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## Article

# The importance of digital skills for the Western Balkans - comparative analysis between the Western Balkans and the European Union

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### THE IMPORTANCE OF DIGITAL SKILLS FOR THE WESTERN BALKANS - COMPARATIVE ANALYSIS BETWEEN THE WESTERN BALKANS AND THE EUROPEAN UNION

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#### **Abstract**

*In knowledge-intensive economies, skills emerged as crucial resources, determining economic development. Thus, in the post-pandemic, digital world, digital skills gain new ground, attracting the interest of researchers and practitioners, especially in the Western Balkan (WB) countries, which aspire to be a part of the European Union (EU). As a result, the article aims to investigate the level of digital, computer, and skills in evaluating data, information, and digital content in WB and to compare it with the EU region. Furthermore, we found that EU countries are way ahead in terms of basic or above basic overall digital skills on average. In the WB context, Serbia and Montenegro are close to converging with the EU average related to computer skills while Montenegro and North Macedonia lead in skills in evaluating data, information, and digital content. The results point out that the level of digital skills highly correlates with labor productivity and GDP per capita in WB.*

*Keywords: digital skills; labor productivity; European Union; Western Balkans; comparative analysis.*

*JEL classification: J24.*

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## Introduction

In the contemporary economy, the power and competitiveness of a country or region strongly rely not only on the available raw materials and the size of the area and population but on the capacities and know-how of people, too (Ozden & Guleryuz, 2022). This may bring with itself a new onset of challenges in developing countries where non-knowledge-intensive industries still make up a large portion of the economy, have a less-developed infrastructure, and have different contextual and socio-economic factors (Bogoviz et al., 2019). Therefore, education and training, culture, and nurturing human capital have turned into relevant concepts high on the agenda of decision-makers as essential factors to growth, higher productivity, and innovation (Habib et al., 2019).

Even though information and communication technology (ICT) is often considered the backbone of innovation, this infrastructural component of innovation would not create knowledge-based economies by itself without the input of a highly skilled workforce (Oberländer et al., 2020; Ognjanović et al., 2024). Hence, as technological development has rapidly accelerated under the two-fold impact of the post-pandemic trends and already increasing digitalization, the need for possessing and developing digital skills to foster innovative work behavior and high job performances has become imperative (Van Laar et al., 2020; Pilav-Velić et al., 2021).

The concept of digital skills represents an umbrella term for a wide array of both basic and advanced sets of skills that enable the individual to use digital technologies, including emotional, technical, cognitive, and social skills (Kiss, 2017). Related to this term is the concept of digital literacy or digital competence. Researchers have defined it as one's ability to look for, assess, use, share, and ultimately create new content using ICT and the internet (Tinmaz et al., 2022) or even one's ability to utilize digital sources effectively (Bejaković & Mrnjavac, 2020).

While it has been underscored that high levels of digital skills possession can affect the economy positively (Oberländer et al., 2020), researchers still need to expand their horizons and gain a more comprehensive understanding of these skills' impact on the level of labor productivity and GDP per capita as indicators of growth. In this regard, the lack of studies in this field, especially for regional studies may prevent nuanced understanding and provide a crooked outlook on the state of digital skills in all countries and its impact on economic development. In truth, this is subject to a wide array of societal, cultural, and contextual factors which differ among countries and regions. As such, the findings from studies done in the research contexts of the United States or Western Europe may represent a risk for decision-makers in different countries where these results would be suboptimal and inadequate to the context (Palvia et al., 2021).

In this sense, the context of the Western Balkan (WB) countries as opposed to the European Union (EU) ones is interesting to explore since most of them aspire to join the Union and have even gained the status of candidate members. While each of these countries – Bosnia and Herzegovina, Montenegro, North Macedonia, Albania, and Serbia – has a distinct trajectory of development, there are still some similarities since some of these countries were once together part of the Yugoslav Federation and they are neighboring countries. Related to this, we found a gap in the literature that investigated and compared the digital skills between these two pairs of countries or looked at the relations between these skills and the labor productivity and GDP per capita in these countries. The very few studies on the topic signal the need for a new perspective and a fresh analysis between the two regions.

Besides addressing the geographical research gap, the article contributes to shedding light on the current state of digital and computer skills as well as skills for evaluating data, information, and digital content and their effect on labor productivity and economic growth. Moreover, we found that there is a higher percentage of people having basic or above basic overall digital skills on average in the EU region compared to the Western Balkans with Montenegro coming close to the EU average in terms of basic or above basic overall digital skills. When it comes to the average percentage of basic overall digital skills of youth, the WB region is slightly above that of the EU. Also, no large difference between the two regions exists in the average number of people with programming skills, contrary to our expectations. Additionally, data analysis of the skills for evaluating data, information, and digital content in WB showed that Montenegro and North Macedonia are leading despite not being the most developed countries in the WB region. Considering this, the findings can be valuable to decision-makers who can direct their

efforts towards improving some of the indicators and increasing the capacities and capabilities of the workforce towards digital, knowledge-based advancement.

## Theoretical Background

By the term digital skills, we understand a plethora of basic and advanced technical, social, emotional, and cognitive skills that individuals possess to use digital technologies actively and effectively (Kiss, 2017). These skills can translate from digital fluency and citizenship to software use, development, and understanding of digital systems (Bowers & Sabin, 2023). In other words, these are the skills that the workforce needs to use software applications and operate digital devices (Van Laar et al., 2020). While newer generations are considered digital natives characterized by possessing advanced digital skills (Hernandez-de-Menendez et al., 2020), these skills know no gender boundaries, making them equally important to have for all generational cohorts in the workplace. As such, due to technological advancements, they are dynamic and require continuous effort and learning to be mastered. On the contrary, low levels of digital skills are often deemed as barriers to building a sustainable career and social inclusion due to exposure to disinformation, and false or misleading information (Kiss, 2017).

