



## **The Implementation of Digital Technology in Romanian Rural Tourism and the Associated Challenges**

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### ABSTRACT

Digitalization is undoubtedly one of the most significant transformations currently reshaping our society. New technologies, including artificial intelligence, augmented reality, cloud computing, etc., are changing the way people plan and experience travel and present opportunities not only to reach new consumers with novel tourism products, but also to improve the operations and performance of businesses in the rural tourism sector and accelerate the transition to more sustainable business models. These changes have created both new opportunities and challenges for tourism businesses, which are striving to meet consumer demands and gain a competitive edge. Accordingly, the objectives of this paper are to examine the extent to which suppliers of rural tourism services in Romania have integrated digital technologies into their operations, to identify the barriers they encounter in this process, and the challenges they perceive. The proposed objectives were achieved through direct research (a survey) conducted among rural tourism service suppliers in Romania. The paper provides an overview of the current state of digitalization in the Romanian rural tourism industry and the challenges associated with adopting digital technologies. The findings reveal that Romanian rural tourism service suppliers have implemented digital technology at a low level, primarily due to challenges such as limited financing, high costs, and inadequate knowledge. The results of this study can provide valuable information to those managing Romanian rural tourist destinations, tourism companies, and to all those interested.

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## 1. Introduction

We live in an era of unprecedented connectivity. Digital technologies, including generative AI, immersive technologies, and blockchain, have transformed the tourism industry, revolutionizing products, experiences, and business ecosystems. Digitalization has transformed the traditional roles of tourism producers and consumers, giving rise to new relationships, business models, and skills. Internet-connected devices have influenced tourism at the infrastructure and communication levels. Digital platforms have increased the availability of tourism products and services, with on-demand functionality accelerating economic transactions and market feedback. As a result, the global tourism industry has increasingly recognized the importance of digital transformation in enhancing service delivery and redefining travel experiences (Gkiliyas, 2024). Despite these changes, tourism suppliers face challenges in meeting consumer demands and gaining a competitive edge.

Digitalization presents both challenges and opportunities for rural tourism suppliers. The fragmented tourism sector, including transportation, hospitality, and cultural services, faces varying digitalization challenges. Businesses differ in terms of human resources, access to financial resources, awareness levels, and digital skills. In rural tourism, these challenges are amplified at both business ecosystems and destination levels.

Considering all this, the objectives of this paper are to examine the extent to which suppliers of rural tourism services in Romania have integrated digital technologies into their operations, to identify the barriers they encounter in this process, and the challenges they perceive. The significance of this investigation is emphasized by the urgent need to enhance the competitiveness of rural tourism through digital innovation, aligning it with current digital trends in European and global rural areas. The novelty lies in the approach and its comprehensive coverage of the entire country.

## 2. Literature Review

Digitalization has been identified as the most significant technological trend changing both society and the business environment (Leviäkangas, 2016). Digitalization refers to the use of digital technologies and data to generate revenue, improve business operations, replace or transform business processes, and create an environment for digital business, in which digital information is essential (De Clerck, 2017). Digitalization creates new forms of interaction between companies and customers (Crittenden et al., 2019). Recent advancements in digital technology have

significantly enhanced the operational efficiency of companies, enabling them to access global markets with greater ease (Triwahyono et al., 2023).

A significant number of research studies have been undertaken to explore the impact of technology on tourism practices, service infrastructures, and the relationships that underpin them (Disztinger et al., 2017; Gursoy et al., 2019; Kim et al., 2020; Bec et al., 2021; Chkhotua, 2021; Falter & Jóhannesson, 2023; Alonso Gallo et al., 2024).

The tourism industry can utilize technological advancements to provide consumers with innovative travel experiences through the use of smart technology. By adopting digital solutions, companies can reduce operational costs, enhance productivity, and improve profitability in a competitive market (Sinaga & Hermawan, 2023).

Goldfarb and Tucker (2019) argue that digital technologies can reduce costs in five areas, including search costs, replication costs, transportation costs, tracking costs, and verification costs. Reducing replication costs can help companies innovate in new product development. Urbinati et al. (2020) similarly suggested that digital technologies can reduce the cost of knowledge management and help firms develop and cultivate open innovation. Furthermore, since the key to successful innovation is the management of information and knowledge (Barba-Sánchez et al., 2021), which is carried in data, digitalization becomes an innovation strategy (Saura et al., 2021).

