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New technologies in tourism: a bibliometric review of research trends and emerging topics

Abstract. The rapid growth of digital technologies is affecting all areas of life, including tourism. The ways in which people plan trips, experience places and engage with the tourism industry are evolving. As a result, increasing attention is being paid to the role of new technologies in shaping modern tourism. The purpose of this article is to identify major trends, research topics and gaps in the literature on the application of new technologies in tourism, based on a bibliometric review of publications. A state-of-the-art type review was conducted using bibliometric analysis. The analysis included 296 publications from the Web of Science Core Collection database (2000–2024), using the bibliometrix tool. Since 2019, a marked increase in publication volume has been observed. Research in the social, economic and environmental sciences dominates. The most common topics are AI, big data and destination management. The largest number of publications comes from Spain. New technologies are changing the structure and operation of the tourism sector. The results highlight the need for in-depth qualitative research on the social and cultural impacts of this transformation, as well as for promoting sustainable and inclusive tourism development.

Keywords: tourism, new technologies, tourism technology, smart tourism, artificial intelligence, bibliometric analysis

Introduction

The tourism sector is most often associated with attractive places worth visiting, monuments to see or entertainment (Hopkins et al., 2010). In the common opinion, the tourism sector has no negatives – it brings hundreds of tourists to the country, who leave money, provide work and popularize the local space. On the other

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hand, large tourist traffic causes significant damage not only to the environment, which can lead to its degradation, but also has a negative impact on the local community (Bajdor and Grabara, 2012). However, it is worth noting that new technologies, innovations and diversification play a significant role in the development of tourism (Aldebert, Dang and Longhi, 2011). This topic concerning new technologies is becoming increasingly popular in scientific discussions.

Technology can be defined as “a complex system of artifact, made and/or used by living systems, that is composed of more than one entity or sub-system and a relationship that holds between each entity and at least one other entity in the system, selected considering practical, technical and economic characteristics, to satisfy needs, achieve goals and/or solve problems of users for the purpose of adaptation and/or survival in environment (Coccia, 2019).” In the view of Galbraith (1967, p. 12), technology “(...) is the systematic application of scientific or other organized knowledge to practical tasks”. According to Sigala (2018), technology not only supports communication and information flow in tourism, but also transforms its structure, the way it operates and the role of market players. Technological advances are triggering significant changes, enabling various players to create new markets and strategies. As a result, tourism management and marketing are transforming - new technologies are no longer just a tool, but are becoming a co-creator of the market and its participants.

New technologies in tourism can therefore be understood as digital, often intelligent and interactive tools, systems or platforms that transform the production, delivery and experience of tourism services – fostering greater personalisation, accessibility, real-time responsiveness and co-creation between service providers and tourists.

Nowadays, technology is constantly revolutionizing various areas of life (Szczycka, 2023), and tourism is no exception (Loureiro and Nascimento, 2021). With the emergence of new technologies such as artificial intelligence, augmented reality and the Internet of Things (Buhalis, 2000), we are experiencing a revolution in the way we travel, discover new places and experience different cultures (Roman et al., 2022). This era of new technologies brings many changes in tourism. From changes in the way we plan trips, through new travel experiences, to transformations in the very process of interacting with destinations – all this affects our view of traveling and shapes our expectations of tourist experiences (Roman et al., 2021).

New technologies in the tourism sector bring many benefits, including greater efficiency, personalization of services and improved traveller experiences. However, their implementation also comes with many challenges, such as data security issues, implementation costs and potential impact on the environment and authenticity of the destination. It is important for the tourism industry and travelers to be aware of these challenges and prepare for them accordingly in order to fully exploit the opportunities that new technologies bring (Korstanje, 2021).

New technologies influence many aspects of the tourism sector, as demonstrated in various studies (e.g., Garau, 2016; Sigala, 2018; Zhong et al., 2022), bringing both benefits and challenges (Figure 1).

