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ANALYSIS OF THE WESTERN BALKANS COUNTRIES' INNOVATIVE SYSTEMS

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Abstract: While the Western Balkan (WB) countries have been actively seeking membership in the EU, their level of development is diverging more and more from that of the EU as a whole. Along with the protracted reform processes and numerous political and social unrest, these nations' lack of innovation should be considered a possible cause of these results. Based on information from the GII report for 2021, this research seeks to conduct a comparative analysis of the innovation in the WB countries and pinpoint their major advantages and disadvantages in this area. According to the results, Serbia is the top-ranked country when all factors are considered. The results have outlined some recommendations and instructions for economic policymakers in these countries to enhance innovation in the future.

Keywords: Innovation, GII, Innovative system, Western Balkan

1. INTRODUCTION

Following each global crisis, the Western Balkan (WB) countries' capacity for development gradually deteriorates (Kikoni, 2020). These countries export human resources on a net basis (World Bank, 2019). These factors substantially impact these countries' capacity for innovation (Jardon, 2016; Li & Tang, 2017; Calabrò et al., 2021; Jagódka & Snarska, 2021). The development of science and technology, as well as higher education quality, are crucial prerequisites for innovation development (Erić, 2018; Agerberg, 2019; Agasisti & Bertoletti, 2020). It is essential to make enough investments in science, ensure that universities are well-connected to the economy, and actively support this sector (Docampo, 2013; Živković et al., 2017; Avelar et al., 2019). This sociopolitical environment's lack of investment in higher education has prevented these institutions from developing and prevented the country from achieving its long-term strategic goals in this area (Brajković, 2016). A stimulating business environment also plays a vital role in developing innovation. A dynamic corporate environment is essential for the growth of innovation. The stability of the innovation climate is facilitated by a supportive political environment (Cooray, 2009; Lendel, 2010; Baumann & Kritikos, 2016). The WB countries must enhance the environment for innovation development in these circumstances, focusing especially on those areas that do not necessitate considerable financial resources.

This study uses data from the Global Innovation Index (GII), which condenses the main factors affecting innovation and the outcomes of all types of innovative activity (WIPO, 2021). This article aims to conduct a multicriteria comparative analysis of the innovation in the WB countries and highlight the major advantages and disadvantages of these economies in

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terms of innovation. To determine the current state in this region, data from the GII report for 2021 were used. The fact that this is one of the few articles that deal with innovations in this region systematically speaks to the importance of this research. Numerous options exist for the findings to be visually shown when the PROMETHEE method is applied using the Visual PROMETHEE software.

2. LITERATURE REVIEW

Innovation is frequently seen as a key factor in a company's performance from a microeconomic perspective (Coad et al., 2016; Rubera et al., 2016; McCormik & Fernhaber, 2017). Improved work organization practices in businesses and their interactions with related businesses and the academic community lead to innovation (Hasan & Tucci, 2010; Zhu et al., 2011). From a macroeconomic standpoint, innovation is important in driving economic growth, employment growth, and rising living standards (Schumpeter, 1950; Colombelli et al., 2013; Despotović et al., 2014). Innovation enables the economy to respond to global issues more successfully (Paredes-Frigolett et al., 2021). According to Diaconu (2011), the emphasis on innovation is being made because of the widening gap between developed and developing countries due to wealthy nations' attention to measures to spur economic development through invention.

Long-term prerequisites for WB countries' economic and social survival and development include increasing the economy's capacity for innovation and enhancing competitiveness (Balkytė & Tvaronavičienė, 2010). Regarding innovation, the WB countries fall considerably short of the EU members (Despotović et al., 2014; Kostoska & Hristoski, 2017). In the case of these countries, there is no statistically significant correlation between innovation and competitiveness (Cvetanović et al., 2014). In general, these countries' infrastructure is of much worse quality than that of the EU (Atoyan et al., 2018).

The innovativeness of the WB countries is the subject of very few papers. Typically, they are examined in a wider context, either with EU members (Aytekin et al., 2022) or with Southern and Eastern Europe countries (Ramadani et al., 2019; Cvetanović et al., 2020). Most of the publications (Pilav-Velić & Marjanović, 2016; Klisaroski, 2018; Jovanović, 2018; Savić et al., 2018; Lagumdžija et al., 2019; Trbovich et al., 2020) are concerned with innovation in several of these countries. This paper adds to the literature on innovation, which is currently lacking in studies.

