THE ROLE OF TELECOMMUNICATIONS IN SUSTAINABLE DEVELOPMENT OF TOURIST DESTINATIONS

Marija Vukoja
Irijana Rajković
Dino Baričević

Abstract

Purpose – This paper provides an overview of theoretical and practical knowledge regarding the role of telecommunications in managing sustainable tourism destinations. The aim is to determine the role of telecommunications in managing sustainable tourism development through assessing the level of telecommunications development in tourist destinations and their utilization in sustainable tourism management. The purpose of the study is to enrich the understanding of the connection between the development of telecommunications, sustainable and destination tourism development.

Methodology – The paper is based on primary and secondary research, including the analysis of statistical data on telecommunications development, sustainability, and tourist development in destinations, as well as empirical research on the perception of entrepreneurs in the tourism sector in Croatian tourist destinations regarding the role of telecommunications and information and communication technologies in sustainable tourism development and the level of telecommunications development in the destination. The research results were processed using descriptive statistics and presented in tables and graphs.

Findings – The results show a high level of availability of telecommunications services in Croatian tourist destinations and positive effects of telecommunications on destination sustainability, but also the shortcomings. A causal relationship between telecommunications development and sustainability, as well as telecommunications and tourist development, was also identified in Croatian tourist destinations.

Contribution – The research results can contribute to enriching the literature on the impact of telecommunications on the development of tourism destinations and be useful in future research efforts to deepen existing knowledge and understanding of destination management mechanisms through the application of telecommunications technologies.

Keywords: telecommunications, information and communication technologies, smart destination, sustainable development.

INTRODUCTION

Tourism is viewed as a global phenomenon that exhibits quantitative and qualitative dynamics and potential, with a significant contribution to the economy and employment. By examining the historical development of tourism, it is clear that the development of telecommunications has determined the dynamics of tourism development and continues to have a significant impact. On the other hand, tourism, by connecting the most distant emitting and receiving markets, stimulates innovations in telecommunications. The development of telecommunications has enabled the transmission of information over

long distances and the connection of geographically distant tourist destinations. Looking back at the history of tourism, it can be confidently stated that the Computer Reservation System (CRS) in the 1970s, the Global Distribution System (GDS) in the 1980s, and the global expansion of the Internet in the 1990s marked a turning point in the tourism industry (Galičić 2015) and opened up broad possibilities for tourism operations. However, this would not have been possible without a developed telecommunications network in the destination.

Given that tourism is based on the exchange of information and communication, it is understandable that the tourism industry has been among the first to harness telecommunications innovations for its needs. Theoretical and practical knowledge (Seetanah, 2019; Amriddinova and Shirinova 2022) highlight the crucial role of telecommunications in the development of a tourist destination.

Telecommunication technologies (telegraph, telephone, mobile phones, smartphones, radio, TV, video telephony, satellites, closed computer networks, Internet, etc.) have improved the operations of all stakeholders in the tourism sector and during tourist journeys. They have contributed to enhancing the quality of services and improving the tourist experience. Modern telecommunications are focused on addressing challenges that involve transmitting large amounts of information over long distances without loss due to noise or interference (Borth et al. 2023).

Modern digital telecommunication systems have enabled the transmission of voice, data, radio, and television signals. They provide high reliability and ensure significantly lower costs of information transmission compared to analog systems. The Internet has become an excellent platform for communication and sharing of information that facilitates immediate access and distribution of tourist information, enables the booking of tourist services and products, and at the level of a tourist destination, better positioning and reaching a larger number of tourists through traditional channels due to an interactive environment in which tourists can shape your trips according to your own wishes and needs (Buhalis and O'Connor 2005).

In recent years, revolutionary progress has been achieved in mobile communication networks and the Web of Things (WoT). The "fifth generation" (5G) of telecommunications systems has significantly increased data capacity and data transmission speed compared to 3G and 4G (European Court of Auditors, 2022). With the help of the Internet of Things (IoT) and WoT, it allows for the interconnection of devices within tourist facilities (such as security cameras, smoke detectors, doors, etc.) and their connection via the web using the main technology (e.g., smart home technology) and standards, in order to be accessible to users (e.g., owners of hospitality establishments).

Furthermore, 5G services are essential for a wide range of innovative applications (European Court of Auditors 2022) that enable the management of various aspects of tourism development, such as data collection platforms generated by users and tracking statistics on the use of tourism resources in a destination. These applications can be valuable to tourism destinations in obtaining information on user preferences and needs (Pierdicca, Paolanti, and Frontoni 2019), intelligent platforms for integrating data collected from various areas through mobile phone signalling on tourist flows at specific

locations within the destination (Tuo, Ning, and Zhu 2021), and more. Telecommunications, particularly digital technology and artificial intelligence driven by the development of 5G technology, are changing tourists' behaviour as well as the management of sustainable tourism destinations.

Tourist destinations are facing increasing challenges in terms of social, economic, and environmental sustainability. The development of telecommunications infrastructure in a destination forms the basis for the implementation of innovative approaches to managing sustainable tourism destinations, such as the *European Tourism Indicators System* (ETIS). This tool encourages a smarter approach to tourism planning and has multiple benefits, including management tools, sustainability performance monitoring systems, and an information tool (European Commission n.d.). Improvements in the telecommunications sector facilitate more efficient flow of information, leading to the introduction of new products and services in the market. In the context of sustainability as a fundamental global goal and tourism policy in the European Union, enhanced telecommunications bring new scenarios for destination management, including new management models such as the smart tourism destination model (Ivars-Baidal et al., 2019).

