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## ANALYSIS OF THE SERBIA'S INNOVATION PROFILE

**Abstract:** *The paper highlights the importance of strengthening the country's innovative potential due to its economic prosperity. Also the paper points out to the importance of application an appropriate metrics for assessing the effectiveness of the national innovation systems and innovation policies. In addition, the Serbia's innovation profile was presented, through the analysis of innovation potential indicators as the factors that affect how new products, services and processes are generated, developed and implemented. Based on this analysis, proposals have been put forward for strengthening the innovation potential of Serbia and creating conditions in which organizations across the country can successfully innovate.*

**Keywords:** *Innovation potential, Innovation measurement, Serbia's innovation profile*

### 1. Introduction

Innovations are the key to achieving a sustainable competitive advantage (Ferreira et al., 2017). The path to competitiveness of economies, whose companies are exposed to international competition, goes through innovation (Ciocanel et al., 2015). According to Dereli (2015), in terms of surviving in global competition, maintaining competitiveness, improving economic performance and growth, contributing to national economic development, innovation is an essential element. Debrah et al. (2018) emphasize that the country's international competitiveness is determined by its innovation performance

A number of studies indicate that there is a strong correlation between the economic prosperity of a country and the level of innoviveness of its enterprises, as well as the the existence of suitable conditions for creating and implementing innovations, in other words - the innovative potential of the country (Kogan et al., 2017; Czarnitzki and Toivanen, 2013; Westmore, 2013).

At first, the paper highlights the importance

of strengthening the country's innovative potential for its economic prosperity. Within the second chapter the most important methods and metrics for assessing innovation potential from a macroeconomic perspective are presented, while within the third section the overview of world's innovative leaders and analyzes of their innovative profiles are provided. The fourth part analysis the Serbia's innovation profile, strengths and weaknesses, in detail, as well as prospects for the development of its innovative potential. The last part of the paper focuses on proposing the strengthening of the Serbia's innovation potential.

### 2. Evaluation of the national economies' innovation potential

The assessment of innovative potential requires the studying and measuring the availability of various types of resources for creating, implementing and disseminating innovations, such as intellectual, financial, technical (Kogan et al., 2017; Albert & Bradley, 2015; Edvinsson, 2014).

Therefore, developing and managing

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innovation potential at the national level requires defining the appropriate metrics that deals with innovation potential indicators which reflect a country's intentions to improve and develop.

The country's innovation potential is reflected by the willingness of its companies to invest material and financial resources in the development of new products, ideas and processes, and by outcomes of the realized innovation processes in terms of the number of new products, services and processes that have been developed. A country's innovation potential also depends on companies' openness to cooperation and linking in the creation and implementation of innovations.

All that is stated indicates that there is a need for applying comprehensive methods for assessing the level of innovation potential from a macroeconomic perspective.

### 2.1. Metrics for the innovation potential evaluation

There are many tools for measuring the level of innovation potential from macroeconomic perspective, but it is possible to make a summary of the most important metrics that serve for innovation potential evaluation at the level of national economies:

- The Global Innovation Index (GII)
- The European Innovation Scoreboard (EIS)
- The Global Cleantech Innovation Index (GCII)

**The Global Innovation Index (GII)** is a widely used composite index for ranking of world economies' innovation capabilities. It is established by Cornell University INSEAD and the specialized agency of the United Nations the World Intellectual Property Organization (WIPO).

The GII includes two indicators: The Innovation Input Sub-Index which evaluates national economy's potential for innovation activities, taking into account five segments

(1) Institutions, (2) Human capital and research, (3) Infrastructure, (4) Market sophistication, and (5) Business sophistication and the Innovation Output Sub-Index which evaluates the actual innovation results, thru two aspects: (1) Knowledge and technology outputs and (2) Creative outputs.

The GII is continuously assessed for 126 countries, in addition, it includes ranking and analysis of their economic profiles, strengths and weaknesses.

**The European Innovation Scoreboard (EIS)** is established by the European Union as one of the tools for implementing the strategy Europe 2020 (The European Commission, 2010). It enables a comprehensive analysis of the national investment systems performance for the European Union member states and other European countries.

The EIS classifies countries into four categories: Innovation leader; Strong innovator; Moderate innovator and Modest innovator. The classification is based on the degree of innovation that is assessed on the basis of the following elements: innovation factors such as human resources, research systems, innovation-friendly environment, financial support; innovation potential indicators like realized innovations, investments, intellectual property and links with the economy and economic effects of innovation activities.

**The Global Cleantech Innovation Index (GCII)** has been established within the Global Cleantech Innovation Programme (GCIP) initiated by the United Nations Industrial Development Organization (UNIDO). The GCIP is aimed at discovering of high-potential countries for launching entrepreneurial start-up companies that will commercialize clean technology innovations.

