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Research Article

BIBLIOMETRIC ANALYSIS OF ARTIFICIAL INTELLIGENCE APPLICATIONS IN TOURISM WITH THE SCIENTIFIC MAPPING TECHNIQUE

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Abstract

The aim of this study is to reveal the research trends of scientific publications on artificial intelligence (AI) in the tourism sector using scientific mapping techniques. For this purpose, a total of 1.277 studies published between 2003 and 2024 were analyzed without restrictions on publication type and year using the Bibliometrix package based on the R programming language. This study aims to comprehensively examine the development and innovations in the literature on the intersection of AI and tourism. The analysis focuses on identifying the most influential sources, authors, and institutions, as well as collaboration and citation networks and scientific production patterns. Through dynamic keyword analyses and co-occurence networks, the study reveals the direction and academic impact of research in this field. The results show that scientific production on tourism and AI has grown significantly over time, especially since 2015. Most of the studies originate from countries such as the United States, China, and the United Kingdom, and the most frequently studied themes include personalized recommendation systems, chatbots, and demand forecasting. The high proportion of co-authored papers and dense citation networks indicate strong interdisciplinary collaboration. These findings suggest that AI research in tourism is both growing in volume and deepening in thematic diversity.

Keywords: Tourism, Artificial Intelligence, Web of Science, Scientific Mapping, Bibliometric Analysis

Introduction

The tourism industry is one of the most dynamic and competitive areas of the global economy, and today it has to respond to rapidly changing consumer demands and adapt to technological innovations. Along with the innovations brought by technological developments, social transformation and change inevitably and rapidly continue. The digital age we are in is a new era that includes efforts to make industrial applications more efficient by taking advantage of the opportunities of information and communication technologies, allowing production to be carried out with advanced technologies and is called “Industry 4.0”. Industry 4.0 is a new method that enables the integration of technologies with society (Roblek et al., 2021), considers information as its main source and reveals the importance of knowledge accumulation in the development of these technologies (Roblek et al., 2016). Advanced technologies that came with the Industry 4.0 phase have had transformative effects on many sectors around the world (Aydınbaş, 2023). The tourism industry is one of the industries affected by these changes and transformations. The effects of these advanced technologies on the tourism industry are becoming increasingly widespread, especially by transforming service delivery methods. AI technologies are also at the forefront of advanced technologies used in tourism thanks to their features and characteristics. The new understanding that AI has evolved into has led to the emergence of virtual assistants, robots, image and sound processing systems, augmented reality and virtual reality applications. The tourism industry stands out as one of the areas where these applications are heavily applied. Tourism and hospitality businesses use artificial intelligence-supported applications to organize operational processes, increase operational quality, increase employee efficiency and productivity, lighten employee workload, reduce labor costs, prevent waste and offer guests entertainment experiences that they will enjoy through advanced technologies (Akgün, 2023)

In this context, bibliometric analysis of studies on tourism and AI using the R-based Bibliometrix programme is carried out to better understand the scope, effects and relationships of the scientific literature in this field.

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This study aims to contribute to the development of the field by revealing current research trends, key themes and interaction networks in the field of tourism and artificial intelligence.

Conceptual Framework

AI Applications in Tourism

AI has been accepted as a field that has emerged since the 1950s and that researchers are increasingly curious about and working on. The activities to recognize and understand artificial intelligence, which has made rapid progress over the past 50 years, have accelerated especially with the increase in studies in this field after Industry 4.0. It is known that AI is widely applied in the fields of computer science and operational research. Intelligence, which forms the basis of artificial intelligence, is generally expressed as the ability to collect information and reason on this information to solve complex problems. John McCarthy introduced the term AI as a computer science aimed at ensuring that computers behave like humans during a workshop held at Dartmond College in 1956 (McCarthy et al., 1956). AI is simply defined as "the science and engineering of making intelligent machines" (Mccarthy, 2007). AI has a sequence such as Intelligence = Perception + Analysis + Response. AI differs from psychology by focusing on computation, and from computer science by emphasizing the processes of perception, reasoning, and action (Kamble and Shah, 2018).

