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Araştırma Makalesi/ Research Article

**Research Trends in The Use of Technology in The Tourism: Bibliometric and
Content Analysis**
**Turizmde Teknoloji Konulu Araştırmaların Eğilimleri: Bibliyometrik ve İçerik
Analizi**

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Abstract

This study aims to reveal the current trends of the studies within the scope of technology in the tourism sector. Bibliometric mapping analysis was conducted, which included all 611 studies related to 'Tourism and Technology' in academic resources indexed in Web of Science. A total of 203 articles that could be obtained and reached were analyzed by content analysis method. In terms of methodology, it is seen that the majority of the studies were designed in the qualitative method pattern and the questionnaire/survey technique was more preferred in data collection. This research will provide both researchers and practitioners with information about the direction and outcomes of "tourism and technology" studies.

Key Words: Tourism, Technology, Bibliometric mapping, Content analysis.

Öz

Bu çalışma, turizm sektöründe teknoloji kapsamındaki çalışmaların güncel eğilimlerini ortaya koymayı amaçlamaktadır. Web of Science'da indekslenen akademik kaynaklarda yer alan 'Turizm ve Teknoloji' ile ilgili 611 çalışmanın tamamına yönelik bibliyometrik haritalama analizi yapılmıştır. Elde edilebilen ve ulaşılabilen toplam 203 makale ise içerik analizi yöntemi ile analiz edilmiştir. Metodoloji açısından bakıldığında çalışmaların büyük çoğunluğunun nitel yöntem deseninde tasarlandığı ve veri toplamada anket tekniğinin daha çok tercih edildiği görülmektedir. Konunun son zamanlarda daha popüler hale geldiği ve ilgili çalışmaların sayısının yıllar itibarıyla arttığı gözlemlenmiştir. Bu araştırma hem konuyla ilgilenen araştırmacılara hem de uygulayıcılara "turizm ve teknoloji" çalışmalarının yönü ve sonuçları hakkında bilgi sağlayacaktır.

Anahtar Kelimeler: Turizm, Teknoloji, Bibliyometrik haritalama, İçerik analizi

1. Introduction

Global tourism technologies have made remarkable progress in recent years (Rashideh, 2020). These technological developments have led to radical changes in tourism (Gössling, 2021) and have begun to be implemented in many areas of tourism (Zhang et al, 2019; Seyitoğlu and Ivanov, 2022). Recently, a synergetic relationship has been established between tourism and technology and there has been a rapid change, which has caused radical changes in the perception of the tourism sector and its nature (Buhalis and Law, 2008). Changes in information and communication technologies play an important role in tourism (Law et al., 2009; Stankov and Filimonau, 2019; Azis et al., 2020; Kelly and Lawlor, 2021) and change the way tourism services are accessed and consumed (Ukpabi and Karjaluoto, 2017) and tourism globally (Buhalis and Law, 2008). Information and communication technologies have played a vital role in supporting the development of tourism since the 1970s. (Wan, 2017). These technologies also provide new tools for the creation of tourism products, tourism marketing and management (Buhalis and O'Connor, 2005; Pansiri and Courvisanos, 2010) and bring opportunities and threats for tourism businesses as well (Buhalis, 1998; Law et al., 2014). Tourism, which is a part of the service sector, and technological developments are historically interconnected (Stamboulis & Skayannis, 2003; Pesonen & Horster, 2012; Anaya & Lehto, 2020) and technology plays an important role in determining the strategy and competitiveness of tourism organizations (Buhalis, 2020). Along with the development of technology, businesses in the tourism sector have benefited from these advances and developed new business models for themselves (Nikoli and Lazakidou, 2019; Rashideh, 2020; Bilotta et al., 2021). Technology has made the tourism product more individual, flexible and also more accessible to every consumer (Lee et al., 2018; Yavorska et al., 2019). In other words, the advent of new technologies has resulted in significant changes in the dynamics and structure of production and consumption, influencing how people travel, book hotels, taxis, and airline tickets, both globally and at specific tourism destinations. (Şchiopu et al., 2016; Gore et al., 2021). When looking at the reflections of technological developments on the tourism sector, examples such as Online Reservation and Travel Planning, Mobile Applications, Social Media and Digital Marketing, Artificial Intelligence and Customer Services, Virtual Reality (VR) and Augmented Reality (AR), Digital Payments, Smart Hotels, and Environmentally Friendly Technologies can be shown.

All these developments have made the subject of tourism and technology a very popular research area (Cai and McKenna, 2021). Although there are bibliometric studies (Oral, 2023; Üstüner and Dilek, 2024) focusing on the subject of "Tourism and Technology" in national and international literature, in this research, in addition to the bibliometric analysis, content analysis of the studies such as method, technique and sample was also conducted. Therefore, it is important to determine the development and trends of scientific research on the use of technology in the tourism sector, and to offer suggestions for future research on the subject. However, when the literature on the subject is examined, it is seen that there is a large gap in scientific studies on the use of technology in the tourism sector. Based on the existing gaps in knowledge, the current study aims to answer the following research questions:

- 1- What is the current trend in studies on technology in tourism?
- 2- Which methods are used in these studies?
- 3- What are the future trends related to technology in tourism?

In this context, this research aims to reveal the current trends of the studies within the scope of technology in the tourism sector. In this respect, the studies titled tourism and technology in the academic resources indexed in the Web of Science (WoS) database in the last 20 years have been analyzed with content and bibliometric mapping methods.

In general, this study contributes significantly to the accumulation of knowledge in terms of determining the scientific technological studies carried out in the field of tourism and the content of these studies. At the same time, it provides important clues to tourism stakeholders about how the technology element is analyzed in terms of tourism and the current situation on the subject.

2. Theoretical Background

While most of the technological developments in the tourism sector emerged between 1989 and 2008, the use of the internet has facilitated the growth of tourism over the years (Gore et al., 2021:10). In a rapidly growing global tourism industry, knowing about the latest technologies plays an important role in achieving success (Rahimizhian et al., 2020). Buhalis (1998) argued that if the current tourism industry does not enhance its competitiveness by adopting emerging information technologies and innovative management practices, it risks facing competition from new entrants that could threaten the position of established players.

IT can be used by tourism businesses to monitor new markets, predict the future eution of consumer demand, and identify new trends in the behavior of current and potential customers (Yavorska et al., 2019). In this respect, following the rapidly developing technology, adapting and using new technologies to businesses is an important issue for tourism businesses to survive. In the new millennium, only creative and innovative suppliers will survive the competition (Buhalis, 1998). According to Navio-Marco et al. (2019:588), the literature has mostly started to deal with mobile technologies, which have attracted more attention than wireless technologies in recent years.

At the same time, research on technology and tourism also reflects the general understanding of how technology changes society and the economy (Xiang, 2018). Marco et al (2018) emphasized that the rapid development of technology and its reflections on tourism can be a good analysis topic. However, Gretzel and Koo (2021) stated that research on technology-based touristic value creation did not receive enough attention from scholars. Cai et al. (2019) emphasized that due to the swift advancement and adoption of cutting-edge information technologies in tourism, it is essential to review the progress of technology utilization in the sector over the past 15 years and establish a research agenda for future studies. Oral (2023) conducted a bibliometric analysis of studies conducted within the tourism-technology relationship in the Web of Science (WoS) database, and examined the articles in terms of author and citation distribution. The study showed that the concepts of tourism-technology have been studied intensively in the literature, and have increased especially after the pandemic period. Üstüner and Dilek (2024) examined international tourism journals that have recently become increasingly popular, and analyzed existing studies. It was concluded that the most studies were on artificial intelligence, that qualitative and quantitative methods were used almost equally in the studies. At the end of the day, the use of technology in the tourism sector has become the focus of attention of both practitioners and researchers.

