Danijela Pantović[1]
Jovana Davidović
Andrija Milutinović

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АНАЛИЗА ДИГИТАЛНОГ СТУБА ТУРИСТИЧКОГ ЕКОСИСТЕМА ИЗАБРАНИХ ЗЕМАЉА ЕВРОПЕ

Апстракт: У истраживању су разматрани основни индикатори дигиталног стуба у земљама Западне и Централне Европе у 2023. години. Обухваћени индикатори укључују ниво продаје путем е-трговине, употребу друштвених мрежа од стране туристичких предузећа, учешће у обукама за развој дигиталних вештина, потражњу за ИКТ стручњацима и брзину интернет конекције у туристичким дестинацијама. Подаци су прикупљени из релевантних званичних извора, укључујући Европску комисију и националне заводе за статистику. Резултати анализе показују значајне разлике у нивоу дигитализације међу посматраним земљама. Белгија се истиче највећим уделом продаје путем е-трговине (38,9%), док Немачка предњачи по броју предузећа која активно користе друштвене мреже (51,7%). Пољска издваја највише ресурса за обуку запослених у дигиталним вештинама (22,6%), а Литванија има најразвијенију интернет инфраструктуру у туристичким зонама (78,53%). Добијени подаци указују на то да је дигитална трансформација у европском туризму у току, али са израженим разликама између земаља.

Кључне речи: дигитални стуб, транзиција туризма, дигитална транзиција, Европа

ANALYSIS OF THE DIGITAL PILLAR OF THE TOURISM ECOSYSTEM OF SELECTED EUROPEAN COUNTRIES

Abstract: The study examined key indicators of the digital pillar in Western and Central European countries in 2023. The indicators include the level of e-commerce sales, the use of social media by tourism businesses, participation in digital skills training, demand for ICT professionals, and internet connection speeds in tourist destinations. Data were collected from relevant official sources, including the European Commission and national statistical institutes. The results of the analysis show significant differences in the level of digitalization among the observed countries. Belgium stands out with the highest share of e-commerce sales (38.9%), while Germany leads in the number of businesses actively using social media (51.7%). Poland allocates the most resources for employee training in digital skills (22.6%), and Lithuania boasts the most advanced internet infrastructure in tourist zones (78.53%). The data suggest that digital transformation in European tourism is underway, but with notable differences between countries.

Keywords: digital pillar, tourism transition, digital transition, Europe

1 University of Kragujevac, Faculty of Hotel Management and Tourism in Vrnjačka Banja, Serbia. danijela.durkalic@kg.ac.rs, jsdavidovic@gmail.com, milutinovicandrija222@gmail.com

1. INTRODUCTION

In recent years, the European Commission has actively collected and provided significant and relevant data related to the European tourism sector, with the aim of supporting the sustainable development and progress of the tourism ecosystem on the continent. The primary goal of the provided data is to promote and monitor the green and digital transition, as well as the socio-economic resilience of European tourism, and to provide support to decision-makers and stakeholders in guiding evidence-based policies and strategies.

Currently, the platform includes a total of 20 indicators, classified into three policy pillars: the green pillar, the digital pillar, and the socio-economic pillar. The subject of this paper is the digital pillar, which encompasses five indicators: e-commerce, the use of social networks by tourism enterprises, participation in digital skills development training, demand for experts in the field of information and communication technologies (ICT), and internet connection speed in tourist destinations.

Although most of the observed countries show a positive trend in adopting digital tools and technologies, significant disparities remain. The examined factors may influence the competitiveness of tourist destinations and their ability to attract digitally aware tourists. The research aims to highlight and analyze these differences in the countries of Western and Central Europe.In this regard, the research question arises: Do the countries of Western and Central Europe converge with each other in terms of the digital pillar?

The paper is structured into three sections. After the literature review with an emphasis on the digital pillar of the EU tourism ecosystem, an overview of the research methodology is provided, followed by the results with a discussion.

2. LITERATURE REVIEW

Digital transition has developed in parallel with the growing awareness of numerous stakeholders regarding the economic benefits of digital technologies. Digital competitiveness and sustainability of countries is an important concept that is constantly evolving and is often seen as a driving force for economies (Sofranakova et al., 2023). Digital inequality represents a critical challenge in the pursuit of sustainable development, as disparities in access to and knowledge of digital technologies hinder fair growth, social inclusion, and environmental sustainability (Rydzewski, 2025).