To measure and categorize digital skills, a variety of frameworks have been developed including the Digital Competence Framework for Citizens (DigComp) by the European Commission and UNESCO's Digital Literacy Global Framework (Bravo et al., 2021). Further, DigComp identifies five competence areas related to digital skills such as information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving (Bravo et al., 2021). Additionally, other scholars have identified digital information, communication, collaboration, critical thinking, problem-solving, and creative skills as part of digital skills (Van Laar et al., 2020).

When it comes to *information and data literacy* as a digital skills competence, individuals are expected to browse, search, and filter data, information, and digital content effectively and efficiently as well as to evaluate and manage data, information, and digital content (Carmi et al., 2020). Many claim that we are living in a post-truth media landscape where fake news and misinformation are very accessible as well as an infodemic (Li & Chang, 2023), so these skills become essential for searching the truthful information and analyzing, comparing, organizing, retrieving, and critically assessing information (Aissaoui, 2022).

Digital *communication and collaboration* represent another important competence as workplaces become more geographically diverse. So, the ability to interact, share information and content, engage in citizenship, and collaborate all through digital technologies becomes a necessity (Van Laar et al., 2020). With the rise of social media and interactive online work platforms, a new set of digital skills can also be considered an asset – *digital content creation*. These competencies relate to one's ability to develop, integrate, and re-elaborate digital content as well as understand programming, copyright, and licenses (Lordache et al., 2017).

Another digital skills area is *safety* which has gained new ground as cybersecurity climbs up on decision-makers' agenda, becoming a ubiquitous and multi-disciplinary field. In this sense, individuals should know how to protect their devices, personal data, privacy, health, and well-being, as well as understand the environmental impact of digital technologies and their utilization (Sonck & de Haan, 2014). Eventually, a key future-proof skill on its own, *problem solving* is the fifth competence about digital skills. These skills underscore the importance of knowing how to solve technical problems, identify needs, and adjust to them, as well as using digital tools creatively in digital environments (Cai & Gut, 2020; Tuomi et al., 2018).

To measure digital skills, these competence descriptors are part of the composite indicators for digital skills indicators, based on chosen activities that require the use of the internet or software and are performed by people who are between 16 and 74 years old (Kiss, 2017). Hence, these indicators are considered proxies for digital skills and competencies (Eurostat, 2023), so for the purpose of our research we use them to assess the levels of individual digital skills, computer skills, skills in evaluating data, information, and digital content.

When speaking of digital skills, a closely connected concept is digital literacy or digital competence. Some definitions view it as an individual's capability to use digital sources and tools (Bejaković & Mrnjavac, 2020), while others conceptualize it as a person's ability to see, evaluate, use, share, and create new content using digital technologies and the internet (Tinmaz et al., 2022). Some scholars go as far as equating this concept with a mindset shift, making the process of working in digital environments intuitive, easy, and effective through accessing the rich knowledge base woven in these digital environments (Martin, 2008).

From a wider point of view, researchers often observe digital skills as part of the so-called twenty-first-century skills. The roots of this concept are tied with a discussion at the start of the new century in terms of which skills and know-how people should have in the contemporary knowledge society (Joynes et al., 2019). Yet, twenty-first-century skills are not essentially grounded in ICT or digital technologies, thus digital skills act in a way as practical tools for understanding and utilizing information from different digital sources (Van Laar et al., 2017). In other words, there is a close relation between these two concepts, but we cannot put an equal sign between them.

Moreover, born out of the necessity to define and measure the most desired skills of the digital era, the twenty-first-century skills encompass the ways of thinking, ways, and tools for working, and ways of living in the world (Binkley et al., 2012). Interestingly, digital components and skills are interwoven in most of these categories, especially when it comes to critical thinking, creativity, and innovation (ways of thinking), communication and teamwork (ways of working), ICT literacy (tools for working), and digital citizenship, responsibility, and career (ways of living in the world) (González-Pérez & Ramírez-Montoya, 2022).

As modern technologies like artificial intelligence (AI) become more accessible and cost-effective, there has been a surge in the demand for AI skills across multiple industries and occupations – IT and non-IT alike including management, science, architecture, and engineering (Alekseeva et al., 2021). Subsequently, companies that demand AI skills are known to increasingly offer higher compensation in non-AI job occupations (Alekseeva et al., 2021). This reaffirms that digital skills are becoming the aspect that can bring out the competitive advantage in the workforce of tomorrow even in industries besides ICT.

Namely, GDP per capita, employment, and labor productivity are often considered transmission mechanisms between macroeconomic indicators and digitalization (Evangelista et al., 2014; Georgescu & Kinnunen, 2021). As noted, the use of digital technologies and the employment of ICT staff is associated with significant improvements in labor productivity as an indicator of economic development (Cette et al., 2022). Another factor of economic development is the new employment opportunities. In this sense, possessing digital skills or facilitating digital empowerment is considered more important than providing ICT facilities and infrastructure (Evangelista et al., 2014). Regarding this, the use of digitalization has been demonstrated to exert major economic effects, becoming more relevant for enhancing labor productivity and GDP growth (Evangelista et al., 2014). This is because digital skills offer the opportunity to increase the employment rates of women, minimize long-term unemployment, and widen the employment choices in terms of human and social capital for rural workers (Stofkova et al., 2022; Zhang et al., 2023). Yet, this may be different in various contexts as it has been demonstrated that digitalization can narrow inequalities in developed economies and widen this gap in developing economies (Nguyen, 2022).