The GCII is measured for forty innovative-sustainable and emerging national economies, on the basis of the following indicators: General Innovation Drivers;

Cleantech-Specific Innovation Drivers; Evidence of Emerging Cleantech Innovation and Evidence of Commercialised Cleantech Innovation.

### 3. The global innovation leaders

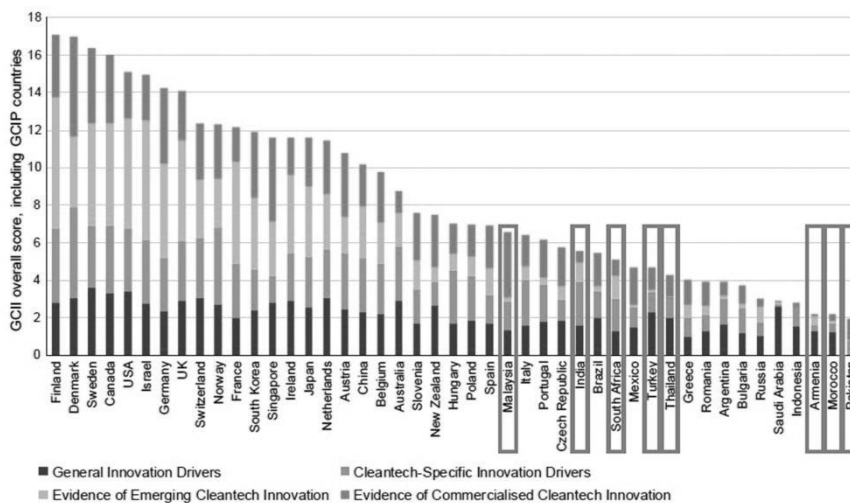
According to the The Global Innovation Index 2018 report (INSEAD & WIPO, 2018) the top ten global innovation leaders are Switzerland, Netherlands Sweden, the United Kingdom, Singapore, the United States of America, Finland, Denmark, Germany and Ireland.

The report also states that the most innovative regions are Northern America and Europe with average GII scores 56 and 47 respective.

The analysis (INSEAD & WIPO, 2018) of the innovation profile of 126 countries has resulted in the following findings about global innovativeness:

- Becoming optimistic about global innovation and growth is possible;
- Continued investments in breakthrough energy innovations are essential for global growth and to avert an environmental crisis;
- China’s rapid rise shows the way for other middle-income economies;
- Focusing on translating innovation investments into results is key.

The high-potential countries for launching entrepreneurial start-up companies that will commercialize clean-technology innovations are Finland, Denmark, Sweden, China and the United States of America, as indicated by the results of the GCII (Sworder et al., 2017). These results were created as supplements to the GII 2017 (INSEAD & WIPO, 2018) for GCII countries are presented in Figure 1.



**Figure 1.** Global Cleantech Innovation Index for GCII countries in 2017 (Sworder et al., 2017)

According to the EIS comparative assessment (European Commission, 2018), the EU Member States’ with leading innovation systems are Denmark, Finland, Luxembourg, the Netherlands, Sweden, and the United Kingdom. The performance of

these countries is more than 20% above the EU average.

The category of strong innovators includes Member States whose performance is close to the EU average: Austria, Belgium, France, Germany, Ireland and Slovenia.

Member States that show performance significantly below the EU average such as Croatia, Cyprus, the Czech Republic, Estonia, Greece, Hungary... are classified as Moderate Innovators. Bulgaria and Romania

achieve an extremely low level of performance towards the EIS, and are labeled as the most Modest Innovators.

The results of the European Innovation Scoreboard 2018 are presented in Figure 2.

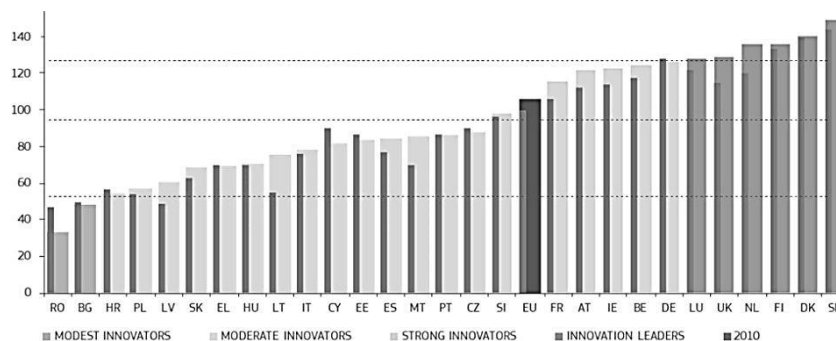


Figure 2. Performance of EU Member States' innovation systems according to the EIS (European Commission, 2018)

The EIS (European Commission, 2018) points out that eighteen EU Member States have recorded a performance increase between 2010 and 2018, among which Lithuania (20.1%), the Netherlands (15.9%) and Malta (15.2%), recorded the highest increase. On the other hand, ten countries have a performance decline.