3. DATA AND METHODOLOGY

The World Intellectual Property Organization (WIPO) has published country ranking results based on the Global Innovation Index (GII) values since 2011. The GII examines a country's level of innovation development using seven innovation pillars split into inputs and outputs. Among the inputs are institutions, human resources and research, infrastructure, market sophistication, business sophistication, and associated sub-areas (WIPO, 2021).

The GII 2021 report data (WIPO, 2021) examined innovation in WB countries. The examination covers Albania, Bosnia and Herzegovina (B&H), Montenegro, Northern Macedonia, and Serbia. In terms of socialist heritage, turbulent social, economic, and political transitions, an underdeveloped institutional and regulatory environment, the state's continued substantial engagement in the economy, and bad economic results, WB countries share many characteristics. On the other hand, these countries vary in terms of the progression and transition toward EU membership (Jusić & Obradović, 2019). The multicriteria analysis

covers the comparative analysis of innovation in WB countries. In this study, the PROMETHEE and Entropy methods are employed.

3.1. Multicriteria analysis model setting up

The multicriteria analysis model settings are shown in Table 1. The weights were computed via the entropy method. The preference threshold was determined using the standard deviation and expressed in absolute amounts using the V-shape preference function. The WB countries received rankings using the assessed criteria in multicriteria analysis settings.

Table 1. The multicriteria analysis model setting

Criteria	Weights	Direction of preference	Preference function	Preference threshold (p)	Threshold type
Political environment	0.040	max.	V-shape	4.98	absolute
Regulatory environment	0.042	max.	V-shape	4.95	absolute
Business environment	0.041	max.	V-shape	6.03	absolute
Education	0.057	max.	V-shape	8.49	absolute
Tertiary education	0.049	max.	V-shape	5.13	absolute
R&D	0.044	max.	V-shape	3.54	absolute
ICT	0.046	max.	V-shape	5.27	absolute
General infrastructure	0.044	max.	V-shape	2.73	absolute
Ecological sustainability	0.061	max.	V-shape	5.48	absolute
Credit	0.052	max.	V-shape	4.30	absolute
Investment	0.048	max.	V-shape	19.02	absolute
Trade, competition and market scale	0.040	max.	V-shape	7.48	absolute
Knowledge workers	0.054	max.	V-shape	4.15	absolute
Innovation linkages	0.052	max.	V-shape	2.78	absolute
Knowledge absorption	0.050	max.	V-shape	5.76	absolute
Knowledge creation	0.043	max.	V-shape	6.79	absolute
Knowledge impact	0.044	max.	V-shape	6.23	absolute
Knowledge diffusion	0.043	max.	V-shape	7.31	absolute
Intangible assets	0.051	max.	V-shape	4.91	absolute
Creative goods and services	0.037	max.	V-shape	3.93	absolute
Online creativity	0.061	max.	V-shape	14.66	absolute

Source: Authors' calculations.

4. RANKING RESULTS AND DISCUSSION

The WB countries were ranked using the indicators obtained from the GII 2021 database and the multicriteria analysis model setting up. Serbia is the WB country with the greatest positive net flow of preferences, as seen in Table 2. B&H is ranked fourth, just below last-placed Albania, with a negative net flow of preferences. Serbia and N. Macedonia have switched places in the PROMETHEE method results. Otherwise, the ranking of the countries is the same as that in the GII report. These outcomes are the consequence of various

weighting coefficients, which modify the significance of each ranking criterion and various approaches.

Table 2. Ranking results

Rank	Action	Phi	Phi+	Phi-
1	Serbia	0,2859	0,5314	0,2454
2	Montenegro	0,2576	0,5465	0,2889
3	Northern Macedonia	0,1395	0,4372	0,2976
4	B&H	-0,3070	0,2466	0,5536
5	Albania	-0,3760	0,2090	0,5850

Source: Authors' calculations.

It is required to look at the profiles of the observed countries created using Visual PROMETHEE software to assess the factors contributing to this rating. It is feasible to pinpoint each country's advantages and disadvantages using country profiles. The upward-pointing pillars stand for each country's advantages over the others. The larger the pillar, by the specified criteria, the greater the given country's advantage over others. On the other hand, the pillars that face down show disadvantages. The observed country's limitation increases with the pillar size given the criterion.

