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DIGITIZATION DEVELOPMENT ANALYSIS WITHIN THE SMART ECONOMY AND SOCIETY IN THE VISEGRAD 4 GROUP COUNTRIES

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Abstract
This research paper is devoted to analysis the circumstances of how the digitization process in economy and society will affect sustainable economic and social development in V4 countries to enhance their competitiveness in EU economy. The main objective of the research is to estimate the impact of digitization processes in the smart economy and society on sustainable economic and social development in V4 countries. The estimation is based on the World Bank, IMD, DESI, EIS data assessment approach. The main method used is the correlation a regress analysis conducted within the framework of the VEGA project output, from which data related to assessment were analyzed along with graphical explanation. The results have indicated that to fully benefit from digitization processes, V4 countries must strategically invest in digital tools, develop digital skills within their workforce. The ability to adapt to and leverage digital technologies will be a key determinant of success in the increasing digital business landscape to enhance their competitive advantage within the sustainable economic and social development in the EU.
KEYWORDS: digitization process, smart business, small and medium enterprises, international business, development sustainability, smart economy and society.
JEL: F66, F22, J62

Introduction

The objective of the study is to specify and analyze the factors that influence the quality of the business environment, digitization, and innovation within the V4 countries. The results of this analysis should then be compared between the V4 countries. The identification of these factors will be based on recognized indices developed by the World Bank (Doing Business), the International Institute for Management Development (IMD), and the European Commission (DESI, EIS). In the context of the findings, an effort will be made to demonstrate, through the application of correlation analysis, the extent to which the quality of the business environment exerts an influence on the growth of the number and value added of SMEs. Additionally, the role of innovation and digitization in promoting the growth of the number and value added of SMEs in high-tech sectors will be investigated. The research paper deals with the new phenomenon, namely the fact that the digitization process has a significant impact on the competitiveness of economies in V4 countries. This paper presents a framework for a new and so far, unexplored issue, where the novelty is how the implemented digitization process would affect the competitiveness of SMEs in V4 countries to enhance their sustainable economic and social development in the EU. This paper aims at filling this gap in literature by assessing the impact of digitization along with smart business entrepreneurship on competitiveness of SMEs in terms of the possibility to enhance their business being a significant pilar of national economies in V4 countries. The uniqueness of the paper lies in the exploration of the competitive advantage of V4 countries within their differentiation and faster adaptation to the EU economy. SMEs in V4 countries that leverage digital technologies can differentiate themselves from competitors by offering unique digital experiences, efficient services, or innovative products. Digitized economy and society are more agile and can quickly adapt to new technologies, regulations, or market shifts, maintaining their competitive edge to enhance their sustainable economic and social development within the EU. This paper is organized as follows. After the Introduction section in Section 2, essential theoretical background is proposed according to the description of the small and medium enterprises in their role in national and global economy along with the mutual parallels and synergies within the competitiveness issue found in the literature; in Section 3, the research methodology is described more in depth. In Section 4, the review results of empirical analysis have been proposed and in Section 5, discussions related to the contributions, advantages and recommendations of proposed findings are presented and significant insights are brought to light such as assessing the data analyzed by V4 countries and determining the impact on their economies. Finally, Conclusions at the end of the paper summer up the relevance of this study, along with the research limitations and future research directions.

Literature review

The notion of competitiveness finds its roots in classical economic theory and underwent significant development at the end of the 20th century, following the dissemination of the works of M. Porter. He was the first to identify the sources of sustainable prosperity in the modern global economy (Ahmedová 2015; Marchevská, Kravčáková-Vozárová 2019). Nevertheless, several authors (Stawasz 2019; Kaczmarek 2022) concur that the concept of competitiveness is not definitively defined. Due to the qualitative and quantitative nature of its factors, precise limits in the level of analysis and various measurement methodologies are lacking. Due to the

extensive scope of its significance, which encompasses the corporate, sectoral, national, and supranational levels, a consensus for its conceptual definition remains elusive. The concept of competitiveness can be examined across various geographical scales, including the European Union, individual countries, regions, and smaller geographical areas. Additionally, competitiveness can be studied within specific sectors, economic activities, and enterprise groups (Garcia-Martinez, et al. 2023).

