

EDUCATION FOR SUSTAINABLE DEVELOPMENT IN SERBIA AT THE ONSET OF THE FOURTH INDUSTRIAL REVOLUTION

Biljana Jovanović Gavrilović¹⁸⁸
Biljana Radivojević¹⁸⁹

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Abstract: *Considering a relatively low level of economic development of Serbia, compared to elsewhere in Europe, a dynamic and sustainable economic growth is imperative to this country. The concept of sustainable development has nowadays been accepted as a universal development paradigm applicable to the countries worldwide. This is a new approach to development, which assumes increased production based on solid economic grounds, environmental responsibility and meeting the criteria of social justice. Investing in human capital, especially education and training, is an important factor of sustainable economic development of Serbia at the onset of the fourth industrial revolution. Although educational outcomes in today's Serbia are generally discouraging, there are hidden potentials which need to be activated in the years to come. Changes in Serbian education system are necessary and they should comply with current global trends and particularly match the requirements of the fourth industrial revolution, which will have a significant impact on jobs and future skills needs. A system is needed which will help young people develop 'liquid skills' and enable them to adapt to future challenges which cannot be anticipated. The trump card of Serbia's development should not be cheap labor but knowledge and innovation as the key resources of the modern world.*

Key words: *Education, sustainable development, fourth industrial revolution, Serbia, EU*

1. INTRODUCTION

Serbia ranks at the bottom of the European list in terms of its economic development level and its *per capita GDP* is only slightly above half of the world's average [1]. In addition, this country is lagging behind not only Europe and the world, but behind itself as well, its level of economic development in 1989. In 2014, after a triple-dip recession (preceded by the economic downturn of the 1990s), Serbia's real GDP sunk to less than 70% of its 1989 level [2]. The following years saw the beginning of Serbian economic recovery, with relatively modest economic growth rates.

Considering the economic and social situation in the country, dynamic and sustainable economic development is imperative to Serbia. In the paper we point out the importance of investing in education, as a powerful source of economic growth and development for a small country such as Serbia, at the onset of the fourth industrial revolution. The research also deals with the necessary changes in education ushered in by the digital age, as well as the impact of education on economic, social and ecological contexts.

¹⁸⁸ Faculty of Economics, University of Belgrade, Kamenička 6, Serbia

¹⁸⁹ Faculty of Economics, University of Belgrade, Kamenička 6, Serbia

The aim of the analysis is to point out the key role of quality education in the achievement of dynamic and sustainable economic development in Serbia, as well as to outline, on the basis of the existing situation, the desirable directions of changes to meet the requirements of the modern age.

2. THE ROLE OF EDUCATION IN ACHIEVING SUSTAINABLE DEVELOPMENT OF SERBIAN ECONOMY

The concept of sustainable development has a long history in scientific thought. As early as in 1713, Hans Carl von Carlowitz used the term ‘sustainable yield’ in the context of sustainable forestry management [3]. Interest in sustainable development has grown since the late 1960s, which is related to increasing environmental concerns. The concept has over time expanded to include, in addition to ecological, the other two important dimensions – economic and social. Progress in the economic, social and ecological spheres lies in the essence of contemporary approach to sustainable development [4].

Education plays a major role in achieving sustainable development. The impact of education on sustainable development is manifested across all three of its dimensions, economic (fosters economic growth, increases labor productivity, promotes entrepreneurship), social (promotes employment and higher income opportunities; reduces poverty and inequality, ensures healthy lives) and ecological (promotes people’s environmental awareness; improves their ability to rationally use natural resources) [5].

The idea of sustainable development has been present in Serbia ever since the late 1980s. Shortly before the onset of the global financial crisis, the *National Sustainable Development Strategy of the Republic of Serbia* was adopted, but it was soon abandoned due to essentially changed economic circumstances in the country [6]. No new comprehensive national strategy was formally adopted, but the idea of sustainable development has been incorporated in many sectoral strategies which were adopted in the meantime. The concept is also supported by the fact that sustainable development has been accepted as a key EU goal, which is very important for Serbia in light of its orientation towards the EU accession. The current EU

education strategy also serves as an important indicator for Serbia in its effort to accelerate economic growth and improve population well-being. Education have an important place in the EU strategy *Europe 2020*, which highlights three core priorities: smart growth (developing an

Biljana Jovanović Gavrilović

Full professor at Faculty of Economics, University of Belgrade where she lectures national economy and economic development. The main areas of her scientific interest are: quality of economic growth, sustainable development, economic inequality, poverty and social exclusion, unemployment and labor market policy, human capital, green economy and green growth. She has published more than 150 papers: monographs, textbooks, articles, etc. Participated in several scientific projects for the needs of the governments of Yugoslavia and Serbia, as well as three international projects (TEMPUS and GLAMUR), funded by the European Union. Visiting fellow at London School of Economics and Political Science, Cracow University of Economics, University of Information Technology and Management, Rzeszow and University of Udine – Department of Economics. She was head of the Department for Economic Policy and Development, and a member of the Presidency of the Scientific Society of Economists. Since 2006 she is a member of Professional Board for Law and Economic Science at University of Belgrade.