Studies on the history of AI show that the roots of AI date back to the pre-Christian era. Various ideas were developed about humanoid robots and artificial beings, especially in the Ancient Greek period. Daedelus, one of the mythological figures of this period, draws attention with his ideas of creating artificial humans guided by the mythological characteristics of the wind. Such beings depicted by Daedelus can be considered as reflections of the historical roots of AI in human imagination. The foundations of modern AI date back to the end of the 19th century. The year 1884 is considered a critical turning point in AI studies. During this period, Charles Babbage worked on developing a mechanical machine that could exhibit intelligent behavior. However, Babbage concluded that this machine could not successfully exhibit human-like intelligent behavior and therefore stopped the project. Babbage's early experiments reveal the technical and theoretical difficulties faced by AI research and provide an important historical ground that paved the way for modern AI studies (Mijwel, 2015).

Artificial Intelligence has brought about significant changes in many industries such as manufacturing, automotive, banking, finance, healthcare, telecom, and energy, and it has been observed that this technology is rapidly gaining popularity in the tourism industry as well (Samala et al.) The tourism industry has emerged as an area where AI applications are easy to integrate as it is largely a service oriented structure and prioritizes the customer experience. AI was initially used to facilitate the marketing process in the tourism industry, but today it also features in more complex service processes such as welcoming, reception, drop-off and revitalizing customer relationships (Samala et al., 2022). This development reveals that AI has become an integral element of the tourism industry and not just an aid to it.

AI has brought about significant changes in many industries such as manufacturing, automotive, banking, finance, healthcare, telecommunication and energy, and it has been observed that this technology is rapidly gaining popularity in the tourism industry as well (Samala et al. 2022). The tourism industry has emerged as an easy-to-integrate area for AI applications, as it is largely a service-oriented structure and prioritizes customer experience. AI was initially used to facilitate the marketing process in the tourism industry, but today it also features in more complex service processes such as welcoming, reception, drop-off and revitalizing customer relationships (Samala et al., 2022). This development reveals that AI has become an indispensable element of the tourism industry and not just an aid to it. Arguably, the sub-sector of the tourism industry where AI is most widely used is the accommodation sector. Many units of these businesses are known to use AI applications, especially in front desk, food and beverage, room service, and housekeeping (Çuhadar et al., 2022). For example, Marriott's robotic system called "Mario" communicates with guests and provides them with information about hotel events, bus schedules, and so on. On the other hand, the Wynn Casino Hotel can also utilize its Alexa-based AI application Echo to perform similar services with Mario, as well as adjusting the room's lights, curtains, and heating (Prentice et al., 2020). At the Clarion Hotel, the same app could request room service and provide similar services such as online information on request. Hotel Icon could use its Jevees delivery robots to serve food and beverages, and its Aerobot cleaning robots to provide air cleaning and reporting services in addition to room cleaning (Choi et al., 2020). On the other hand, the Edwardian Hotel can provide guests with detailed information about local restaurants, bars, and other tourist attractions via chatbots, while the Hilton Hawaiian Village Beach Resort & Spa can check guests in and out via self-service

terminals. check-out via self-service terminals. Check-out procedures (Prentice et al., 2004) are available at the Hilton Hawaiian Village Beach Resort & Spa.

In the transportation sector, AI applications have an important place, especially in airline transportation. The most important reason for this is that it is faster, safer and more comfortable than other transportation systems (Akkan and Cura, 2022). Today, the internet has become an indispensable phenomenon for airline companies, as it is for all other businesses. Because the internet is considered the most important tool used by businesses to communicate with their customers, employees, suppliers and other stakeholders. Similarly, these businesses use artificial intelligence-based technologies intensively (Şimşek, 2023). For example, customer reservation and check-in transactions, baggage handling, parking and customer information and guidance services are largely carried out with the help of robots, chatbots and software connected to the technology in question. Again, route determination, fingerprint reading, face and voice recognition, tracking of passenger baggage, detection of illegal objects in baggage, analysis of the effects of in-flight loads formed on the wing and tail during flight are also carried out with artificial intelligence-based applications. On the other hand, with machine learning technology connected to artificial intelligence, it is possible to detect and track the location of people, ground and aircraft inside and outside the terminal. In addition, ticketing PNR transactions, which can be listed as back-office transactions, cancellation, return and change requests and refund, invoicing and reporting transactions related to these transactions are also carried out with artificial intelligence-based applications (Şimşek, 2023). AI basically helps to simplify business processes, make the jobs of employees easier and make transactions more efficient.