The aim of this study is to determine the role of telecommunications in managing sustainable tourism development in terms of the development of telecommunications in tourist destinations and their use in sustainable tourism management. The underdevelopment of the telecommunications network in tourist destinations poses a challenge and threat to these destinations and their competitiveness, highlighting the need for continuous monitoring of the development of telecommunications infrastructure in tourist destinations and the development of telecommunications infrastructure in line with market trends in telecommunications services. The purpose of this study is to enhance our understanding of the connection between the development of telecommunications infrastructure and the development of tourist destinations.

1. LITERATURE REVIEW

By reviewing the literature, it is evident that there is a growing interest among professionals and researchers in the field of telecommunications (Babu and Subramoniam 2016; Car, Pilepić Stifanich, and Šimunić 2019; Nikoli and Lazakidou 2019) and sustainable tourism destination development (Krstinić Nižić, Vodeb, and Šverko Grdić 2020; OECD 2021; Santos et al. 2022). Nikoli and Lazakidou (2019) advocate the view that telecommunications, together with information technologies, have brought changes to the global business environment through a wide range of tools, methodologies, and functions, facilitating strategic management and supporting companies in achieving long-term competitive advantages. It would not be an overstatement to say that there is no human activity segment in which telecommunications have not created new possibilities. This is particularly true for mobile technology. Several authors (Babu and Subramoniam 2016; Car, Pilepić Stifanich, and Šimunić 2019) highlight how telecommunications have enabled easy and fast communication, almost instant transmission of large amounts of data over long distances, easy publication and updating of multimedia documents with global

accessibility 24/7, digital delivery of goods and services, direct online payments, creation of virtual organizations, IoT, and more.

Fafurida, Ineke, and Winda (2018) recognize tourist infrastructure as a tourism requirement that needs to be prepared or provided to enhance the tourism industry. Consequently, if there is a need for telecommunications, they become an integral part of the tourism infrastructure in a destination and an important factor in attracting tourists to the destination. Nonthapot and Watchalaanun (2015), analysing the causal relationship between international tourist arrivals and investments in telecommunications, discovered their two-way long-term impact. Improving telecommunications services and investing in the telecommunications industry directly influence the growth of international tourist arrivals. Research by Seetanah (2019) highlighted the positive effects of investing in telecommunications infrastructure on the development of tourism and the tourism industry in Mauritius.

Hamid et al. (2016) discovered a significant impact of communication and presentation of virtual travel on tourists' decision to visit Malaysia. This is supported by a study by the OECD (2020) that reveals the ability of social media and peer-to-peer platforms to drive temporal and geographical concentration of tourist visits. The study also emphasizes the importance of economic, cultural, and environmental sustainability and highlights the negative effects of poor tourism growth management in destinations. The establishment of necessary digital infrastructure in a destination, connecting various platforms that provide destinations with flexibility to respond to peak demand situations, is considered a valuable tool to support more effective visitor flow management. Geographic Information System (GIS) and location data (GPS) from mobile networks are seen as important in managing tourism development and understanding visitor flows. There is potential for more efficient tourism management through mobile communications, which enable tracking of individual mobility and tourist behaviour. Benckendorff, Xiang, and Sheldon (2019) provide an overview of key aspects of the mobile technology ecosystem, including mobile devices, signals and sensors, operating systems, and applications, and highlight the functions of mobile devices in tourism. They particularly emphasize the use of information technology for environmental, economic, and cultural sustainability in tourism destinations. The OECD (2021) views sustainability as a guiding principle in the recovery of tourism destinations after the Covid-19 crisis, and digitalization as one of the key drivers of change that enables economically sustainable business development in the tourism industry.

Indeed, research is further focused on smart tourism destinations as a new management model arising from the influence of information and communication technologies on tourism and its development (Ivars-Baidal et al. 2019; Soares et al. 2022). According to Gelter et al. (2022), the concept of smart tourism destinations is primarily derived from the introduction of ICT infrastructure and efficiency in tourism and destination management.

However, research that provides a direct approach to the connection between telecommunications and the management of sustainable development in tourist destinations is lacking. Implementing appropriate destination management appears to be crucial for the success of a destination (Santos et al. 2022). Considering the ongoing

advancements in the field of telecommunications, it is important to complement existing literature by analysing the current state of telecommunications in a destination, its causal relationship with tourism development and destination sustainability. This would contribute to research and fill the gaps in existing literature, particularly in the context of the role of telecommunications in the sustainable development of Croatian tourist destinations.

2. THEORETICAL FRAMEWORK OF TELECOMMUNICATIONS AND SUSTAINABLE TOURISM DEVELOPMENT

Telecommunications, from a scientific and practical perspective, refers to the transmission of information (speech, music, text, images, video) using electromagnetic means (Borth et al., 2023). It is a form of communication that enables the exchange of information over long distances, and it consists of various telecommunications services provided to end-users by telecommunications operators (The Miroslav Krleža Institute of Lexicography, 2021). The transmission and switching of information between users are facilitated by a built telecommunications network, which users can access through end devices such as telephones or local area networks. Telecommunications is closely related to information and communication technology (ICT), but it is important to distinguish between the two. While telecommunications focus on the transmission of signals containing information, ICT encompasses technology that facilitates the transmission of information and communication. Telecommunications can be seen more as hardware and infrastructure technology necessary for the operation and functioning of ICT.