Rehman et al. (2023) emphasize that the European Commission, in an effort to promote a sustainable future, has set as a goal the use of digital technologies to achieve the green agenda through systematic transformations. This approach is integrated with the concept of the green transition, which together represents the simultaneous process of the green and digital transition.

Due to the significant importance of sustainability issues within all the tourism policies adopted by the European Commission, considerable attention has been given to the creation of tools for sustainable destinations (Cismaru and Bratucu, 2015).

Hegyes and co-authors (2017) highlight that in 2015, the United Nations General Assembly emphasized the comprehensive contribution of ICT to the newly defined sustainable development goals, as ICT can accelerate sustainability progress. Rah-

madian et al. (2022) also highlight the importance of information technologies (IT) for sustainable tourism development.

The Digital Pillar of the EU tourism ecosystem is focused on assessing and monitoring the level of digitalization in the tourism sector across EU countries. This pillar aims to encourage the technological transformation of the tourism sector, increase efficiency, enable innovation, and enhance the competitiveness of destinations on the global market.

The Digital Pillar of the tourism ecosystem is characterized by five indicators used to measure the intensity and achievement of objectives in this area. The set of indicators for the digital pillar is illustrated in Figure 1.

Figure1: Digital pillar of the tourist ecosystem

Source: Authors

One of the indicators of the digital pillar is *e-commerce sales*, expressed as a percentage. This indicator assesses the level of development of digital solutions for tourism, including online reservations, guide applications, virtual tours, and digital maps. Higher values indicate a greater share of businesses with e-commerce sales, which potentially reveals a higher level of digital transformation. It is based on data collected by national statistical institutes through questionnaires for businesses with 10 or more employees and self-employed individuals.

The indicator "*enterprise using social networks*" represents the percentage of businesses in the tourism ecosystem that actively use two or more social media platforms (through user profiles, accounts, or licenses). Higher values of this indicator reflect greater representation and activity of tourism businesses on social networks. Data for this indicator are collected by national statistical institutes through surveys conducted in businesses with 10 or more employees, as well as among the self-employed.

Personnel training on digital skills (%) is an indicator that shows the percentage of businesses in the tourism ecosystem that organize training in ICT for their employees. This indicator reflects the level of investment by businesses in the development and improvement of their teams' digital competencies. Higher values indicate a higher degree of engagement in digital training. Data for this indicator are collected by national statistical institutes through surveys conducted in businesses with at least 10 employees, as well as among the self-employed.

Enterprises seeking ICT specialists (%) represent the percentage of businesses in the tourism ecosystem that are in the process of hiring or have attempted to hire ICT professionals. Higher values of this indicator reflect a greater number of businesses showing interest in digitalization through the hiring of information and communication technology experts. Data for this indicator are collected through surveys conducted by national statistical institutes in businesses with at least 10 employees, as well as among the self-employed.

Internet speed at tourist destinations (%) represents the share of tourist accommodation (measured by the number of rooms) with an internet speed greater than 100 Mb/s within a given tourist destination. It is calculated by estimating the maximum internet speed in each accommodation facility, taking into account both fixed and mobile networks. Higher values of the indicator indicate a more developed digital infrastructure and higher-quality internet connection available to tourists.

The Digital Pillar is crucial for preparing the European tourism sector for future challenges, as well as for supporting its green and sustainable transformation.

3. METHODOLOGY

The indicators developed for the EU tourism dashboard are constructed based on data and statistics collected from available reliable sources with the highest possible territorial and thematic details. Eurostat – the statistical office of the European Union – is the primary source of data and statistics, alongside numerous additional relevant sources(EU Tourism Dashboard, https://tourism-dashboard.ec.europa.eu/).

The following section of the paper presents the indicators of the digital pillar in the countries of Western and Central Europe in 2023. For a detailed presentation of the research results, descriptive statistics were used in the form of tabular and graphical representation of the data.

4. RESULTS AND DISCUSSION

Table1: Indicators of the digital pillar of Western Europe, 2023

State	E-commerce sales (%)↑	Enterprise using social media (%)↑	Personnel training on digital skills (%)↑	Enterprises seeking ICT specialists (%)↑	Internet speed at tourism destinations (%)↑
Germany	35	51,7	10,8	2,3	56,95
France	28,3	43	7,3	5	68,2
Belgium	38,9	-	8	3,4	59,95
Netherlands	34,4	51,3	9,1	2,7	75,85

Source: European Commission, EU Tourism Dashboard, https://tourism-dashboard.ec.europa.eu/

In 2023, indicators of digital progress in Western European countries show significant differences in the adoption of technologies.

