c) Doctoral (PhD) studies, this system at the same time consists of: a) academic studies, which are mainly realized at universities and some colleges, and b) vocational, i.e. applied studies that are realized at some higher schools, faculties and at several universities (European Union, 2018). According the quality of their teaching and educational outcomes` performance, state higher education institutions are still in an advantage over private ones, while a far smaller number of students attend private universities than public ones.

Despite the fact that Serbian education has a long and rich tradition, the absence of market mechanism and adequate strategies of its financing reflect in its weak position in European education area. The financing of state higher education institutions (HEI) is in the competence of RS Government, while the available funds for their financing are not evenly distributed among universities and faculties. In the Serbian education system, the state provides funds from its budget for the running of its public HEIs in accordance with their operating program, planned number of students and staff structure. HEIs have full autonomy in managing the funds received by the state, primarily for covering operating costs, staff salaries, equipment, scientific research, scientific and professional training, publishing, international cooperation costs, etc. In addition to budget funds, public HEIs earn their own, extra-budgetary revenues based on collected tuition fees, but also on other sources of funding such as received gifts, donations, sponsorships, implemented projects, providing services to third parties, cooperation with business and public sector, etc. In addition, state HEIs independently make decisions about their tuition fees (Official Gazette of RS, 2016). Due to their different attractiveness to students, state universities and colleges differ from each other in their financial position and earnings. In short, the main shortcomings of the current model of financing higher education in Serbia are reflected in (Lutovac and Lutovac, 2012: 381): a) large gap between budget and self-financing students, b) non-compliance of graduates' competences with labour market needs, c) insufficient transparency of funding HEIs, d) expanding the scope of business to the detriment of the quality of teaching processes and content, and e) less access to education for students of lower financial status. In contrast, private HEIs in the country are largely funded from the equity stake of owners and student tuition, and to a much lesser extent from project and other funding sources.

Besides, private HEIs do not have the right to enrol budget students, nor to receive government support funds, which is why their tuition fees are generally higher than the state ones, putting them in a far more difficult position at the domestic education market. Overall, the current system of financing higher education is characterized by inequality in financing and its unequal availability to students, inefficiency of studding process, as well as insufficient harmonization of educational offer with the needs of the economy and society. In addition, it should be noted that the state directly finances its secondary schools and gymnasiums from its budget, while state secondary education is currently facing problems of unfavourable demographic trends, low fertility rates and consequent reduction of student population (by about 10% in the last decade). Compared to neighbouring and other European countries, Serbia's public expenditure on secondary education is still very low, while in the period from 2007 to 2015 alone there was a 1.7% drop in public spending per student in secondary education (OECD, 2020). As Serbia allocates significantly less funds to finance its secondary education both in absolute terms and as a percentage of GDP compared to EU and OECD countries, this area could be the subject of some future consideration and research.

Historically, the public expenditures on education in Serbia have always been at low level, while recently there has been an increase in public spending per student in tertiary education (by 8%). This trend can be explained by the decrease in the country`s population due to the low fertility rates, as well as by the wave of mass emigration of young people abroad. According to the World Banka Data (2021a), the level of public spending in the country on education in 2019 was only 3.62% GDP, which is lower than the OECD countries` average of about 5.3% (OECD, 2020). In the same year, the share of total expenditures for education in total public expenditures was also small, amounting to only 8.61% (The World Bank Data, 2021b). According to OECD (2020), spending on education in Serbia is also lower than the United Nations (UN) benchmark, i.e. the reference value that ranges from 15% to 20% of total government expenditures on education. The following Figure 1 indicates a gradual, continuous and slight decline in the share of education expenditures in Serbian GDP and total government public expenditures in the period from 2007 to 2019, with the exception of 2011 in which the share of this indicator in GDP experienced a drastic decline of 2.24%.