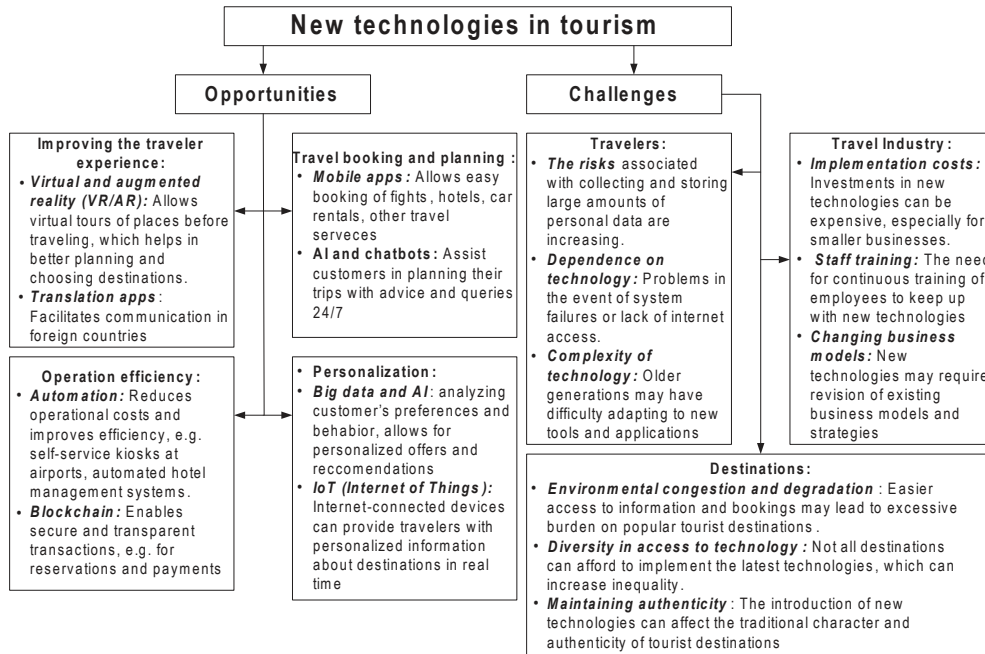


Figure 1. New technologies in tourism: opportunities and challenges

Source: Based on Garau (2016); Sigala (2018); Sokhulu (2020); Zhong et al. (2022).

According to Garau (2016), new technologies are changing tourism and what challenges and opportunities they bring to travellers, the tourism industry and destinations. We will also focus on analysing how tourism responds to these changes and what strategies can be adopted to better use the potential of new tourism technologies. We will also analyse the social, economic and cultural implications of this transformation and what values and challenges tourism faces in the era of new technologies.

Despite the growing number of publications on the application of new technologies in tourism, there is still no comprehensive synthesis that organizes the main research directions, identifies emerging topics and points out gaps in existing research. Such fragmentation of knowledge hinders the development of a coherent research agenda in this area. The aim of the article is to identify key research areas, thematic trends and knowledge gaps concerning the role of new technologies in the transformation of tourism, based on a bibliometric analysis of scientific literature from 2000 to 2024.

Literature review

In the era of new technologies, along with dynamic digital development, tourism is constantly changing its face. The new reality in which we live is characterized not only by technological progress, but also by social, economic and cultural changes that are directly or indirectly involved in our travel experiences (Schertler, 1994). The tourism

and hospitality industry has faced and will continue to face a technology-driven revolution. Managers in the hotel and tourism industry are beginning to consider the possibility of introducing service robots into their facilities and other innovative solutions (Zhong et al., 2022).

A review of the literature on tourism in the era of new technologies in a new reality is an extremely important contribution to understanding these changes. By analysing existing tourism research, theories and practices and their relationship to new technologies, we are able to better understand both the impact of these technologies on tourism and the ways in which tourism responds to these changes.

In this literature review, we will focus on topics related to tourism in the context of new technologies. We will look at various scientific publications related to this topic. By synthesizing existing research and identifying knowledge gaps, this literature review will provide valuable information regarding new technologies in the new travel reality.

Table 1 presents selected scientific publications on tourism in the era of new technologies and the new reality.