The accelerating ICT integration in the workplace and all spheres of society paired with the advancement of global knowledge highlights the need for individuals to acquire digital skills to find a job and take part in the social order as it is (González-Pérez & Ramírez-Montoya, 2022). Digitalization also significantly affects the labor markets as new business models, products, services, and technologies transform and eliminate existing jobs while creating new ones as well (Mantulenko et al., 2021). The COVID-19 pandemic has accelerated this social phenomenon while at the same time widening the gap between EU member countries and facing the growing application of digital education (Aissaoui, 2022; van Kessel et al., 2022). Another challenge is that despite high unemployment levels, companies still find it difficult to find ICT specialist candidates (Eurostat, 2020). Thus, this reaffirms the claim that digital skills and literacy are challenging to tackle at the regional, Western Balkan, and European Union levels.

In the context of Western Balkan countries, some studies have highlighted that there is a growing awareness of the need to invest in knowledge, innovation, and skills of the employees (Rejman Petrovic et al., 2022), yet a lack of awareness for introducing new skills in employment criteria and personnel policy as well as frequent personal upskilling among the employees persists (Vidas et al., 2023). This is supported by other studies that consider the region of South and South-Eastern Europe (including the Balkan countries) as low-performing countries in terms of the adaptability of the workforce to upskill for the digital era (Jandrić & Randelović, 2018; Mitrović, 2015). This is why we believe it is captivating to compare the state of digital skills among the people living in the Western Balkans and the European Union as two distinctive regions.

## Research Method

To conduct the analysis, we use data on 1) digital skills, 2) computer skills, and 3) individuals' skills in evaluating data, information, and digital content from the Eurostat database. According to the Eurostat metadata, the Digital Skills Indicator 2.0 is a composite indicator, which is based on selected activities related to internet or software use that individuals aged 16-74 perform in five specific areas (Information and data literacy, Communication and collaboration, Digital content creation, Safety, and Problem-solving) (Eurostat, 2023). The indicators can be considered as a proxy of individuals' digital skills since it is assumed that individuals having performed certain activities have the corresponding skills (Eurostat, 2023).

We use the data for the two consecutive years (2021, 2023) in our analysis, since Eurostat began collecting this data as composite indicators for digital skills every two years, starting in 2021. Since we aim to investigate the level of digital skills in the Western Balkans and to compare it with the EU region, we use data for all the countries from the Western Balkans (Bosnia and Herzegovina, Montenegro, North Macedonia, Albania, and Serbia)<sup>1</sup>. For Bosnia and Herzegovina, Serbia, and Montenegro, we used data from 2023, while for North Macedonia and Albania, we used data from 2021 since there was no data from 2023. In the case of North Macedonia and Albania, this method of last observation carried forward is recommended for filling gaps in data and addressing the issue of missing values (Enders, 2022).

To compare the level of digital skills between the countries in the Western Balkan region, and between the two regions of interest (Western Balkans and EU), we calculated averages for the activities comprising the composite indicators of digital skills, computer skills, and information evaluation skills. Further, we investigated the relationship between the level of digital skills of the Western Balkan countries and the level of labor productivity and GDP per capita of each country. For GDP per capita, we use official data from the World Bank database whereas for labor productivity, we use the data from the International Labor Organization's (ILO) database.

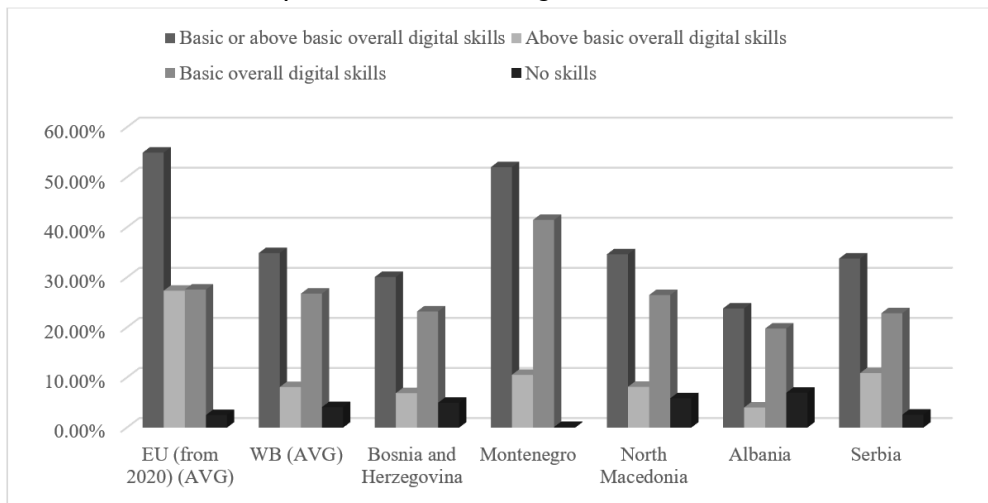
## Data Analysis and Results

In the following section, we present the results from data analysis comparing the region of Western Balkans and the EU, but also the comparison between the countries within Western Balkans. Graph 1 compares the average level of the selected four indicators considered as a proxy for individuals' digital skills for EU and Western Balkans (i.e., 1) basic or above basic overall digital skills, 2) above basic overall digital skills, 3) basic overall digital skills, and 4) no skills). Further, it compares the level of the same four indicators for each country within the Western Balkan region. The graph shows an interesting pattern, indicating that the EU region has a significantly higher percentage of people having basic or above basic overall digital skills on average (54.92%) than the Western Balkans (34.86%). Even more striking is that three times more people in the EU region possess above-basic digital skills than in the WB (EU - 27.35% vs. WB - 8.10%). No significant difference between the two regions is noticeable regarding the average number of people having basic overall digital skills (EU-27.57% vs. WB-26.76%). But, concerning the indicator "no skills," we can notice that the percentage of people with no skills is almost twice as high in WB (4.10%) compared to EU (2.51%).

