

Comparative Characteristics of the Degree of Digitalisation of Small and Medium-Sized Enterprises in the Balkans

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Abstract

The digitalisation process is no longer just an opportunity, but a necessary innovative condition for competitiveness and prosperity. For the Balkan countries, this process is difficult and slow due to objective factors, such as weaker economic development, limited funding, and insufficient number of specialists. This study aims to make a comparative characterisation of the degree of digitalisation in these countries based on the calculations of the Eurostat Digital Intensity Index and the indicators that make it up. The article also compares the absolute and relative changes of these indicators for individual countries using absolute growth and growth rate. The strength of the relationship between the degree of digitalisation and the GDP growth rate is measured by calculating a correlation coefficient.

Keywords: degree of digitalisation, small and medium enterprises, Balkans

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Introduction

Digitalisation of enterprises in the context of globalisation has been perceived as a necessity and a prerequisite for increasing their competitiveness and performance. It provides small enterprises with the opportunity to become multinational companies by expanding their operations and decreasing their costs (Brennen et al., 2014). This leads to a change in the international economy, the markets and consumers' and producers' behaviour. It has been reported within the European Union that small and medium-sized enterprises (SMEs) account for 99% of all enterprises and over the past 5 years they have created approximately 85% of new jobs. Perceiving SMEs as a driver of economic growth has been reflected in the development of a number of European initiatives and programmes supporting this business and a major part of them are related to the digitalisation process. Although these initiatives are intended for all EU countries, the results from them largely depend on the created institutional and organisational conditions for access to the funds in the individual countries and on the level of economic development achieved. Thus, there is no reason to expect that our country could be compared to highly developed economies and countries of larger scale. Considering the fact that our neighbours – Balkan countries are largely comparable to Bulgaria in terms of economic development, it is logical to compare the degree of digitalisation of SMEs with the situation in those countries.

This article covers SMEs from the following Balkan countries – Albania, Bosnia and Herzegovina, Bulgaria, Greece, Republic of North Macedonia, Romania, Slovenia, Serbia, Turkey, Croatia and Montenegro. Kosovo is not included due to the lack of data about the digitalisation process. The subject of the study is the degree of digitalisation of SMEs in the countries mentioned above, with the task to make a comparative analysis and find Bulgaria's place in terms of the development of this process.

1. Thesis statement and literature review

The main problem SMEs are faced with when conducting the process of digitalisation of their operations is the need of funding, however, the need of experts, institutional support and level of economic development achieved also need to be noted. The challenges mentioned are inherent for most SMEs irrespective of the country they are based in, however, the advantage of those of

them that operate in highly developed and stable economies needs to be taken into account. SMEs in Balkan countries are to a great extent deprived of this advantage. Hawach (Hawach et al., 2023) states that Balkan countries have lost the economic race with Western Europe, however, digital transformation provides them with the chance to compensate for the time lost. In his study, he defends the argument that innovations and digitalisation are the methods that the Balkan industry can use to grow and overcome the economic crisis from the past few years. Broz (Broz et al., 2022) also makes a suggestion about potential GDP growth as a result of the focus on the digitalisation process. The authors also report that Western Balkan countries lag behind the EU in their digital transformation, but point that economic cooperation dominated by foreign trade is one of the means for overcoming this. According to Mrdovic (Mrdovic et al., 2023), digitalisation in the Western Balkans is still a difficult and ongoing process, however, it is supported by the presence of multinational companies. It is mentioned that the difference in the level of availability of information technologies in rural and urban environments is a specific feature that makes digitalisation difficult. This problem is also characteristic in the Bulgarian context as a result of the impact of both economic and demographic factors. In a research on the fourth industrial revolution, Milosevic (Milosevic et al., 2022) used a survey in an attempt to identify the limitations and problems related to the development of the digitalisation process in Serbia, as well as the benefits thereof. The authors highlight that the competitiveness and productivity of SMEs is expected to increase as a result of digital transformation.

In summary, it can be claimed that Balkan countries are faced with similar problems in the implementation of the digitalisation process. This is largely predetermined by the common characteristics of their political and economic development. Despite facing the same difficulties and limitations, digital transformation in the different countries has reached a different level of development depending on the institutional support and organisation.