Table 1. List of publications about tourism in the era of new technologies and new reality

Authors (year)	Title	Methods
Ercan (2020)	Investigating the use of immersive reality technologies in the travel and tourism industry	content analysis
Barrado-Timón and Hidalgo-Giralt (2019)	The Historic City, Its Transmission and Perception via Augmented Reality and Virtual Reality and the Use of the Past as a Resource for the Present: A New Era for Urban Cultural Heritage and Tourism	software ATLAS.ti
Kudinova and Krasuk (2020)	Development of the tourism business during the pandemic	systematic literature review
Lysiuk, Royko and Biletsky (2023)	Digital innovative technologies in the field of tourism in Ukraine	analysis of statistical data, case studies
Mazaraki, Boyko and Bosovska (2020)	Transformation of tourism in Society 5.0.	finding trends, literary sources, expert assessments
Hughes and Moscardo (2019)	ICT and the future of tourist management	systematic literature review and analysis of existing research
Tsvilyi, Zhylko and Zaytseva (2023)	The use of digital technologies in the post-war recovery of the tourism industry	empirical studies, case studies, data analysis

Source: authors' own study.

In these articles, the researchers used different research methods depending on the specific research objectives and subject matter. The main research methods most often used across the reviewed studies are:

- literature analysis. Also known as a systematic literature review. Researchers analyse previous studies, theoretical works and other sources to understand what is already known about the chosen topic;

- empirical research. The authors conducted their own research, collected data or conducted surveys among tourists, tourism professionals or other stakeholders;
- open data analysis. Some studies may use open data from various sources, such as reports from tourism organisations, travel statistics, etc;
- qualitative research. This method involves in-depth interviews, focus groups or content analysis to collect qualitative information about the experiences, opinions and impressions of participants regarding the use of new technologies in tourism;
- quantitative research. The authors collected quantitative data, for example, statistics on the use of AR and VR technologies in tourism or surveys with a numerical assessment of responses;
- modelling. Some studies used modelling to predict trends in the use of technology in tourism.

Ercan (2020) presents an approach to new technologies in tourism, argued that technology has improved transport and tourism. In the travel and tourism industry, the details of the use of modern tool technologies and various initiatives in the travel and tourism industry are in one form a central controller of prices. Important are the technologies of product location, reservation, real estate and service offer, accommodation, shopping for hotels, restaurants, tourist shops.

According to Barrado-Timón and Hidalgo-Giralt (2019), augmented reality (AR) and virtual reality (VR) have a great impact on the development of tourism and other fields. In their article, they analysed the scientific literature assessing the use of AR and VR in urban heritage spaces to show the effects that affect the „virtualization” of space. In their opinion, concerns about critical aspects are very limited and only a few notices the potential threats related to the trivialization of heritage, the creation of virtual tourist worlds detached from the material space of socio-economic relations, the negative effects on the way knowledge is constructed or the difficulties that some user groups encounter in accessing these technologies.

Methods

Research methodology

The SotA procedure (State-of-the-Art literature review) has been described in detail by Barry et al. (2022). The study used bibliometric methods to facilitate the analysis of a large number of publications (Stork and Astrin, 2014). Descriptive bibliometrics was applied to analyse trends in scientific research and to identify relevant researchers or research centres (Klincewicz, 2012; Badger, Nursten and Williams, 2000; Barry et al., 2022a). The limitations of the conducted research should also be taken into account, which concern mainly the methodological part. They include the selected publication database and search criteria, such as the year or language of the publication. For analysing a thematic evolution, we used a study design in R-tool bibliometrix to identify the main topics in two time slices (2000–2018 and 2019–2024) (Aria and Cuccurullo, 2017; Aria et al., 2020). The articles analysed in the literature review presented in Table 1 were selected

purposively. In order to identify scientific publications on the use of new technologies in tourism and changes in the sector in the so-called new reality, a purposive selection of articles from the Web of Science database was carried out. Titles, keywords, and abstracts were analysed. The final list includes studies that directly address the topic of technological innovations (e.g. augmented reality, artificial intelligence, digitalisation) in the context of tourism.