Telecommunications and ICT contribute to the development of tourism and bring significant benefits to the tourism industry. It is a fact that every destination visited by tourists experiences economic, social, and environmental impacts, whether positive or negative. The increasing pressure of tourist flows on infrastructure, the environment, local communities, other economic sectors, and society at large (OECD, 2020) has led to the recognition of the need for more sustainable and inclusive growth. Sustainable tourism is not seen as a new form of tourism but rather as a goal that all forms of tourism should strive for (OECD, 2021). Achieving sustainable tourism and sustainable development of a tourist destination is an ongoing process that requires continuous monitoring of economic, social, and environmental impacts, finding responses to current challenges, and establishing a foundation for future tourism policies and policies for managing sustainable destination development.

In 2007, the European Union adopted the Agenda for a Sustainable and Competitive European Tourism (European Council, Council of European Union, 2022), which addresses the challenges of sustainable tourism, including: preserving natural and cultural heritage, limiting negative impacts on tourist destinations, such as the use of natural resources and waste production, promoting the well-being of local communities, reducing seasonality in tourism demand, limiting the environmental impact of tourism, making tourism accessible to all, and improving the quality of tourism jobs. Increasing awareness of environmental protection and sustainable development among the residents of the European Union also leads to changes in travel behaviour. According to a survey conducted by the European

Commission (2021) on a representative sample of citizens from the 27 EU member states regarding their attitudes towards travel, 82% of EU citizens are willing to change some of their travel habits to travel more sustainably. For example, they are inclined to consume local products while on vacation (55%), reduce waste during their trip (48%), travel outside the tourist season (42%), and visit less crowded destinations (41%). In 2022, a new European Tourism Program for 2030 was adopted, which includes a multi-year action plan by the European Union to support member states, public bodies, the Commission, and stakeholders in making the tourism sector greener, more sustainable, resilient, and digitalized (European Council, Council of the European Union, 2022). In line with the guidelines for tourism development in the European Union, the Republic of Croatia has dedicated its tourism development strategy until 2030 to sustainable development (Government of the Republic of Croatia, 2023). Digitalization is seen as one of the key factors in achieving sustainable development goals.

The transformation of traditional tourist destinations into sustainable ones, among other things, involves a high level of development of the telecommunications infrastructure in the destination and the monitoring and implementation of ICT innovations in all segments of the tourism industry. The currently present 5G technology stimulates further changes by increasing and improving the efficiency of existing mobile networks, while providing stakeholders with a greater degree of freedom by connecting all devices into one entity, IoT (Peterson and Sunay, 2020), and WoT, along with entirely new service possibilities encompassed in the concept of "smart homes/hotels", "smart destinations", and "smart tourists" (Tuo, Ning, and Zhu 2021).

The development of telecommunications and the availability of telecommunication services in a destination are key factors for organizational and destination competitiveness (Pierdicca, Paolanti, and Frontoni 2019). At the destination level, new digital technologies improve the accessibility of tourist attractions (Buhalis and O'Connor 2005), thereby fostering tourism development and destination attractiveness (Nikoli and Lazakidou 2019; Pierdicca, Paolanti, and Frontoni, 2019). At the level of tourism enterprises, digital technologies reduce transactional and operational costs (Stamboulis and Skayannis, 2003), which positively impact business success. However, digital technologies also contribute to more effective management of sustainable tourism development. They enable the monitoring of sustainable tourism indicators in the destination, the exchange of information, and actions towards improving sustainability.

Collins and Buhalis (2004) recognized the adoption of advanced information and communication technologies, particularly Destination Management Systems (DMS), as a key factor in maximizing the benefits of tourism in a destination. DMS is designed to provide users with a comprehensive set of tools for managing tourism, promoting the destination, and maintaining a database of products, businesses, and visitors. Over the years, DMS has helped tourism destinations increase their competitiveness by enriching them with diverse content and laying the foundation for smart tourism destinations (Benckendorff, Xiang, and Sheldon 2019). Therefore, DMS plays a significant role in destination management and enhancing the competitiveness of a tourism destination in the tourism market.

Various technologies are being used to support destination management, such as tourism applications and Big data, which enable the collection of a large amount of data about tourists'

characteristics, needs, preferences, satisfaction, and more. However, many tourism destinations struggle to keep up with the rapid development of new technologies, especially innovative advertising strategies, changes in demand, limited financial and human resources, and increasing competition resulting from globalization. This also affects the promotion and development of tourism destinations. Therefore, one of the challenges faced by all stakeholders in the tourism industry is the technological and telecommunications challenge, which involves investing in new telecommunications and ICT driven by the globalization of telecommunications and information and technological advancements (such as online booking tools, social networks for tourism recommendations, etc.).

3. METODOLOGY

The research is based on primary and secondary data. Primary data was collected through a survey method from entrepreneurs in the tourism and hospitality sector in Croatian tourist destinations. The survey was conducted in December 2022. A structured questionnaire was used, and respondents were able to choose one of the provided answers and rate the given statements on a Likert scale from 1 to 5 (1 - strongly disagree, 5 - strongly agree). Google Forms was used for the survey, and participants were emailed an invitation to participate in the survey along with a link to the Google Form, which they filled out. Participants were briefly introduced to the concept of sustainable tourism development at the beginning of the questionnaire.