3. Methodology

As of February 26, 2022, there are a total of 7362 publications related to Tourism and Technology in the academic resources indexed in Web of Science. As for the titles of these publications, there are a total of 611 studies that include both 'Tourism' and 'Technology' in their titles. Although the first of the research related to the subject of Tourism and Technology in the academic resources indexed in Web of Science was dated 1988, numerical data is presented related to tourism and technology studies carried out in the last 20 years. The year 2022 is not included in the analysis since it has not ended yet.

The research includes two different analyzes. First of all, bibliometric mapping analysis was conducted, which included all 611 studies related to **'Tourism and Technology'** in academic resources indexed in Web of Science. The bibliometric relationship between begins between two different studies when they cite the same research (Kessler, 1963). VOSviewer software, on the other hand, provides a graphical display of these connections (Cárdenas et al. 2022). Visual techniques were used in the study to make the bibliometric analysis of the articles more understandable. There are different applications such as Citespace, Bibexcel, Gephi and Pajek, which are used to analyze bibliometric relationships (Varshabi et al. 2022). However, it was aimed in the study to make bibliometric relationships more visual and permanent. VOSviewer software developed by Leiden University was used for this purpose (Van Eck & Waltman, 2010). VOSviewer software transforms similarity matrices into maps, making the relationship analysis more visual (Wu et al. 2022). It is one of the most common and up-to-date software used to visualize literature relationships (Wang et al. 2022: 4).

Content analysis was conducted in the second part of the study where only the articles were included. The following parameters were taken into account in the content analysis: Scientific studies containing the words 'tourism and technology' were searched in the Web of Science (WoS) database. Document Types, Book Chapters, and Proceeding Papers were excluded from the relevant documents listed as a result of the search, and only Articles were included. As a result of the search made in the Web of Science (WoS) database, a total of 269 articles were accessed and it was determined that 20 of these articles were included in both the preprint and article groups. Due to the fact that some of the 249 filtered articles are paid journals, there is no institution agreement and they cannot be downloaded, 46 articles could not be accessed. A total of 203 articles that could be obtained and reached were analyzed by content analysis method. Studies by Camprubí, & Coromina (2016) and Çelik (2021) were taken into consideration in determining the criteria to be examined in the articles. Afterwards, the relevant articles were examined separately, notes were taken from them, and five common criteria were determined on which academics reached consensus. In this context, the scientific method used by the articles, the research technique, the participant group in which the research was conducted, the field where the research was conducted, and the sampling methods used in the research were examined. Finally, the results of 13 studies published after 2000 with at least 150+ citations were analyzed to identify future trends, related to technology in tourism. Brantlinger, Jimenez, Klingner, Marleen and Virginia (2005:201) prepared a list of strategies that can be used to ensure validity and reliability in qualitative research.

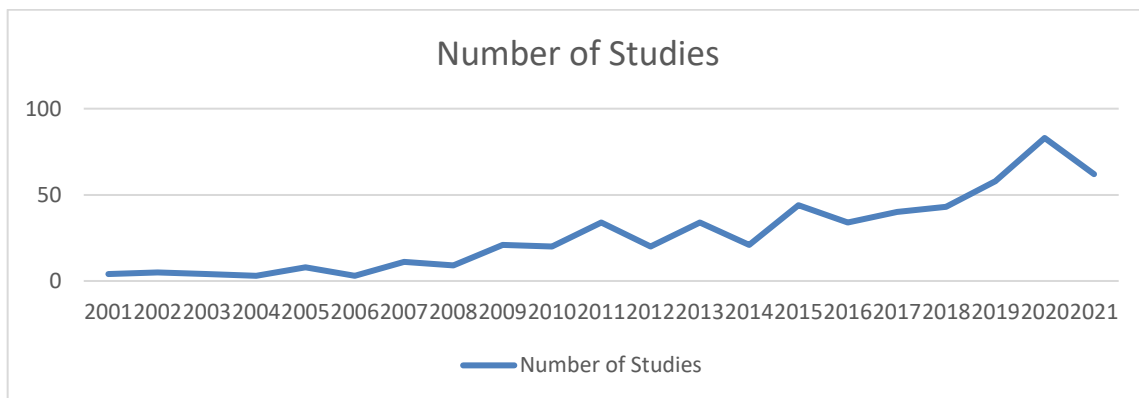
In this context, what was done within the scope of validity and reliability in the research is as follows:

- The purpose was clearly stated together with the sub-purposes.
- Document and literature review was conducted.
- Expert opinion was consulted.
- Direct quotations were made from data sources.
- In addition to bibliometric analysis, content analysis technique was also used in the study.
- The data were analyzed by more than one researcher and the results were compared.
- The existing documents obtained were analyzed in depth. On the other hand, Merriam (2013) stated that the reliability of the study in qualitative studies depends on the credibility of the researcher.

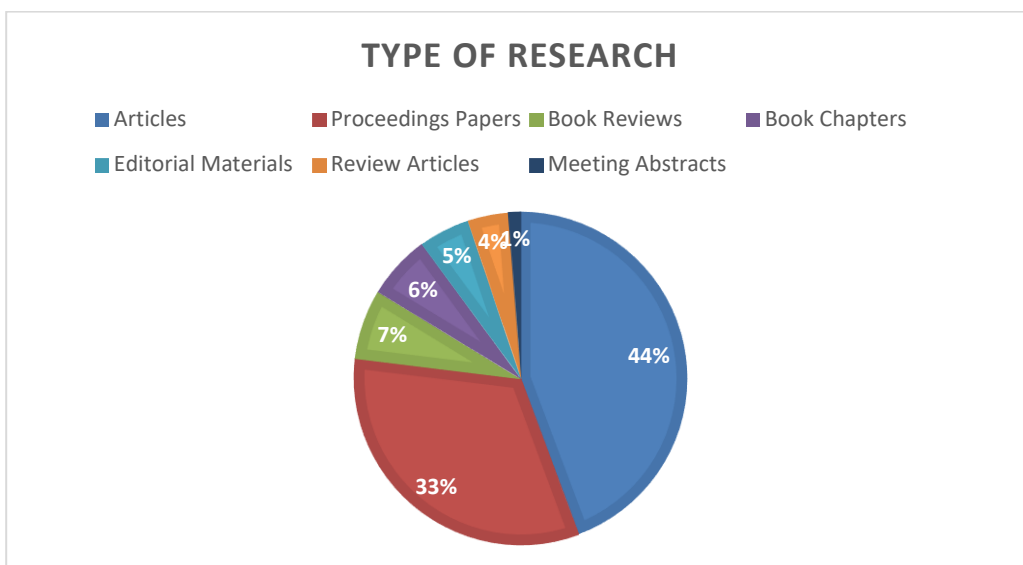
4. Results

In the research findings section, firstly, the findings obtained from the bibliometric mapping analysis, which included all 611 studies related to 'Tourism and Technology', were presented. Subsequently, findings related to 203 articles whose content was analyzed by the researchers were given. When the Figure 1 below is examined within the scope of the findings obtained as a result of the bibliometric mapping analysis, the number of studies related to 'Tourism and Technology' in the academic resources indexed in the Web of Science has continued to increase, although it has fluctuated over the years. This shows that the popularity of studies investigating tourism and technology together has increased over the years.