In the evolving digital age, the internet and digital technology have opened up new opportunities for the tourism industry to explore broader market potentials (Sciarelli et al., 2018).

The capacity of the digital tourism sector to generate significant revenue has drawn considerable attention from the academic community, as well as within political and regional forums, and the EU policy agenda (World Tourism Organization, 2020; European Commission, 2021; Kergroach, 2021). This emphasis is particularly relevant in the context of rural regions. The interplay between rurality and digital tourism has recently shaped development strategies and plans in these areas, as evidenced by the EU's community policy agenda.

Regarding the implementation of digitalization in rural Romania, studies show that while digitization has improved in rural areas (internet access, digital tools in local administration, interest in Smart Villages funding), there remain noticeable gaps compared to urban areas and other European countries (Epure et al., 2024).

In the context of digital transformation within Romanian rural tourism, the scholarly literature is limited, and the majority of existing studies tend to concentrate on regional analyses or only specific components. For example, Moise et al. (2023)

evaluated several villages in Sibiu County to see how “smart” they are as tourist villages. Ciolac et al. (2022) studied the idea of how villages in Maramures could integrate rural resources and digital infrastructure/perception by both tourists and owners. Both studies emphasize the infrastructure limitations, financial constraints, fragmentation, and lack of coordination.

Rus and Tutunea (2013) examined how rural accommodation in Cluj uses ICT: their internet presence, infrastructure, and how these influence innovation in rural tourism, finding that rural areas often have weak broadband/internet connectivity, poor digital hardware, sometimes unreliable power or telecom services.

Although it is not limited to rural tourism, another pilot study (Musteață-Pavel et al., 2022) examined how tourism businesses utilize digital marketing and online communication channels. It shows there is interest, but many companies underutilize digital marketing tools.

### **3. Methodology**

To achieve the proposed objectives, direct quantitative research was undertaken. This was conducted using the online research platform Google Forms, achieved through the administration of surveys targeting the suppliers in Romanian rural tourism (individuals, companies, and cultural institutions). The survey took place from May to October 2024, using a questionnaire primarily distributed through online channels (email, social networks, forms on web pages). A total of 43 responses were collected through face-to-face interactions, and participants completed the questionnaire on a tablet computer. As a result of these actions, a sample considered representative of 535 valid responses was obtained with a probability of 95% and an error of  $\pm 3\%$ . The questionnaire architecture comprises four sections. The first refers to the respondent's profile for which single-answer and multiple-answer questions were used. The second section is designed to evaluate the current level of digital technology implementation among Romanian rural tourism service suppliers. For this purpose, questions with single or multiple answers were also used. The third section focused on identifying strategies for the continued implementation of technologies through a structured single-answer question format. The final section aimed to identify the key challenges and barriers faced by Romanian rural tourism service suppliers in implementing digital technologies. To achieve this, scaled questions (bipolar Likert scale) and multiple-choice questions were used. The responses were anonymous with a balanced distribution representative of the entire country (on regions: 18.13% N-W., 26.91% Center, 12.15% N-E., 16.64% S-E., 8.79% S - Muntenia, 1.68% Bucharest – Ilfov, 7.29% S-W. Oltenia, and 8.41% W.). In terms of