According to Veber et al (2016), competitiveness is defined as "a set of institutions, policies, and factors that determine the level of productivity of a country." An increase in productivity has been shown to lead to an increase in a nation's income, thereby achieving greater prosperity for its citizens and enhancing their quality of life. As Kadárová and Janeková (2019) contend, the concept of competitiveness must first be understood at the macroeconomic level, where it is defined as the performance of a given economy in relation to another economy. Conversely, from a microeconomic perspective, it is defined as the level of education, productivity, utilization of natural resources, or advantageous government policy. Moreover, the concept of competitiveness encompasses elements such as competitive advantage, price competition, strategic management, and other historical and socio-cultural factors (Florek-Paszkowska 2021). The fundamental attribute of competitiveness is the comparative advantage of a given entity over another. A significant undertaking for small and medium-sized enterprises is the identification of a sustainable competitive advantage. This principle should serve as the foundational basis for the development of any business enterprise (Sariyev 2021).

The activities of enterprises are influenced by a multitude of factors, including economic, political, institutional, legal, technological, and cultural elements. These factors exert a significant influence on the environment in which enterprises operate. This concept is referred to as the business environment, which is considered a quantitative factor that exerts a fundamental influence on entrepreneurial activity within individual countries, as well as its outputs, results, and subsequent impacts (Pilková, et al. 2019). The business environment is defined as the external environment of an enterprise, comprising all phenomena, processes, and institutions that influence its exchange relations and developmental conditions. It signifies all phenomena that possess a spatiotemporal dimension, that are capable of exerting influence upon it, or that the enterprise has or will exert influence upon in the future (Rózsa, et al. 2023). In essence, the business environment encompasses all elements that are associated with the enterprise (Čabinová, et al. 2020). A salient feature of the environment is its variability, as well as the threats and opportunities that arise from the enterprise's operations. The business environment is a broad concept, and a considerable number of institutions and actors at the national and transnational levels participate in its formation. Specifically, the company exerts its influence on the specific environment formed by suppliers, customers, and competitors, as well as the general environment, which is represented primarily by the state. The contemporary corporation exerts a substantial influence on the global environment, a phenomenon that can be attributed, in part, to the processes of globalization. The business environment is influenced indirectly by social factors, which are considered relatively marginal. These values, opinions, and lifestyles are shaped by the environment, and the development of population, cultural, ecological, demographic, religious, and ethnic conditions is a contributing factor (Ključnikov 2016).

The quality of the business environment is frequently regarded as a pivotal element in the long-term economic competitiveness of small and medium-sized enterprises. A quality business environment is defined as a state that fosters entrepreneurship through the provision of adequate resources and the establishment of conditions conducive to long-term, sustainable economic growth. Additionally, it is characterized by a straightforward and accessible administrative framework, ensuring the effective operation of both the state and public administration (Mishchuk, et al. 2023). A quality business environment exerts its influence at two fundamental levels. The initial component of the legislative framework encompasses the establishment of overarching regulations, encompassing aspects such as the imposition of taxes and contributions, the extent of labor market regulation, prerequisites for the initiation of commercial activities, accounting regulations, and a plethora of other regulatory and administrative obligations pertinent to entrepreneurial endeavors. The second fundamental level, which gives shape to the business environment, comprises specific social and economic conditions in particular regions. These conditions include the development of transport infrastructure, the composition of local industry, and the availability of labor (SBA 2023). The seamless operation of the business environment is imperative for the optimal development and competitiveness of the business sector and nations. The process of globalization exerts significant pressure on national economies, compelling them to enhance their competitiveness at both the corporate and macroeconomic levels. This enhancement is a critical factor in fostering effective and competitive entrepreneurship (Galgánková 2020; Mura, et al. 2022).

The European Union acknowledges the necessity to provide support to small and medium-sized enterprises (SMEs), as they constitute the predominant and most significant European employers. Their prosperity is of considerable importance for the future of the European economy (Srpová 2020). At the EU level, the European Commission plays the most important role. It supports entrepreneurship and growth by reducing the administrative burden on small businesses and facilitating access to financing for small and medium-sized enterprises. The European Structural and Investment Funds (ESIF) finance operational programs in individual EU member states, and measures to support SMEs are also implemented within them. The Partnership Agreement on the use of the European Structural and Investment Funds in 2014-2020 between the Slovak Republic and the EC was concluded on June 20, 2014 (SBA 2023). The European Investment Bank (EIB), which prioritizes support in four key areas—innovation, small businesses, climate, and infrastructure—is also a prominent institution. During the period 2014-2020, 15,215 projects in Slovakia were supported through these funds, with a total of €8,740

million being drawn (ITMS2014+ 2022). The European Investment Bank also incorporates the European Investment Fund (EIF). The primary objective of the program is to provide financial support to micro, small, and medium-sized enterprises (MSMEs) in Europe by facilitating their access to financing (SBA 2023).