Figure 1: Number of studies (n:611)



The types of research related to 'Tourism and Technology' were examined in the academic resources indexed in Web of Science and the data are presented in Figure 2. Articles constitute 44% of 611 studies. The articles are followed by proceedings papers, book reviews and book chapters, editorial materials, review articles, and meeting abstracts, respectively. As for the categories of these studies in Web of Science, it is seen that the first three categories with the highest share are hospitality, leisure, sports tourism, management, and business, respectively.

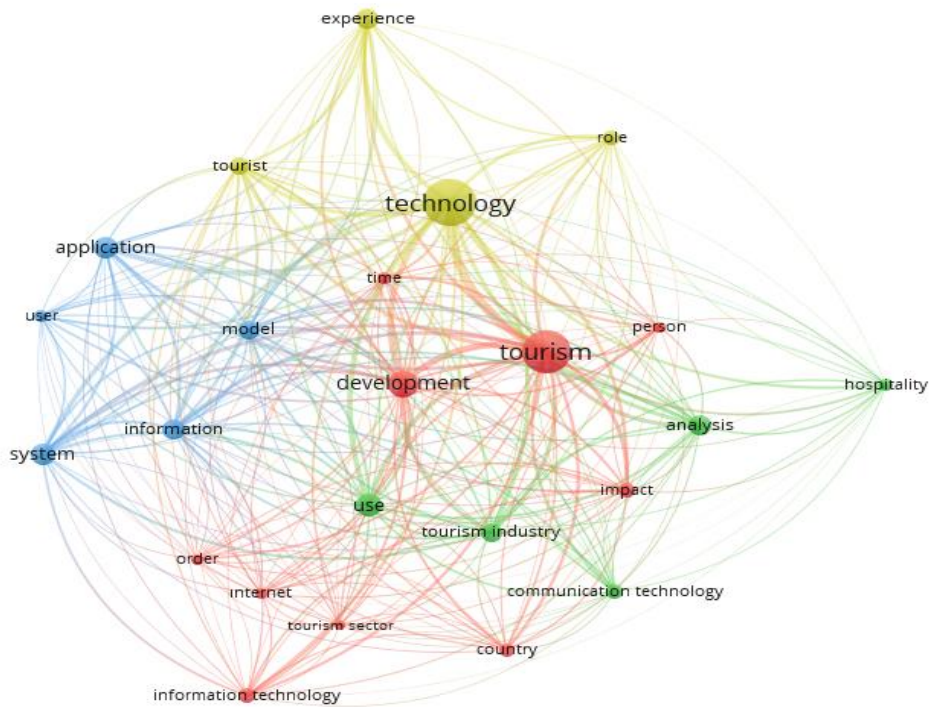
Figure 2: Types of research

When the abstracts of research related to 'Tourism and Technology' are analyzed in the academic resources indexed in Web of Science, it is seen that a total of 9893 different words are used. These words are presented in Table 1. Words such as study, paper and article were excluded during the mapping.

Table 1: Analysis of words in research abstracts (Top 10)

Concept	Frequency	Concept	Frequency
Technology	1088	Application	223
Tourism	908	Experience	216
Development	363	Analysis	212
Use	268	Information	206
System	242	Model	177

The size of the circles shown on the map represents the frequency score of the related concept (Figure 3). The lines between the circles show the frequency of using the concepts together. Colors, on the other hand, answer the question of which concepts are used more often in abstracts. As for the bibliometric map of the concepts mentioned in the abstracts, it is seen that the concepts of technology, tourist, and role are generally used in the same research. The concepts of model, application, user, information, and system are also used together. Hospitality, analysis, use, tourism industry and communication technology are other concepts used together. Finally, the concepts of tourism, development, time, person, impact, order, internet, country, and information technology have been used together in research. Depending on this result, it can be stated that the articles generally deal with the effects of technological applications in tourism on tourists (experience, application, use information, etc.), or the effects of these applications on the development of tourism.

Figure 3: Bibliometric map of concepts in research abstracts

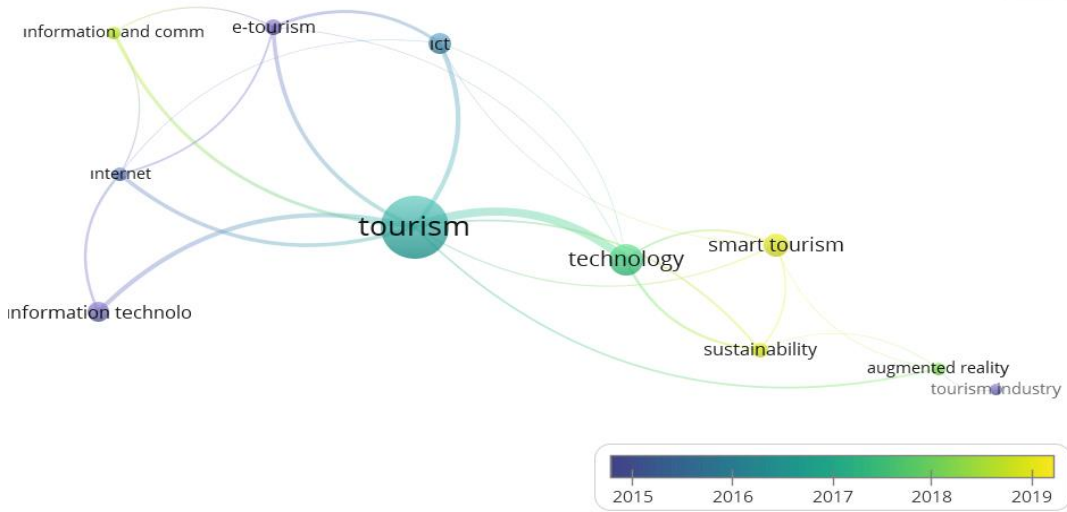
A total of 1426 different keywords from the research were used in the co-occurrence analysis based on the keywords of the researches related to 'Tourism and Technology' in the academic resources indexed in the Web of Science. The number of keywords used at least 20 times is 5 and these keywords are given in Table 2.

Table 2: The number of keywords (Top 5)

Concept	Frequency
Tourism	92
Technology	37
Information And Communication Technology	32
Smart Tourism	24
Information Technology	20

Not only the keywords used together, but also the recency analysis of the keywords are given in the keyword map in Figure 4. The circles show the frequency of occurrence of the relevant keyword. The thickness of the lines between the circles shows the link between the keywords, in other words, the use together. The colors of the circles give the recency of the concepts according to the time scale given in the lower right corner. Figure 2 indicates that the concepts of sustainability, smart tourism, and information and communication technology are used in more recent research.