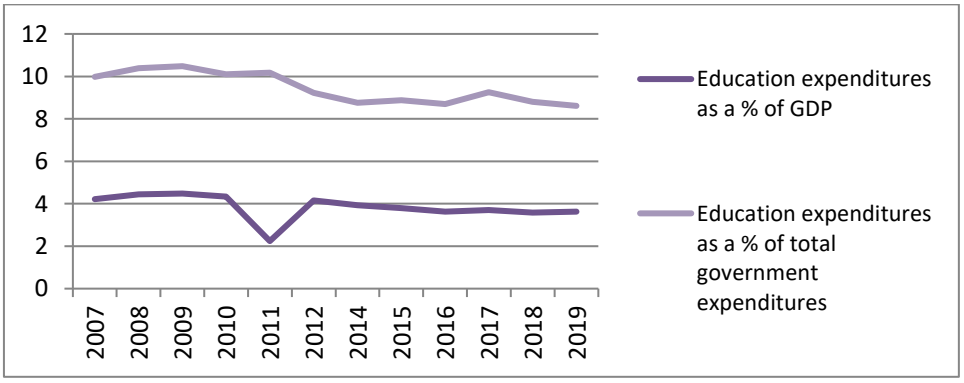

Figure 1: The trend of public expenditures for education in Serbia in the period from 2007 to 2019

Sources: The World Bank Data (2021a and 2021b)

The World Bank`s available data also show that in the period from 2007 to 2019, the share of total public education expenditures in GDP decreased from 4.21% in 2007 to only 3.62% in 2019. We can explain this trend by the fact that despite the growth of Serbian GDP in that period, the absolute government expenditures for education remained at their constant level,

which all influenced their relative decline. In addition, in the observed period, the share of public education expenditures in total public spending decreased from 9.98% in 2007 to 8.61% in 2019 (The World Bank Data, 2021b).

4. The Evolution of HDI Values and the Ranks of Serbia

The HDI indicates the progress or setback of a country in achieving the effects measured by this indicator and its components. Although the achievement of high HDI values indicates high levels of income and living standards, Oprean and Stan (2015: 64) point out that this indicator more relates to the quality of social and fiscal policy, i.e. to the direction of public expenditures for the efficient development of the social sector. The idea of human development goes far beyond the traditional economic indicators, indicators of improving the human resources` quality and the degree of meeting basic population needs, while it is a more comprehensive measure of human progress, assessing some additional elements such as freedom and dignity of individuals as a part of contemporary society functioning.
The value of HDI of Serbia for 2019 was 0.806, which made it a country with very high human development. According to this indicator, in 2019 Serbia was on the 64th place out of 189 analysed countries and territories, sharing this rank with Kuwait. In the period from 1990 to 2019, the value of the county`s HDI increased from 0.722 to 0.806, which unequivocally represents an increase of 11.6%. Table 1 shows the country`s progress in almost each of the HDI components in the observed period. In this period, life expectancy at birth increased by 4.5 years, the average duration of schooling expressed in years increased by 3.2 years, while the expected duration of schooling increased by 2.3 years. However, at the same time, the Serbian GNI per capita fell by about 0.6% (UNDP, 2020b: 2) due to the wars on the territory of the former Yugoslavia, bombing and the then economic crisis caused by the imposed sanctions of the International Community to Serbia.

Table 1: HDI trends in Serbia

Years	Life expectancy at birth	Expected years of schooling	Mean years of schooling	GNI per capita (in 2017 PPP$)	HDI value	HDI ranks
1990	71.5	12.4	8.0	17,296	0.722	41
1995	71.8	12.8	8.8	7,975	0.699	52
2000	72.0	13.1	9.4	8,871	0.716	60
2005	72.8	13.4	10.2	12,100	0.749	60
2010	74.1	13.5	10.4	14,155	0.766	64
2015	75.3	14.4	11.0	14,798	0.789	66
2016	75.5	14.6	11.1	15,231	0.795	64
2017	75.7	14.6	11.1	15,450	0.798	65
2018	75.8	14.8	11.2	16,472	0.803	65
2019	76.0	14.7	11.2	17,192	0.806	64

Source: UNDP (2020b: 3)

As can be seen from the Table 1, the trend of the HDI ranks in Serbia from the end of the last century has gradually improving, while in recent years this indicator has remained at a relatively stable level. Serbia still has a considerably lower position in the overall ranking compared to its neighbours and Central and Eastern European countries, such as Slovenia, the Czech Republic, Slovakia, Hungary, Croatia, Montenegro, Romania and Bulgaria (UNDP, 2021a).