A comprehensive understanding of the external environment is a fundamental prerequisite for the formulation of a successful strategy in the face of evolving business conditions. A variety of indices are employed to assess the quality of the business environment at the international or global level, with different constructions and data sources (Belas, et al. 2023). The assessment of the business environment is conducted by agencies that utilize generally valid evaluation indicators. These criteria are subject to constant updating, expansion, and inclusion of current trends (Vyhnička, Žárska 2021). The factors to be considered include business conditions, government measures such as tax and levy policy, social policy, policy in the field of subsidies and grants, and the field of financing companies and capital (PAS 2021).

At present, several international organizations and institutions are engaged in the measurement and evaluation of economic entities on a global scale. These entities include national economies and the performance of business enterprises. Additionally, these entities assess the quality and competitiveness of the business environment. The most prominent compilers include the World Economic Forum, which annually compiles the Global Competitiveness Index (GCI). The Global Competitiveness Index is determined by evaluating 12 pillars: the quality of public institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, product market efficiency, labor market efficiency, financial market maturity, technological readiness, market size, business process maturity, and innovation (Herčko, et al. 2017; Svazas, et al. 2024).

Another major compiler is the World Competitiveness Center (IMD), which publishes a comprehensive annual yearbook, the World Competitiveness Rankings (WCY). The index is based on 333 competitiveness criteria selected based on comprehensive research, consisting of two-thirds statistical data and one-third survey data, and assesses 63 countries around the world (IMD 2022a). The ranking employs a multifaceted evaluation framework that encompasses economic performance, government effectiveness, business efficiency, and infrastructure (see Table 1). The company is also responsible for the publication of the World Digital Competitiveness Ranking, which has been conducted for the sixth consecutive year. This index serves to assess the capacity and readiness of individual world economies to adopt and explore digital technologies as a catalyst for economic transformation in the business sector. In 2021, a total of 54 criteria were employed, encompassing a combination of external hard data and the IMD Executive Opinion Survey. These criteria were subsequently grouped into three overarching categories: future-ready, knowledge, and technology. It is noteworthy that 63 countries worldwide are engaged in this assessment (IMD 2022b).

Table 1. WCY Competitiveness Criteria

Economic performance	Government effectiveness	Business efficiency	Infrastructure
• domestic trade • international trade • international investment • employment • prices	• public finance • tax policy • institutional framework • business legislation • social framework	• productivity and efficiency • labor market • finance • management practices • attitudes and values	• basic infrastructure • technological infrastructure • scientific infrastructure • health and environment • education

Source: own processing according to IMD, 2023

The World Bank's Doing Business survey is a comprehensive study that assesses regulations pertaining to the business environment in 190 global economies. The assessment was based on indicators during various stages of the life cycle of small and medium-sized enterprises, from company formation to obtaining a building permit, bank loans, to enforcing contracts and closing the business (Figure 1). The primary objective of the project was to establish an objective foundation for comprehending and enhancing the legal environment for business. Presently, the publication of this report is suspended. This is due to inconsistencies in the preparation. The report will be replaced by a new project, Business Enabling Environment - BEE (The World Bank 2022).

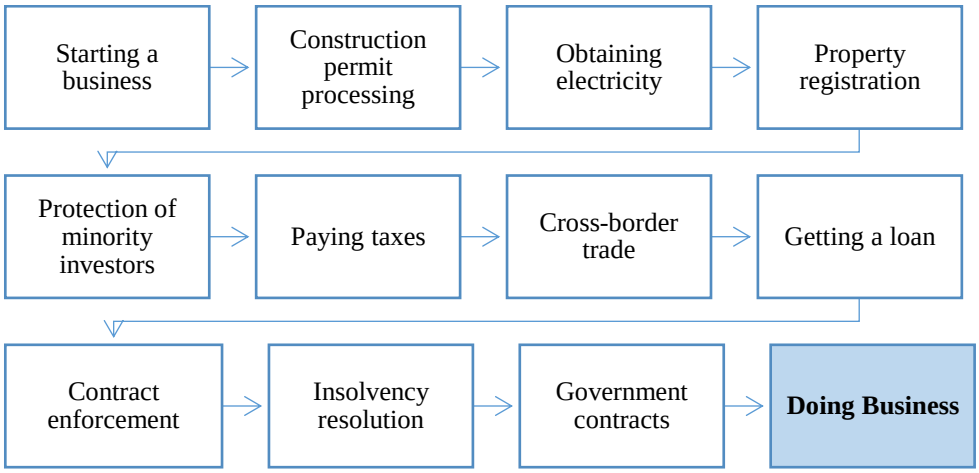

Fig. 1. Doing Business indicators
Source: Own processing based on The World Bank, 2022