#### 4. Serbia's innovation profile

Serbia's innovation potential is analyzed according to the indicators of the Global Innovation Index report, also the Serbia's innovation profile, provided by the European Innovation Scoreboard is analyzed.

##### 4.1. Serbia's Global Innovation Index

Taking into account all GII (INSEAD & WIPO, 2018) indicators (innovation inputs, outputs and effects), Serbia is ranked as the 55<sup>th</sup> country in the GII 2018. Also Serbia is 11<sup>th</sup> ranked country among the 34 upper-middle-income countries in the GII 2018 and 35<sup>th</sup> ranked country among the 39 countries in Europe. Over the past three years, Serbia has improved its rank by moving up from

65<sup>th</sup> to 55<sup>th</sup> position. The most significant progress, was achieved in the area of the Innovation efficiency, moving up for the 13 position from 70<sup>th</sup> to 57<sup>th</sup>.

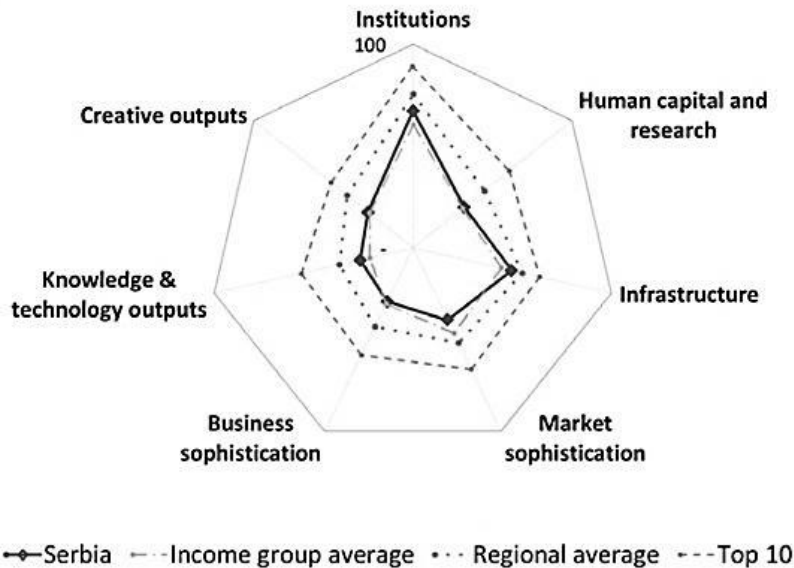
The GII report 2018 (INSEAD & WIPO, 2018) indicates that Serbia has achieved positive results for following indicators:

- *Cost of redundancy dismissal ranks* within the **Institutions** area, as the best ranked country in the world;
- *ISO 14001 environmental certificates* within the **Infrastructure** area, as 8<sup>th</sup> ranked country;
- *Scientific & technical articles* (5<sup>th</sup>) and *ISO 9001 quality certificates* (7<sup>th</sup>) within the **Knowledge & Technology Outputs**.

The most Serbia weaknesses are observed in the innovation input side:

- *Trade, competition & market scale* (as 102<sup>nd</sup> ranked country) and *Intensity of local competition* (as 107<sup>th</sup> ranked country) within **Market Sophistication** input area;
- *High-tech imports* (101<sup>st</sup>) within **Business Sophistication** and

- *Gross capital formation (99<sup>th</sup>) and GDP per unit of energy use (95<sup>th</sup>)* within **Infrastructure**. Those results are presented in the Figure 3.



**Figure 3.** Serbia's GII 2018 score by areas (INSEAD & WIPO, 2018)

#### 4.2. Serbia's innovation profile according to the European Innovation Scoreboard

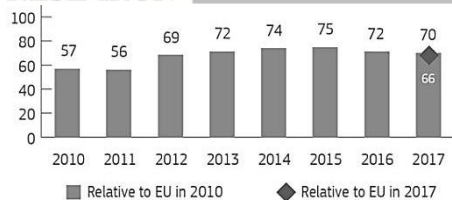
The European Innovation Scoreboard 2018 (European Commission, 2018) places Serbia among the Moderate Innovator countries with Summary Innovation Index of 66.5 (Table 1).