Figure 4: Keywords mapping (Year 2001-2021)

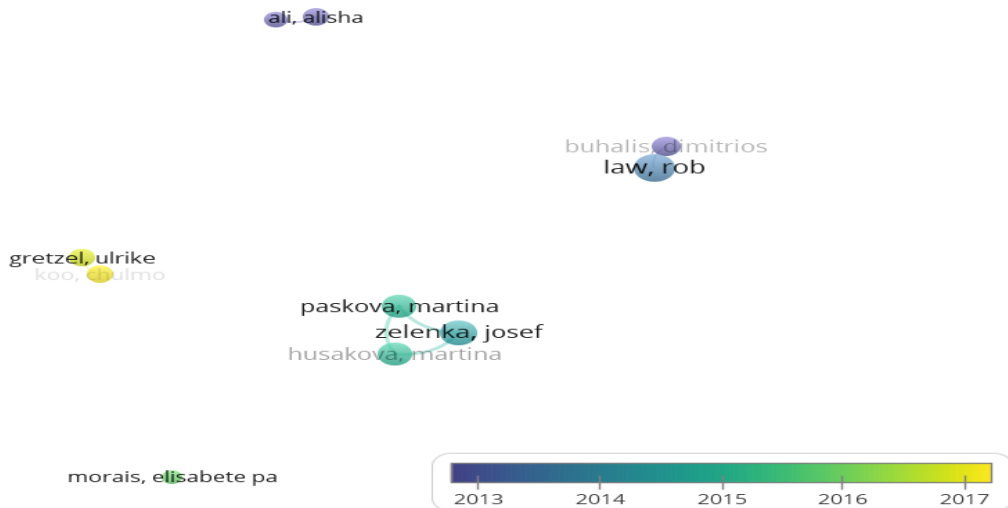


Co-authorship analysis is divided into three in VOSviewer software: co-authors, co-organization, and co-countries. Citation averages were also calculated in the research and effectiveness analysis was performed. Analysis was performed with the order of co-authors, co-organization, and co-countries. As for the Co-Author analysis of the researches related to 'Tourism and Technology' in the academic resources indexed in Web of Science, it was seen that there were a total of 1336 different authors in this field. The number of authors with five or more studies is 10. Information regarding these authors is given in Table 3.

Table 3: Co-Author analysis

Author	Number of publications	Number of citations	Average of citations	Number of co-authors
Law Rob	13	2114	162	24
Zelenka Josef	11	15	1	20
Husakova Martina	10	0	0	20
Paskova Martina	10	0	0	20
Buhalis Dimitrios	8	2470	308	11
Ali Alisha	7	3	0	7
Gretzel Ulrike	7	169	24	12
Koo Chulma	7	99	14	16
Frew Andrew	6	1	0	6
Morais Elisabete Paulo	5	4	1	11

Table 3 shows that the authors with the most publications are Rob Law, Josef Zelenka, Martina Husakova, Martina Paskova, Dimitrios Buhalis, Ali Alisha, Gretzel Ulrike and Chulma Koo respectively. However, as for the effectiveness of the published studies, it can be said that Dimitrios Buhalis is the author of the most influential publications with an average of 308 citations per publication. Rob Law, Gretzel Ulrike and Chulma Koo follow Dimitrios Buhalis, respectively. When we look at the number of co-authors in the studies, it is seen that the name that co-authored with the most names is Rob Law. Rob Law's co-authorship score of 24 is followed by Josef Zelenka, Martina Husakova, and Martina Paskova, with a co-author score of 20. The co-author mapping is given in Figure 5.

Figure 5: Co-Authors mapping

The co-authorship map does not contain many links as it is limited to the top 10 authors with the most publications. However, when the ten authors are examined, it is seen that Martina Paskova, Josef Zelenka and Martina Husakova work together, Rob Law and Dimitrios Buhalis work together, and Chulmio Koo and Ulrike Gretzel have publications together. As for recency map, it is seen that Ulrike Gretzel and Chulmio Koo have the most recent publications among these authors.

The top 5 Co-Organization analysis of the research related to 'Tourism and Technology' in the academic resources indexed in Web of Science is given in Table 4.

Table 4: Co-Organization analysis (Top 5)

University	Number of articles	Total citation	Average of citations	Number of co-organization
Hong Kong Polytechnic University	14	1823	130	8
Bournemouth University	13	2354	181	11
Kyung Hee University	11	212	19	14
Sheffield Hallam University	7	3	0	7
Surrey University	7	292	41	5

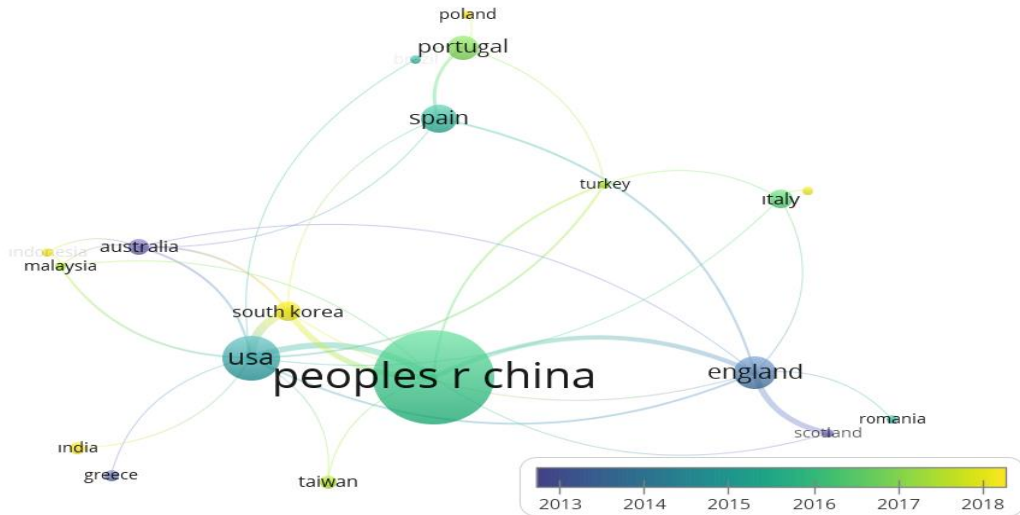
It is seen that Hong Kong Polytechnic University (Hong Kong) and Bournemouth University (England), Sheffield Hallam University (England) and Kyung Hee University (South Korea) and Surrey University (England) are working together.

A total of 83 nationals have researches in the field of 'Tourism and technology'. The number of countries with 20 or more citizens conducting research is 8. Details of countries with more than 20 publications are given in Table 5.

Table 5: Co-Countries analysis

Country	Number of publications	Number of citations	Average of citations	Joint country score	Joint country average
China	132	2391	18	35	4
USA	60	1632	27	46	1
England	43	3184	74	25	1
Spain	36	216	6	12	0
Portugal	32	93	3	11	0
Republic of Korea (South Korea)	25	381	15	22	1
Italy	24	86	4	4	0
Australia	20	177	9	10	0

As shown in Table 5, the countries with the most academic publications are China, the United States, England, Spain and Portugal, respectively. However, when it comes to the impact of publications, the ranking changes. The countries with the most influential academic publications are listed as follows: The United Kingdom, Greece, China, Republic of Korea (South Korea), and Taiwan. As for the research network with different countries, it is seen that the countries that most work with the other countries on average are China, Malaysia, Poland, Scotland, Türkiye, and the United States, respectively. The co-countries mapping is given in Figure 6.

Figure 6: Co-Countries mapping

As can be seen in Figure 6, the strongest research relationship is between China and the United States and China and England. As the color of the circles shows, South Korea, India, Malaysia and Russia seem to be doing more recent research. Table 6 shows the information on the top 5 journals in which most of the researches related to 'Tourism and Technology' are published in the academic resources indexed in Web of Science.

Table 6: Publishing journals on tourism and technology (Top 5)

Journal	Publication	Citation	Average of citations
Sustainability	21	178	8
Tourism Management	19	2359	124
Annals of Tourism Research	14	192	14
Journal of Hospitality and Tourism Technology	12	92	8
Sustainable Tourism	11	141	13
Aplikace Umele Inteligence	11	2	0

As for the journals indexed in Web of Science in which most researches related to 'Tourism and Technology' are published, it is seen that the Sustainability journal stands out. However, when it comes to the most influential journal, Tourism Management magazine takes the first place with 124 citations per article. The mapping of relevant data is presented in Figure 7.

