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*Tomasz Grodzicki**

Innovation Potential in the Western Balkans Relative to the European Union and Selected Neighbouring Countries

Abstract

Although Western Balkan economies are still on the list of EU candidates or potential candidate countries, they do have some integration with EU economies. The EU is the leading trading partner of the Western Balkans and is one of the top destinations for the flow of people. The Western Balkan economies have been trying to address their populations' ongoing emigration (the so-called "brain drain" phenomenon) by implementing targeted economic policies. Since one of the main contributors to economic growth is the ability to create innovation, it is crucial to building innovation potential. The main challenge for innovation policy is to provide a favourable environment for entrepreneurship and economic growth to create jobs. Thus, this paper aims to examine innovation potential – an innovation input – as it creates the conditions needed for innovation development. The results of analysing the data (on research and development spending, human resources, an environment friendly to innovation, and intellectual property rights) indicate that the Western Balkan countries are lagging behind the EU in many aspects of innovation potential, so they should still develop their strategies towards creating higher innovation potential. Thus, they will be able to have a higher level of innovation and, as a result, be more competitive in economic terms.

Keywords: Economic Growth, Innovation Potential, Western Balkans, European Union

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Introduction

Innovation is a key term that has been widely described in scientific literature. Innovation potential has not been as frequently described as innovation, invention, or innovativeness has, but there have still been some attempts at the hands of different researchers to try to define it. Innovation, essentially, is an economy's engine that improves productivity, efficiency, and effectiveness. Innovation potential determines said economy's creative capacity, which, when properly used, contributes to the creation of innovation in a given territory.

The aim of this paper is to examine the performance in innovation potential of the Western Balkan (WB) countries relative to the EU's average. Since WB economies are in the process of EU accession, comparing their innovation potential with the EU's average is vital.

The paper focuses on five out of the six following Western Balkan (WB) countries in Southern and Eastern Europe: Albania, Bosnia and Herzegovina (BiH), Montenegro, North Macedonia, and Serbia. These countries are formally either potential candidates or candidate countries and are included in the EU Enlargement Policy. The Republic of Kosovo has been excluded from this study due to missing data.

This paper begins with a definition and literature review of the concept of innovation potential and presents the results of previous research on innovation in Western Balkan countries. It goes on to apply selected data on innovation potential (namely: research and development spending, human resources, an environment friendly to innovation, and intellectual property rights) to present the performance of the WB countries and compares the results with the EU's average and/or other EU Balkan countries. This is due to the fact that some indicators are not presented in relative terms but in absolute numbers, e.g., patent applications or scientific and technical journal articles. One of the solutions may be dividing them by a common denominator such as population, or the total number of researchers, etc. However, in the case of patent applicants, data for the EU as a whole are not available (there is complete, comprehensive data for 2018 only, when all EU countries provided said data, enabling the total EU number of applicants to be calculated). Thus, comparing the results with other Balkan countries that are part of the EU seems to be justified. Also, other studies analysing innovation in the WB countries very often compare their results with their neighbouring EU countries. The data range is from 2010 to 2020, extracted from the World Bank database. Finally, this paper discusses the results, makes its conclusions, and presents ideas for future research.

The Concept of Innovation Potential

Innovation is crucial for countries to grow their economies, however, one should note that creating innovation is not a random process that can be based on luck. Indeed, it requires some specific settings, environment, resources, etc. Therefore, an important question is whether a given country or even countries – in this case, the Western Balkans – have these characteristics so as to be able to bring about innovation. This ability to create future innovation can be referred to as innovation potential.

Innovation potential is very often perceived as being all means and resources that can be used to create innovations. Such an understanding is often referred to in the literature as inputs to innovation (Hinloopen, 2003; Mairesse, Mohnen, 2010), innovation drivers (Crescenzi et al., 2014; Kourtit et al., 2011), engines (DeSai, 2013), and innovation ecosystem (Dedehayir et al., 2018; Gomes et al., 2018). However, the concept of innovation potential should not be limited only to the resources available for innovation. Innovation mechanisms also include potential development through innovation and investment (Bozic, Botric, 2017; Valitov, Khakimov, 2015). Therefore, innovation potential consists of resources, processes, and conditions that are sufficiently needed for the implementation of innovation activities and, as a result, technological development (Lomachynska, Podgorna, 2018; Nauwelaers, Reid, 1995). Innovation potential determines the innovativeness of the processes in a given territory. Innovation contributes to the competitiveness of economies at every level (national, regional, and local) and thus leads to modernisation, economic growth, and social development (Archibugi, Iammarino, 1999; Jusufi, 2023; Lin, 2011; Sahlberg, 2006). Innovation, of course, enables the solving of problems occurring on a global scale, such as climate change or social inequalities (Adams et al., 2016; Gupta et al., 2020; Mazzanti et al., 2020; Melville, 2010; Oh, 2020; Santos, 2012).