Belgium records the highest percentage of e-commerce sales (38.9%), indicating a high level of trade digitalization and strong online business activity. Germany (35%) and the Netherlands (34.4%) also report significant shares, suggesting that online shopping and digital business models have become the standard in these countries. France (28.3%) ranks the lowest, which may indicate more traditional shopping habits or a slower development of e-commerce compared to neighboring countries.

Germany has the highest share of businesses using social networks (51.7%), showing that German companies are aware of the importance of digital marketing and communication with customers. France (43%) also reports a high percentage, indicating active use of social networks in business. The Netherlands (51.3%) is almost equal to Germany, which suggests that businesses are increasingly relying on social networks or using similar channels for communication and marketing. Data for Belgium is not available, so its position in this segment cannot be assessed.

Training of staff in digital skills is generally at a low level in all countries, with the highest share in Germany (10.8%), while France lags behind (7.3%). The demand for ICT specialists is highest in France (5%), while it is lowest in Germany (2.3%), which may indicate different needs in the labor market.

When it comes to internet speed at tourist destinations, the Netherlands stands out with the best average (75.85%), while Germany ranks the lowest (56.95%), which may affect the tourist experience and digital infrastructure in these countries.

Table2: Indicators of the digital pillar of Central Europe, 2023

State	E-commerce sales (%)↑	Enterprise using social media (%)↑	Personnel training on digital skills (%)↑	Enterprises seeking ICT specialists (%)↑	Internet speed at tourism destinations (%)↑
Bulgaria	34,4	19	3	2,7	67,66
Czechia	38,5	49,7	8,5	2	-
Estonia	33,2	37,6	10,2	2,1	56,08
Latvia	35,2	49,8	8,3	2	59,92
Lithuania	34,3	29,6	6,3	3,2	78,53
Poland	43,5	34,5	22,6	2	53,02

Source: European Commission, EU Tourism Dashboard, https://tourism-dashboard.ec.europa.eu/

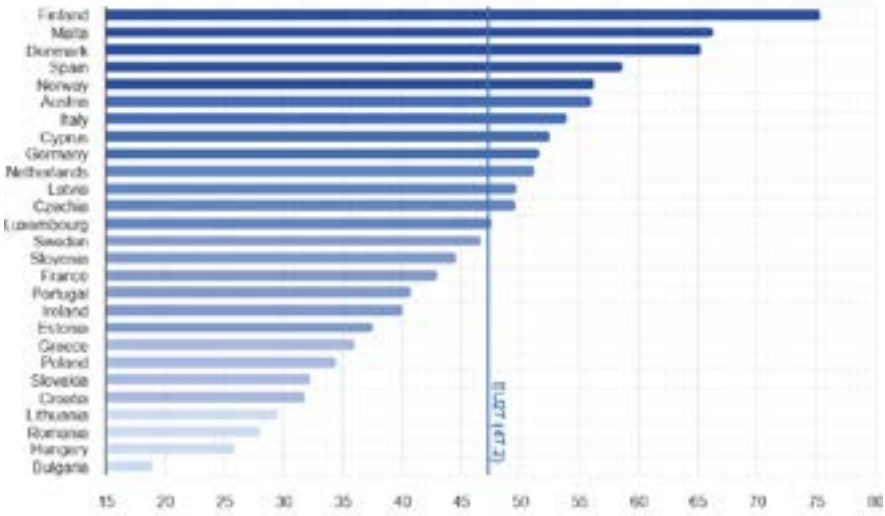
In 2023, digitalization indicators in Central Europe show significant differences in the use of digital tools and employee training.

E-commerce sales indicators in Central European countries indicate a relatively high level of business digitalization, but with significant differences between countries. Poland leads with 43.5% of sales through e-commerce, which indicates a strong development of the digital retail sector and a high level of acceptance of online shopping. On the other hand, Estonia (33.2%) records the lowest percentage, despite being known for advanced digital services, which may suggest different shopping habits or market structures. Other countries, including Bulgaria (34.4%), the Czech Republic (38.5%), Latvia (35.2%), and Lithuania (34.3%), show relatively consistent values, suggesting stable development of e-commerce in the region. These data

indicate that trade digitalization in Central Europe is on the rise, but also that there are differences in the speed of adopting e-commerce solutions, which may be the result of economic factors, levels of digital literacy, and infrastructure support.