The survey questions were divided into two parts. The first part focused on the respondents' demographic characteristics, while the second part covered the respondents' attitudes towards: 1) the connection between telecommunications and sustainable tourism destination development, 2) the awareness of entrepreneurs regarding the use of telecommunications in managing sustainable tourism development in the destination, 3) information and communication technology as a tool for better destination management, and 4) the development of telecommunications infrastructure in the destination. The perception of entrepreneurs was based on their experience in using information and communication technology and telecommunications in the destination, including factors such as internet speed, 4G or 5G networks, and so on. The questions were based on a questionnaire used in the research by Krstinić Nižić, Vodeb, and Šverko Grdić (2020) and were adapted to the needs of the study, with the addition of questions formulated by the authors based on previous research (Vidal-Serrano et al. 2022). The data was processed using Microsoft Excel, and the research results were presented in tabular and graphical forms.

The survey included 60 respondents (N=60), owners and managers in tourism companies. In terms of gender, the research covered 48% males and 52% females. Regarding age, 37% of the respondents were aged 25 to 34, 31% were aged 35 to 44, 18% were aged 44 to 54, 10% were older than 55, and 4% were aged 24 or younger. In terms of education, 46% of the respondents had a higher education degree, while 54% had a secondary education degree. Regarding the size of the companies, the majority of the respondents (61%) were managers and/or owners of micro-enterprises (0-9 employees), 28% were from small enterprises, 8% were from medium-sized enterprises, and 3% were from large enterprises.

Secondary data were collected from other sources that support the research in the study. The data includes information from the *Digital Economy and Society Index* (DESI), *Sustainable Development Goals Index* (SDGs), and the Tourism Development Index for the Republic of Croatia from 2016 to 2021. These data are used to assess the level of telecommunications development, sustainable tourism destination development, and the tourism development index for Croatian destinations. Correlation analysis is conducted to determine the relationship between telecommunications development, sustainability, and tourism development in order to draw conclusions about the role of telecommunications in managing sustainability and tourism development in Croatian destinations.

The fundamental research question is: What is the role of telecommunications in managing sustainable tourism development? Is there a causality between the level of telecommunications development in a tourist destination, sustainability, and tourism development?

4. RESULTS

The level of telecommunications infrastructure development in tourist destinations can be observed through the availability of internet access in the destination. According to estimates, in January 2023, approximately 5.16 billion people worldwide, or about 64.4% of the global population, were using the internet (Datareportal, 2023), with the number of users expected to continue growing in the coming years. This indicates a widespread coverage of internet networks in tourist destinations worldwide. The lack of internet connectivity is mainly associated with underdeveloped destinations in South and East Asia and Africa. However, in addition to coverage, the quality of internet access in tourist destinations remains an important factor. It is estimated that over 92% of internet users access the internet via mobile phones, and mobile phones account for about 57% of total online time and approximately 60% of web traffic globally (Datareportal, 2023). Given these trends, it is clear that telecommunications technology accompanies tourists throughout all stages of the travel cycle, including destination information and selection, decision-making and trip preparation, during the consumption of tourism products, and after the trip has been completed.

In recent years, the Republic of Croatia has been experiencing a stable but slightly slower growth in telecommunications network coverage, ranging between 2% and 3% (Table 1). In comparison to the European Union average, Croatia has a lower rate of telecommunications development. While the overall use of broadband networks is almost on par with the European Union, the coverage of 5G networks is significantly lower. The use of 100 Mbps broadband network also shows a much lower share compared to the European Union (16% compared to 41% in 2021). However, the coverage of the mobile network is more favourable and is only 6% lower than the European Union average.

According to the Digital Economy and Society Index (DESI), in 2022, Croatia ranked 19th out of the 27 EU member states. Although Croatia is relatively low-ranked, there are examples of a strong high-tech industry, including the fastest electric hypercar. Positive development is evident through the deployment of 5G networks, which

significantly accelerates digital transformation and brings new opportunities and benefits to businesses in tourism and tourists.

Table 1: **Access to the telecommunications network in Croatia and EU-27**

Aceess to the telecomunications network	DESI 2019	DESI 2020	DESI 2021	EU-27 DESI 2021
Overall fixed broadband take-up % households	70%	73%	75%	78%
At least 100 Mbps fixed broadband take-up % households	6%	9%	16%	41%
At least 1 Gbps take-up % households	NA	NA	NA	7,6%
Fast broadband (NGA) coverage % households	86%	86%	88%	90%
Fixed Very High Capacity Network (VHCN) coverage % households	43%	47%	52%	70%
Fibre to the Premises (FTTP) coverage % households	31%	36%	39%	50%
5G spectrum Assigned spectrum as a % of total harmonised 5G spectrum	0%	100%	100%	56%
5G coverage* % populated areas	NA	0%	34%	66%
Mobile broadband take-up % individuals	70%	70%	81%	87%

* 5G coverage refers to the percentage of populated areas covered by at least one operator as reported by operators and national regulatory authorities.

Source: Created by the author based on: Datareportal 2023.