In the contemporary business landscape, it has become imperative to assess innovation performance and the extent of digitalization, as these factors significantly influence a nation's or small and medium-sized enterprises' competitiveness. The European Commission employs the European Innovation Scoreboard (EIS) to evaluate the level of innovation on a regular annual basis. The evaluation of countries is conducted using a multifaceted approach, encompassing twelve primary categories of indicators. For instance, assessment encompasses a range of factors, including human resources, digital transformation, the innovative capacity of small and medium-sized enterprises (SMEs), and the support for scientific research and innovation. The objective of this study is to make a comparative analysis of the research and innovation performance of EU countries and a selection of third countries. The EIS contains an assessment of the strengths and weaknesses of national innovation systems and helps countries identify areas for improvement (SBA 2023). The European Commission also oversees the digital progress of EU countries in the Digital Economy and Society Index (DESI) reports. This index facilitates an evaluation of the aggregate degree of digitalization in individual EU countries and identifies problematic areas to which states should direct greater attention. Additionally, it facilitates a comparative analysis of EU member states. The assessment employs a composite indicator system, categorized into the following primary domains of measurement: human capital, connectivity, integration of digital technologies, and digital public services (MIRRI 2022).

Methodology

The goal of this paper is to identify the impact of digitization processes in the smart economy and society on sustainable economic and social development in V4 countries. The basic research method was the correlation a regress analysis conducted within the framework of the VEGA project output, from which data related to assessment were analyzed.

The paper used several combinations of research methods to achieve the stated primary objective. First, we searched for the necessary information and data related to the issues of SMEs and their competitiveness based on the literature review. Next, we elaborated the issues related to SMEs by abstracting and collecting secondary data and information. Then, by synthesizing the collected data, we described the relevant facts of this area. We applied mathematical methods in the calculations of the data obtained from Eurostat, which we then used in the time series analysis in the development of individual indicators of SMEs. We compared the obtained values of the SME indicators among the countries of the Visegrad Group. We also used analysis, synthesis and deduction in the assessment of the business environment, innovation and digitalization based on selected indices and rankings of renovated institutions and organizations. The data based on which we developed the analysis of SME development were obtained from the European statistical portal Eurostat. The advantage of using Eurostat data is that the statistics are harmonized and therefore more comparable between countries. We used the method of correlation and regression analysis to show the degree of dependence of individual EIS sub-indices on the overall EIS ranking and the dependence of the digitization of public services index on the overall DB ranking. Correlation is a measure of the relationship between two or more quantitative variables. The correlation coefficient is used to express the strength of the correlation, which can take values between -1 and 1. The closer the value is to 1, the stronger the linear dependence. Conversely, the closer it is to 0, the weaker the correlation. If the correlation coefficient is positive, there is a direct proportionality between the variables; if the correlation coefficient is negative, there is an indirect proportionality. If it is equal to zero, both variables are statistically independent (Grinčová, Petrillová 2019). The expression of correlation dependence is a correlation graph. Correlation was performed in MS Excel through data analysis. The calculation of the correlation coefficient is as follows:

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}} \quad (1)$$

Results

Digitization is also linked to the development of innovation. A number of indices are used to monitor countries' progress in the use of digital technologies. One of these is the European Commission's Digital Economy and Society Index (DESI). Unlike the EIS assessment of digitization, which only looks at broadband coverage and individuals with high digital skills, the DESI tracks the state of digital technologies in EU countries more comprehensively using a number of indicators - human capital, connectivity, integration of digital technologies and the state of digitization of national public services. According to the DESI 2023 assessment, Poland has the lowest level of digitalization, ranking 24th out of 27 EU countries. Slovakia is one place ahead, while Hungary ranks 22nd. The Czech Republic is the best performing of the V4 countries, ranking 19th, but still below the EU average. Over the last few years, the countries have kept this position more or less the same, with no significant deterioration, but on the contrary, no improvement for any of the V4 countries. We can therefore say that the V4 countries are stagnating in the field of digitization. Figure 2 shows the positions of the countries in the individual indicators of the 2023 assessment in relation to the EU average results, as well as the weight of each assessed indicator for the final ranking. Based on the graph, we can conclude that the digitization of the public sector and its services has the highest weight on the overall digitization status, followed by connectivity and human capital. The lowest weight on the overall ranking is currently identified in the integration of digital technologies directly related to SMEs.