The highest percentage of businesses using social networks is recorded in Latvia (49.8%), followed by the Czech Republic (49.7%), indicating well-developed digital marketing strategies in these countries. On the other hand, Bulgaria (19%) significantly lags behind, which may indicate a lower digital presence of companies or different business models. Other countries, such as Estonia (37.6%), Lithuania (29.6%), and Poland (34.5%), fall in the middle range, showing moderate use of social networks for business purposes.

Figure 2: Businesses using social networks (%), 2023



Source: European Commission, EU Tourism Dashboard, https://tourism-dashboard.ec.europa.eu/

The highest percentage of businesses training employees in digital skills is recorded in Poland (34.5%), indicating awareness of the importance of digital education for competitiveness. Estonia (10.2%) also has a high level of training, while other countries, including the Czech Republic (8.5%), Latvia (8.3%), and Lithuania (6.3%),show moderate investment in digital skills. Bulgaria (3%) has the lowest percentage, which may pose a challenge for further digital transformation.

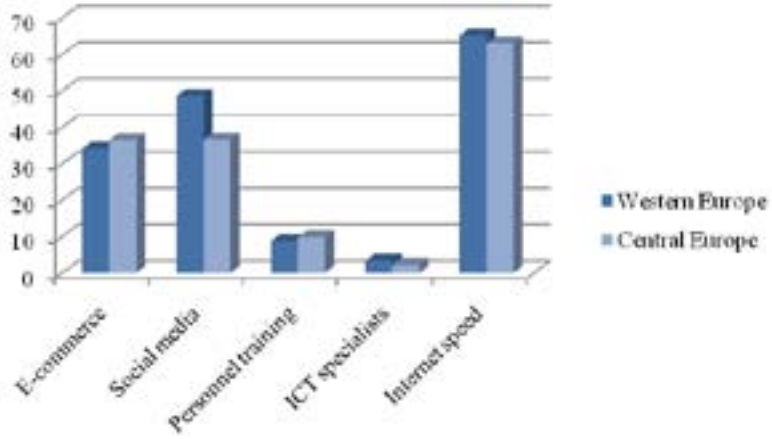
The percentage of businesses actively seeking ICT specialists is relatively low across the region. Lithuania (3.2%) records the highest demand, which may indicate a stronger digital transformation or a shortage of qualified personnel. On the other hand, the Czech Republic (2%), Latvia (2%), and Poland (2%) have identical and slightly lower levels of demand, while Estonia (2.1%) and Bulgaria (2.7%) are slightly above that average. These data may indicate moderate business digitalization or a limited number of job opportunities in the ICT sector.

Regarding internet speed in tourist areas, Lithuania (78.53) stands out as the leader in the region, which is a significant factor for modern tourists who rely on digital services. Bulgaria (67.66) also has good infrastructure, while Latvia (59.92) and Estonia (56.08) are somewhat lower on the list. Poland (53.02) records the lowest speed among the countries with available data, which may affect the user experience. Data for the Czech Republic are not available, which prevents a direct comparison.

The data suggest that some Central European countries have already recognized the importance of digitalization and investment in human resources, while others still need to accelerate this process to remain competitive in the digital market.

Numerous studies also highlight the importance of digitalization in the development of tourism and sustainability. Filipiak et al. (2023) state that ICT is probably the most important factor in the development of the tourism industry in EU countries. Kaur et al. (2024) point out that, with the assistance of digital technology, tourist destinations can progress on the path to sustainability.