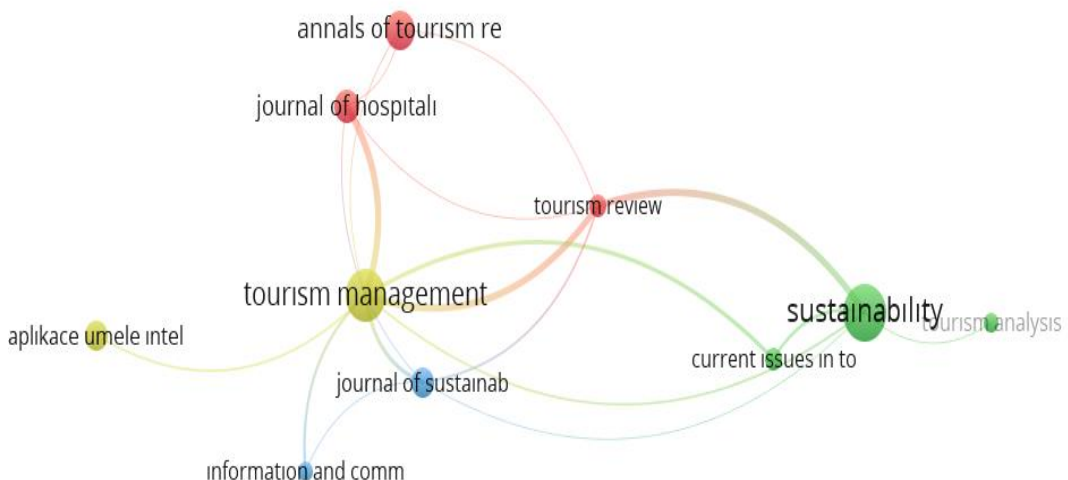
Figure 7: Publication and citation map of journals

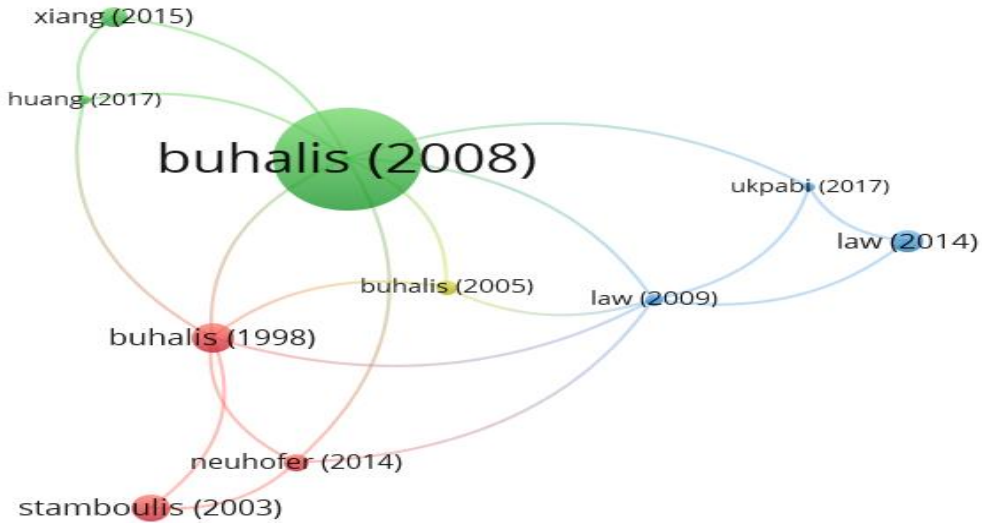
Figure 7 shows that the most influential journal, Tourism Management, has the highest citation relationship with the Journal of Hospitality and Tourism Technology and Journal of Tourism Review.

In the academic resources indexed in Web of Science, the author and year information of the studies on 'Tourism and Technology' with 200 or more citations are given in Table 7.

Table 7: Author and year information of 200 or more cited publications

Author	Year	Number of Citation
Dimitrios Buhalis and Rob Law	2008	1475
Dimitrios Buhalis	1998	401
Yeoryios Stamboulis and Pantoleon Skayannis	2003	367
Rob Law, Dimitrios Buhalis and Cihan Cobanoglu	2014	297
Zheng Xiang, Vincent P. Magninia and Daniel R. Fesenmaier	2015	260
Barbara Neuhofer, Dimitrios Buhalis and Adele Ladkin	2014	222

Table 7 shows that Dimitrios Buhalis stands out. Dimitrios Buhalis is among the authors of 6 of the 6 studies cited 200 or more times. The two studies conducted by the author alone were among the most cited studies. Two studies by a single author were among the most cited studies. One of these studies was carried out by Dimitrios Buhalis and the other by Jennie Germann Molz. The map of the studies cited 100 or more times is in Figure 8.

Figure 8: Relationship map of 100 or more cited research

The size of the circles on the map in Figure 8 indicates the number of citations received. The line between them indicates the citation relationship between the studies. Although there are 14 studies with 100 or more citations, only 10 studies are mapped above. There is no citation relationship in the other four studies. For this reason, it is not included in the map by the VOSviewer software.

The findings of the 203 articles whose content analysis was made regarding the articles written in the field of 'Tourism and Technology' are given below. In Table 8, in which 203 articles were subjected to content analysis, the total number of articles varied due to the fact that the variables sought were not specified in some articles and more than one technique/method was used in some articles. In this context, the frequency and percentage distributions of the studies determined as a result of the analysis are given in Table 8.

Table 8: Frequency and percentage distribution of studies included in the research

Variables	Groups	f	%
Method	Qualitative	116	57,14
	Quantitative	68	33,50
	Mixed	19	9,36
	Total	203	100
Technique	Questionnaire - Survey	60	28,17
	Literature Review	38	17,84
	Interview	24	11,27
	Content Analysis	25	11,74
	Case Study	18	8,45
	The Others	48	22,54
	Total	213	100
Participants	Stakeholders	25	28,74
	Tourist (Local and Foreign)	20	22,99
	Local Tourist	15	17,24
	Managers	8	9,20
	Foreign Tourist	7	8,05
	Students	5	5,75
	Local People	3	3,45
	The Others	4	4,60
Continent	Total	87	100
	Asia	59	44,70
	Europe	37	28,03
	North America	12	9,09
	Africa	6	4,55
	South America	6	4,55
	Australia	6	4,55
	Mixed	6	4,55
Sampling	Total	132	100
	Random Sampling	13	43,33
	Purposive Sampling Method	4	13,33
	Snowball Sampling	4	13,33
	Convenience Sampling	4	13,33
	The Others	5	16,67
	Total	30	100

As for the research methods used in the articles on 'tourism and technology', it is seen that 'the qualitative method' (57.14%) is preferred in most of the research. In the research technique used in the studies, the 'questionnaire' technique, which is a quantitative method, was used in approximately 28,17% of the total studies, while the questionnaire technique was followed by qualitative methods such as 'literature review', 'content analysis', 'interview' and 'case studies', respectively.

The total rate of the articles on 'tourism and technology' in which the participants of the research is specified is 40.9%. It was determined that the participants were 'stakeholders' (multiple participants) (28.74%), 'Tourist (Local and Foreign)' (22.99%), "Local Tourist" (17,24%) and 'managers' (3.8%) respectively.

It was observed that 61.9% of the studies indicated the location of the research. It was found that the articles indicating the research location were mostly carried out in Asia (44.70%) and Europe (28.03%). As for the sampling method, it was observed that 30 (14.1%) out of 203 articles stated the sampling method. In this context, 'Random Sampling Method' (43,33%) was determined as the most used sampling method.