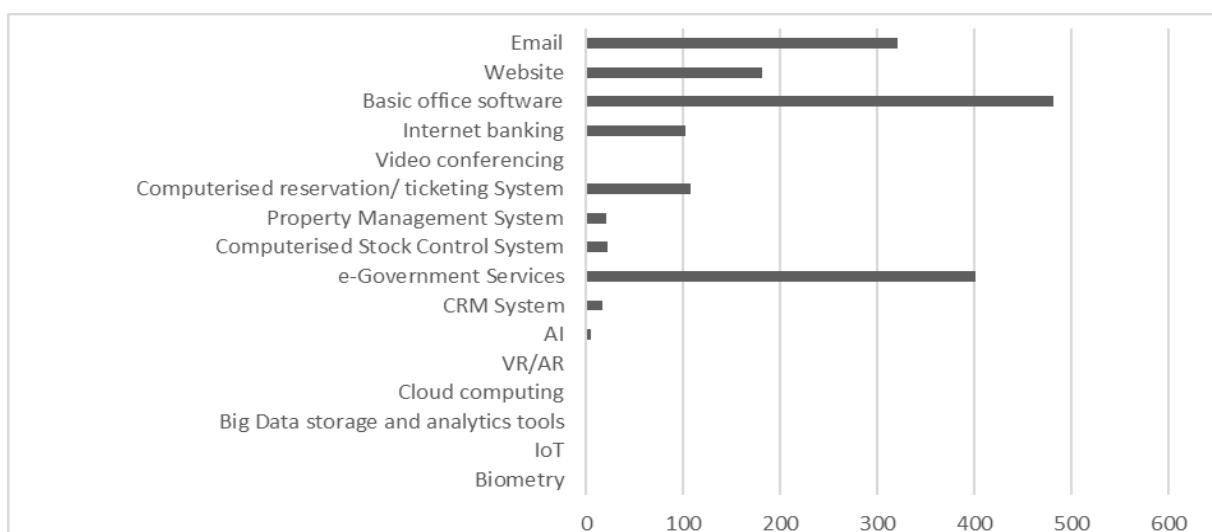
services provided, the majority of respondents were identified as being part of the hospitality sector, with a total of 416 participants. This was followed by those providing transport services, accounting for 56 respondents. Additionally, 45 respondents were from recreational and outdoor services, 15 from cultural services, and a small group, comprising 3 respondents, represented other sectors (such as SPA).

#### 4. Results and Discussion

The research results presented below are based on the responses collected through the survey.

##### 4.1. Level of digitalization

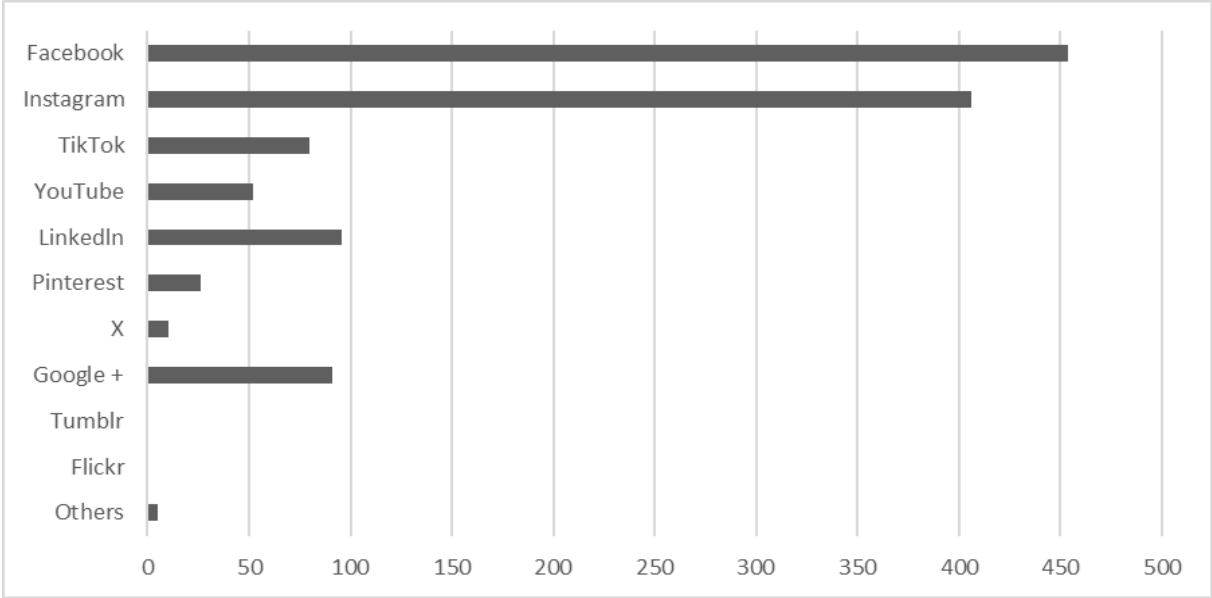
The survey aimed to identify the digital technologies currently used by Romanian rural tourism suppliers in their day-to-day operations (Fig. 1). The data obtained show that they mainly use basic office software (89.91%), E-Government services (74.95%), and email (60%). 181 of the respondents (33.83%) indicated that they are maintaining a website. Conversely, businesses reported no utilization of emerging technologies such as biometrics (0%), virtual or augmented reality (0%), or the Internet of Things (0%). Notably, several systems that are widely advocated as facilitators of business operations, enhancing efficiency and ease of work, remain underutilized. These include Customer Relationship Management (CRM) systems (2.99%), computerised stock control systems (3.93%), and cloud computing (0%).