2. Methodology and experimental methods

Data from Eurostat about the studied Balkan countries have been used for this study. The data used are related to the digital intensity index, the value of which demonstrates the level of digitalisation. This is a composite indicator calculated based on 12 variables, with each of the variables having a score of 1 point, such as internet access, e-commerce, availability of a website, customer integration, integration of internal processes, use of cloud computer services, analysis of big data sets, 3D printing and robotisation and application of a security policy. Due to the different level of application of the different items, countries are also compared by each of the variables used for calculating the digital intensity index. The data are annual and the measuring unit for the different items is the relative share of enterprises. Comparability over time is limited because the composition of the index varies between the different years depending on the questions included in the survey. Comparability between countries is possible because the survey was conducted in all member states of the European Union, as well as some EU candidate countries. This causes certain difficulties because there are no data about countries outside the EU for some periods. Since the group of Balkan countries also includes non-members of the EU, a period with data available was selected for the comparison of the different items of the degree of digitalisation.

For measuring the absolute and relative changes that have occurred, absolute growth and rate of growth were used as indicators (Lambova et al., 2012). Since a number of studies have come to the conclusion that digital transformation depends on economic development and funding opportunities on the one hand and, on the other – these processes are expected to result in higher productivity and larger volume of production, then there is a clear relationship between the level of digitalisation and the gross domestic product (GDP) as a macroeconomic indicator expressing the volume of production and, therefore, economic development. To measure this relationship, Spearman's correlation coefficient was used (Lambova et al., 2012).

3. Results and discussion

The data that present the degree of digitalisation in part of the Balkan countries for 2021 and the rate of GDP growth as compared to the previous year are shown in Table 1. Albania and Turkey have been excluded from this group due to the lack of data about the digital intensity index.

Table 1. Degree of digitalisation and change in GDP

Number	Countries	Digital intensity index 2021	Rate of GDP growth as compared to the previous year	
			2021	2022
1	Bulgaria	0.5	1.15	1.21
2	Bosnia and Herzegovina	1.2	1.13	1.16
3	Greece	1.2	1.10	1.14
4	Republic of North Macedonia	0.3	1.09	1.09
5	Romania	0.4	1.09	1.18
6	Slovenia	3.2	1.11	1.09
7	Serbia	0.1	1.14	1.13
8	Montenegro	5.4	1.18	1.20
9	Croatia	2.8	1.16	1.16

The highest digital intensity of SMEs is in Montenegro and the lowest one is in Serbia. Bulgaria is ahead of Serbia, Republic of North Macedonia and Romania with respect to this indicator. According to the interpretation of the digital intensity index, a value between 0 and 3 shows a very low degree, a value between 4 and 6 – a low degree, between 7 and 9 – a high degree and between 10 and 12 points – a very high degree of digitalisation. Only Montenegro has demonstrated a low degree of digital intensity, while the others from the group of Balkan countries reported a very low degree. The countries with the highest degree of digitalisation also have the highest rate of GDP growth. To measure the strength of the link between the process of digitalisation and GDP, Spearman's correlation coefficient was used. If GDP is considered a factor related to the degree of digitalisation, it is logical to use the relative change of this indicator as compared to the previous year, i.e. as compared to 2020. The calculated value of the correlation coefficient was 0.5 and showed the presence of a moderate dependence between the change in GDP and the degree of digitalisation. If the digital intensity index influenced the change in GDP, then, it would be logical that the dependent variable in this case would be the rate of GDP growth in 2022 as compared to 2021. The value of the calculated correlation coefficient in this case was 0.225, which showed weak dependence of the change in GDP on the degree of digitalisation. This dependence could be more prominent, if we studied the impact of the degree of digitalisation on the rate of GDP growth several years later, i.e. with a higher lag, however, there are no such data available yet.

When comparing the different items that take part in the composition of the digital intensity index in this study, the approach applied was to group the indicators based on their interconnection. The next table shows internet access and use of cloud computer services and their absolute and relative changes in SMEs in Balkan countries.