5. Results and Discussions

5.1 Correlation Analysis

Further analysis bases on the calculation of Pearson`s correlation coefficients among Total public expenditure on education as a % of GDP, GERD in the higher education sector and the level of human development of Serbia, measured by the HDI in the period from 2009 to 2019 (Table 2).

Table 2: HDI values, educational and R&D expenditures in the Serbian higher education sector (from 2009 to 2019)

Indicators	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Education spending as a % of GDP	4.48	4.33	2.24	4.16	-	3.93	3.79	3.63	3.71	3.58	3.62
GERD in higher education (in million EUR)	145.46	114.54	137.31	132.79	132.84	117.61	118.12	111.92	123.96	128.95	141.46
HDI values	0.766	0.766	0.776	0.775	0.778	0.784	0.789	0.795	0.798	0.803	0.806

Sources: The World Bank Data, (2021a), Eurostat, (2021) and UNDP (2021c)

The analysis of the impact of educational public expenditures, as well as of R&D expenditures in the higher education sector on the value of Serbian HDI, i.e. of the pattern and intensity of the relationship between each of these indicators was calculated based on Pearson`s correlation coefficients (Table 3).

Table 3: Pearson`s correlation coefficients

		Total public expenditures for education as a % of GDP	GERD in higher education sector	HDI values
Total public expenditures for education as a % of GDP	Pearson`s correlation	1	-0.142	-0.281
	Sig. (2-tailed)		0.696	0.432
GERD in higher education sector	Pearson`s correlation	-0.142	1	-0.092
	Sig. (2-tailed)	0.696		0.800
HDI values	Pearson`s correlation	-0.281	-0.092	1
	Sig. (2-tailed)	0.432	0.800	

Source: Author`s computed

From the analysis of Pearson`s correlation coefficients, it clearly follows that there was a weak negative correlation between the share of Total public expenditures on education in GDP and HDI value, which further means that educational spending could not affect the growth of HDI values for Serbia. This research also suggests that there was an even weaker negative correlation between GERD in the higher education sector and HDI, indicating that even R&D expenditure in education could not contribute to the growth of the Human

development index of Serbia. The situation was similar with GERD in all sectors, whose Pearson`s correlation coefficient with HDI was also only r=-0.092. Therefore, most likely some other educational indicators contributed to the growth of HDI, such as expected years of schooling, average years of schooling, population growth with at least completed secondary education, solid results on the PISA test and the like.

5.2 Regression Analysis

The last step in this research is based on a regression analysis of the predictors` impact, i.e. GERD in the higher education sector and Total public expenditure on education on the dependent variable HDI values of Serbia. Regression analysis is performed with the aim of deepening the obtained results of the conducted correlation analysis. After the extreme point for 2011 was excluded from analyses, preliminary analyses have shown that the assumptions of normality, linearity, multicollinearity and homogeneity of variance were not violated.

Standard multiple linear regression was applied with the aim to assess the possible impact of these two predictors on the HDI values in Serbia. The model as a whole explained the variance of HDI value well and was statistically significant, Adjusted R Square=98.7%, F(2,6)=306.095, and Sig.=p=0.000<0.001. In the final model, the Total public expenditure on education had a negligibly small, namely slightly different from zero contribution to the explanation of the Serbian HDI value (99% of HDI variance), and it was statistically significant, β_2=-0.047, Sig.=0.000<0.001. On the other hand, GERD in the higher education sector had no contribution to the prediction of HDI value, while its coefficient was also statistically significant, β_1=0.000, Sig. = 0.002<0.05 (Table 4).