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<sup>1</sup> Kosovo is left out of the study since no data was available in the Eurostat database.

**Graph 1: Individuals' Digital Skills in 2023**

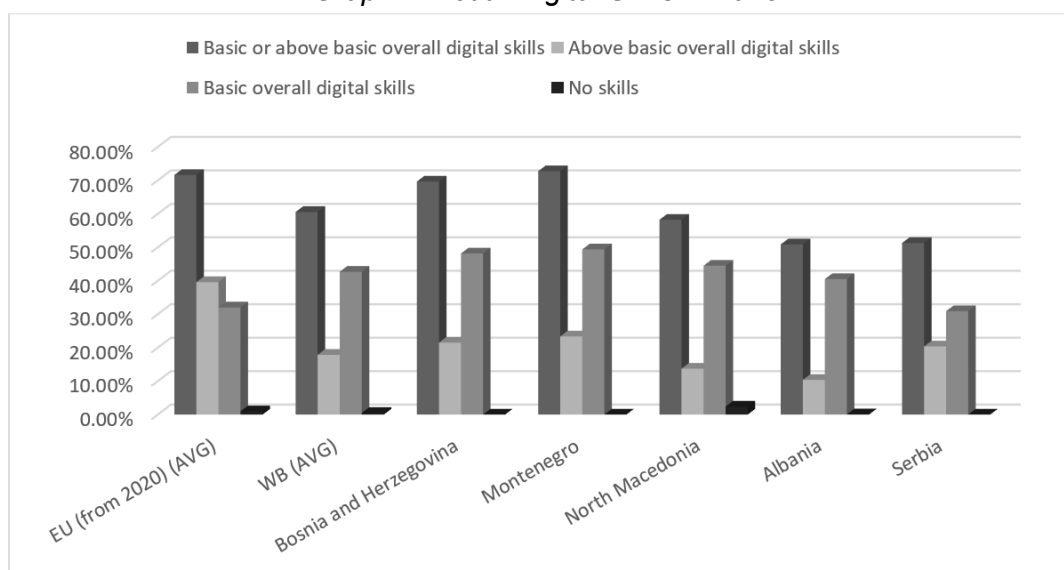


*Source: Authors' analysis based on data from Eurostat.*

Comparing the results between the countries in the WB region, we can notice in Graph 1 that on all indicators Montenegro is the clear leader in the region except for the indicator “above basic overall digital skills” on which Serbia has an insignificant advantage of less than 1%. Montenegro has a significant advantage on all indicators compared to all other countries (e.g. having twice a much higher percentage of people with basic or above basic digital skills compared to Albania). However, the most significant drawback, on which the remaining three countries (Bosnia and Hercegovina, North Macedonia, and Albania) are lagging compared to Montenegro and Serbia is the percentage of people with no skills being very high in these countries (4 - 6 times higher than in Montenegro or 2 - 3 times higher than in Serbia).

It is useful to explore and compare youth digital skills since younger generations are interacting with information technology from a very early age. Based on the same four indicators for digital skills shown in Graph 1, Graph 2 compares the level of those indicators only for individuals between 16 and 29 years of age. Hence, the results in Graph 2 show a smaller difference in the average value for the youth's digital skills between the EU and WB, indicating that younger generations may be closing the gap between the two regions. However, the key difference is in the indicator showing above-basic overall digital skills, where the EU has twice as many youths with above-average skills as WB (EU-39.59% vs. WB-17.86%). Further, it is interesting to notice that when we compare the average percentage of basic overall digital skills, the WB region is slightly above that of the EU. This reveals valuable insight that the youth from WB is behind the EU in developing advanced digital skills, and not in the basic digital skills.