Table 2. Internet access and cloud technologies

Number	Countries	Internet access (%)		Use of cloud technologies (%)	
		2017	2022	2017	2023
1	Bulgaria	94.6	96.1	6.7	14.7
2	Bosnia and Herzegovina	no data available	99.7	no data available	17.1
3	Greece	85.5	97.2	8.9	21.2
4	Republic of North Macedonia	no data available	96.2	6.4	12.2
5	Romania	85.0	98.9	9.5	16.3
6	Slovenia	98.9	98.2	18.5	35.0
7	Serbia	99.7	100.0	8.0	33.0
8	Turkey	95.5	96.0	9.1	13.7
9	Montenegro	97.5	100.0	11.6	29.4
10	Croatia	95.8	97.2	28.9	42.0
11	Albania	no data available	97.7	no data available	18.0

Almost 100% of SMEs in Balkan countries have internet access, while Serbia and Croatia reported in 2022 that all SMEs in those countries had internet access. What is more interesting is the use of cloud computer services, because Balkan countries, with the exception of Croatia, reported a relative share of below 20% and most of them even below 10% for this indicator in 2017. This was a relatively new and expensive service in 2017 and its development is still ongoing. In 2023, six years later, this relative share was over 30% only in Slovenia, Serbia and Croatia, where the relative share of SMEs that used cloud technologies was more than 40%. Serbia demonstrated the highest increase – by 25 percent, followed by Montenegro, Slovenia and Croatia with 17.8, 16.5 and 13.1 percent, respectively. In Bulgaria, this indicator marked an increase of 7 percent. The relative share of SMEs that use cloud technologies remains low in our country even in 2023, with only Republic of North Macedonia having a lower relative share.

The next two indicators that are interrelated are electronic commerce and customer and supply chain management integration. The more developed electronic commerce is, the more customer and supplier integration will develop. The data about these indicators are shown on table 3.

Table 3. E-commerce and customer integration

Number	Countries	E-commerce (%)		Customer integration (%)	
		2018	2023	2018	2023
1	Bulgaria	7.2	14.0	11.4	14.7
2	Bosnia and Herzegovina	21.2	21.3	19.4	16.0
3	Greece	10.6	19.3	7.7	19.4

Number	Countries	E-commerce (%)		Customer integration (%)	
		2018	2023	2018	2023
4	Republic of North Macedonia	no data available	7.5	no data available	no data available
5	Romania	8.1	11.6	18.4	34.1
6	Slovenia	21.9	21.2	59.5	58.9
7	Serbia	25.9	28.1	17.6	56.6
8	Turkey	9.0	17.3	19.2	91.6
9	Montenegro	8.5	no data available	no data available	54.6
10	Croatia	16.5	28.7	10.3	43.5
11	Albania	no data available	12.2	no data available	no data available

In 2018, the highest relative share of SMEs carrying out electronic commerce was observed in Serbia, followed by SMEs in Slovenia and Croatia, and this relative share was the lowest in Bulgaria. In 2023, Croatia already ranked first with an increase of 12.2 percent. Interestingly, Balkan countries can be divided into two groups based on their development. The first group includes Bosnia and Herzegovina, Romania, Slovenia and Serbia, where the relative share of SMEs carrying out electronic commerce remains the same or shows a minor increase. The second group includes Bulgaria, Greece, Turkey and Croatia, which are characterised by a double increase in the relative share of SMEs developing electronic commerce. Although Bulgaria was again among the last in terms of this indicator in 2023, and it was only ahead of the Republic of North Macedonia and Albania, the development of this indicator in our country is characterised by an absolute increase by 6.8 percent, which constitutes a 93% increase.

Regarding the customer integration indicator, it is logical to expect a larger relative share of SMEs in countries where electronic commerce is more developed. The data confirmed this assumption, with the exception of Turkey, where the relative share of SMEs exercising electronic commerce almost doubled, while the relative share of SMEs with customer integration increased by 72.4 percent, which constitutes a 377% increase. The developments in Croatia were similar, with an absolute growth of 33.2 percent and a relative change of 322% reported, as well as in Serbia, where the absolute growth was 39 percent and the relative growth was 222%. This shows that even if there is no development in e-commerce, enterprises can invest in customer and supplier relationship development and in the management of these processes by using information technologies. Again, the highest level of development in this indicator was demonstrated in Slovenia, Serbia, Montenegro and Croatia. Our country had a lower relative share of SMEs applying customer integration and a minor increase by 3.3 percent over the studied period.