In January 2023, Croatia recorded a high rate of Internet users, around 3.34 million or 83% of the total population, and there were 5.37 million active mobile connections, which is 33.6% more than the total population of 4.02 million (Datareportal 2023). However, when compared to the countries from which Croatia receives the largest number of tourists (Table 2), a lower rate of Internet users is observed.

Table 2: **Access to internet connectivity in Croatia and selected countries**

Countries	Internet users, u mil.	The share of Internet users in the total population, %	Average mobile Internet connection speed, Mbps	Average fixed Internet connection speed, Mbps
Croatia	3,34	83,0	70,27	46,53
Austria	1,94	94,2	61,19	67,23
Slovenia	1,64	91,4	50,75	79,29
Germany	77,53	93,1	56,18	80,69
Italy*	50,85	84,3	34,53	49,82

* 2022. godina

Source: Created by the author based on Datareportal 2023.

If the average speed of mobile and fixed internet connections is taken as a measure of internet access quality in a destination, it can be concluded that Croatia has a lower level of quality in fixed internet access, but higher quality in mobile internet access. In Croatia, as well as in other countries worldwide, the Covid-19 pandemic has accelerated digital transformation. Cloud technology was quickly implemented to enable remote work, and there has been an increase in online shopping and online communication. The growing demand for information and communication technology has also been recognized in the tourism sector.

In order to determine the role of telecommunications in managing sustainable tourism development, the correlation between the development of telecommunications in the Republic of Croatia based on the DESI Index and the SDG Index is analysed. The SDG Index measures progress towards a country's sustainable development goals. It is also compared with the connectivity of telecommunications development and the Index of Tourist Development of local self-government units (ITR) (Institute for Tourism 2022). Table 3 provide an overview of data from the DESI Index, SDG Index, and Index of Tourist Development.

Table 3: **Overview of DESI, SDG, and ITR Index results for the Republic of Croatia, 2016-2021**

Years	DESI	SDG	ITR
2016	42,0	70,7	-
2017	43,2	76,9	20,60
2018	46,7	76,5	20,91
2019	44,3	77,8	21,04
2020	47,6	78,4	19,51
2021	46,0	78,8	19,95

Source: Created by the author based on: Institute for Tourism (2022); European Commission (2023); Eurostat (2023).

The correlation analysis demonstrates the relationship between the development of telecommunications and the sustainability of tourist destinations, as measured by the DESI and SDG indices, as well as the relationship between telecommunications and tourism development (Table 4). The correlation matrix and Graf 1 shows a positive and strong relationship between telecommunications and sustainable development.

When comparing the DESI and ITR indices, a moderate but negative correlation is observed. However, considering the decline in tourist traffic in 2020 and 2021 due to the COVID-19 pandemic and excluding the results from these years, the correlation matrix demonstrates a positive and moderately strong relationship between the development of telecommunications and the tourism development of Croatian destinations. The same with the SDG and ITR correlation.

Table 4: **Correlation matrix of DESI, SDG, and Tourism Development Index for the Republic Croatia**

	DESI	SDG
DESI	1	
SDG	0,714	1
	DESI	ITR
DESI	1	
ITR	-0,581*	1
	DESI	ITR
DESI	1	
ITR	0,518**	1
	SDG	ITR
SDG	1	
IRT	-0,719	1
	SDG	ITR
SDG	1	
IRT	0,488	1

* period 2017-2021; ** period 2017-2019

Source: Created by the authors based on: Institute for Tourism (2022); European Commission (2023); Eurostat (2023).

Graph 1: **Correlation of DESI and SDG for the Republic Croatia**
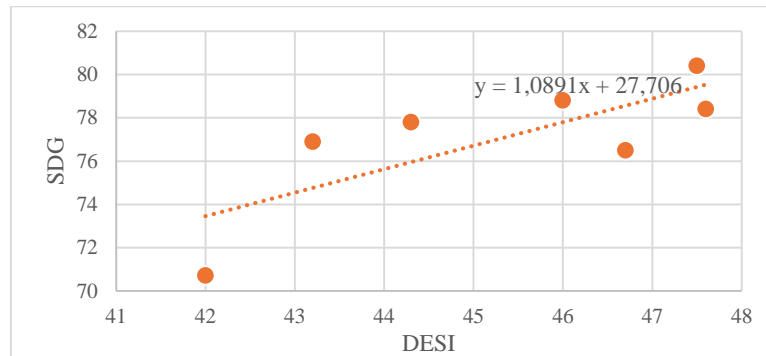
Source: Created by the authors based on: Institute for Tourism (2022); European Commission (2023); Eurostat (2023).

The research further focused on exploring the perception of entrepreneurs in tourism regarding the development of telecommunications infrastructure in destinations and its implementation in managing sustainable destination development. It aimed to assess their understanding of the concept of sustainable tourism development in destinations and the use of telecommunications in achieving sustainable development goals.

The respondents were asked the question: "In their opinion, is there a connection between telecommunications and sustainable tourism development in the destination?" The results in Graph 2 show that the majority of entrepreneurs operating in tourist

destinations recognize the connection between telecommunications and sustainable destination development (83%). These findings provide a positive indication of the awareness among entrepreneurs about the significance of telecommunications for tourism development.