**Fig. 1.** Digital technologies currently used by Romanian rural tourism businesses

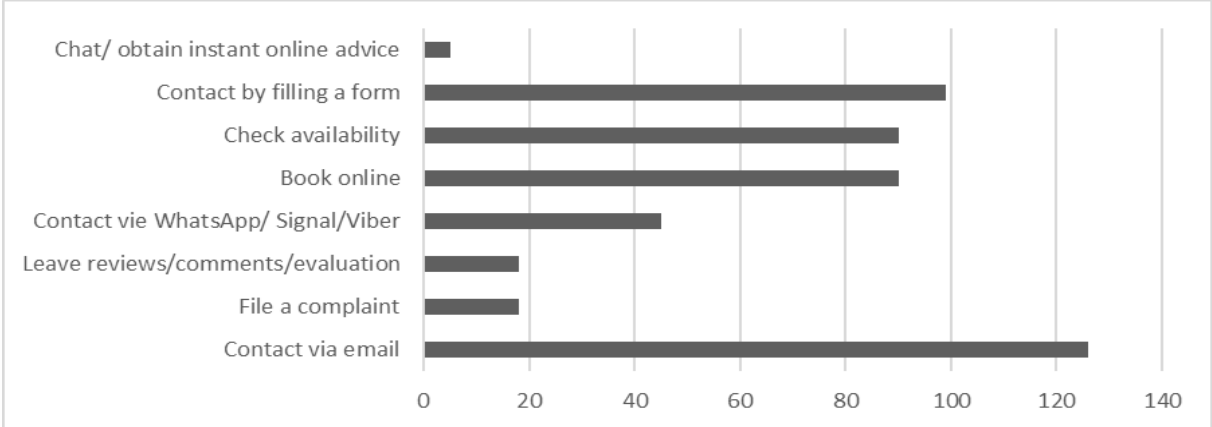
Source: Author's elaboration based on survey responses

A whopping 98.69% of suppliers surveyed reported using social media platforms. Of these, Facebook (85.98%) and Instagram (76.89%) are the most used. At the other end of the spectrum are X, Tumblr, and Flickr (Fig. 2).



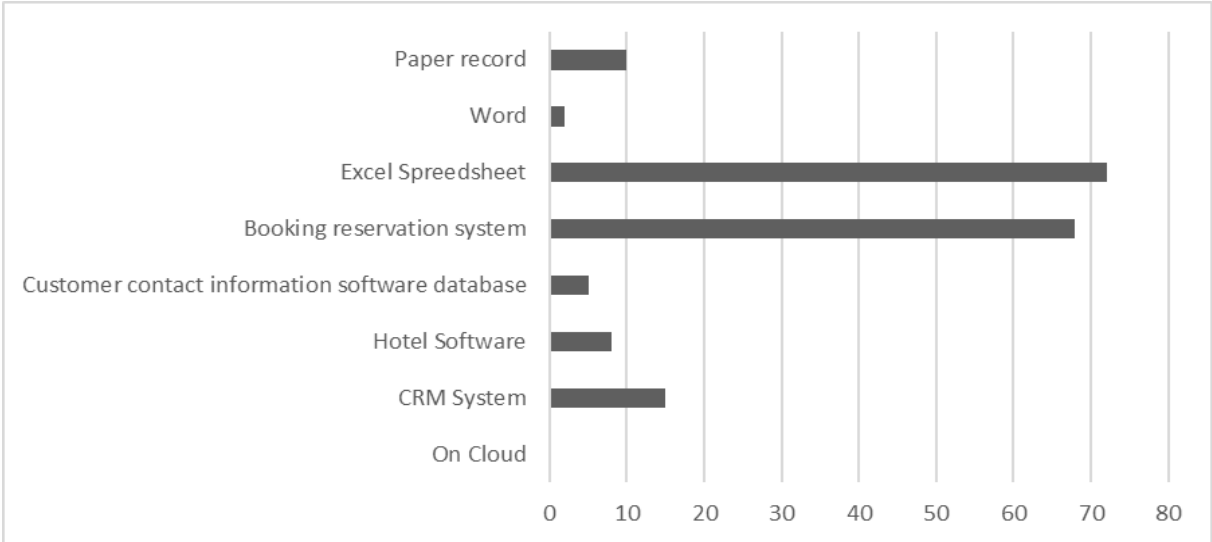
**Fig. 2.** Social media platforms used  
 Source: Author's elaboration based on survey responses

The survey focused on the 181 respondents who had previously indicated they possessed online websites (Fig. 3). Its purpose was to evaluate the complexity of their online presence. The responses received show that the most common feature available on these sites is the email contact function (69.61%). Other common functions include filling out a form (54.70%) and checking availability and booking online (49.72%). As previous responses have shown, Romanian rural tourism suppliers have adopted more advanced digital technologies to a lesser extent.