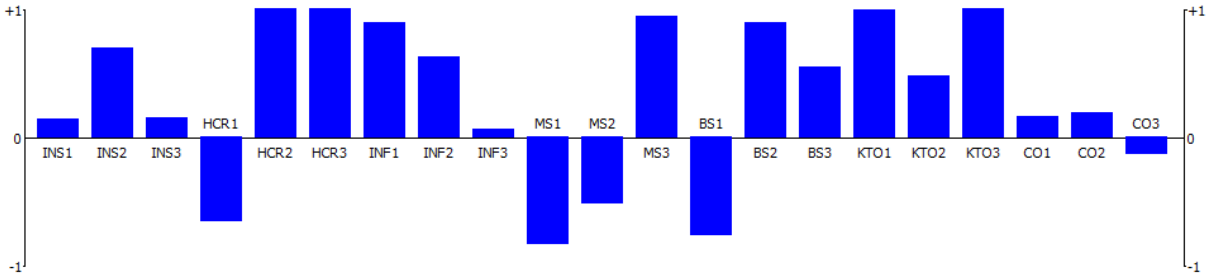

Figure 1. Serbia's Profile

Figure 1's profile of Serbia concludes that its success in securing the top position was largely due to its advantages in institutions, infrastructure, and technological and intellectual outputs. While the political and corporate environments are marginally more favorable than in other countries, the regulatory environment is the most pronounced advantage in institutions. ICT infrastructure development is the biggest advantage in infrastructure development, while environmental sustainability has a much smaller advantage. Serbia uses e-government more frequently and has more readily accessible state online services. Although the number of online services has significantly increased, their use is still only slightly above average (Đurašković et al., 2021).

In the creation and diffusion of knowledge, Serbia enjoys a substantial advantage. Compared to other WB countries, Serbia has a stronger diversification of production and exports, with the largest exports of ICT services as a percentage of total exports and the most scientific journal articles. Additionally, because of the bad conditions in education generally, Serbia's enormous advantage in human capital and research, attained via the development of higher education and R&D, has been significantly diminished. The longer average length of schooling and lower educational investment are the causes of this.

Business sophistication is a big advantage. It was made possible by relatively effective actor networking in knowledge absorption, hindered by employees' inadequate abilities and innovative development. Serbia also observed a certain advantage in creative outputs, which relates to the number of creative goods and services and the relatively high value of intangible

assets. Serbia's most important disadvantage is its relatively low market sophistication, resulting from unfavorable lending conditions and low investment activity (Sanfey et al., 2016).

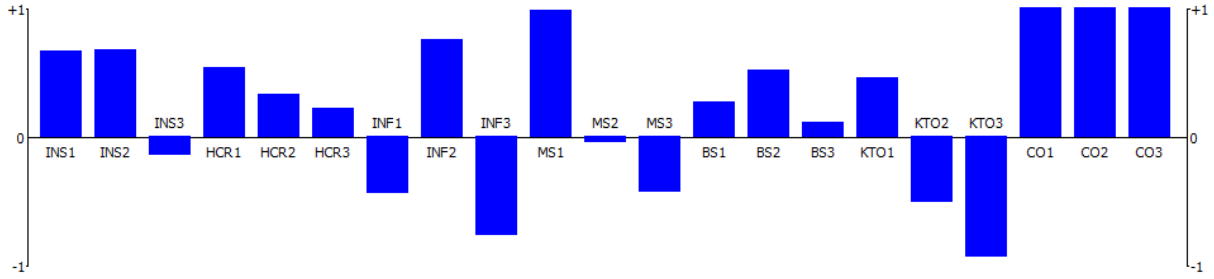

Figure 2. Montenegro's Profile

According to Figure 2, Montenegro has an important advantage over other WB countries regarding human capital and research, business sophistication, and creative outputs. This country has the largest human resources and research advantage in the general education development segment, followed by higher education development, and the least in the R&D field. Due mostly to the connections made by the good actors in the sphere of innovation development, a somewhat better position in terms of business sophistication compared to other countries was attained. Montenegro has a distinct advantage in the area of creative outputs, where it records the highest intangible asset value, the highest number of creative goods and services, and the highest level of online creativity (Milić, 2022).

The business and regulatory environments are advantageous in Montenegro. These positive outcomes are somewhat offset by the challenging business startup procedures and the most challenging and expensive insolvency resolution process. Most segments are disadvantaged compared to other countries regarding infrastructure, market sophistication, and knowledge and technology outputs.