*Graph 2: Youth Digital Skills in 2023*



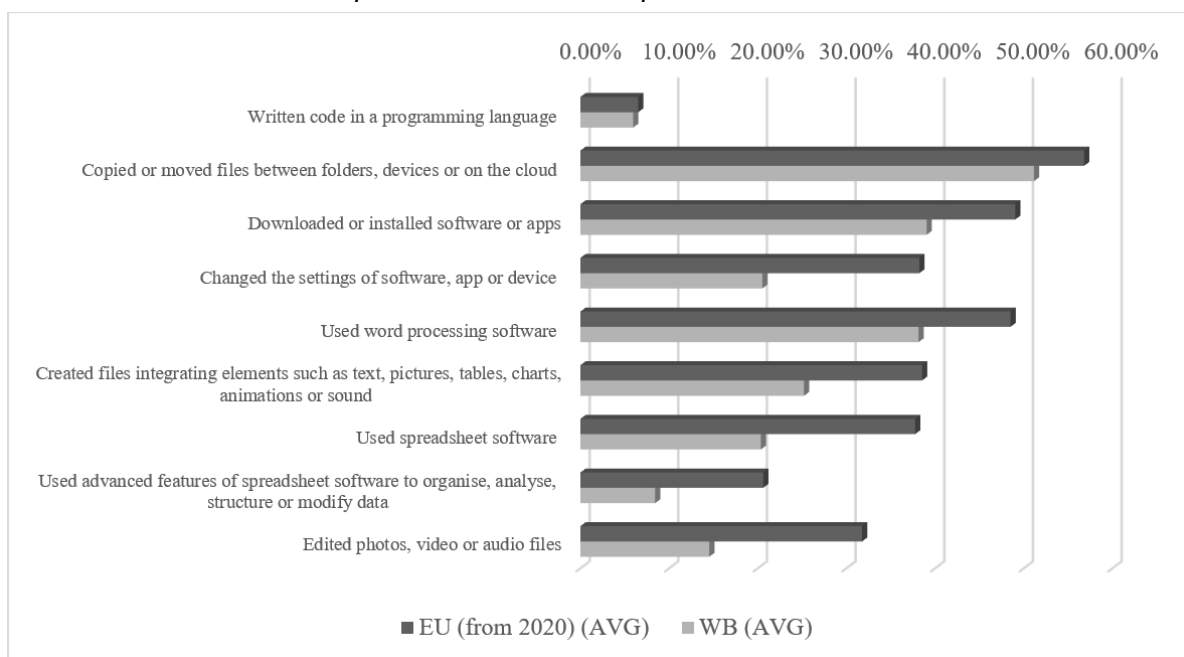
*Source: Authors' analysis based on data from Eurostat.*

In the WB, Montenegro continues to lead in all four indicators. All countries from WB converge with the indicators for digital skills. But one substantial difference can be observed: North Macedonia and Albania have two times lower rates of youth with above-basic digital skills, compared to the rest of the countries from WB.

To broaden our understanding of the digital skills in the region of WB we explored the data about individuals' computer skills in 2023 for the two regions. The evaluation of computer skills is included in the estimation of the composite indicator called The Digital Skills Indicator 2.0. In Graph 3 we present the average value of all nine activities used to evaluate the level of the indicator for computer skills. Data in Graph 3 indicates that the EU region has on average more people with higher computer skills than WB in all compared activities. However, the most significant difference between the two regions can be noticed in activities that people do concerning the use of advanced features of the spreadsheets (EU-20.62% vs WB-8.42%), then editing photo, video, or audio files (EU-31.76% vs WB-14.53%), and changing the settings of the software, applications, or devices (EU-38.22% vs. WB-20.51%). Opposite to our expectations, no large difference between the two regions exists comparing the average number of people with programming skills (EU-6.51% vs. WB-5.95%).

Comparing the data about computer skills between the countries from WB shows again that Montenegro and Serbia are leaders in most evaluated activities concerning computer skills. Serbia is slightly ahead of Montenegro in programming skills (Serbia – 9.29% vs. Montenegro 8.59%). In general Montenegro and Serbia are leading in most of the computer skills compared to the rest of the countries from WB, although surprisingly the low level of Serbia in using advanced features of spreadsheet software to organize, analyze, structure, or modify data and edit photo, video, or audio files. Albania, North Macedonia, and Bosnia and Herzegovina are way below the EU average in most of the evaluated activities that comprise the indicator for computer skills. Furthermore, North Macedonia and Bosnia and Herzegovina have twice as few people who have written code in programming languages as the EU average (EU – 6.51% vs North Macedonia 3.30% and Bosnia and Herzegovina 2.89%). Hence, Montenegro and Serbia are on the path to converge toward the EU average than the remaining countries from WB.