Table 4: Results of the regression analysis

Model	B	Std. error	t-value	Sig.
Constant	0.934	0.009	107.571	0.000
GERD in higher education sector	0.000	0.000	5.371	0.002
Total public expenditure on education (as a % of GDP)	-0.047	0.002	-24.736	0.000

Source: Author`s computed

The following standard regression equation arose from the obtained results:

$$HDI = 0.934 - 0.047Exp + \varepsilon_t \quad (2)$$

Applied standard multiple linear regression showed that almost no predictor contributed to the prediction of the dependent variable HDI value, with the small exception of the predictor Total public expenditure on education whose regression coefficient was β_2=-0.047, slightly differing from zero. The analysis also found that the influence of GERD on the explanation of HDI values was completely lacking. From the research follows that it is almost impossible to reject the null hypothesis H_0 on the absence of the predictors` influence on the HDI values` trend in Serbia. These findings are consistent with the results of the performed correlation analysis that indicated a weak negative relationship between education expenditures and HDI values, as well as an even weaker negative correlation between GERD in the higher education sector and the dependent variable. Therefore, these findings also support the claim that some other factors had to contribute to the growth of HDI values of Serbia.

6. Concluding Remarks

A quality system of higher and other educational levels, in which continuous investments are made, enables the availability, progress and adequate use of new knowledge, as well as the essential progress of the economy and society. Such public benefits present a sufficient argument for Serbia to support this sector far more actively and intense in the financial and wider sense. From this research, we can unequivocally conclude that in the observed period there was a decline in public expenditure on education, as well as that this indicator could not contribute to the growth of HDI values in Serbia. This is especially true for GERD whose regression coefficient was equal to zero, indicating the complete absence of its any impact on the country`s HDI trend. All of the above definitely and undoubtedly points to the conclusion that it is necessary to increase continuously investments in Serbian education as one of the basic and leading factors of economic growth. In order for the country to further develop and progress in the long-run, it is necessary to abandon the prevailing practice of saving on education because only those countries that invest in acquiring new knowledge, skills and technological know-how have real chances to develop, gain comparative advantages and create added value in sophisticated and technologically supported industries.

Serbia should look for new approaches and mechanisms for funding its higher education system, as well as more rationale ways and forms of allocating its budget funds in order to increase the efficiency and transparency of its public spending. In light of negative demographic trends, the massive wave of students going abroad, the declining number of domestic students and limited budget funds, the country should not reduce its resources for financing educational needs. Given that the financing of higher education is very expensive, Serbia should recognize the advantages of the market mechanism in relation to the administrative managing of educational processes and the means of their financing. In that sense, it could shift from the current system of budget financing, which is focused on the projected educational needs, to a more inventive model of flexible financing of HEIs that would focus on results obtained, as well as strengthening the financial autonomy of HEIs. This results-based funding model would imply their participation in competitions for state funds depending on the number of enrolled students in the first year, the number of graduates, the results of students' knowledge and grades, the complexity of curricula, the number of defended doctoral dissertations (Leshanych, Miahkykh and Shkoda, 2018: 149), the number of interdisciplinary courses implemented, number of international curricula and students, implementation of short-term vocational training courses, etc. The RS Government could also consider the development of certain forms and methods of attracting extra-budgetary funds, as well as to encourage HEIs to become more entrepreneurial-oriented, shift on intensively project financing and, to enhance connections with the private sector. The state could also consider developing the concept of international education as a key factor in actively attracting students from abroad who would pay tuition and contribute to the HEIs budgets. It is necessary to ensure the strengthening of the public HEIs financial autonomy with the aim of more efficient use of their financial resources and assets, as well as spending of state funds. In addition to strengthening administrative, personnel, scientific and program independency, all the proposed solutions would unequivocally contribute to increasing the quality of educational content and learning outcomes. It is also necessary to point out the fact that there were recently initiatives involving budget subsidising the private HEIs, but they were abandoned due to dissatisfaction and opposition of public opinion.

Only a contemporary and comprehensive approach to the financing of Serbian education can figure as an important factor in the development of its science, national economy and the society as a whole, which is way the Government of RS should give much more attention to financing this important social area in the future. Serbia is also facing massive waves of

emigration, as well as declining birth rates that threaten it with a serious risk of losing human capital. One of the possible ways to solve this problem is to nurture the concept of lifelong learning, improve living standards, as well as continuously raise the quality of teaching staff and curricula. Serbia could also introduce a compulsory system of secondary education. Only radical changes in education can create other preconditions for the development of other segments of society. However, in order to be successful and efficient enough, it is clear that the country's educational policy itself will also have to be supported by fundamental changes in the domestic economy, the labour market and society itself.

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Bio-note

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