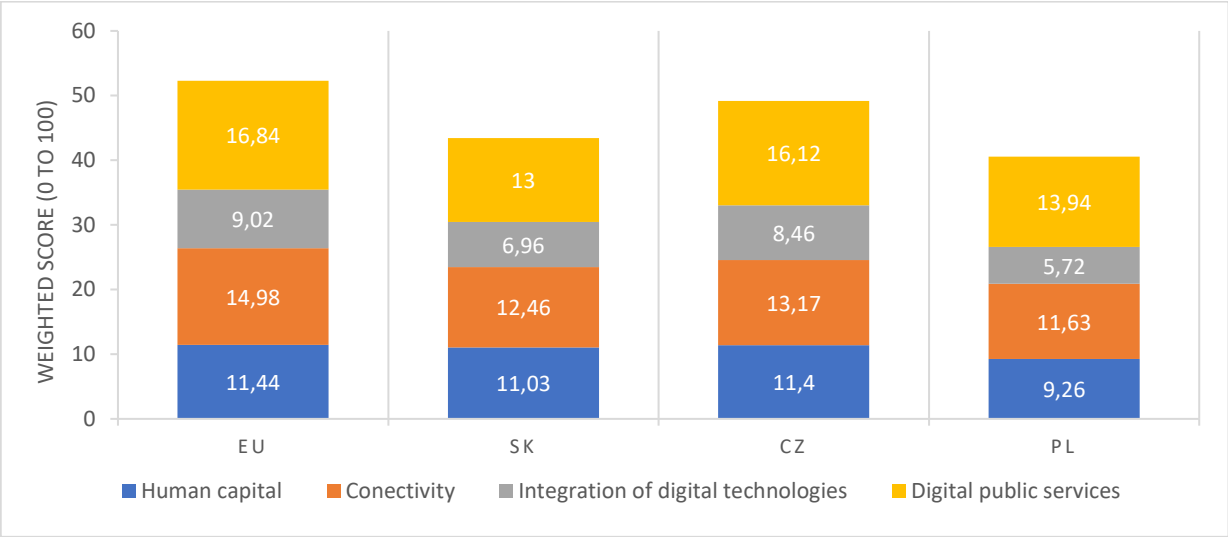

Fig. 2. Ranking of V4 countries according to the DESI Index in 2023
Source: Own processing based on DESI data, 2024

Based on the analysis, we can conclude that Slovakia and the Czech Republic are just below the EU average in human capital indicators, while Hungary and Poland are slightly worse off. For example, this indicator assesses basic digital skills, which 55% of Slovaks have in Slovakia, slightly above the EU average of 54%. For the advanced digital skills indicator, the percentage is significantly lower at 21%, compared to the EU average of 26%. According to the European Commission, this is due to the lack of a systematic approach to the implementation of adult digital literacy training. The Czech Republic is more successful in this indicator, with 60% of Czechs having at least basic digital skills and 24% having advanced digital skills. In Hungary, 49% of 16–74-year-olds have at least basic digital skills, compared to only 43% in Poland. In terms of connectivity, i.e. the availability, quality and coverage of the Internet network, all the countries surveyed are below the EU average. The best performer among the V4 countries on this indicator is Hungary, which ranks 13th overall; Poland also lags behind the other V4 countries on this indicator, making it one of the three worst performing EU countries on this indicator. It should be noted, however, that all V4 countries are showing significant growth in Internet connectivity, coverage and speed. The challenge for the countries remains the development of 5G networks, which will enable the use of the Internet of Things or autonomous vehicles, for example, and thus have a major impact on the future of the countries. From an SME perspective, an important category is Digital Technology Integration, which assesses SMEs based on their level of digitalization. Specifically, it focuses on indicators such as the basic level of digital intensity, electronic dissemination of information, big data, artificial intelligence, internet sales and turnover, cross-border internet turnover or the use of e-invoicing. Selected indicators for each V4 country are shown in Table 2.