Although there are no studies on innovation potential in the Western Balkans, there are some on innovation. Cvetanovic and others (2014) conducted research on six WB countries (Albania, Bosnia and Herzegovina, Macedonia, Serbia, Croatia, and Montenegro) and six EU countries (Bulgaria, Greece, Hungary, Romania, and Slovenia) in 2012. Their results were based on the Global Innovation Index Report along with the Global Competitiveness Index Report, both of which indicated that the WB countries were lagging behind in terms of innovation with the selected group of EU countries that (besides Greece) joined the EU at the latest (Croatia joined the EU in 2013), either in 2004 or 2007. Despotovic and others (2014) conducted a similar study based on a similar group of

countries, and they arrived at the same conclusion. Sanfey and others (2016) analysed the Western Balkans as a whole and compared them with the EU-11 (the so-called “new” Member States), the EU, and EU-15 (the old Member States). Apart from the Global Innovation Index, they focused on selected measures of innovation such as spending on R&D, the percentage of firms engaging in product and process innovation, and focused on the percentage of firms engaging in organisational and marketing innovation. This study’s results clearly underline that spending on R&D in the WB countries was around 20% of the EU-11, and far less as compared to the EU average. Some other studies also indicated significant disparities between innovation levels in the WB countries and the EU (Cvetanović et al., 2021; Grieveson et al., 2018). Thus, this paper investigates whether the problem lies at the heart of innovation potential.

Innovation Potential in the Western Balkan Countries

The most commonly used indicator for measuring innovation potential is Research and Development (R&D) expenditures expressed as a percentage of GDP (Ambroziak, 2016; Cavdar, Aydin, 2015; Griffiths et al., 2009; Janger et al., 2017). Gross domestic expenditures on R&D consist of both capital and current spending in four main sectors: business enterprise, government, higher education, and private non-profit. R&D includes not only basic and applied research but also experimental development. There is a long way ahead for the WB countries that they might catch up with the EU’s level of R&D expenditures (Figure 1). The best-performing WB country was Serbia, which spent from almost 0.7% in 2010 to 0.91% in 2020 of its GDP on R&D activities. The highest value for this indicator for both North Macedonia and Montenegro was around 0.5% and 0.32% for BiH. The EU’s average level of spending for R&D was about 2% in 2010 and 2.32% in 2020. When comparing the WB countries with the selected EU neighbouring countries, one may note that only Slovenia remains relatively high in this indicator’s performance (ranging from 1.87% to 2.56%), oscillating close to the EU’s average. Greece has significantly progressed from 0.6% in 2010 to nearly 1.5% in 2020. Croatia has also enjoyed an upward trend; in 2020, its spending on R&D reached nearly 1.25% of its GDP. Bulgaria did not manage to achieve 1% in this indicator, and lagged behind not only aforementioned three EU members, but even Serbia in recent years. Nevertheless, the performance of the WB countries as a whole is not satisfactory, and they have created a challenge for themselves to increase their R&D expenditures in order to be able to catch up with at least their EU neighbours and even, eventually, with the EU’s average.