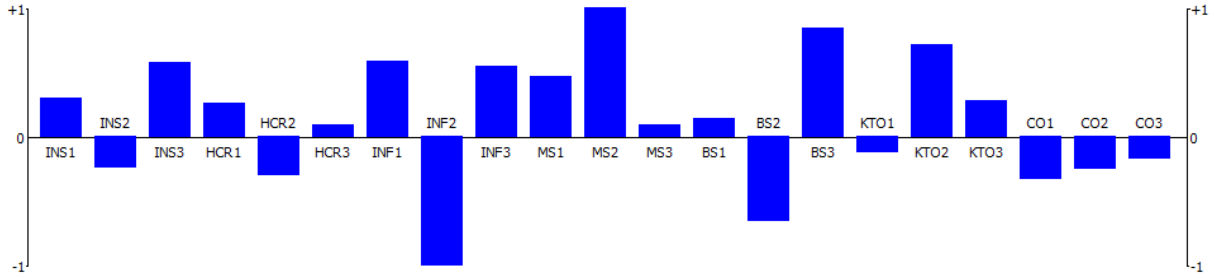

Figure 3. N. Macedonia's Profile

The only area in which N. Macedonia has a competitive advantage over other WB countries in all sectors, according to Figure 3, is market sophistication. This country offers the ideal circumstances for investment (Marjanović & Đukić, 2020). This country has a considerable advantage in institutions, human capital and research, infrastructure, business sophistication, and knowledge and technological outputs. This country enjoys a comparatively favorable political and business environment in terms of institutions. However, the country's regulatory environment is unfavourable because of the weak rule of law (Hoxhaj, 2021). In terms of general education development and R&D, this country performs relatively well compared to other WB countries in human capital and research. But the country's underdeveloped higher education system is one of its limitations (Stambolieva, 2018; Bigagli, 2021; Thanasi-Boçe & Kurtishi-Kastrati, 2022). Due to this situation in higher education and

the difficult socioeconomic climate, a large portion of the youthful population has migrated, decreasing the number of students.

Figure 3 demonstrates how this country's greatest weakness is its infrastructure's general underdevelopment, which negatively impacts the advancement of ICT infrastructure and environmental sustainability. This deficiency is the result of ineffective logistics and electricity production and delivery (Atoyan et al., 2018). This country has a strong knowledge absorption advantage and a marginal workers' skill advantage regarding business sophistication. The impact and, to a lesser extent, the knowledge diffusion are advantages in knowledge and technology outputs. The insufficient creation of knowledge is a minor limitation. This country still has significant gaps in the actors' networking in the sector of innovation development. This restriction results from inadequate collaboration between academic institutions and the economy (Petruhevska, 2019). The creative outputs had the worst outcomes.

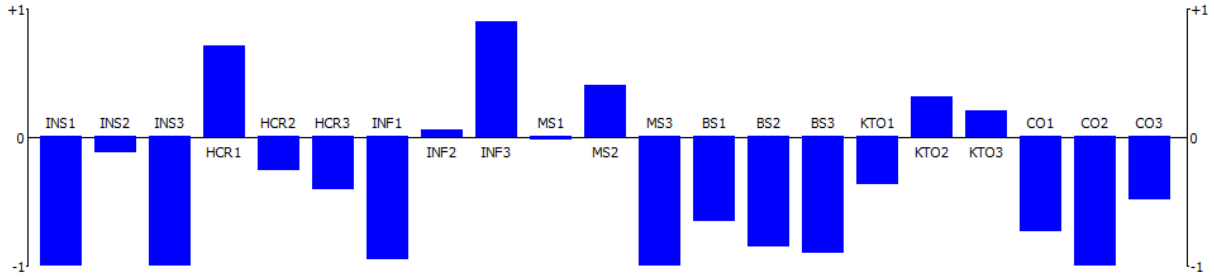

Figure 4. B&H's profile

Figure 4 indicates that B&H has several disadvantages. The institutions, business sophistication, and creative outputs are lacking compared to other WB countries. B&H's political and business environment is the worst in terms of institutions. This country is characterized by the absence of a favorable and predictable environment for businesses to participate in creative activities (Aridi & Ong Lopez, 2019). The regulatory environment, however, is somewhat less pronounced in this country. The level of business sophistication is a considerable barrier. There is a lack of actors networking involved in developing the innovations, followed by a lack of knowledge absorption. The lowest volume of creative goods and services, followed by a low intangible asset value and, finally, a lack of online creativity, are the worst drawbacks in terms of creative outputs.