When we look at the highlights of the most cited studies in order to determine the future trends related to technology in the field of tourism, it emerges that the integration of IT into tourism is the most important factor. In related studies, it is emphasised that IT should be incorporated into business missions, that it will take over all mechanical aspects of tourism operations, that it will provide an advantage in increasing the innovation and competitiveness of the tourism sector, that it will create an unprecedented opportunity for horizontal, vertical and cross integration as well as the development of virtual businesses, and that the future success of tourism organisations and destinations will be determined by a combination of the strategic use of advanced IT. However, another highlight of the related studies is that technological applications in tourism will also be important for tourists (social networking technologies, 'consumer-centred' technologies, mobile applications, e-tourism- e-learning). (Buhalis, 1998; Germann Molz, 2003; Stamboulis and Skayannis, 2003; Buhalis and O'Connor, 2005; Buhalis and Law, 2008; Law et al., 2014; Huang et al., 2015; Xiang, Magnini and Fesenmaier, 2015; Shoval and Ahas, 2016; Huang, Goo, Nam, and Yoo, 2017; Ukpabi and Karjaluoto, 2017; Buhalis, 2020; Razzaq et al., 2020).

5. Conclusions, Discussion and Implications

5.1 Conclusion

The rapid change of technology affects the tourism sector as well as in all sectors and offers changes and innovations. Technology research in the field of Tourism has shown a significant increase in recent years. Thus, it is crucial to outline the landscape of technology research within the tourism sector. This study employed a two-phase methodological approach, incorporating bibliometric mapping analysis and content analysis, to chart the landscape of technological research in this field. As a result of the analysis, three research questions were answered.

In this study, all 611 studies related to Tourism and Technology in academic resources searched in Web of Science were included in the analysis by bibliometric mapping analysis and 203 articles accessed were included in the analysis by content analysis method. Bibliometric mapping analysis: Number of studies by years, Publication type, Research abstract concept analysis, Keyword, Author, Institution / organisation, Country and Journal analyses and bibliometric mapping analyses, while content analysis includes: Scientific method, Research technique, Participant groups, Research field (continent) and Research sampling methods.

When current trends in studies on technology in tourism are examined, the following results were determined. As for the number of studies on 'tourism and technology', it is seen that only 4 articles were published in 2001, and the number increased 20 times in 2020, the peak year. Considering the rapid advances in technology, it is thought that the subject of tourism and technology will continue to be popular in the coming years. Other studies in the field also support this conclusion. Cai and McKenna (2021) stated that after the technological developments in the tourism sector, the subject of tourism and technology has become a very popular research field. Çelik stated that the developing technology and the products, services and changes it brings will increase the number of technology studies in the coming years (Çelik, 2021). The vast majority (n=269) of 611 studies on tourism and technology are articles. In the second place, academic papers have the highest share. It is predicted that scholars mostly prefer to publish their research in scientific journals and the trend will continue in this way. Based on the most used keywords in the research, it was

seen that the authors focused on the use of technological developments in the tourism sector. It has been determined that this use is mostly in the field of technological models, technological information systems and applications. While some of the researches focus on the use of technology in tourism activities and to what extent it can benefit from it, some of the current researches deal with the sustainability and smart tourism dimension.

It is thought that the number of authors dealing with the subject of 'tourism and technology' in the tourism sector and trying to specialize in this field is around 10 and this number is insufficient. China, the United States and England are top three countries regarding the nationality of the authors with the most studies. The analyzes have shown that China and the United States, which are the two leading countries in technology today, also play a leading role regarding the studies on 'tourism and technology'. This finding is in line with expectations, as the United States and China show high interest in technology and innovation in tourism (Türkmendağ, 2021). It has been seen that countries such as South Korea, India, Malaysia and Russia have stood out with new studies in the field of 'tourism and technology' in recent years.

The most influential journal in the field of 'Tourism and technology' is *Tourism Management*, with 124 citations per article. Türkmendağ (2021), in his study aiming at the bibliometric analysis of information technology (IT) related articles published in tourism and hospitality (T&H) journals in the Social Science Citation Index (SSCI), found that the most studies on the subject were published in the journal of *Tourism Management*. Top journals in SSCI have a strategy to publish IT related articles considering its influence on impact factor. Regarding the scholars, it has been found that Dimitrios Buhalis has produced a significant number of influential publications on the subject.

Although technology has become important in the business world (Mazikana, 2023), when the subject is considered from the point of view of tourism business, it has been seen that the studies are usually carried out by a small number of specific scientists in the field, and in the same way, the studies are published under the leadership of limited-edition journal

When studies on technology in tourism are examined in terms of method, qualitative method (57.14 %) was preferred in most of the researches on 'tourism and technology'. This may have resulted from the desire to obtain more in-depth information on the subject and to examine the subject in a more holistic manner in a realistic environment. The fact that researches are generally based on exploratory and embedded theory may result in a high number of studies using qualitative methods. However, although the recently developed scales have increased the interest in quantitative methods, there are also mixed-method studies in the literature (Çelik, 2021). The questionnaire/survey technique, which is a quantitative method, was used in approximately 28,17% of the studies, and the participants in the related articles were tourists (Local, foreign or mixed) (40.23%), stakeholders (28,74), and managers (3.8%), respectively. It has been observed that the articles with the research universe/location specified are mostly made in Asia, and it has been determined that the countries that publish the most, such as China, South Korea, India, Malaysia and Russia, are also located in Asia. These two results confirm the research data and increase its reliability.

When future trends in technology in tourism are examined, In the studies conducted in the field of tourism and technology, it is predicted that IT will be a popular

topic in the tourism sector in the future, IT can be applied in many processes in the tourism sector and IT will have an important role in terms of sustainable competition. In addition, developing technological applications will create benefits for tourists and these applications will cause a great change in the purchasing behavior of tourists in the future.

5.2 Theoretical implications

The findings of this study provide many important theoretical implications to the literature on the use of technology in the tourism sector. This research contributes to the literature by revealing the content of the studies within the scope of tourism-technology and how technology is handled in the field of tourism. It is attempted to draw attention to research on technology in the tourism sector, which is a service-oriented sector in the millennium age when technology is changing rapidly. This study contributes to the theory in terms of seeing and implementing the technological research areas that have been discussed in the relevant field in recent years. The fact that the studies in the field of tourism-technology have already been summarized in certain categories will contribute to researchers who want to work in this field, and researchers will be able to see potential research areas with this study. Finally, this article offers various suggestions for research in the field of tourism-technology.

5.3 Practical implications

The conclusions of this study have important practical and managerial implications for the tourism practitioners. The bibliometric map of the concepts in the abstracts of research on 'tourism and technology' shows that the technology issue is concentrated on hospitality businesses. While the related research on the subject focus on tourists and employees, technology related studies focused on the effects and benefits of internet technology and mobile applications as a communication and information source on users. As a result, this research can guide practitioners by providing knowledge about the outcomes of technology.

This research, on the other hand, contributes to the awareness of practitioners about the benefits and effects of technology and technological changes by drawing their attention to the subject as well as learning technology and technology-related concepts. It is also critical for sector managers to closely follow the information and communication systems developing within the scope of technology and integrate them into their businesses. It helps the decisions to be taken and implemented for technological changes in the organization to be taken quickly.

The bibliometric map of the concepts in the abstracts (Figure 1) of research on 'tourism and technology' shows that the technology issue is concentrated on hospitality businesses. While the researches focus on tourists and employees, technology related studies focused on the effects and benefits of internet technology and mobile applications as a communication and information source on users. Adapting to technological developments requires changes in both the organizational structure and the attitudes and behaviors of individuals (Topaloğlu and Koç, 2017). Tourism managers should follow the rapidly changing and developing technology not only in terms of tools and equipment, but also in terms of intellectual tools such as programs, software, and models. On the other hand, considering the new generation that is more prone to technology, it becomes even more important for tourism managers to follow up-to-date technological applications and software. In this context, tourism managers

should evaluate technology studies in terms of business and user benefits, adapt it to tourism businesses and ensure its use.