When carrying out e-commerce and customer and supplier integration by using information technologies, maintaining a website by an SMEs would also be beneficial. The data about this indicator are shown on the next table.

Table 4. Relative share of SMEs maintaining a website over the period 2016-2023

Number	Countries	2016	2019	2023
1	Bulgaria	46.3	45.9	44.8

Number	Countries	2016	2019	2023
2	Bosnia and Herzegovina	no data available	57.1	59.5
3	Greece	62.9	56.1	58.1
4	Romania	38.4	43.8	46.7
5	Slovenia	79.8	81.1	74.2
6	Serbia	no data available	80.5	82.4
7	Turkey	62.4	47.3	51.5
8	Montenegro	67.0	79.0	84.8
9	Croatia	64.4	64.8	65.4
10	Albania	no data available	no data available	38.2

The data show that this indicator remains stable with minor changes during the studied period in Balkan countries – in most countries, the relative share of SMEs with a website was about and slightly over 50%. The highest relative share of SMEs with their own website was observed in Montenegro, Serbia and Slovenia. Bulgaria was only ahead of Albania in terms of this indicator. The data show that there is a decrease in the relative share of SMEs with a website in some countries. A possible reason for this is a change in the questions in the survey questionnaire used for this study.

The digitalisation process is also linked to integration of the internal processes and security measures in enterprises which requires the use of information technologies. To this end, Eurostat measures two indicators – relative share of enterprises with integration of the internal processes and relative share of enterprises with security measures. The data about these indicators in the studied countries are shown on the next table.

Table 5. SMEs with integration of the internal processes and security measures

Number	Countries	Integration of internal processes (%)		Security measures (%)	
		2019	2023	2019	2022
1	Bulgaria	19.2	17.4	2.1	3.0
2	Bosnia and Herzegovina	20.1	19.8	16.8	11.2
3	Greece	33.3	41.9	23.9	12.5
4	Republic of North Macedonia	no data available	12.7	no data available	14.8
5	Romania	20.8	19.6	4.5	5.8
6	Slovenia	26.0	29.7	4.0	6.4
7	Serbia	22.3	16.7	13.5	8.5
8	Turkey	16.3	25.3	no data available	5.8
9	Montenegro	no data available	41.7	14.7	17.1
10	Croatia	20.2	19.9	6.5	6.2
11	Albania	no data available	28.2	no data available	no data available

These indicators make it difficult to compare the data due to the different methodologies used over the studied periods, however, countries could be compared within a certain period. It is notable that no significant variation was observed with respect to the integration of internal processes. The highest relative share of SMEs was observed in Greece, Montenegro, Slovenia and Turkey. Regarding security measures, the variation in distribution was more prominent and the relative shares of SMEs in Balkan countries were smaller as compared to the ones for the former indicator. A possible reason for this could be that security technologies require experts with specific education that SMEs cannot afford. On the other hand, probably the experts themselves do not prefer to be engaged in or employed by SMEs because their services are demanded by many large and international companies. Regarding the second indicator, the highest values were observed in Montenegro, Greece and Republic of North Macedonia and while this was something we would expect for the first two countries, it was obviously surprising for the Republic of North Macedonia considering the values of the previous indicators in this country, which are characterised by greater accessibility and easier implementation of the activities. At the same time, countries with high values of the indicators measuring the degree of digitalisation lagged behind in terms of security – this was the case in Slovenia, Serbia and Turkey. A possible explanation for this is that the survey studied both security measures and incidents and consequences thereof.

The last pair of indicators discussed in this article are related to certain more modern and more complex activities relevant to digital transformation – big data analysis and 3D printing and robotics. The data about them are shown on table 6.