**Graph 3: Individuals' Computer Skills in 2023**

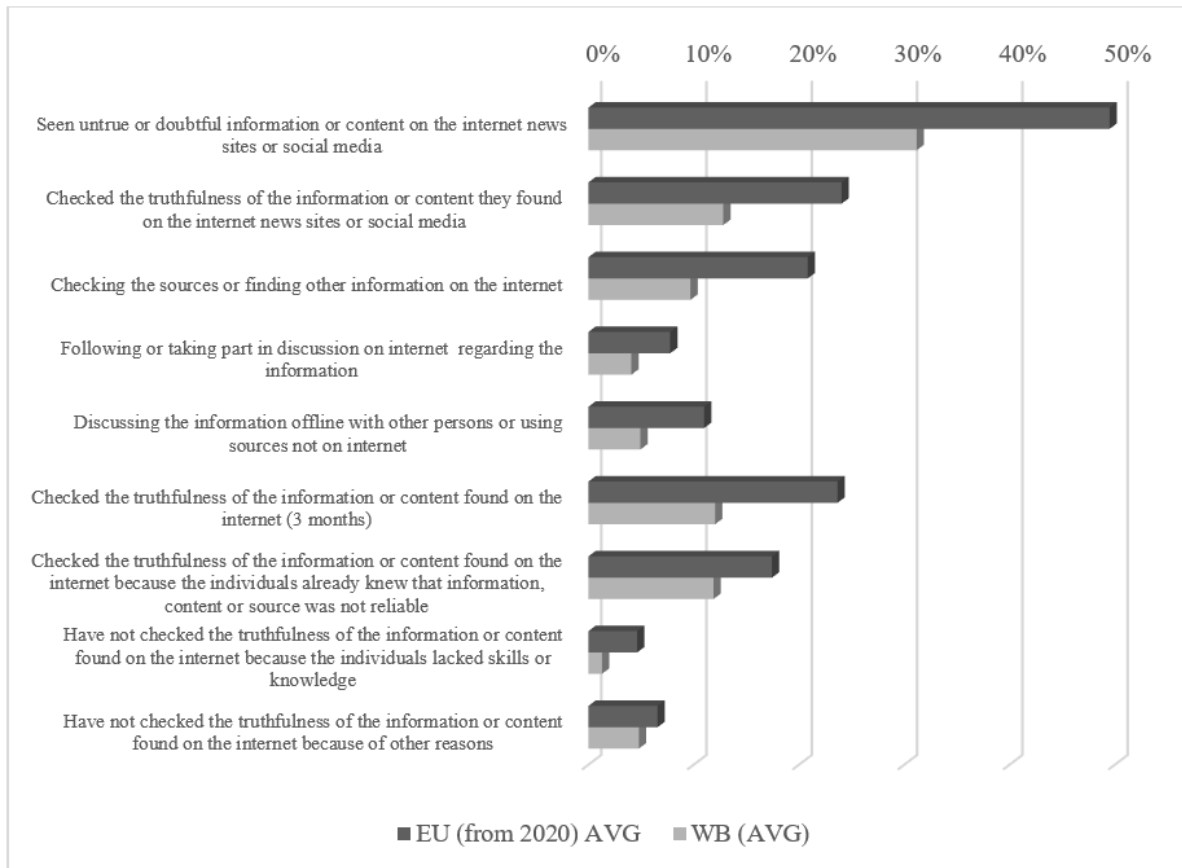


*Source: Authors' analysis based on data from Eurostat.*

Graph 4 presents the average value of all nine activities used to evaluate individuals' skills in evaluating data, information, and digital content. The estimated level of individuals' skills in evaluating data, information, and digital content is also included in the Digital Skills Indicator 2.0 composite indicator. As shown in Graph 4, the EU region has on average more skilled people across all nine activities that comprise this indicator. The greatest difference in average values between the two regions can be noticed in the percentage of individuals who did not check the truthfulness of the information online. In WB, four times fewer individuals checked the truthfulness of the information or content found on the Internet because they lacked skills or knowledge compared to the EU average. In all other activities related to evaluating data, information, and digital content, the EU has twice the number of skilled people as WB.

Based on a more in-depth analysis of the data relating to skills for evaluating data, information, and digital content in WB, Montenegro, and North Macedonia are leading in five out of nine activities having above-average value compared to other countries in the WB region. Considering our previous analysis, we expected both countries (Montenegro and Serbia) to lead on this indicator in WB, but data showed Serbia, Albania, and Bosnia and Herzegovina have fewer people that checks the truthfulness or reliability of information compared to the average in WB.

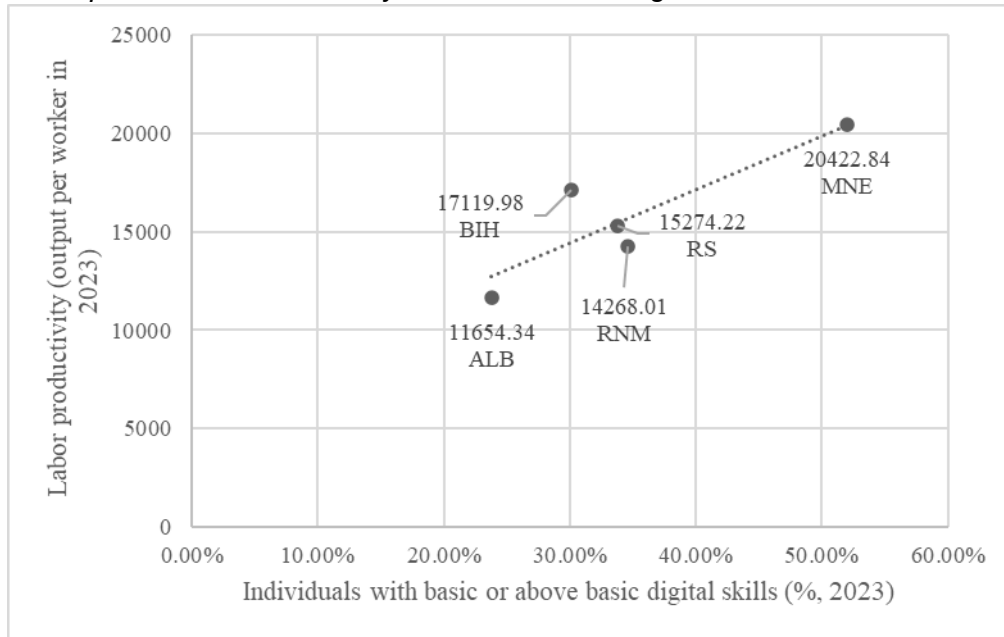
**Graph 4: Individuals' Skills in Evaluating Data, Information, and Digital Content in 2023**



*Source: Authors' analysis based on data from Eurostat.*

To further broaden our understanding of the role of digital skills in WB, we explored the potential relation between the level of digital skills of the countries in WB and their economic performance, measured through labor productivity and GDP per capita for 2023. The scatter plot in Graph 5 presents the Pearson correlation between labor productivity and the share of individuals with satisfactory digital skills (basic or above basic) to live and perform in the digital age. The results indicate a significant correlation ( $R^2=0.87108$ ) between the two examined variables. Hence, we think that today, in the digital era of AI, the higher the level of digital skills of a population in a WB country, the more likely it is to be paired with a higher value of labor productivity.