5.4 Limitations and future research

This research has some limitations. Firstly, this study focused on the studies titled 'tourism and technology' researchs and excluded the others articles that do not contain two concepts. This research has focused on the bibliometric mapping analysis of 611 studies on 'tourism and technology' in the academic resources indexed in the Web of Science and published in the last 20 years, and the content analysis of 203 accessible articles. This research, which examines the researches on 'technology and tourism' in the tourism literature, has analyzed the subject through 'content, method and technique'. Finally, the literature review was conducted from January 2000 to December 2022; therefore, other publications after January 2023 are obviously not included in the study.

Future studies could explore a broader range of journals and books to gain a more thorough understanding. Since technology is considered as a general concept in the research, subsequent studies may focus on more specific topics such as augmented/virtual reality, artificial intelligence and the possible effects of robots on the tourism sector. On the other hand, the future research can also collect data from tourism sector stakeholders using different techniques such as interviews or surveys.

6. References

- Anaya, G. J. & Lehto, X. (2020), Traveler-facing technology in the tourism experience: A historical perspective, *Journal of Travel & Tourism Marketing*, 37(3), 317-331. <https://doi.org/10.1080/10548408.2020.1757561>.
- Azis, N., Amin, M., Chan, S. & Aprilia, C. (2020), How smart tourism technologies affect tourist destination loyalty, *Journal of Hospitality and Tourism Technology*, 11(4), 603-625. <https://doi.org/10.1108/JHTT-01-2020-0005>.
- Bilotta, E., Bertacchini, F., Gabriele, L., Giglio, S., Pantano, P., S. & Romita, T. (2021), Industry 4.0 technologies in tourism education: Nurturing students to think with technology, *Journal of Hospitality, Leisure, Sport & Tourism Education*, 29, p. 100275. <https://doi.org/10.1016/j.jhlste.2020.100275>.
- Buhalis, D. (1998), Strategic use of information technologies in the tourism industry, *Tourism Management*, 9(5), 409-421. [https://doi.org/10.1016/S0261-5177\(98\)00038-7](https://doi.org/10.1016/S0261-5177(98)00038-7).
- Buhalis, D. (2020), Technology in tourism-from information communication technologies to eTourism and smart tourism towards ambient intelligence tourism: a perspective article, *Tourism Review*, 75(1), 267-272. <https://doi.org/10.1108/TR-06-2019-0258>.
- Buhalis, D. & Law, R. (2008), Progress in information technology and tourism management: 20 years on and 10 years after the internet: The state of eTourism research, *Tourism Management*, 29, 609-623. <https://doi.org/10.1016/j.tourman.2008.01.005>.
- Buhalis, D. & O'Connor, P. (2005), Information communication technology revolutionizing tourism, *Tourism Recreation Research*, 30(3), 7-16. <https://doi.org/10.1080/02508281.2005.11081482>.
- Brantlinger, E., Jimenez, R., Klingner, J., Marleen, P. & Virginia, R. (2005), Qualitative studies in special education. *Exceptional Children*, 71 (2), 95-207.

- Cai, W. & McKenna, B. (2021), Knowledge creation in information technology and tourism research, *Journal of Travel Research*, 60(4), 912– 915. <https://doi.org/10.1177/0047287520903142>.
- Cai, W., Richter, S. & Brad McKenna. B. (2019), Progress on technology use in tourism, *Journal of Hospitality and Tourism Technology*, 10(4), 651-672. <https://doi.org/10.1108/JHTT-07-2018-0068>.
- Camprubí, R. & Coromina, L. (2016), Content analysis in tourism research, *Tourism Management Perspectives*, 18, 134-140. <https://doi.org/10.1016/j.tmp.2016.03.002>.
- Cárdenas, D.L.B., Huerta, R.M., Castro, E.L. & Valenzuela, K.C.S. (2022), Innovation management in small and medium enterprises: A bibliometric analysis approach between 1985 and 2019, *Management Letters/Cuadernos de Gestión*, 22(2), 155-166. <https://doi.org/10.5295/cdg.211551el>
- Çelik, A. (2021), Turizmde teknoloji çalışmaları, *Journal of Tourism Intelligence and Smartness*, 4(2), 270-295.
- Germann Molz, J. (2013). Social networking technologies and the moral economy of alternative tourism: The case of couchsurfing.org, *Annals of Tourism Research*, 43, 210–230. <https://doi.org/10.1016/j.annals.2013.08.001>
- Gore, S., Borde, N. & Desai, P.H (2021), Assessment of technology strategies for sustainable tourism planning, *Foresight*, 23(2), 172-187. <https://doi.org/10.1108/FS-02-2020-0006>.
- Gössling, S. (2021), Technology, ICT and tourism: from big data to the big picture, *Journal of Sustainable Tourism*, 29(5), 849-858. <https://doi.org/10.1080/09669582.2020.1865387>.
- Gretzel, U. & Koo, C. (2021), Smart tourism cities: A duality of place where technology supports the convergence of touristic and residential experiences, *Asia Pacific Journal of Tourism Research*, 26(4), 352-364. <https://doi.org/10.1080/10941665.2021.1897636>.
- Huang, D. C., Goo, J., Nam, K. & Yoo, C.W. (2017). Smart tourism technologies in travel planning: The role of exploration and exploitation, *Information & Management*, 54, 757–770. <https://doi.org/10.1016/j.im.2016.11.010>
- Kelly, P. & Lawlor, J. (2021), Adding or destroying value? User experiences of tourism self-service technologies, *Journal of Hospitality and Tourism Insights*, 4(3), 300-317. <https://doi.org/10.1108/JHTI-08-2018-0051>.
- Kessler, M. M. (1963), Bibliographic coupling between scientific papers, *American Documentation*, 14(1), 10-25. <https://doi.org/10.1002/asi.5090140103>
- Law, R., Buhalis, D. & Cobanoglu, C. (2014), Progress on information and communication technologies in hospitality and tourism, *International Journal of Contemporary Hospitality Management*, 26(5), 727-750. <https://doi.org/10.1108/IJCHM-08-2013-0367>.
- Law, R., Leung, R. & Buhalis, D. (2009), Information technology applications in hospitality and tourism: A review of publications from 2005 to 2007, *Journal of Travel & Tourism Marketing*, 26, 5-6, 599-623. <https://doi.org/10.1080/10548400903163160>.
- Lee, H., Lee, J., Chung, N. & Koo, C. (2018), Tourists' happiness: Are there smart tourism technology effects? *Asia Pacific Journal of Tourism Research*, 23(5), 486-501. <https://doi.org/10.1080/10941665.2018.1468344>.
- Marco, J.N., Ruiz-Gómez, L.M. & Sevilla, C.S. (2018), Progress in information technology and tourism management: 30 years on and 20 years after the internet - Revisiting Buhalis & Law's landmark study about eTourism, *Tourism Management*, 69, 460–470. <https://doi.org/10.1016/j.tourman.2018.06.002>.
- Mazikana, Anthony Tapiwa (2003). How business can use information technology to increase switching costs (March 3, 2023). Available at SSRN:

- <https://ssrn.com/abstract=4378467> or <https://doi.org/http://dx.doi.org/10.2139/ssrn.4378467>
- Merriam, S. B. (2013). *Nitel araştırma desen ve uygulama için bir rehber (3. Baskı)*. (Çev. S. Turan). Ankara: Nobel yayıncılık.
- Navio-Marco, J., Ruiz-Gómez, L. M. & Sevilla-Sevilla, C. (2019), Progress in wireless technologies in hospitality and tourism, *Journal of Hospitality and Tourism Technology*, 10(4), 587-599. <https://doi.org/10.1108/JHTT-07-2018-0061>
- Nikoli G. & Lazakidou A. (2019), The impact of information and communication technology on the tourism sector, *Almatourism*, 19, 45-68. <https://doi.org/10.6092/issn.2036---5195/8553>.
- Pansiri, J. & Courvisanos, J. (2010), Attitude to risk in technology-based strategic alliances for tourism, *International Journal of Hospitality & Tourism Administration*, 11 (3), 275-302. <https://doi.org/10.1080/15256480.2010.498283>.
- Pesonen, J. & Horster, E. (2012), Near field communication technology in tourism, *Tourism Management Perspectives*, 4, 11-18. <https://doi.org/10.1016/j.tmp.2012.04.001>.
- Rahimizhian, S., Oztüren, A. & Ilkan, M. (2020), Emerging realm of 360-degree technology to promote tourism destination, *Technology in Society*, 63, 101411. <https://doi.org/10.1016/j.techsoc.2020.101411>.
- Rashideh, W. (2020), Blockchain technology framework: Current and future perspectives for the tourism industry, *Tourism Management*, 80, 104125. <https://doi.org/10.1016/j.tourman.2020.104125>.
- Razzaq, A., Sharif, A., Ahmad, P. & Jermisittiparsert, K. (2020). Asymmetric role of tourism development and technology innovation on carbon dioxide emission reduction in the Chinese economy: Fresh insights from QARDL approach, *Sustainable Development*, 29:176-193. <https://doi.org/10.1002/sd.2139>
- Şchiopu, A., F., Pădurean, A.M., Țală, M.L. & Nica, A.M. (2016), The influence of new technologies on tourism consumption behavior of the millennials, *Amfiteatru Economic*, 18 (Special Issue No. 10), pp. 829-846
- Seyitoğlu, F. & Ivanov, S.(2022), The 'new normal' in the (post-)viral tourism: The role of technology, *Tourism An International Interdisciplinary Journal*, 70(2), 151 – 167. <https://doi.org/10.37741/t.70.2.1>.
- Shoval, N. & Ahas, R. (2016) The use of tracking technologies in tourism research: The first decade, *Tourism Geographies*, 18(5), 587-606. <https://doi.org/10.1080/14616688.2016.1214977>
- Stamboulis, Y. & Skayannis, P. (2003), Innovation strategies and technology for experience-based tourism, *Tourism Management*, 24, 35-43, [https://doi.org/10.1016/S0261-5177\(02\)00047-X](https://doi.org/10.1016/S0261-5177(02)00047-X).
- Stankov, U. & Filimonau, V. (2019), Reviving calm technology in the e-tourism context, *The Service Industries Journal*, 39 (5-6), 343-360. <https://doi.org/10.1080/02642069.2018.1544619>.
- Topaloğlu, M. & Koç, H. (2010). *Yönetim ve Organizasyon (Kavramlar – Teoriler – Yaklaşımlar)*, Ankara: Seçkin Yayıncılık.
- Türkmenbaş, Z. (2021), A Bibliometric analysis of information technology research in tourism and hospitality journals in the SSCI, *Journal of Yasar University*, 16, 94-110.
- Oral, S. (2023). Turizm teknolojileri ile ilgili araştırmalarının kavramsallaştırılması: VOSviewer ile bibliyometrik analiz, *Journal of Global Tourism And Technology Research*, 4(2): 115-128
- Ukpabi, D. & Karjaluoto, H. (2017), Consumers' acceptance of information and communications technology in tourism: A review, *Telematics and Informatics*, 34(5), 618-644. <https://doi.org/10.1016/j.tele.2016.12.002>.

- Üstüner, M. ve Dilek, S. E. (2024). Turizm ve Teknoloji İlişkisi: Uluslararası Turizm Dergilerindeki Makalelere Yönelik Bibliyometrik Bir Değerlendirme, *Journal of Tourism Intelligence and Smartness*, 7(1), 36-50. <http://doi.org/10.58636/jtis.1469307>
- Van Eck, N.J. & Waltman, L. (2010), Software survey: VOSviewer, a computer program for bibliometric mapping, *Scientometrics*, 84(2), 523-538. <https://doi.org/10.1007/s11192-009-0146-3>.
- Varshabi N., Arslan Selçuk S. & Mutlu Avinç G. (2022), Biomimicry for energy-efficient building design: A bibliometric analysis, *Biomimetics*, 7(1), 21. <https://doi.org/10.3390/biomimetics7010021>.
- Wan, C. K. B. (2017), Flourishing through smart tourism: experience patterns for co-designing technology-mediated traveller experiences, *The Design Journal*, 21(1), 163–173. <https://doi.org/10.1080/14606925.2018.1395266>
- Wang C., Guan D., Li Z., Yang Y., Yang K. (2022), Emerging trends and frontier research on recurrent implantation failure: A bibliometric analysis, *Annals of Translational Medicine*, 10(6), p.307. <https://doi.org/10.21037/atm-22-703>.
- Wu, J., Wang, F., Wang, Z., Hu, H., Yang, L. & Fu, H. (2022), Global performance and trends of research on per- and polyfluoroalkyl substances (PFASs) between 2001 and 2018 using bibliometric analysis, *Chemosphere*, 295, 133853. <https://doi.org/10.1016/j.chemosphere.2022.133853>.
- Xiang, Z. (2018), From digitization to the age of acceleration: On information technology and tourism, *Tourism Management Perspectives*, 25, 147–150. <https://doi.org/10.1016/j.tmp.2017.11.023>
- Xiang, Z., Magnini, P.V., Fesenmaier, D.R. (2015). Information technology and consumer behavior in travel and tourism: Insights from travel planning using the internet, *Journal of Retailing and Consumer Services*, 22, 244–249. <https://doi.org/10.1016/j.jretconser.2014.08.005>
- Yavorska, V. V., Hevko, I. V., Sych, V. A., Potapchuk, O.I. & Kolomiyets, K. V (2019), Features of application of information technologies in modern tourism, *Journal of Geology, Geography and Geoecology*, 28(3), 591–599. <https://doi.org/10.15421/111956>.
- Zhang, T., Wei, W., Fu, X., Hua, N. & Wang, Y. (2019), Exploring the roles of technology, people, and organization in building a tourism destination experience: Insights from the 2nd USA-China tourism research summit and industry dialogue, *Journal of Destination Marketing & Management*, 12, 130–135. <https://doi.org/10.1016/j.jdmm.2019.03.001>.

Hakem Değerlendirmesi: Dış bağımsız.	Bilgilendirilmiş Onam Formu: Tüm taraflar kendi rızaları ile çalışmaya dâhil olmuşlardır.
Teşekkür: Katkılarından dolayı hakemlere teşekkür ederiz.	Araştırmacıların Katkı Oranı: Yazarlar çalışmaya eşit oranda katkı sağlamıştır.
Destek Bilgisi: Herhangi bir kurum ve/veya kuruluştan destek alınmamıştır.	Etik Kurul Onayı: Çalışma için Etik Kurul onayı gerekmemektedir.
Çıkar Çatışması: Yazarlar arasında çıkar çatışması yoktur.	