**Table 1.** The Serbia's performance for core innovation dimensions (European Commission, 2018)

Summary Innovation Index	57.1	70.3	66.5
Human resources	28	76.5	64.1
Innovation-friendly environment	67.3	40.6	37.7
Finance and support	78	132.3	118.3
Firm investments	78	132.3	118.3
Innovators	47.7	72.3	84.1
Linkages	96.6	94.9	94
Intellectual assets	27.2	24.4	24.2
Employment impacts	62.8	94	93.5
Sales impacts	50.4	60.9	58.5

Serbia demonstrates weaknesses in the Firm investments (118.3), Linkages (94.0), and Employment impacts (93.5) innovation dimensions. Serbia demonstrates strong performance in the innovation potential indicators such as: *Firm investments* (118.3) and *Linkages* (94.0), and also in the *Employment impacts* (93.5) innovation dimensions. On the other hand the *Innovation-friendly environment* (37.7) and *Intellectual assets* (27.2) are assessed as the weakest Serbia's innovation dimensions.

Over past ten years, Serbia's performance has increased relative to that of the EU in 2010, however, this performance increase has recorded stagnation in the last three years (Figure 4).



**Figure 4.** The Serbia's performance increase over past time (European Commission, 2018)

## 5. Suggestions for strengthening the Serbia's innovation potential

In order to strengthen the Serbia's innovation potential, of essential important is developing the program at the national level which should provide capital, financial, legislative and logistical support to enterprises for the successful creation and diffusion of product, service and process innovations.

The program should be focused on the removal of critical points highlighted in the GII report (INSEAD & WIPO, 2018) and the European Innovation Scoreboard (European Commission, 2018). That implies ensuring the companies support to create and implement the programme that will enhance their innovation policies and systems.

Also it is necessary to encourage cooperation between research teams across different companies and create national programs for boosting capital investment in innovative start-up companies across country. What is also important is providing state regulation more conducive for creation, implementation

## References:

- Albert, S., & Bradley, K. (2015). *Intellectual capitals the foundation for new conditions relating to organizations and management practices*. Working Paper Series No. 2015, Milton Keynes, Open University Business School.
- Ciocanel, A. B., & Pavelescu, F. M. (2015). Innovation and competitiveness in European context. *Procedia Economics and Finance*, 32, 728-737.
- Cornell University, INSEAD, and WIPO (2018): *The Global Innovation Index 2018: Energizing the world with innovation*. Ithaca, Fontainebleau, and Geneva.
- Czarnitzki, D., & Toivanen, O. (2013). *Innovation policy and economic growth*. Directorate General Economic and Financial Affairs (DG ECFIN), European Commission.

and diffusion of innovation, and overcome perceived regulatory barriers to innovation.

In order to ensure successful implementation of the program for strengthening the innovation potential of the Serbian economy, it is necessary to create synergies between research and innovation strategies at state, regional and local level.

## 6. Conclusion

The paper highlights the importance of strengthening the country's innovative potential for its economic prosperity. Also the Serbia's innovation profile has been analysed, on the bases of the indicators of the Global Innovation Index report and the European Innovation Scoreboard.

In addition, the rank of Serbia was also considered, based on the innovativeness level and the conditions for successful creation and implementation of innovations, compared to other countries in Europe and the world. The paper also pointed to the positive results that Serbia achieved and weaknesses in this area. The results of the analysis indicates the necessity of the create appropriate programs and policies at the national level, with the aim of strengthening the Serbia's innovation system.

**Acknowledgment:** Research presented in this paper was supported by Ministry of Science and Technological Development of Republic of Serbia, Grant III-44010.

- Debrah, Y. A., Oseghale, R. O., & Adams, K. (2018). *Human capital, innovation and international competitiveness in Sub-Saharan Africa. In Africa's Competitiveness in the Global Economy* (pp. 219-248). Palgrave Macmillan, Cham.
- Dereli, D. D. (2015). Innovation management in global competition and competitive advantage. *Procedia-Social and Behavioral Sciences*, 195, 1365-1370.
- Edvinsson, L. (2000). Some perspectives on intangibles and intellectual capital 2000. *Journal of Intellectual Capital*, 1(1), 12-16.
- Europe, E. C. (2010). *2020: A strategy for smart, sustainable and inclusive growth*. European Commission.
- European Commission (2018): *The European Innovative Scoreboard 2018*. Luxembourg.
- Ferreira, J. J., Fernandes, C. I., & Ratten, V. (2017). Entrepreneurship, innovation and competitiveness: what is the connection? *International Journal of Business and Globalisation*, 18(1), 73-95.
- Kogan, L., Papanikolaou, D., Seru, A., & Stoffman, N. (2017). Technological innovation, resource allocation, and growth. *The Quarterly Journal of Economics*, 132(2), 665-712.
- Sworder, C., Salge, L., & Van Soers, H. (2017). *The Global Cleantech Innovation Index 2017*. Cleantech Group and WWF.
- Westmore, B. (2013). R&D, Pateting and growth: The role of public policy, *OECD Economics Department Working Papers*, No. 1047, OECD Publishing, pp. 2-48.

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