Graph 2: **The connection between telecommunications and sustainable tourism development**
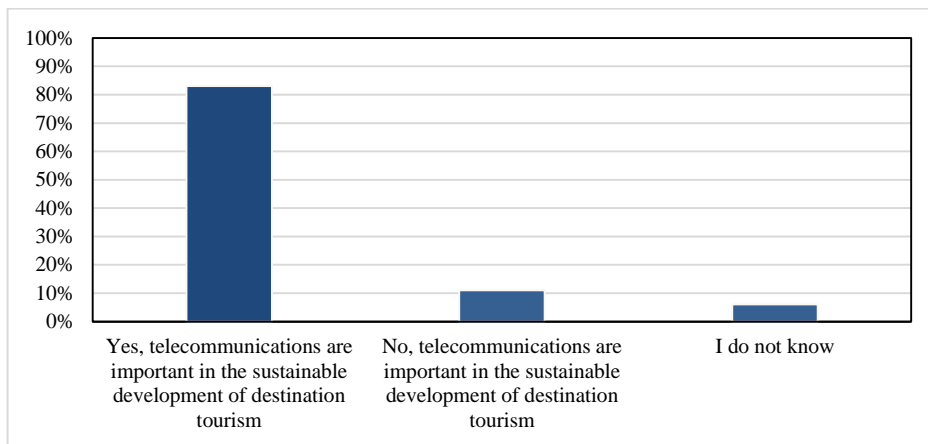
Source: Research of authors.

When asked: are they familiar with how telecommunications is applied at the destination level (municipality, city, tourist board) in managing tourism development, respondents mostly replied that they are not familiar (Graph 3). Similar research conducted by Kristinić Nižić, Vodeb, and Šverko Grdić (2020) supports these findings, indicating a lack of transparency in managing sustainable destination development and limited participation the respondents in decision-making processes related to tourism development in the destination.

Graph 3: **The familiarity of entrepreneurs with the application of telecommunications in managing the development of sustainable tourism at the destination**
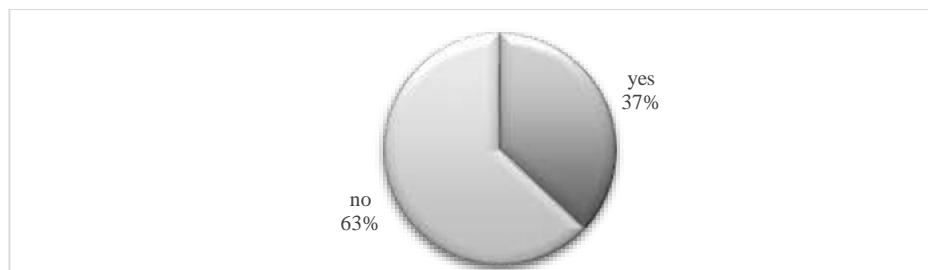
Source: Research of authors.

Participants were asked to rate the statement: "The development of ICT has led to better management of tourist destinations" on a scale of 1 to 5 (1 – completely disagree, 5 – completely agree). Despite not being extensively familiar with the use of telecommunications in destination management, the majority of participants (64%) fully agree that information and communication technology has led to better management of tourist destinations. 21% of participants agree with the statement, while 13% remain neutral. Only 2% of participants disagree with the statement.

Table 5: **ICT as Better Destination Management Tool**

ICT as Better Destination Management Tool	Percentage
Strongly Agree	64
Agree	21
Neutral	13
Disagree	2
Strongly Disagree	-

Source: Research of authors.

When asked to assess the development of telecommunication infrastructure in tourist destinations, the majority of respondents gave high and very high ratings, while only a small number of participants indicated shortcomings in its development (Table 6). The results indicate that entrepreneurs/managers are aware of the importance of telecommunications in the development of sustainable tourism in the destination, but at the same time, they do not have a complete understanding of their application to improve the position of the tourist destination in the market.

Table 6: **Development of the telecommunications infrastructure in the destination**

The tourist destination has a development telecommunications infrastructure.	Percentage
Strongly Agree	41
Agree	38
Neutral	7
Disagree	14
Strongly Disagree	-

Source: Research of authors.

CONCLUSION

The overview of previous research clearly shows the importance of telecommunications in the development of sustainable tourism in the destination, as well as the wide range of possibilities for using telecommunications in improving the management of sustainable tourism development. In the era of digital revolution, leveraging telecommunications tools to promote the destination to potential tourists appears to be a key factor in competitiveness in the highly dynamic tourism market.

It is evident that tourists utilize modern technologies throughout the entire process of making travel decisions, staying in the destination, and even after returning home. Therefore, it is of utmost importance for a tourist destination to adopt a management

model that incorporates modern telecommunications technology to drive improvements in tourism development, particularly in sustainable tourism through the reduction of natural resource burden, promotion of local culture, enhancement of living standards, and more.

One of those models is smart tourism destinations. Although the focus of the study was not specifically on smart tourism destinations, considering that this concept supports the development of telecommunications and information and communication technologies, it is evident that the future development of a tourist destination is heading towards the development of smart tourism destinations that will utilize telecommunications and information and communication technologies to provide a new scenario for managing the tourist destination in a sustainable manner.

The research results have indicated the lagging behind of Croatian tourist destinations in terms of telecommunications development compared to the European Union average. This highlights the need to focus on improving the telecommunications infrastructure in tourist destinations and to increase efforts in achieving sustainable tourism development in the destination in the future.

The research results can contribute to enriching the literature on the impact of telecommunications on the development of tourist destinations and be valuable for future research efforts to deepen existing knowledge and understanding of destination management mechanisms through the use of telecommunications technologies.