economy based on knowledge and innovation); sustainable growth (promoting a more resource efficient, greener and more competitive economy); and inclusive growth (fostering a high-employment economy delivering social and territorial cohesion). Consequently, in late 2010 the Government of Serbia drafted the *Serbia 2020* strategy, relying on the corresponding EU strategy, which respects national specificities. Among the five key goals, modeled after a similar European document, is improving the quality of human capital. It is stated that 'knowledge and education do not rank high in the list of social values. Education in Serbia does not have a social status that it deserves' [7]. At the beginning of the current decade, Serbia adopted a strategy for education development until 2020, which recognizes the importance of this sector for the achievement of sustainable development. 'The education system of the Republic of Serbia has a duty to timely, properly and efficiently educate the population of the Republic of Serbia in accordance with the expressed or identified developmental orientations toward sustainability and to meet the educational needs of all citizens of the Republic of Serbia throughout their lives' [8]. Let us also mention that Serbia, much like the EU, has demonstrated commitment to achieving the global Sustainable Development Goals (including the Goal 4 which concern education), pointing out the need to define national-specific goals and progress-monitoring indicators [9].

3. EDUCATION IN SERBIA FACING THE CHALLENGE OF THE FOURTH INDUSTRIAL REVOLUTION

The world is at the onset of the fourth industrial revolution whose scale, scope and complexity is unlike anything humankind has experienced before. The new industrial revolution is marked by technological breakthroughs in genetics, artificial intelligence, robotics, 3D printing and other segments of modern science and technology which until recently were unrelated, and now they are all building on and amplifying one another [10].

The modern industrial revolution is fundamental and global in nature – it creates huge opportunities for economic growth and social progress, but also unprecedented threats for geopolitical security, labor market, income equality, as well as for the value system and ethical standards.

The changes brought about by the fourth industrial revolution are manifested through newly emerging jobs and professions, which will partially or entirely replace the existing ones. The demand for knowledge and skills in job categories gaining but also losing in importance will also change rapidly. Consequently, the core curriculum content in many academic fields needs to continuously adapt to the current technological trends and fast knowledge outdated. The fourth industrial revolution, in combination with other global trends (including population ageing), has an encouraging effect on lifelong learning as well. The concept of one-off education, providing people with lifelong knowledge and skills, is a matter of past.

The quality of education systems in countries worldwide and their preparedness to meet the challenges of the digital age may be judged by the The Programme for International Student Assessment (PISA) results. This is the most important survey in the field of education, which tests 15-year-olds' knowledge and skills globally. The survey has been carried out on a three-year cycle since 2000 under the auspices of the OECD. The last cycle for which results are available was realized in 2015 and encompassed 72 countries of the world. PISA focuses on competencies which students will need in the future and assesses the application of their knowledge and skills acquired both in and outside of school [11]. The assessment is undertaken in three core subjects – science, reading and mathematics, with the focus on a different subject

in every three-year cycle. Since 2012, PISA has included two new domains – problem-solving and financial literacy, in which not all countries participated.

Since Serbia did not take part in the PISA cycle of 2015, our focus will be on the 2012 assessment, in which 66 countries participated. Student performance level was determined according to a six-level proficiency scale. Top-ranking students in all three core domains (mathematics, reading and science) were from Shanghai, Singapore and Hong Kong, performing better than the OECD average. Among the European countries, Liechtenstein, Switzerland and the Netherlands ranked best. Serbia ranked 43, lagging behind the OECD average in all domains. Percentage of students performing at mathematics literacy highest proficiency levels (levels 5 and 6) in Serbia was 4.6%, compared to 12.6% in the OECD countries. The corresponding figures for reading literacy were 2.2% (Serbia) and 8.4% (OECD), whereas the figures for science literacy were 1.7% (Serbia) and 8.4% (OECD).¹⁹⁰ Especially worrying is the percentage of functionally illiterate students in Serbia (performing below level 2), which was 38.9% in the domain of mathematics, 33.1% in the domain of reading, and 35.0% in the domain of science. The corresponding figures for the OECD countries were 23.0%, 18.0% and 17.8%, respectively. Serbia achieved somewhat better results in problem-solving assessment, which tested student capacity for logical reasoning and communicating conclusions, as important competencies in the new digital age. Out of 44 countries which participated in this domain assessment, Serbia ranked 31st, above the EU members – Croatia, Hungary and Bulgaria. A percentage of students from Serbia performing at levels 5 and 6 was 4.75%, compared to 11.4% in the OECD countries, whereas the figures for students performing below level 2 were 28.5% and 21.4% respectively. The best performing students in problem solving were from Singapore, Korea and Japan [12]. The Serbian results point out the characteristics of education system in our country, which is to a large extent based on the ability to reproduce knowledge and, therefore, it is not geared to meet the requirements of the future.