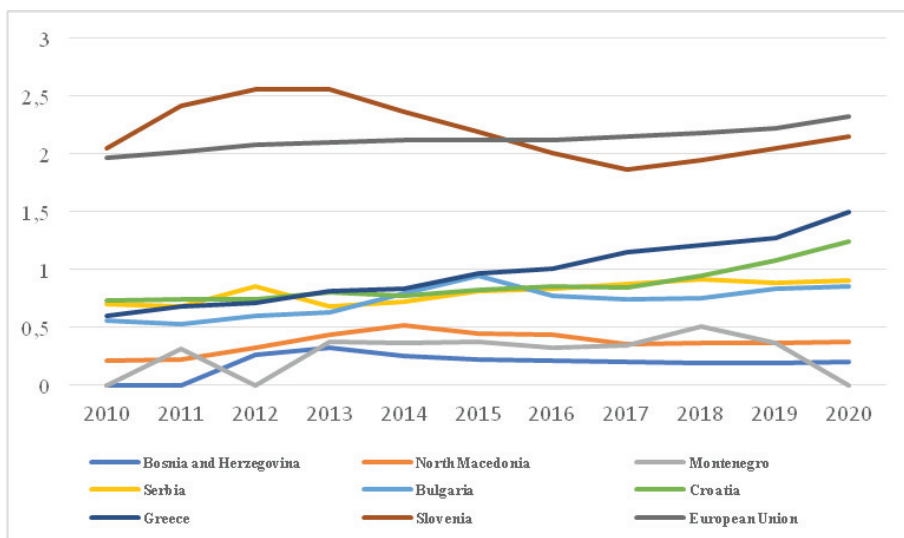


Figure 1. Gross Domestic Expenditures on Research and Development, Expressed as a Percent of GDP

Note: The only available data for Albania was 0.09 in 2007 and 0.15 in 2008.

Source: The author's own elaboration based on World Bank data.

While the WB countries should mobilise their resources to increase their gross domestic expenditures on R&D, they also need to focus on human resources, especially those employed in the R&D sector (Figure 2). The number of researchers engaged in R&D processes is a prevalent indicator of innovation potential applied in research papers (Boden, 2000; Buerger et al., 2012; Lee, 2015; Mueller, Peters, 2010). Out of all the WB countries, except for Albania (due to the aforementioned lack of data), the highest number of researchers engaged in R&D per million people was noted in Serbia in 2020 – with a value of 2167. The remaining WB countries were far below this number. Indeed, as regards BiH, their highest number was 485 in 2017, while North Macedonia had 858 in 2015, and Montenegro had 835 researchers engaged in R&D per million in 2015. The EU average was 4257 R&D researchers per million in 2020, indicating that Serbia – as a WB leader in this indicator – is a bit more than halfway to catching up with the EU-27. The leader of the EU Balkan countries is Slovenia, with results significantly exceeding the EU's average. Greece eventually reached 4000 researchers per million of the population in 2020, hence it is still ahead of the EU's average. Although Bulgaria started with fewer

researchers per million than Serbia, it managed to grow this number to more than 2400 in 2020. Croatia had more researchers per million than Serbia only in 2010, 2019, and 2020. Hence, human resources in R&D is undoubtedly a critical issue that has to be addressed by WB countries in order to enhance their innovation potential.

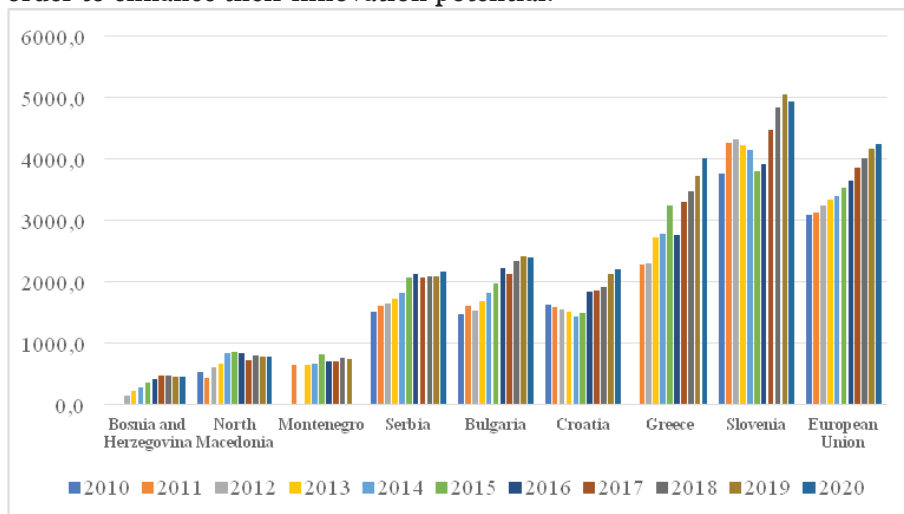


Figure 2. The Number of Researchers Engaged in Research and Development, Expressed per Million of the Population

Note: Data for Albania were missing; the only available data were in 2008, with a value of 156; there was also a lack of data for some years for BiH and Montenegro.