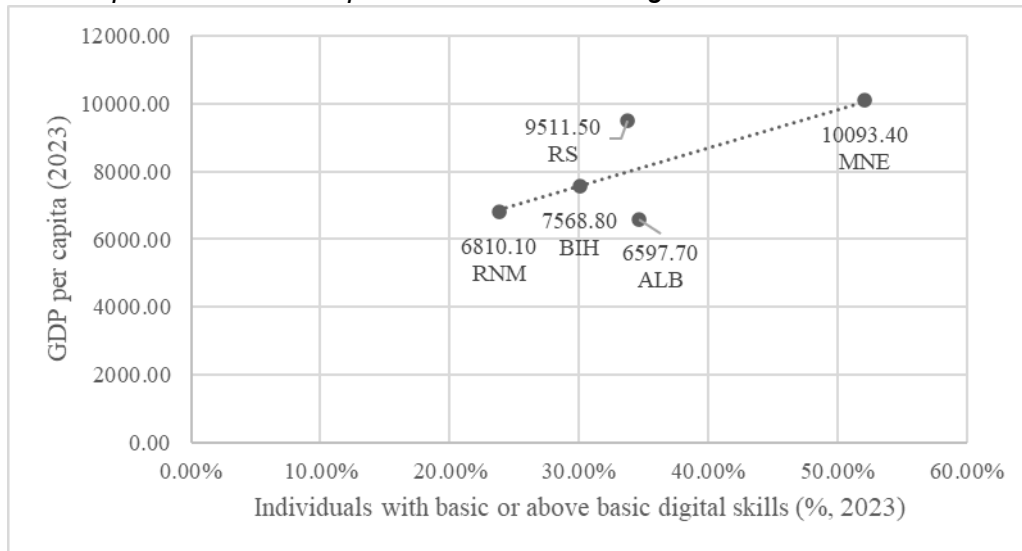
**Graph 5: Labor Productivity as a Function of Digital Skills for WB in 2023**



Source: Authors' analysis based on data from Eurostat.

We further examined the relation between the level of digital skills in the countries of WB and their economic performance, measured through GDP per capita for 2023. Hence, the scatter plot in Graph 6 presents the Pearson correlation between the share of individuals with basic or above basic digital skills and the GDP per capita of each country in 2023. As with labor productivity, we found a significant correlation ( $R^2 = 0.74409$ ) between digital skills and GDP per capita.

**Graph 6: GDP Per Capita as a Function of Digital Skills for WB in 2023**



Source: Authors' analysis based on data from Eurostat.

## Discussion

The results point to the European Union countries having a significant edge over their Western Balkan counterparts when it comes to basic or above basic overall digital skills on average, as well as computer skills and skills in evaluating data, information, and digital content. As the countries in the region have begun converging toward OECD and EU levels, performance in the digitalization sphere is positive, yet other studies have also found that this performance is underscored by the low ratio of people with basic or above basic digital skills (Organization for Economic Co-operation and Development, 2023). This is in line with other studies that have identified large cross-country inequalities in terms of digital literacy, making Europe, as a whole, unable to foster a sustainable digital society (van Kessel et al., 2022).

On the other hand, we found that the two regions were similar when it comes to the average number of people having basic overall digital skills. Yet, there are twice as many citizens of Western Balkan countries who have no skills compared to their EU peers, singling out Montenegro which has a significant advantage on all indicators compared to all other countries. This is most likely due to a large gap in terms of digital infrastructure, digital empowerment, and the low willingness of employees to upskill themselves individually (Vidas et al., 2023). Montenegro has also been recognized as having the highest score in the region in terms of digital technology integration, going beyond the WB average (Regional Cooperation Council, 2022).

Connected to this, while contextual determinants to digital skills gaps have been emphasized in the scientific discourse, researchers now focus on the individual factors relating to the material, mental, cultural, temporal, and social ones that individuals can manage (Van Laar et al., 2020). Illustratively, the importance of taking part in informal social networks and ICT training has been often underscored (Brandtweiner et al., 2010). Similarly, researchers have called on public authorities to address the need to boost and enhance digital skills training and education through education systems, as a determinant to fostering digital innovation (Shakina et al., 2021). Yet, as technology becomes increasingly accessible, the education system alone does not have to be the sole factor to blame, as individuals are empowered to hone their skills on their own (Haleem et al., 2022). Reports also turn the attention to increased policy response as a solution for addressing deficiencies in digital skills (Organization for Economic Co-operation and Development, 2023).

The slogan that we leave the future to the youth may be well applicable here as we demonstrated a large potential of younger generations closing the gap between the two regions. As members of Generation Z enter the workplace, it is highly likely that the differences between countries and regions blur considering these generations globally are raised with new technologies (Hernandez-de-Menendez et al., 2020). This has also been proven in other studies that single out youth and the developing start-up ecosystems in the countries of interest as drivers of digital transformation (Regional Cooperation Council, 2021).

Contrary to studies that place the region of interest as a low-performing one when it comes to digital skills (Jandrić & Randelović, 2018), we find that the WB region ranks higher than the EU one in terms of the average percentage of basic overall digital skills, while the EU has twice as many young people with above-average skills. Again, young Montenegrins lead in all four indicators while their counterparts from North Macedonia and Albania experience lower rates of above-basic digital skills. Illustratively, other research highlighted that despite being the first WB country that assigned spectrum for utilizing 5G, North Macedonia still lags behind the WB average in terms of connectivity (Regional Cooperation Council, 2022), which may be one of the reasons behind the lower rates in this segment. This highlights the increasing need for investment in digital infrastructure, the development of digital-friendly policies, and intensive work on supporting digital empowerment and culture among the citizens (Mitrović, 2015; Ognjanović et al., 2024).