Table 2. Indicators of the category Integration of digital technologies in the V4 countries in 2023

	SK	CR	PL	HU	EU
Basic digital intensity level	43%	53%	40%	34%	55%
Electronic Invoice	16%	12%	13%	13%	32%
Online sales	13%	23%	14%	18%	18%
Internet turnover	8%	17%	n/a	11%	12%
Internet cross-border sales	7%	11%	5%	5%	9%

Source: Own processing based on DESI data, 2024

Looking at the overall category assessed, all V4 countries are below the EU average. The same is true when looking at the individual categories of the assessed indicator. SMEs do not make sufficient use of digitization to increase their competitiveness. Hungary ranks 25th in the EU in terms of the integration of digital technologies in the activities of enterprises. Despite an increase in several indicators in this area, most Hungarian enterprises still fail to make use of digital technologies. Only one third of SMEs have at least a basic level of digital intensity, and only 13% of companies use e-invoicing. More businesses are engaging in online trade, with internet sales up 5% and internet turnover up 2% compared to 2021. Cross-border online trade has been stagnant for several years, with Hungarian SMEs accounting for 5% of foreign online trade.

Poland ranks 24th in this indicator, reflecting the fact that only 40% of Polish SMEs have at least basic digital intensity, which is below the EU level. SMEs are more involved in e-commerce than in the previous period, with 14% of Polish SMEs using online sales and 13% using e-invoicing. Foreign online trading is below the EU average, with 5% of SMEs using this sales tool. Slovakia ranks 21st, with 43% of SMEs having at least a basic level of digital intensity, below the EU average of 55%. Only 16% of SMEs use e-invoicing, half the EU average. The e-commerce score is 13% and the share of online sales is also below the EU average at 8%. Slovak SMEs make only 7% of their cross-border sales online, compared to 9% in the EU. Negatively for the country, the individual indicators show a decline compared to last year. The Czech Republic ranks 19th among the 27 EU Member States in terms of digital technology integration, which is the best ranking among the V4 countries but still four places worse than in the previous period. More than half of SMEs have at least a basic level of digitization, which is just below the EU average. E-commerce indicators are higher than the EU average, with 23% of Czech SMEs selling online and accounting for 17% of turnover. Online foreign trade is also higher than the EU average at 11%.

The digitization of public administration is generally very important for all countries, as it has a major impact on the business environment, cutting red tape and speeding up processes. Governments should also support the digitization of SMEs by setting the right example and digitizing their operations and services, especially when dealing with small businesses. Recognizing this, digitization of the public sector is becoming a priority for V4 governments, but the countries rank below the EU average. It assesses the level of use of digital public services for citizens and businesses, open data, pre-populated forms or the percentage of e-government users. The Czech Republic is the best-performing country, at 17th place, while Slovakia is the worst-performing country, at 24th out of 27 EU countries and below average in all the indicators monitored. This is even though the country has, for example, significantly increased online filing of tax returns, eased the process of starting a business, and legislated for e-invoicing. Hungary has managed to significantly improve the digitization of its public administration, moving up to 4 places, while Poland underperforms in the availability of digital online services for citizens and businesses, ranking 22nd. E-government can have important demonstration effects for the economy, providing platforms, technologies and standards that facilitate transactions and create opportunities for SMEs.

Since we defined the need for digitization of public administration as a factor for improving the business environment in the results of the Doing Business ranking analysis, we investigated whether there is a dependency between these two variables. We examined this based on correlation and regression analysis. The coefficient value of the correlation analysis R= 0.54 shows a medium linear dependence between the variables of the overall DB ranking and the digitization of the public sector, as it is in the range of 0.3-0.8. The coefficient tells us that 54% of the data in the dataset behave in the same way as the overall Doing Business ranking. In Figure 3, it can be seen a positive linear dependence between the variables under study. The p-value = 0.013 is lower than the set significance level $\alpha = 0.05$ and therefore we can confirm hypothesis H1 that the correlation coefficient between the overall Doing Business score and the digitization of public services is statistically significant at the significance level $\alpha = 0.05$.