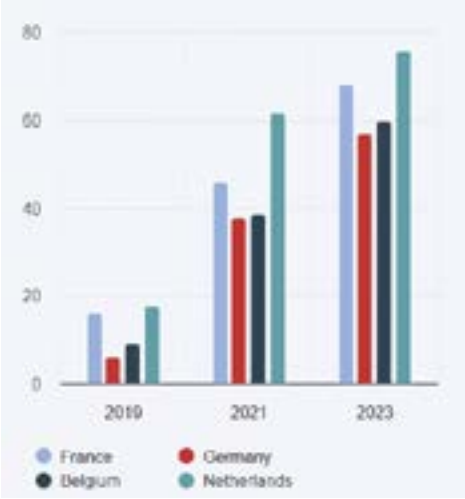
Chart 1: Representation of the average presence of the digital pillar indicators inselected countries (%), 2023



Source: Authors

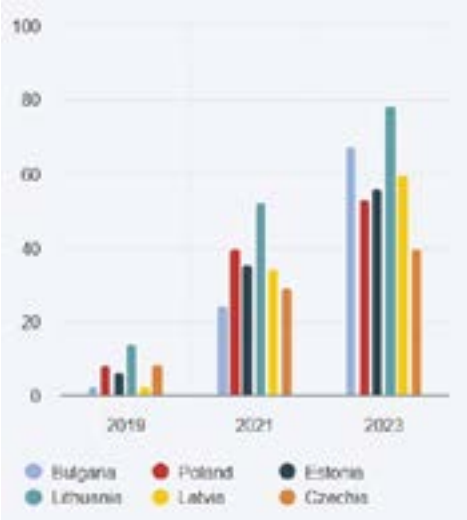
Chart 1 provides an insight into the average presence of the digital pillar indicators in the countries of Western and Central Europe. E-commerce sales are the third most represented indicator, right after the «enterprises using social media» indicator, which indicates strong development in the digital commerce sector across both groups of countries. Western European countries lead in the use of social media, particularly in the domain of digital marketing. The percentage of businesses training employees in digital skills is not at a high level, with the observed groups of countries being almost equal in this regard. The percentage of businesses actively seeking ICT experts is relatively low in the given countries, with this indicator showing the lowest frequency. Internet speed in tourist areas, as an indicator, shows the highest level of presence in the observed countries of Western and Central Europe, indicating the recognition of the significant need for quality network infrastructure.

Figure3: Internet speed in Western European countries (%), 2019, 2021, 2023



Source:European Commission, EU Tourism Dashboard, https://tourism-dashboard.ec.europa.eu/

Figure4: Internet speed in Central European countries (%), 2019, 2021, 2023



Source: European Commission, EU Tourism Dashboard, https://tourism-dashboard.ec.europa.eu/

Considering the significant results regarding digital infrastructure and internet connection speed at tourist destinations, Figures 3 and 4 present comparative measurements for selected European countries during 2019, 2021, and 2023. A constant growth trend is noticeable, indicating ongoing efforts to ensure adequate network support, which directly impacts tourist satisfaction.

5. CONCLUSION

The EU Digital Pillar represents a key element in analyzing the level of digitalization in the tourism sector. Its main goal is to promote technological transformation, increase efficiency, enhance innovation, and strengthen the competitiveness of tourist destinations in the global market. This pillar is part of the broader concept of the green and digital transition, which the European Commission has set as a strategic objective for achieving a sustainable future.

This research analyzes the key indicators of the digital pillar in the countries of Western and Central Europe during 2023. These indicators include e-commerce sales, the use of social networks by tourism enterprises, employee training in digital skills, demand for ICT experts, and internet connection speed at tourist destinations. The data was collected from official sources, including the European Commission and national statistical offices.

The research results indicate significant differences in the degree of digitalization among the analyzed countries. Belgium leads in e-commerce sales (38.9%), while Germany has the largest share of businesses actively using social networks (51.7%). Poland shows the highest investment in employee training in digital skills (22.6%), and Lithuania has the best internet infrastructure in tourist areas (78.53%). These data suggest that digital transformation in European tourism is ongoing, but with significant variations between countries. However, it can be noticed that the groups of countries being examined are converging in terms of the digital pillar, which provides a positive answer to the research question.

It is notable that less developed economies in Central Europe lag behind in the percentage of enterprises actively using social media. The recommendation is to consider the practices of Western European countries and apply their development system. Regarding the other examined indicators, it can be stated that the results of the countries are similar, with a shared direction and a common goal – digital development.

In conclusion, the digital pillar plays a crucial role in modernizing the tourism sector in Europe. Increasing investment in digital infrastructure, enhancing the digital competencies of employees, and strengthening the presence of tourism businesses in the digital environment are key steps toward a sustainable and competitive tourism industry of the future.

The recommendation for future research is to analyze the remaining two pillars, the green pillar and the socio-economic pillar. Furthermore, it would be beneficial to expand the scope of the study to include additional EU member states.

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