The food and beverage industry has also significantly benefited from recent technological advancements (Utermohlen, 2019). These developments encompass a wide range of innovations, including robotics, data-driven technologies, novel processing methods, and the emergence of new application areas within the sector. In the context of agriculture—an integral part of the food production chain—technologies such as drones and autonomous robots are increasingly employed to enhance productivity while minimizing environmental impact. These tools are used to support farmers by improving operational efficiency and precision, fostering the cultivation of climate-resilient crops, advancing aquaculture practices, and facilitating the production of alternative protein sources. Furthermore, biotechnology plays a pivotal role in enhancing food safety and sustainability, contributing to the development of innovative solutions to meet growing global food demands.

Tussyadiah (2020) highlights the convenience and comfort that artificial intelligence (AI) technologies offer to users in the tourism sector. These technologies streamline the purchasing process, allow travelers to access relevant information before their trips, and provide personalized recommendations for activities and excursions. Moreover, AI empowers users to obtain information independently, increasing their autonomy—particularly in managing aspects of their accommodation, such as room controls—which contributes to higher levels of guest satisfaction. In addition to enhancing user experience, AI also improves operational efficiency and productivity through the use of tools such as virtual personal assistants, service robots, smart sensors, natural language processing (NLP), and chatbots Artificial intelligence has emerged as a transformative force in the tourism sector, offering substantial benefits in terms of service personalization, operational efficiency, and sustainable development. Bulchand-Gidumal (2020) emphasizes that AI facilitates personalized travel planning by overcoming common barriers such as language differences and workforce limitations, while also offering context-aware recommendations through tools like chatbots, virtual assistants, and language translation applications. Similarly, Samala et al. (2020) highlight AI's role in enhancing customer experience by providing real-time, location-specific information about destination infrastructure and natural assets. Technologies such as facial recognition, virtual reality (VR), and service robots are particularly noted for their capacity to improve interactivity and traveler satisfaction. Başer and Olcay (2022) argue that AI contributes to time efficiency and enhances decision-making by offering pre-trip information—such as hotel details—and generating suggestions based on previous travel behaviors. Their study underscores the importance of integrated platforms such as Google Maps and service optimization tools in supporting seamless tourist experiences. Furthermore, Zhang and Sun (2019) underline AI’s capacity to deliver multilingual, transparent, and cost-effective services, thereby improving destination marketing and tourist trust. Advanced technologies, including smart mapping systems, real-time image transmission, and humanoid robots, are identified as key elements in the operational transformation of the tourism industry.

However the uncertainty of the negative impact of the development of AI on humans is also discussed. In this context, various concerns are expressed for the future of the tourism sector, such as the disappearance of the confidentiality of personal data and the emergence of security risks, the replacement of human labor by artificial intelligence-based robotic applications and the occurrence of job losses, legal and ethical problems

that may arise in human-machine interaction, decrease in social communication, and desensitization (Tussyadiah and Miller, 2019; Tong et al., 2022; Grundner and Neuhofer, 2021; Aydın, 2023; Er et al., 2023). Those who think that such negativities are just the beginning and will be carried to more dimensions clAI m that AI is a technology that will end human supremacy and even claim that it is the last invention of humanity (Barrat, 2013; Leonhard, 2016).

Related Research

In order to better understand the subject of AI and tourism to reveal future directions, and to contribute to its progress, it is important to investigate and analyze previous studies. Literature review is one of the most important academic studies that are frequently used for this purpose. The development of the national and international literature in the relevant field over the years, the keywords used, the research types of the published articles, the prominent researchers, and the general characteristics of the research topics are very important in terms of the development and effectiveness of the literature. Bibliometric analysis, which enables the investigation of these, is an effective method of providing data not only to researchers but also to all relevant stakeholders by showing which topics are discussed the most in the field (Böyükyılmaz and Oktay, 2020). The main purpose of applying bibliometric analysis is to promote a discussion among researchers in the relevant field about the basic dimensions and functionality of scientific work, as well as to provide a benchmark for the productivity of the development process (Moed et al. 2002).