Source: The author's own elaboration based on World Bank data.

Innovation potential can also be described in terms of patent applications (Noh, Lee, 2020; Pavitt, 2005; Rogers, 1998; Whalen et al., 2020). A patent guarantees exclusive rights for an invention, a product or a process that offers a new, technical solution to a problem or provides a new way of doing something. Table 1 below presents the number of patent applications by residents in the WB countries and the EU Balkan economies. Since it shows the total number of applications, a comparison with the EU-27 would not allow for a comparison of their relative performances. Serbia leads this ranking with 290 patent applications in 2010 and 138 applications in 2020. Albania submitted not more than 20 applications per year, while BiH submitted 87, North Macedonia 50, and Montenegro 37. Compared with the EU Balkan countries, only Serbia is a competitive economy with regard to patent applications. Since Greece is a well-established EU country in terms of its length of EU membership and has enjoyed the benefits from the EU's policies for a long time, it

cannot be compared to the WB economies, whereas the remaining EU Balkan countries can be treated as relatively new EU Member States. Serbia had a similar performance to Croatia, and performed only slightly worse than Bulgaria over the period of 2010–2020.

Table 1. Number of Patent Applications by Residents

Country Name	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Western Balkan countries											
Albania	-	3	-	-	10	14	20	16	15	4	-
BiH	56	43	2	7	41	0	60	87	84	45	50
North Macedonia	27	37	50	42	-	-	-	-	-	-	47
Montenegro	23	20	37	23	13	23	10	-	3	16	5
Serbia	290	180	192	201	202	178	192	171	163	168	138
EU Balkan countries											
Bulgaria	243	262	245	282	218	280	230	202	180	186	239
Croatia	257	230	217	230	170	169	175	148	121	195	117
Greece	728	721	628	698	651	550	606	498	430	356	400
Slovenia	442	470	-	-	-	-	-	-	255	-	-

Note: - means that data were not available.

Source: The author's own elaboration based on World Bank data.

Another topical indicator of innovation potential is the number of scientific articles published in the fields of biology, biomedical research, chemistry, clinical medicine, earth and space sciences, engineering and technology, mathematics, and physics (Hicks et al., 2000; Morillo et al., 2003; Okubo, 1997; Taylor, 2004). Albanian scientists and engineers published only between 43 to 67 papers per million of the population, the lowest output of all the considered countries (Figure 3). At the same time, researchers from BiH and North Macedonia published, on average, 281 and 206 papers respectively in 2020. For BiH, the progress in this indicator was substantial as its scientists started from 130 papers in 2010 and went on to more than double this number by the end of 2020. Researchers from Montenegro enjoyed even more significant improvement since they started with, on average, 175 papers in 2010 per million, and in 2020, they reached almost 500 publications. Serbia is the leader of the WB countries in this respect, with, on average, 687 papers in 2020 per million, improving upon Bulgaria's result of 594 papers. Greece, Croatia, and Slovenia published more than 1000 papers per million in the whole period, and, in 2020, they reached 1172, 1186, and 1821 respectively. The EU's average was 1282 in 2020, far more than any countries of the Western Balkans. Although the WB countries noted some progress in the number of scientific papers, they still have a long way to catch up with the EU's average.