Table 6. Relative share of SMEs applying big data analysis and 3D printing and robotics in 2020

Number	Countries	Big data analysis (%)	3D printing and robotics (%)
1	Bulgaria	5.0	4.2
2	Bosnia and Herzegovina	3.6	2.2
3	Greece	no data available	no data available
4	Republic of North Macedonia	11.6	7.7
5	Romania	4.4	2.9
6	Slovenia	4.6	5.0
7	Serbia	1.1	1.5
8	Turkey	8.1	3.9
9	Montenegro	15.1	1.0
10	Croatia	11.9	5.7
11	Albania	no data available	no data available

The data lead to the conclusion that the activities mentioned are not characteristic for SMEs in Balkan countries. The countries with a leading role in big data analysis are Montenegro, Croatia and Republic of North Macedonia. Bulgaria is ahead in terms of this indicator of countries like Slovenia and Serbia, which demonstrate otherwise higher degree of digitalisation. Regarding the activities related to the application of 3D printing and robotics, the highest relative share of SMEs was observed in the Republic of North Macedonia, Croatia and Slovenia, while Bulgaria was ahead of Montenegro and Turkey. The two indicators studied cover activities linked to the future of the

processes of digital transformation. They are distinguished by higher complexity in implementation and are related to a need of more funding. In contrast to the situation with the indicators discussed earlier, Bulgaria is among the more developed countries with respect to the last two indicators. The reason for the relatively low share of SMEs applying these two activities in our country, in addition to the ones mentioned above, is the lack of a sufficient number of experts to serve these processes – it was only in recent years that training in these fields has become more intensive in universities.

Conclusion

The digitalisation process is difficult for Balkan countries in general, however, based on the indicators analysed, it can be concluded that countries from the Western Balkans are doing better in the field of digital transformation. Bulgaria may not be last, but is nevertheless at the end of this ranking. However, a positive fact in this respect is the more advanced position of our country in certain activities distinguished by greater complexity. The opinion that economic development expressed by the rate of GDP growth has impact on digital transformation has been justified. The analysis did not find any significant impact of the degree of digitalisation during the current period on GDP growth during the next period. In conclusion, it can be stated that Balkan countries have realised the need of digital transformation as a prerequisite for more rapid development, competitiveness and prosperity and have laid the foundations for this process.

References

1. Brennen, S., Kreiss, D. (2014). *Digitalisation and digitisation*. [Online] Available from: <https://www.culturedigitally.org/2014/09/digitalization-and-digitization> [Accessed 19/10/2023].
2. Broz, T., Butarac, G., & Parezanin, M. (2022). *Digital transformation and economic cooperation: The case of Western Balkan countries*. [Online] Available from: https://www.researchgate.net/publication/358125101_Digital_transformation_and_economic_cooperation_the_case_of_Western_Balkan_countries [Accessed 17/10/2023].
3. Hawach, F., Zhang, C., Acharjee, S., & Nicolas-Sans, R. (2023). *Internet capabilities and innovation in the Balkan countries: The role of foreign technology licensing*. [Online] Available from: <https://www.onlinelibrary.com/doi/10.1002/isd2.12242> [Accessed 02/11/2023].
4. Milosevic, I., Arsic, S., Glogovac, M., Rakic, A., & Ruso, J. (2022). *Industry 4.0: Limitation or benefit for success*. [Online] Available from: <https://www.aseestant.ceon.rs/index.php/sjm/article/view/36413> [Accessed 21/10/2023].
5. Mrdovic, P. (2023). *The role of digitalization in transforming Western Balkan societies*. [Online] Available from: <https://www.oegfe.at/policy-briefs/the-role-of-digitalisation-in-transforming-western-balkan-societies> [Accessed 25/10/2023].
6. Ndou, V., Husa, E., Ratten, V., & Ndrecaj, D. (2023). *Digital transformation experiences in the Balkan countries*. [Online] Available from: https://www.researchgate.net/publication/367052395_Digital_transformation_experiences_in_the_Balkan_countries [Accessed 01/11/2023].
7. Zuzaku, A., & Abazi, B. (2022). *Digital transformation in the Western Balkans as an Opportunity for Managing Innovation in Small and Medium Businesses-Challenges and Opportunities*. [Online] Available from: <https://www.sciencedirect.com/science/article/pii/S2405896322030518> [Accessed 10/10/2023].
8. Lambova, M., Koseva, D., Rusev, C., & Stoyanova, V. (2012). *Vavedenie v statisticata*. Varna: Steno.
9. Eurostat. (2023a). [Online] Available from: https://www.eurostat.databrowser/view/isoc_e_dii/default/table?lang=en [Accessed 10/10/2023].
10. Eurostat. (2023b). Available from: https://www.ec.europa.eu/eurostat/databrowser/view/nama_10_gdp/default/table?lang=en [Accessed 10/10/2023].