Data collection and research tasks

Data for analysis were collected from the Web of Science database on April 12, 2024. Web of Science is one of the main mechanisms for finding scientific sources offering a large variety of documents. In record searching, a fundamental issue is the identification of keywords that are considered relevant to the analysed problem (Halcomb, 2011). The analysis included articles with the following phrases in their titles: “touris*”, “new technologies” or “new reality”. The following limiting criteria were used:

- publication date – publications from 2000 to 2024 were included;
- type of publication – publications in peer-reviewed scientific journals were included;
- publications in English;
- publication topic – publications focusing on selected keywords.

After applying the limiting criteria, the dataset consisted of 296 publications. Answers were then sought regarding the overall trend in the number of publications and citations, the identification of key researchers, centres, countries and journals, as well as the main research areas in the field of tourism. The total number of article citations was 4,347 and h-Index = 33.

Results

Increasing number of publications in the WoS database on tourism in the era of new technologies, including the new reality in the years 2000–2024, shows growing interest in the field of new technologies in tourism (Figure 2). Attention should be paid to the constantly growing trend of interest in the analyzed topic. Two sub-periods of the development of tourism publications can be distinguished: (1) very low interest 2000–2018; (2) 2019–2023 – great interest in the topic with two visible declines. The significant increase in the number of publications in recent years reflects the growing academic interest in the intersection of tourism and emerging technologies. This trend supports the relevance of systematically reviewing the latest literature and identifying future research directions in this area. The apparent decline in 2024 results from the fact that the data were collected on April 12, 2024, and not all publications for that year had yet been indexed in the Web of Science database.

All articles were written in English. Most publications concerned research topics such as social sciences, business economics and environmental sciences. However, many publications have been written in the economic, social and agricultural sciences. The next step concerned the division of scientific publications into Web of Sciences categories.

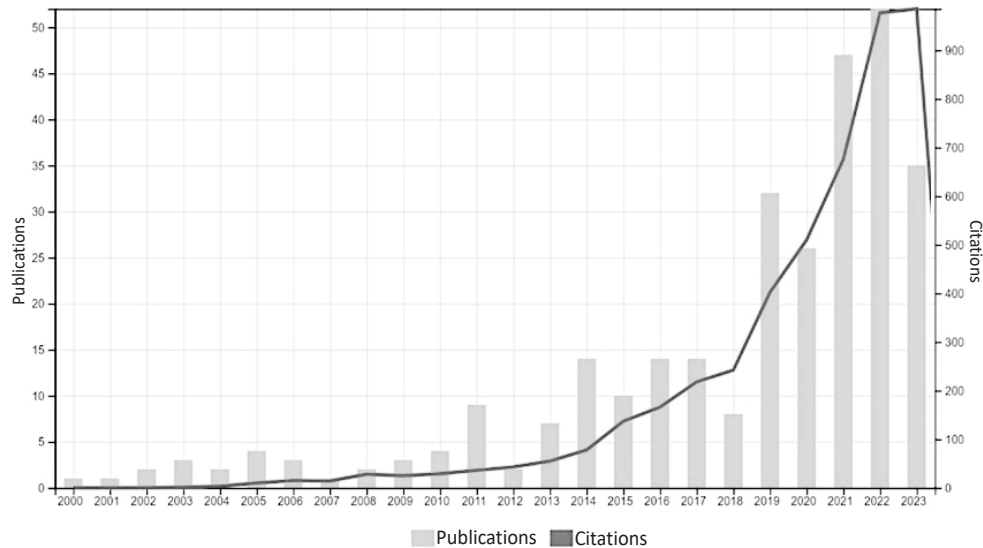


Figure 2. Number of publications related to tourism in the era of new technologies, including the new reality in the years 2000–2024

Source: own elaboration based on the created database.

Most of these publications were classified in the “Hospitality Leisure Sport” category. The most popular journals in which articles on the era of new technologies in tourism, including the new reality, have been published include: Sustainability, Tourism Management, Worldwide Hospitality and Tourism Themes, Current Issues in Tourism. The most popular publishers include MDPI, Taylor & Francis, and Elsevier.