This paper has many limitations. Research limitations pertain to the relatively small number of participants. In addition to a large number of participants, the research should be conducted on an more variables. The recommendation for further research is to include in the research relevant stakeholders in the management of tourism development of the destination, such as tourist boards, local authorities, etc. Despite the limitations, the practical implications lie in encouraging the development of telecommunications infrastructure in Croatian tourist destinations and predicting that the research findings will be beneficial to all stakeholders directly and indirectly involved in destination management.

REFERENCES

Amriddinova, R. S. and Shirinova, G. K. (2022), "Use of telecommunicaton services in the development of tourism", *Builders Of The Future*, Vol. 2, No. 2, pp. 336-343 https://doi.org/10.37547/builders-v2-i2-51

Babu, S. and Subramoniam, S. (2016), "Tourism management in internet of things era", *Journal of Information Technology & Economic Development*, Vol. 7, No. 1, pp. 1-14

Benckendorff, P. J., Xiang, Z., and Sheldon, P. J. (2019), *Tourism information technology*, CABI, Wallingford, United Kingdom.

Borth, D. E., Starkk, W. E., and Lehnert, J. S. 2023., *Telecommunication*, viewed 7 May 2023, https://www.britannica.com/technology/telecommunication

Buhalis, D. and O'Connor P. (2005), "Information communication technology revolutionizing tourism", *Tourism Recreation Research*, Vol. 30, No. 3, pp. 7–16 https://doi.org/10.1080/02508281.2005.11081482

Car, T., Pilepić Stifanich, L., and Šimunić, M. (2019), "Internet of things (IOT) in tourism and hospitality: Opportunities and challenges", *In Proceedings of 5th International Conference Tourism in Southern and Eastern Europe: Creating Innovative Tourism Experiences: The Way to Extend the Tourist Season (ToSEE 2019)*, May 16-18, Opatija, Croatia, pp. 163-175.

Collins, C. and Buhalis, D. (2004), "Destination Management Systems Utilisation in England", *In Proceedings of the International Conference Information and Communication Technologies 2003*, 2003, Helsinki, Finland, pp. 1-10

Datareportal 2023., *Digital around the world*, viewed 9 February 2023, https://datareportal.com/global-digital-overview

European Commission 2007, *Communication from the Commission of 19 October 2007 – Agenda for a sustainable and competitive European tourism (COM(2007 621 final – Not published in the Official Journal)*, viewed 4 February 2023, https://eur-lex.europa.eu/EN/legal-content/summary/agenda-for-a-sustainable-and-competitive-european-tourism.html

European Commission 2021., *Flash Eurobarometer 499: Attitudes of Europeans towards tourism*, viewed 19 December 2022, https://europa.eu/eurobarometer/surveys/detail/2283

European Commission 2023., *Hrvatska u indeksu digitalnog gospodarstva i društva [Croatia in the digital economy and society index]*, viewed 8 May 2023, https://digital-strategy.ec.europa.eu/hr/policies/desi-croatia

European Commission n.d., *European Tourism Indicators System for sustainable destination management*, viewed 7 May 2023, https://single-market-economy.ec.europa.eu/sectors/tourism/eu-funding-and-businesses/funded-projects/sustainable/indicators_en.

European Council, Council of European Union 2022., *New European agenda for tourism*, viewed 9 February 2023, https://www.consilium.europa.eu/en/press/press-releases/2022/12/01/new-european-agenda-for-tourism/

European Court of Auditors (2022). *Introduction of 5G networks in the EU: delays in the introduction of networks are noted, and certain security issues are still not resolved* [*Uvođenje 5G mreža u EU-u: bilježe se kašnjenja u uvođenju mreža, a određena sigurnosna pitanja i dalje nisu riješena]*, viewed 6 May 2023, https://www.eca.europa.eu/Lists/ECADocuments/SR22_03/SR_Security-5G-networks_HR.pdf.

Eurostat 2023., *Sustainable development in the European Union – Overview of progress towards the SDGs in an EU context – 2016-2022 edition*, viewed 8 May 2023, https://ec.europa.eu/eurostat/documents/4031688/14665125/KS-06-22-017-EN-N.pdf/8febd4ca-49e4-abd3-23ca-76c48eb4b4e6?t=1653033908879.

Fafurida, Ineke P., and Winda, F. N., (2018), "Analysis of Availability of Tourism Infrastructure: Comparative Study in Joglosemar Area", In *Proceedings of International Conference on Economics, Business and Economic Education 2018*, July 17-18, Semarang City, Central Java, Indonesia, pp. 91-101 doi:10.18502/kss.v3i10.3121

Galičić V. (2015), *Informacijski sustavi u turizmu i hotelijerstvu*, Fakultet za menadžment u turizmu i ugostiteljstvu, Opatija.