The ICT infrastructure in this country is the least advanced. On the other hand, the country's greatest advantage is its commitment to environmental sustainability. The achievement of this goal has been made possible by working toward EU standards for ecological sustainability (Primorac, 2021). A relatively strong science impact and diffusion also give this country a modest lead over other WB countries in terms of infrastructure development generally, including knowledge and technology outputs.

In the end, it should be highlighted that this economy only has one advantage over other WB countries in two areas: market sophistication and human capital and research. It can be said that the capital market in this country is complex, organized, and multilayered when taking regulation and organization into account (Kasumović & Mešić, 2018). Due to the highest import and export tariffs in WB, the absence of a single economic space, and the existence of a divided internal market, this economy is in the worst position compared to other WB countries in terms of trade volume, size, and market diversification (Sinanagić et al., 2013).

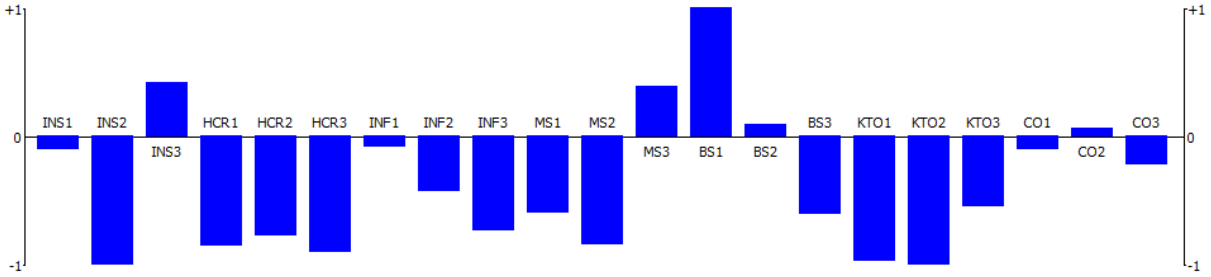

Figure 5. Albania's profile

Albania has various constraints, as seen in Figure 5, responsible for its poor performance in the final rankings. All of the examined components show the country's enormous limits in terms of infrastructure, human resources and research, and knowledge and technology output. The restriction of this economy is most obvious in the areas of human capital and research. Higher education and education, in general, are underdeveloped. There aren't many researchers, and R&D spending isn't very high (Sota, 2021a). The least obvious weakness is the underdevelopment of ICT infrastructure. The lack of infrastructure development in general and, in particular, the lack of adherence to the principles of environmental sustainability comes next.

A high amount of public debt restricts public infrastructure investments in this country, which has significant gross finance needs for infrastructure improvement. It also has an unstable energy supply, frequent outages, and significant distributional losses due to its outdated and low-capacity power plants. The infrastructure continues to be much below the EU average (Atoyan et al., 2018). The lowest creation and impact of knowledge are the most important limits in terms of knowledge and technological outputs.

Business sophistication is the only area where the Albanian economy has an advantage in two sections. Regarding the workers' qualifications and prospects for further training, it is in the top position (Sota, 2021b). This country's primary constraint is its capacity for knowledge absorption. Within the three areas under examination, Albania enjoys an advantage. In institutions, it is a business environment. There is trade volume, size, and market diversification in the market sophistication. However, only creative goods and services have a minor edge in creative outputs.

5. CONCLUSIONS

Economic growth and development in the WB countries are incredibly poor. The WB countries are less innovative than the EU member states. According to this study, Serbia is the top-ranked country in the WB region, followed by Montenegro, N. Macedonia, B&H, and Albania. The countries' profile diagrams also highlighted the main advantages and disadvantages of each of the observed countries.

Based on a conducted analysis, it is possible to establish specific recommendations for economic policymakers to raise the degree of innovation in these countries in the future. The WB's greatest potential lies in its human resources and still-respectable scientific results. Developing these potentials should be the primary goal of any initiatives designed to increase innovation and competitiveness. The greatest way to stop young people from leaving the WB is to strengthen the regional integration of academic institutions and industry. Institutions and infrastructure are essential "input" elements for the WB's innovation and competitiveness.

Improving the region's infrastructure and maintaining its political and institutional frameworks is important. Given the lack of funds for large infrastructure upgrades, these countries should prioritize investment projects to close the gap with countries in the EU progressively. Additionally, it is essential to boost competition in the infrastructure sector and privatize state-owned infrastructure businesses. The WB nations must increase R&D funding (particularly from the corporate sector), establish scientific research institutes that produce the knowledge required to build new technologies and improve collaboration among all R&D actors.

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