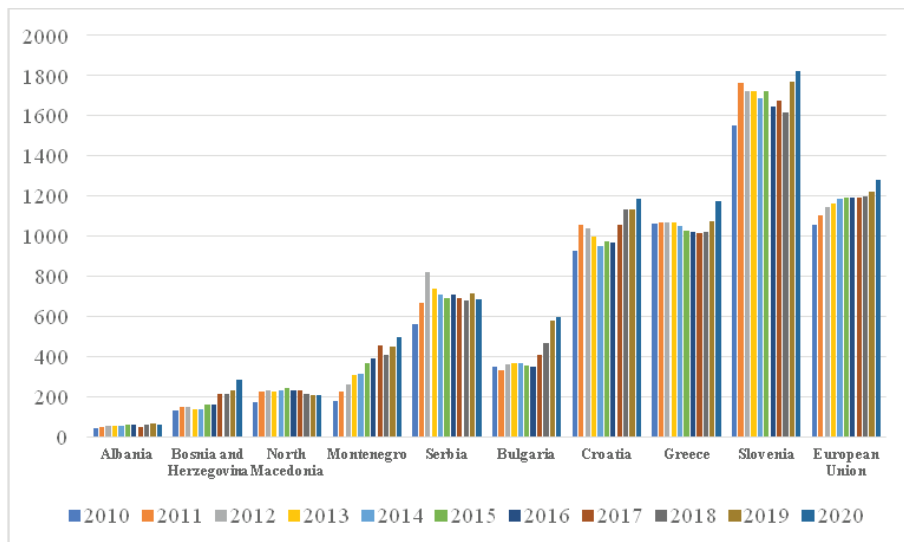


Figure 3. The Number of Scientific and Engineering Articles (Published in the Following Fields: Biology, Biomedical Research, Chemistry, Clinical Medicine, Earth and Space Sciences, Engineering and Technology, Mathematics, and Physics) per Million of the Population

Source: The author’s own elaboration based on World Bank data.

Table 2. The Number of Days Needed for Businesses to Secure Rights to Property

Country Name	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
European Union	39	33	29	27	27	26	25	25	26	27
Western Balkan countries										
BiH	32	32	24	24	24	24	24	35	35	35
North Macedonia	60	43	43	31	31	30	30	30	30	30
Montenegro	70	70	70	69	69	69	69	69	69	69
Serbia	89	34	34	34	52	52	34	34	34	33
EU Balkan countries										
Bulgaria	19	19	19	19	19	19	19	19	19	19
Croatia	103	73	73	73	73	63	48	48	48	33
Greece	26	26	26	26	26	26	26	26	26	26
Slovenia	113,5	110,5	95,5	80,5	65,5	50,5	50,5	50,5	50,5	50,5

Note: Data for Albania are not available.

Source: The author’s own elaboration based on World Bank data.

A country needs to have well-functioning institutions to create an innovation-friendly environment (Ali et al., 2020; Hekkert et al., 2007; Sondermann, 2018). One possible way to measure such metrics is to look at the time required to register property rights (table 2). In WB countries, the shortest time to register property rights was noted in BiH, where there were just 24 days needed to do so in the period of 2012–2016. In 2019, the leader in this indicator was North Macedonia, with 30 days required for property rights registration, while in Serbia it was 33 days, BiH – 35 days, and Montenegro – 69 days (no data available for Albania). The EU average was 27 days in 2019. This means that WB countries, except for Montenegro, are on the right track to catching up with the EU-27 due to the fact that the difference is not particularly stark. For other Balkan countries, the time for property-right registration differs, with 19 days needed in Bulgaria, 33 days in Croatia, 26 days in Greece, and more than 50 days in Slovenia in 2019.

Discussion and Conclusions

Western Balkan economies are still on their way to catching up with EU countries in economic development and innovation potential. Their performance in most innovation potential indicators confirmed there is a long way to go before they reach the average EU level in generating innovation. It is a matter of increasing financing and enhancing the innovation ecosystem through good institutions, well-educated and specialised human capital, good innovation policies, infrastructure, etc. Through its pre-accession funds, the EU supports innovation, but most of the money goes to EU Member States. Therefore, for WB countries, the ideal situation to foster innovation potential would be to join the EU. However, in the meantime, while being the candidate of potential candidate countries, they should work on their economic systems to be more efficient, productive, and more market-oriented to eventually stimulate innovation processes.

Although the performance of BiH, Montenegro, and North Macedonia (data for Albania were missing to a large extent) are somewhat similar and relatively far from the EU average, Serbia deserves special attention. It is a country that has treated its innovation policy with great importance and stands out from the remaining WB countries in terms of R&D expenditures, R&D personnel, patent applications, and published scientific papers.

It is vital to underline that a problem with the innovation of WB countries indicated in the literature review is undoubtedly related to their relatively poor innovation potential (except for Serbia). Developing their

innovation potential would then allow for a fostering of their innovation-based performance.

Further research on this topic could include spatial differentiation of regional innovation potential in order to see which are the top innovators and which are lagging. It would also be a good idea to compare their performance with EU Balkan regions in a dynamic view to see whether there are any catching-up processes occurring between them.

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