Biljana Radivojević

Full professor at Faculty of Economics, University of Belgrade, where she lectures demography. Main fields of interest and research: natural



movement of population, especially mortality, demographic structures, population aging, education, labour force and labour market. She is engaged in various scientific projects of the Ministry of Science and Education of Serbia. She is member of Committee for the Study of Population of Serbian Academy of Sciences and Arts; Serbian Demographic Society (president); Scientific Society of Economists of Serbia; Statistical Society of Serbia.

Advocating the approach based on the principle that all people deserve an equal opportunity to develop their talents and that leaders worldwide are capable of navigating the transition to the fourth industrial revolution, the World Economic Forum has recently constructed the Global Human Capital Index (GHCI), which measures in a holistic way human resources of a country (current and expected), taking into account individual's ability to acquire, develop and deploy knowledge and skills throughout their working life [13]. 'Human capital' is here understood in a narrow sense and encompasses the knowledge and skills which can be used to create value in a given economic system. The aim is to foster a revolution in education to meet the needs of the future.

¹⁹⁰ PISA introduced a new concept of 'literacy', which refers to capacity of students to apply knowledge and skills in key subject areas (functional literacy).

The GHCI ranks 130 countries on a scale from 0 (worst) to 100 (best) across four thematic dimensions, i.e. sub-indexes (*Capacity*, *Deployment*, *Development* and *Know-how*) and five age groups (0–14 years; 15–24 years; 25–54 years; 55–64 years; and 65 years and over) in order to capture the full national potential of a country's human capital. The *Capacity* subindex measures human capital resulting from earlier education investment. Better educated people are better prepared to adopt new technologies, to innovate and to compete on the global level. The *Deployment* subindex covers knowledge and skills application, as well as accumulation of skills through work. The *Development* subindex covers formal education of the next generation work-force, continuous upskilling and upgrading of the skills of the current work-force through lifelong learning. The *Know-how* subindex captures the breadth and depth of specialized knowledge and skills used at work.

The composite GHCI index covers 21 unique indicators, covering distinct age groups. The final results (the GHCI value) for each observed country is roughly interpreted as a percentage of effective human capital use in relation to 'the ideal'. As measured by this index, on average, the world has developed only 62% of its human capital, i.e. nations are neglecting or wasting the remaining 38%. Top-ranking countries in 2017 index are Norway, Finland and Switzerland. All three countries are unique in having passed the threshold of developing more than 75% of their human capital against the ideal of 100%, which indicates their long-standing commitment to education and great importance they place on building future human capital. The EU collectively achieve a group average score of 70%, with 13 member states individually passing this threshold and the remaining member states being within the range of 60% to 70%.

Serbia, with the GHCI index of 62.50, slightly exceeds the world average, ranking 60th out of the total of 130 countries observed. Across individual thematic dimensions, Serbia is best-ranked on the *Development* subindex (36th) and worst-ranked on the *Deployment* subindex (112th). According to some indicators within the *Development* subindex, which are very important from the perspective of the fourth industrial revolution, this country ranks near the bottom (e.g. education quality, 95th), whereas some other indicators, such as skill and knowledge diversity among the university graduates, rank Serbia much better (16th).

It is worth mentioning that Serbia is selected as one of the TACTICS (acronym for Thailand, Argentina, Chile, Turkey, Iran, Colombia and Serbia) countries, which are thought to have the potential to be the higher education global leaders among emerging economies. following research conducted in Great Britain [13]. In addition, Serbia qualifies as a specific European country which, albeit relatively undeveloped, has a significant potential in higher education, which opens perspectives for a stronger growth in a new knowledge-based and technology-driven economy.

4. CONCLUSION

The knowledge and skills of the population, i.e. narrowly defined human capital, is the most valuable resources of the modern age, which can rightly be referred to as the age of education. It is also key to sustainable development of modern economy from economic, social and ecological perspectives.

Education offers a development opportunity for Serbia at the onset of the fourth industrial revolution. As a small and underdeveloped country, Serbia should not remain a passive observer of events. On the contrary, through adjusting its education system to the requirements of the day and improving its human capital, this country needs to find its place in a changing labor

market and create preconditions for a dynamic sustainable economic development it urgently needs. Education in Serbia should be re-shaped so as to offer new knowledge and skills for the new economy. Modernizing the curriculum will not be enough. An education system is needed which offers 'liquid skills' and enables the youth to adapt to future unanticipated challenges. The main prerequisite for this is a changed attitude to education, which should not be treated as a cost that the government could save on, but as a major factor enjoying wide social support. Technological changes brought about by the fourth industrial revolution do not foster economic development based on cheap labor, but the one based on knowledge and innovation as the key resources in the new economy.

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