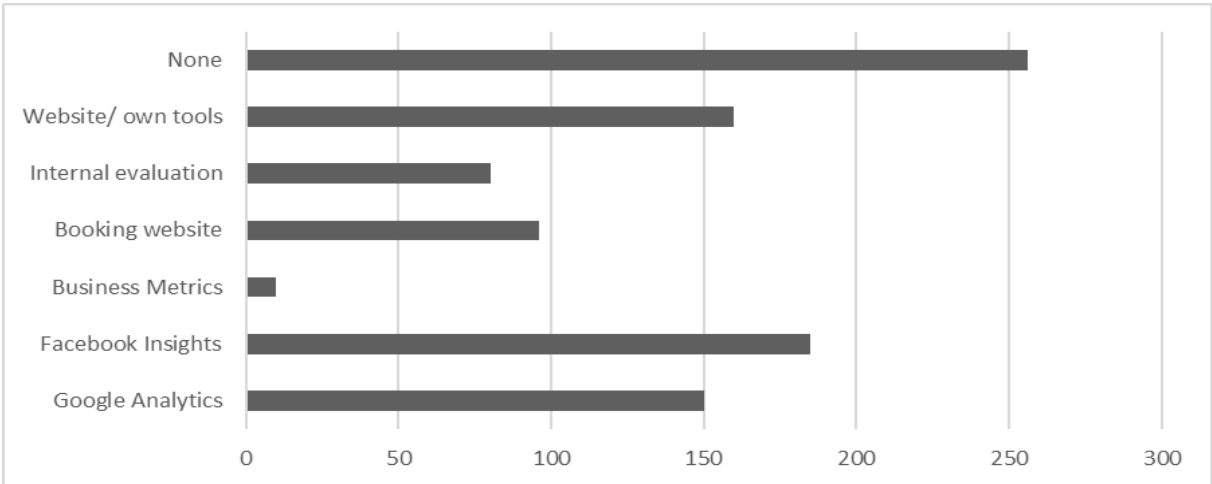
**Fig. 3.** Functionality of websites of Romanian rural tourism suppliers  
 Source: Author's elaboration based on survey responses

A low percentage—only 21% of suppliers—reported storing customer information. This highlights a significant gap in data management practices that could impact customer relationships and overall business success. Further data from the survey (Fig. 4) shows that most customer information is stored in Excel (64.28%) and in the reservation system (60.71%).



**Fig. 4.** Storage of customer information by Romanian rural tourism suppliers  
*Source:* Author's elaboration based on survey responses

Romanian rural tourism suppliers were surveyed regarding the analytical tools they use to measure their communication with the customers (Fig. 5). Nearly half (47.85%) reported that they do not use any such tools. Among those who do, the most commonly used tools are Facebook Insights, utilized by 34.58 % of respondents, and their tools, used by 29.91%.



**Fig. 5.** Analysis tools used regarding customer communication  
*Source:* Author's elaboration based on survey responses

The findings indicate that the level of digitalization in Romanian rural tourism ranges from low to medium. A low level of digitalization refers to the use of basic digital tools and practices that assist with internal management and daily operations of the businesses. A medium level of digitalization involves more advanced tools and practices that enhance the efficient management of enterprises and improve connections with value chains, including consumers, suppliers, and networks. This level also facilitates multidirectional communication and knowledge exchange.

#### **4.2. Plans for further implementation of digital technologies**

Participants in the survey were asked about their intentions to adopt additional digital technologies. The results revealed that 37.58% of respondents have not considered or are not planning to introduce any new digital technologies in the near future. Meanwhile, 34.20% indicated that they are considering adopting new technologies within the next 12 months, and 28% plan to do so within the next 2-3 years.