The next stage involved presenting the authors of the publication, their country of origin and their affiliation. The leader in publishing the largest number of publications on tourism in the era of new technologies, including the new reality, was Antonio Martínez-Graña.

Authors publishing scientific articles on tourism in the era of new technologies, including the new reality, most often came from Spain. Moreover, several publications were associated with authors from countries such as Italy, China and Great Britain.

In the next step, research centres were analysed. It should be noted that the dispersion of research on the discussed issues was large. Most publications were published by employees of the University of Johannesburg. The authors also represented the Instituto Universitario de Lisboa, the Ministry of Education Science of Ukraine and the Universitat D’Alacant.

The bibliometric analysis shows that the topic of tourism in the new reality is currently the subject of many scientific discussions. This topic is increasingly being addressed by many authors. New technologies have a huge impact on the tourism

sector, bringing numerous benefits, but also posing new challenges. It is important for the tourism industry and travellers to be aware of these challenges and prepare for them accordingly, in order to fully use the opportunities that new technologies bring.

The last step of our bibliographic analysis is related to the thematic evolution in terms of technologies in tourism industry. Cutting on two time slices (2000–2018, 2019–2024), we noticed keywords in articles as data analytics, artificial intelligence, and big data (Figure 3).

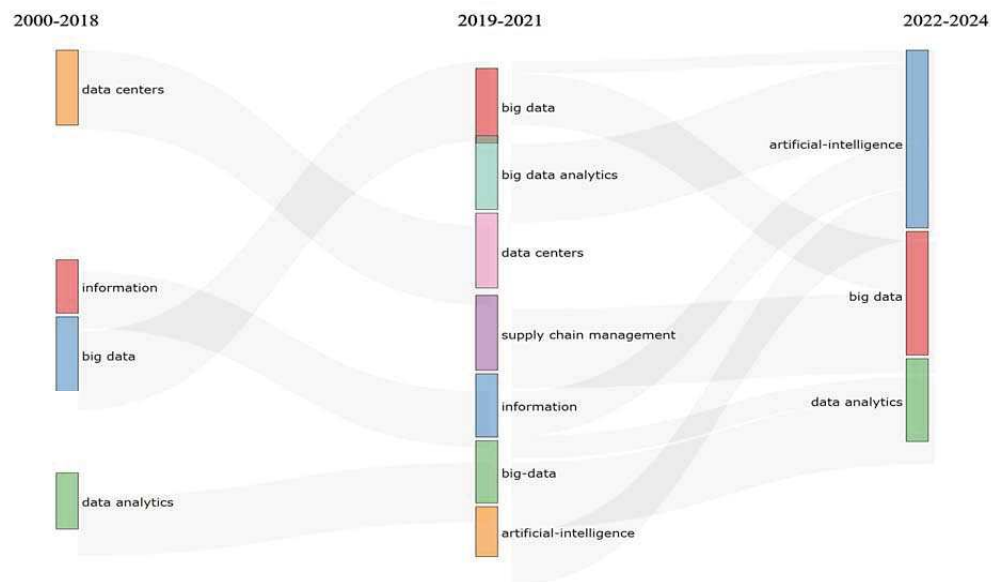


Figure 3. Thematic evolution in terms of new technologies and data in tourism

Source: own elaboration on created database.

In first time period (2000–2018) the emerging topic was information and communication technologies for engaging tourists in terms of visitor experience’ management (Alabau-Montoya and Ruiz-Molina, 2019). In last time period new technologies were one of topic for destination management: analysing of spatial data for creating or improving tourism policy in destinations (Ramos et al., 2021).

For analysing period (2000–2024) emerging topic were in big data analytics, risk assessment for destinations when motor themes were ICT, and using AI in tourism industry.

Summarizing, our exploring period was related to data analytics, decision-making process using new technologies in managing and marketing tools for destination development.