Related to computer skills, we found that Montenegro and Serbia are leaders in most evaluated activities in this area, leaving Albania, North Macedonia, and Bosnia and Herzegovina increasingly below the EU

average. Considering this, Montenegro and Serbia are on the path to meet the EU's average rates. This is in line with the countries' intensive, expansive, and relatively efficient digitalization efforts (Rejman Petrovic et al., 2022; Ognjanović et al., 2024). Serbia has also been confirmed as a leader, going above WB averages according to the Western Balkans Digital Economy Society Index (Regional Cooperation Council, 2022). Moreover, programming skills belong to this cluster of digital skills. As the programming profession becomes more and more attractive, we found no significant contrast between the two regions in terms of the average number of people with programming skills, which was contrary to what we initially expected (Tuomi et al., 2018).

In terms of the skills for evaluating data, information, and digital content, the findings significantly outlined the differences between the percentage of people who did not check the truthfulness of the information online, detailing that residents in the Western Balkans tend to evade proving the truthfulness of the information and content four times more than their EU counterparts. Researchers claim that fact-checking results by experts and spreading the truth can be challenging in politically divided climates, where individuals like to get information and content from like-minded sources (Li & Chang, 2023). Since a lack of skills and knowledge in this area is detected in the Western Balkan context compared to the EU's average, it can be safe to assume that not everyone can successfully detect misinformation online as the first step to combating it (Li & Chang, 2023).

What is more, the results indicate a significant Pearson correlation between labor productivity and the share of individuals with satisfactory digital skills (basic or above basic) to live and work successfully in the digital age. The same was proven for the relationship between digital skills and GDP per capita. Hence, the Organization for Economic Co-operation and Development (OECD) (2023), identified digitalization as one of the key determinants of economic convergence as well as inclusive and sustainable expansion in the region. The results of this study also confirm prior findings that digitalization can impact the labor markets in a major way since it changes current jobs and creates new ones that did not exist a few years ago (Mantulenko et al., 2021). Claims that the higher inclusion of women and rural communities thanks to digitalization (Nguyen, 2022; Zhang et al., 2023) means that more people participate in the workforce and contribute to a nation's productivity. Thus, the higher the level of digital skills of a population, the more likely it is to experience a higher value of labor productivity. In this sense, our findings are in line with those of other researchers, who claim that digital skills can be important predictors of GDP as well as competitiveness and Human Development Index (HDI) values (Georgescu & Kinnunen, 2021).

## **Limitations and Directions for Future Research**

The study does not come free of some constraints, which can at the same time act as pathways for future research. Since the research is grounded in secondary data from Eurostat, World Bank, and ILO, there were some inconsistencies related to the data as well as missing data. Connected to this, Kosovo is left out of the study despite being a Western Balkan country because there was no data available in the Eurostat database. Moreover, gender was not included separately, too, so the gender-related aspects may not be explicitly shown in the findings. In terms of investigating the levels of above basic, basic, and low digital skills, the data is relevant for the age groups 16-74 except for youth skills where the age range is different. As a result, the findings should not be blindly generalized and deemed completely relevant to people outside of these age groups. Regardless, it can be reasonably assumed that the methodological constraints do not have the capacity to undermine the findings presented in this research.

While this study focused on a cross-regional comparison between EU and Western Balkan countries, other studies may compare these findings with other regions in Europe such as South Europe, Baltic countries, and similar. Additionally, the state of digital skills between different genders, educational backgrounds, and rural and urban places of living can be evaluated. Additionally, it would be beneficial to understand the cultural factors and motivators to expand the understanding as to why some regions

in Europe still face challenges related to Internet connection and digital skills advancement. As digital skills are becoming increasingly broader with the introduction of AI skills, it can be interesting to explore how these skills are developed in this region of interest. Furthermore, longitudinal studies tracking the evolution of digital skills and their impact on economic outcomes can also provide a more nuanced overview of the topic and the dynamics across time.

## Conclusion

While recent literature views digital skills and investment in human capital as prevalent for improving and maintaining competitiveness, productivity, and economic development, not all regions have been represented the same in the scientific discussion. With this article, we address this gap and investigate the current landscape of digital, computer, and individuals' skills in evaluating data, information, and digital content through a comparison between EU and Western Balkan countries. The diversity in the development phases of these countries as well as the aspirations of the Western Balkan countries to join the EU family make this research context captivating to analyze. A Pearson correlation suggests a significant relationship between digital skills and labor productivity as well as digital skills and GDP per capita. Interestingly, the findings point to areas where EU countries perform better than WB countries and vice versa, which is contrary to popular belief.

Moreover, the findings outlined in the article provide valuable insights and contributions to policymakers about which levels of digital skills should be strengthened and how this can be achieved, which ultimately will impact the nation's productivity and development. Considering that the countries in the research context aspire to be digitally enabled and technology-driven, the findings can contribute to developing national strategies and action plans that put digital skills at the forefront. Additionally, the shift in the demand for digital skills by both employers and students as well as the skills gaps outlined in this article point to the need for modifying existing curricula in all levels of education. This can include the introduction of new courses and modules that will equip students to better meet the standards of the wider society and industry.

Besides this set of stakeholders, managers, and human resource professionals can implement this information for redesigning their talent management plans and skills development. In this sense, the findings indicate room for improvement in the digital skills landscape, which can be filled by holistic and cross-sectoral approaches that nurture collaboration between policymakers, education institutions, and industry practitioners. Underpinned by the emergence of new technologies and the rushing digital transformation, digital skills can be considered a nation's resource, which can significantly impact the innovation capacities, competitive advantage, and productivity of the economy at large.

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