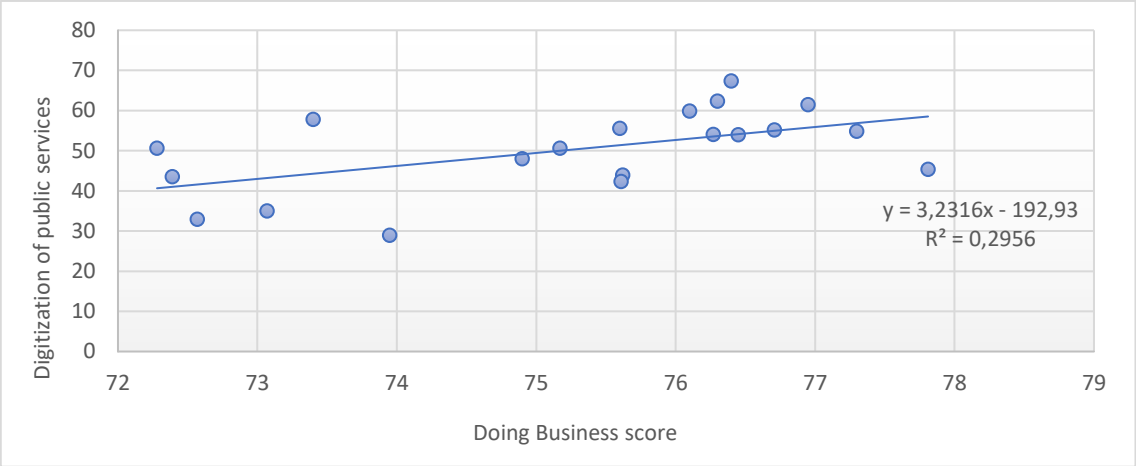

Fig. 3. Correlation between the overall Doing Business score and the digitization of public services
Source: Own processing

Countries with higher levels of digital transformation tend to be more competitive. The importance of digital transformation for countries to be more competitive is also highlighted by the IMD. In its assessment, it considers knowledge, technology and the future readiness of countries as the main factors affecting digital competitiveness. Based on these assessments, the ranking of the V4 countries is shown in Figure 4.

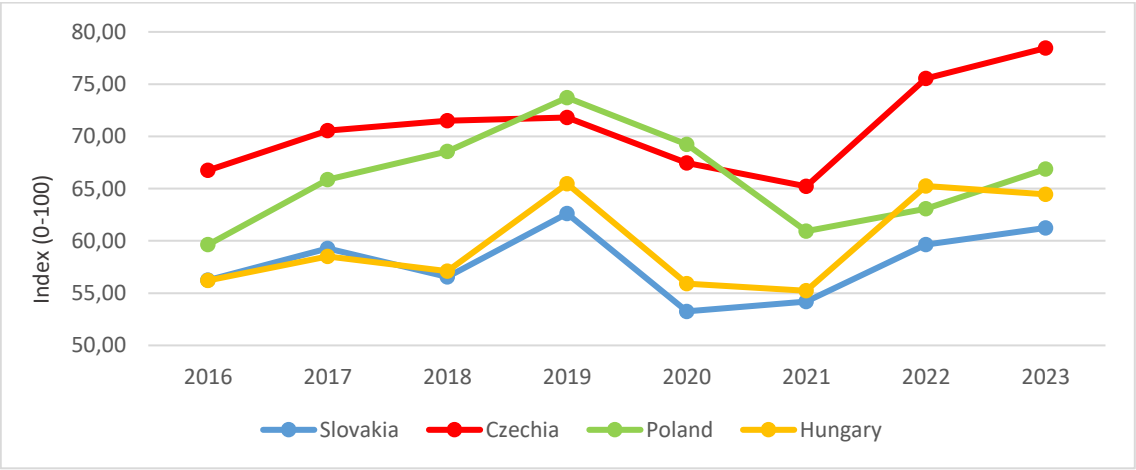

Fig. 4. Ranking of V4 countries in the WCY Digital ranking in 2016-2023
Source: Own processing based on data by IMD

Slovakia is the worst performer in this ranking at 47th place. The country's main problem is the indicators in the field of technology, such as starting a business, laws and legislation in the field of scientific research, capital and technical framework, such as Internet connection or export of the high-tech sector. In the IMD ranking, Poland is better placed than Slovakia (46th place). However, Poland is a country where conditions are gradually deteriorating. In 2019, it was the best-ranked V4 country in terms of digital competitiveness, but a significant decline was recorded in 2020 and 2021. A gradual deterioration was observed in all categories. Digital skills are underutilized in the country, and digital education of the workforce, public-private partnerships, or the development of technical applications are also lacking. Another country in the ranking is Hungary, which had similar results to Slovakia, but improved slightly in 2019 and even overtook Poland in 2022, finishing in 42nd place. Unlike Slovakia, Hungary has the best results in the technology category, while IMD rates it the worst in the area of future readiness, which includes areas such as the use of big data, threats and opportunities, or company skills. The most successful V4 country in this rating is also the Czech Republic, which ranks 33rd and is in the first half of the successful countries in the ranking. The results in all categories are similar, for example, the Czech Republic is the leader in mobile phone coverage or the provision of banking and financial services. The share of foreign university students and the use of robots in education and research are also positive.