Government of the Republic of Croatia 2023., *Strategija razvoja održivog turizma do 2030. godine [Sustainable tourism development strategy until 2030]*, viewed 8 May 2023, https://mint.gov.hr/UserDocsImages/2022_dokumenti/003_220721_Strategija_ROT_nacrt.pdf

Gelter, J., Fuchs, M., and Lexhagen, M. (2022), "Making sense of smart tourism destinations: A qualitative text analysis from Sweden", *Journal of Destination Marketing & Management*, Vol. 23, pp. 1-12, https://doi.org/10.1016/j.jdmm.2022.100690

Hamid Z., Wee H., Hanafiah M. and Hanafiah N.A.A. (2016), "The effect of social media on tourists' decision to travel to Islamic destination: A case of Malaysia", in Radzi, S.M., Hanafiah, M.H.M., Sumarjan, N., Mohi, Z., Sukyadi, D., Suryadi, K., Purnawarman, P. (Eds.), *Heritage, Culture and Society Research agenda and best practices in the hospitality and tourism industry*, CRC Press, United Kingdom, pp. 1-5.

Institute for Tourism 2022., *Indeks turističke razvijenosti 2017-2021 [Index of tourism development 2017-2021]*, viewed 8 May 2023, https://www.iztzg.hr/hr/itr/

Ivars-Baidal, J. A., Celdrán-Bernabeu, M. A., Mazón, J. N., and Perles-Ivars, Á. F. (2019), "Smart destinations and the evolution of ICTs: a new scenario for destination management?", *Current Issues in Tourism*, Vol. 22, No. 13, pp. 1581-1600 https://doi.org/10.1080/13683500.2017.1388771

Krstinić Nižić, M., Vodeb, K., and Šverko Grdić, Z. (2020), "The Smart City Concept for Sustainable Development of a Tourism Destination", *Pomorski zbornik*, vol. 58, pp. 111-123

Nikoli, G. and Lazakidou, A. (2019), "The Impact of Information and Communication Technology on the Tourism Sector", *Almatourism - Journal of Tourism, Culture and Territorial Development*, Vol. 10, No. 19, pp. 45-68 doi://org/10.6092/issn.2036-5195/8553

Nonthapot, S. and Watchalaanun, T. (2015). "Relationship between Tourism Expansion and Telecommunication in Thailand", *Journal of Environmental Management and Tourism*, Vol. 6, No. 1, pp. 34-43

OECD 2021., *Managing tourism development for sustainable and inclusive recovery*, viewed 11 April 2023, https://www.oecd-ilibrary.org/docserver/b062f603-en.pdf?expires=1690484233&id=id&accname=guest&checksum=DF2066A4C3BEAA49C0FB3F1FE204CA31

OECD 2020., *Tourism Trends and Policies 2020*, viewed 9 May 2023, https://www.oecd-ilibrary.org/sites/82b46508-en/index.html?itemId=/content/component/82b46508-en

Peterson, L., Sunay, O. (2020), *5G Mobile Networks A Systems Approach*, Springer Cham, Switzerland

Pierdicca, R., Paolanti, M. and Frontoni, E. (2019), "eTourism: ICT and its role for tourism management", *Journal of Hospitality and Tourism Technology*, Vol. 10, No. 1, pp. 90-106 https://doi.org/10.1108/JHTT-07-2017-0043

Santos, M.C., Veiga, C., Santos, J.A.C. and Águas, P. (2022), "Sustainability as a success factor for tourism destinations: a systematic literature review", *Worldwide Hospitality and Tourism Themes*, Vol. 14 No. 1, pp. 20-37, https://doi.org/10.1108/WHATT-10-2021-0139

Seetanah, B. (2019), "Telecommunication and tourism development: an island perspective", *Tourism Review*, Vol. 74, No. 4, pp. 815-829 https://doi.org/10.1108/TR-08-2018-0117

Soares, J. C., Domareski Ruiz, T. C. and Ivars Baidal, J. A. (2022), "Smart destinations: a new planning and management approach?" *Current Issues in Tourism*, Vol. 25, No. 17, pp. 2717-2732 doi: 10.1080/13683500.2021.1991897

Stamboulis, Y., & Skayannis, P. (2003), "Innovation strategies and technology for experience based tourism", *Tourism Management*, Vol. 24, No. 1, pp. 35-43 https://doi.org/10.1016/S0261-5177(02)00047-X

The Miroslav Krleža Institute of Lexicography 2021., Telekomunikacije, *viewed* 8 May 2023, https://enciklopedija.hr/natuknica.aspx?ID=60728

Tuo, Y., Ning, L. and Zhu, A. (2021), "How Artificial Intelligence Will Change the Future of Tourism Industry: The Practice in China", *In Proceedings of the ENTER 2021 eTourism Conference Information and Communication Technologies in Tourism 2021*, January 19–22, online conference, pp. 83-94

Vidal-Serrano, L., Rodríguez-Antón, J. M., Rubio-Andrada, L. and Narbona-Reina, B. (2022). Information and Communication Technologies (ICT) as a Tool for Sustainable Tourism Management: A Bibliometric Analysis. *Cuadernos de Turismo*, Vol. 50, pp. 97–117, https://doi.org/10.6018/turismo.541881

Marija Vukoja, PhD Student
Faculty of Tourism and Hospitality Management Opatija, University of Rijeka
Primorska 46, Opatija, Republic of Croatia
marija.vukoja@yahoo.com

Irijana Rajković, PhD Student
Faculty of Tourism and Hospitality Management Opatija, University of Rijeka
Primorska 46, Opatija, Republic of Croatia
irijana.rajkovic1@gmail.com

Dino Baričević, PhD Student
Faculty of Tourism and Hospitality Management Opatija, University of Rijeka
Primorska 46, Opatija, Republic of Croatia
baricevicd@gmail.com