#### **4.3. Challenges and obstacles in the implementation of new digital technologies**

Additionally, the survey questions helped identify the primary challenges suppliers of Romanian rural tourism services encounter when adopting digital technologies (Table 1). These are primarily related to costs and then to the level of training in the ICT field. Thus, the five most significant difficulties consist of: the concern that the technology may become obsolete before the investment can be fully recovered; high costs and their uncertain profitability as benefits; the need for training following the introduction of a new digital technology; insufficient technical knowledge to make informed choices; and insufficient knowledge to identify opportunities and make appropriate decisions.

**Table 1.** Challenges facing rural tourism suppliers when implementing new digital technologies

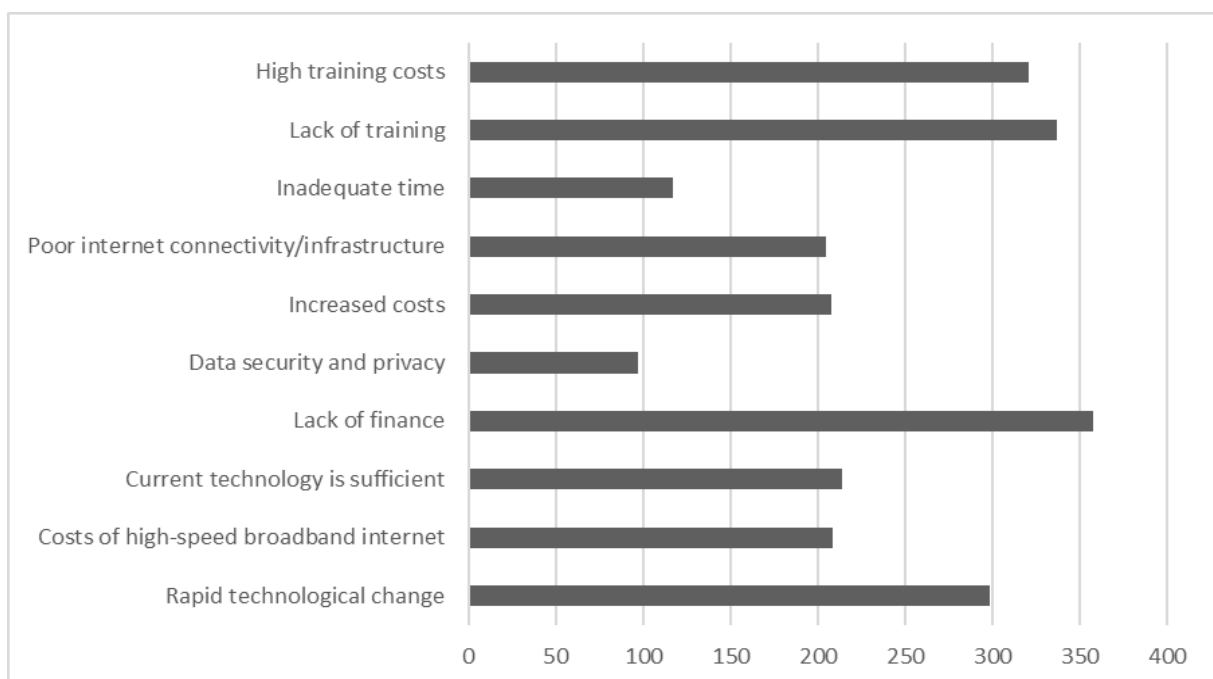
	<b>Strongly agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly disagree</b>	<b>Average</b>
	5	4	3	2	1	
<b>Concern over technology becoming obsolete before returning the investment</b>	192	165	112	64	2	3.90
<b>The costs and their uncertain returns as benefits</b>	182	180	102	69	2	3.88
<b>Resistance from staff to the new digital technology</b>	37	102	171	219	6	2.90

<b>Need for training following the introduction of a new digital technology</b>	112	278	59	59	27	3.73
<b>Lack of an off-the-shelf product within budget</b>	80	160	193	96	6	3.40
<b>Potential impacts on staff practices</b>	118	177	96	134	10	3.48
<b>Insufficient technical knowledge to make informed choices</b>	166	123	80	165	1	3.54
<b>Insufficient knowledge to be able to identify the opportunities</b>	165	112	86	171	1	3.50

Source: Author's elaboration based on survey responses

These difficulties are not surprising, as most rural tourism businesses are owned by small entrepreneurs who typically have limited resources, financial and labor-related. Additionally, they often lack the skills for digitalization and other essential resources, such as initial capital investments and ongoing technical support, which are necessary for effective training.