Discussion

The research paper has been dealing with the complicated situation regarding digitization, its impact on competitiveness of SMEs in V4 countries. When identifying and analyzing the SMEs development factors given the prevalence of reports and assessments that consider innovation as a factor in SME development, the present study examined the innovation performance of the V4 countries using the European Innovation Scoreboard EIS Index from the European Commission. A comparison was made between the countries and the average of the EU 27 countries. The European Commission's evaluation is not particularly favorable, with the sole exception of the Czech Republic, which closely aligns with the EU average. The outcomes obtained by each nation vary across the spectrum of indicators that are subject to observation. For small and medium-sized businesses, the Innovators indicator is of particular importance. This indicator refers to SMEs that introduce innovations into their products and production processes. Consequently, it is primarily related to the high-tech sector. It is noteworthy that the Czech Republic is the sole country that attains results for this indicator that are commensurate with the EU average. Another crucial indicator for SMEs is the impact on employment and trade, in which Poland is particularly lagging. A prevalent challenge associated with the innovation performance rate pertains to human resources, a matter chiefly associated with educational attainment. In the evaluated countries, there is insufficient government and state support for financing and supporting innovation. Concurrently, individual companies do not provide sufficient funding for research and development.

When it comes to the quality of the business environment, it was assessed primarily based on the World Bank's Doing Business ranking. The overall ranking of countries within the index is found to be significantly influenced by the individual categories of the index, which are primarily related to various administrative tasks that entrepreneurs complete during their business life cycle. In general, it can be posited that the primary challenges confronting entrepreneurs in the countries under observation pertain to the superfluous administrative load and bureaucracy, protracted durations required for the execution of various tasks, the opacity of the fee system, onerous tax obligations, and the perpetual flux of legislation.

Next there was the estimation of the WCY ranking as a metric that evaluates countries based on their overall competitiveness. The analysis encompasses a more comprehensive evaluation of countries, incorporating macroeconomic indicators, government efficiency, business efficiency, and built infrastructure. According to the assessment of the ranking compiler, the most significant deficiencies in the V4 countries are deemed to be the gradual rate of digital transformation, the absence of financial resources for SMEs, inadequate support for innovation, the high cost of entrepreneurial initiation, and the dearth of qualified personnel. In the preceding year, energy supplies and migration to the V4 countries have become salient issues. It is evident that all the countries evaluated are confronted with these challenges to a varying degree. For instance, IMD offers a positive evaluation of the growth of real GDP, as well as the gradual improvement of the countries in administrative bureaucracy and the enhancement of the legal and regulatory framework.

Within the stated objective to determine the extent to which the implemented digitization process would affect sustainable economic and social development in the V4 countries, digitalization is also assessed within the EIS ranking; however, the European Commission addresses digitalization more extensively in the DESI ranking. This assessment indicates that the V4 countries are experiencing stagnation in the realm of digitalization. Their position at the lower echelons of the ranking, coupled with the absence of substantial advancement, substantiates this conclusion. The category of "Integration of digital technologies" has been identified as a primary concern for small and medium-sized enterprises. The countries exhibit deficiencies in nearly all of the evaluated criteria, including the fundamental level of digital intensity and the implementation of electronic invoicing. It has been demonstrated that businesses do not fully leverage online sales, consequently failing to attain the desired levels of online turnover. Furthermore, the realm of online cross-border trade holds untapped potential for enhancement. Digitalization of public services is an essential category that exerts a substantial influence on the quality of the business environment. The findings of the study indicate that the evaluated nations should prioritize the advancement of digital technologies, as the full potential of these countries has not been realized.

Conclusions

In this paper it has been shown that digitization has a fatal impact on the competitiveness of SMEs in V4 countries when enhancing the sustainable economic and social development in the EU. We have arrived at the conclusion that businesses in V4 countries are not leveraging digital technologies to the extent that they could be to enhance their operations. In order to ensure the continued competitiveness of small and medium-sized enterprises, it is imperative that improvements in this area be made in the future. Finally, to summarize the results of the research, digitization significantly enhances the competitiveness of SMEs by improving efficiency, reducing costs, expanding market reach, and enabling innovation. The ability to adapt to and leverage digital technologies will be a key determinant of success in the increasing digital business landscape in V4 countries to enhance sustainable economic and social development in the EU. As research limitations can be mentioned, issues such as: statistical data vary depending on the source being used; the brevity of the time series employed may have influenced the interpretation of the results. The period under analysis was influenced by the economic crisis resulting from the pandemic, as well as the utilization of solely quantitative indicators. By going deeper and making this explored issue coherent and compact further research will be devoted to exploring the issues such as the benefits of smart cities to social and economic sustainable development in V4 countries.

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