Emerging issues and future considerations

The era of new technologies brings opportunities and challenges for the tourism industry that are worth being discussed. Below are some key discussion points that arise from the article in question:

- Personalization of tourism experiences: What are the benefits and risks associated with the growing role of artificial intelligence and data analysis in personalizing tourism experiences? Is there a risk that personalization may lead to a loss of authenticity and diversity in travel?
- The impact of social media on tourism: What are the main trends related to the use of social media in planning trips and sharing tourism experiences? Is there a risk of becoming overly dependent on the virtual world at the expense of real interactions while traveling?
- Sustainable development in the era of digitalization: How can new technologies support sustainable development goals in tourism? What are the best practices in using technology to minimize the negative impact of tourism on the natural environment and local communities?
- New trends in travel experiences: What are the latest technological innovations that are changing the way we travel and discover new places? What are the potential implications of these trends for the tourism industry and travellers?
- Digital divide and accessibility: What challenges related to digital divide may result from the increasing dependence of tourism on technology? How can we ensure that the benefits of new technologies are available to all sections of society?

The above research areas illustrate how profoundly technology is transforming tourism, not only in terms of tools and trends, but also in social, cultural and ethical dimensions. Answering these questions is essential to guide responsible innovation and ensure sustainability in the sector.

Conclusions

Analysing issues related to tourism in the age of new technologies allows for a better understanding of the profound transformations taking place in the industry. It also makes it possible to identify effective ways of harnessing the potential of digital tools to support the development of more sustainable, accessible and engaging tourism for all market players. Technology not only facilitates communication or management, but increasingly acts as a transformative force that is reshaping the structure and functioning of the tourism sector. In this context, it is essential to further deepen our understanding of the relationship between technology and tourism and to seek innovative solutions that foster a more responsible and inclusive future for tourism.

The article discusses tourism in the era of new technologies in the new reality, based on a literature review and analysis of existing research and trends. The analysis carried out in the article shows that there has been an increase in the number of publications in recent years on the presented tourism issues. Most publications from the Web of Sciences database concerned research topics in the field of social sciences, business

economics and environmental sciences. The most popular journals in which articles on the era of new technologies, taking into account the new reality, were published include: Sustainability, Tourism Management, Worldwide Hospitality and Tourism Themes, Current Issues in Tourism. Authors publishing scientific articles on tourism in the era of new technologies, in the context of the new reality, most often came from Spain. The growing number of publications and thematic diversity - encompassing social, economic and environmental sciences – confirm that digital transformation is significantly changing tourism research and practice.

The considerations presented in the article have certain theoretical implications. This study constitutes an important contribution to knowledge, being one of the studies analysing the essence of tourism in the new reality in scientific research. The study also enriched the literature with comparative analysis of tourism development. The presented considerations can provide decision-makers and government bodies (including tourism organizations) with more information about existing problems and challenges related to embedding tourism in society. The challenges include the fact, that new technologies are increasingly important from the point of view of tourism development. Further research is also necessary due to the fact that research in this area rarely focuses on this topic. Qualitative research can be conducted to correctly answer the questions:

1. What factors determine the development of tourism in the era of new technologies, including the new reality?
2. What are the barriers limiting the development of tourism in the new reality?
3. In which direction can tourism develop in the new reality?
4. What types of research are needed to support tourism development?

The research conducted is not without limitations. The criteria used in this research for the systematic literature review could have led to the exclusion of several interesting works. Despite some limitations, our article provides an interesting starting point for the future research. The methodology used in the article can be reconstructed using other indicators and the phenomenon under study can be assessed in the future. Another proposal is to use the same indicators, but use different multi-criteria methods (e.g. analytical hierarchy method) to compare the obtained results.

Overall, the article sheds light on how tourism research is evolving in the face of new technologies, identifying both the potential benefits and challenges that this transformation brings. It also presents possible directions of development and the need to take action to use the potential of new technologies in a responsible and sustainable manner.

In addition, as technology penetrates deeper into tourism systems, a critical look at its ethical, cultural and social implications is needed. Issues such as digital exclusion, the erosion of authenticity, and the dominance of large technology platforms over local tourism entities require greater attention in future research. A stronger emphasis on qualitative and participatory research methods can provide deeper insights into how diverse communities experience and respond to technological changes in tourism.

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