The study also attempted to identify the obstacles that prevent Romanian rural tourism suppliers from adopting new digital technologies (Fig. 6).



**Fig. 6.** Obstacles to further improving digitalisation

Source: Author's elaboration based on survey responses

Lack of financing is identified as the number one obstacle preventing the implementation of new digital technologies by Romanian rural tourism suppliers (66.92% of respondents indicated this). After the significant losses recorded during the COVID-19 pandemic (the tourism industry being the most affected as it was forced to cease its activity several times), the most difficult thing is especially for small and medium-sized entrepreneurs who are still trying to recover, to invest in digital innovation. The integration of digital technologies, particularly advanced ones like Big Data, cloud computing, and AI, requires substantial investments in costs, infrastructure, and skilled personnel. It is normal for rural tourism suppliers, with limited budgets, to perceive the costs of adopting these technologies as inaccessible. A second major obstacle is the lack of training (63% of respondents). Implementing and managing digital technologies necessitates specialized skills, which small businesses in rural areas may struggle to acquire, resulting in operational difficulties. This justifies the third perceived obstacle, relating to the high costs of training in digital skills (60% of respondents). The fourth perceived obstacle reflects a concern that technology is evolving too rapidly (55.89% of respondents), leading to uncertainties regarding the sustainability of investments. In particular, family-owned businesses tend to refrain from investing in digital innovations, which may indicate a lack of awareness regarding the potential benefits these technologies can offer. By understanding and implementing appropriate strategies, they can effectively capitalize on the opportunities presented by the digital landscape. In fact, in fifth place in the “top” of obstacles is the perception that current technology is sufficient (40%). While it is not a concrete “obstacle”, such as technology costs or human resource capabilities, the obstacle itself is the decision on the level of digitalization that would be appropriate under very context-specific conditions. Many rural tourism suppliers regard digital technologies as more suitable for certain industries or large urban corporations, perceiving these innovations as having limited applicability and relevance to their unique needs or the scale of their operations.

## 5. Conclusion

Digitalization presents a range of tools, frameworks, and technologies that can significantly enhance tourism products and experiences. However, the successful implementation of digitalization is contingent upon the sector's ability to effectively share knowledge, learn from one another, and foster collaboration.

To face competitiveness, the suppliers in the rural tourism sector must remain open and adopt technological innovations that meet the needs and requirements of tourism demand and market trends.

This study showed that the difficulties and obstacles faced or perceived by Romanian rural tourism suppliers are largely related to the individual circumstances of their businesses. Lack of financing, costs, and lack of ICT knowledge are the key challenges.

Despite the potential benefits, interest in digitalization is relatively low among the suppliers of Romanian rural tourism services, and the use of these technologies is still largely limited to basic software.

Addressing the gaps in technology adoption is crucial to prevent a growing digital divide between the Romanian tourism industry and its international counterparts, as well as within the domestic market.

Small tourism businesses, particularly, require support to overcome barriers to digital adoption in business planning and decision-making regarding new technologies for effective use.

The public sector, professional associations, and destination management organizations should play crucial roles in providing consultancy and advice: financial assistance to reduce investment burdens, and promote innovative solutions and digital skills; assist in developing digital strategies that best fit their current state of digitalization and existing resources (these digital strategies should not be stand-alone, but should also focus on integration strategies into existing digital supply chains); assist in developing appropriate training plans to acquire new digital skills that are in line with destination or sector-level digital strategies (these training plans can help them identify current and future skills gaps, as well as explore the range of options to address these gaps), and mentoring initiatives that can stimulate innovation, improve creativity and idea generation, help build capacity, and improve connectivity between tourism suppliers, technology companies, the arts and culture sector, and other start-ups.

Furthermore, national tourism policy plays a crucial role in shaping the digital environment for rural tourism, ensuring that tourism suppliers can adopt new technological solutions to enhance internal operations and innovate tourism services.

The limitations of this research include the fact that the analysis was based solely on the responses collected from the survey. Additionally, it focused only on rural tourism service suppliers and did not consider all stakeholders in the rural tourism industry. Furthermore, this study is not intended to be the definitive model of analysis; rather, it aims to promote discussion on this important issue and to guide future research.

While the importance of digital technologies to the rural tourism industry is widely acknowledged, much more needs to be learned about their adoption, their benefits, and their risks.

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