AI has been addressed with increasing interest in the field of tourism, as in many sectors in recent years. With the acceleration of technological developments, the integration of AI into the tourism sector has become a remarkable research area in the academic literature. Bibliometric studies conducted within this framework aim to identify trends in the literature, prominent themes, authors, institutions, and collaboration networks. Bibliometric studies on AI play an important role in understanding the developments in the sector. Kırtıl and Aşkun (2021) stated that academic interest in AI has increased after 2017 and that the focus is on topics such as customer experience and data analysis in this field. Knani et al. (2022) discussed future research agendas such as the effects of AI on the workforce, privacy concerns, and smart tourism experiences. Chavan et al. (2024) pointed out the potential of AI to increase customer satisfaction through tools such as augmented reality and virtual assistants. Fouad et al. (2024) reviewed 25 studies on the applications of generative AI technologies in tourism, highlighting areas such as decision making, chatbots, and sentiment analysis. Tuo et al. (2024), on the other hand, stated that AI has been researched on important topics such as tourist experience, marketing, and destination management in their analysis of 4.048 articles. Samara et. (2020) emphasized the role of big data and AI in the tourism sector and showed how these technologies are used to increase business efficiency.

The previous studies summarized above show that AI technologies are increasingly being used in the tourism sector and that research in this field is developing rapidly. On the other hand, they highlighted the need for more studies to support this research context, which is still fuzzy and fragmented. Our study attempts to overcome the aforementioned limitations by adopting a multidisciplinary perspective and searching for a larger number of keywords. In particular, analyzing only academic publications directly related to AI and tourism provides an in-depth examination of the research in this field. Furthermore, through dynamic keyword analyses and co-citation networks with the Bibliometrix tool, a solid foundation has been established on the direction of innovative developments in the sector and the future of AI research. In this context, this study will be an important resource in filling the knowledge gaps in the field by providing a comprehensive scientific roadmap for researchers and practitioners in the sector who want to examine the effects of AI technologies in the tourism sector.

Method

This study uses bibliometric analysis to explore the research trends of artificial intelligence in the tourism field. Bibliometric analysis was first proposed by Pritchard (1969) and refers to the quantitative and qualitative analysis of academic publications to monitor the development of a specific field. This method can statistically test research results based on variables such as authors, journals, institutions, keywords, and citation patterns, while revealing the knowledge structure and development evolution of the field (Diodato, 2012; Ruhanen et al., 2015).

In this study, a total of 1.277 publications were retrieved from the Web of Science (WoS) Core Collection database. The data collection process was conducted in February 2024, using a keyword-based search query in the title, abstract, and keywords fields: (“artificial intelligence” OR “CHATGPT” OR “machine learning” OR “AI ” OR “generative AI ” OR “natural language processing” OR “NLP”) AND “tourism”. In order to

ensure a focused and relevant dataset, the subject category was limited to "Hospitality, Leisure, Sport & Tourism". The Web of Science Core Collection database was specifically chosen for this study because it indexes high-impact, peer-reviewed publications and is widely recognized as a reliable and authoritative source in bibliometric research. Its extensive coverage of abstracts, citations, and references enables comprehensive and consistent data analysis across disciplines (Li and Hale, 2016). A total of 1.277 publications were identified, including articles, conference proceedings, book chapters, and other types of academic publications. Although no publication type was initially excluded, all records were manually reviewed, and only publications that directly covered both AI and tourism were included in the analysis. In addition, only academic studies published in English were included in the study. In this direction, a total of 1,277 studies published between January 2003 and August 2024 were downloaded as BibTeX files and analysed in Biblioshiny with the help of the RStudio program integrated into the R program. Biblioshiny is a Bibliometrix package developed by Aria and Cuccurullo (2017) using R Studio software. The use of these tools increases the reliability and accuracy of the bibliometric analysis process of the research and allows a more comprehensive and in-depth examination of the findings obtained (Zupic and Čater, 2015). *Since this study is based entirely on secondary data obtained from a publicly accessible scientific database and does not involve human subjects, experimental intervention, or personal data collection, no ethics committee approval was required.*

Findings

General information about the 1.277 studies included in the analysis is presented in Table 1.

Table 1. General Information on Publications

Time Interval	**2003:2024**
Sources (Journals, Books, etc.)	114
Total Number of Studies	1.277
Annual Growth Rate (%)	1.86
Annual citation rate	4.54
Average Citation Per Study	17.55
Sources Used (References)	46.186
Keywords (ID)	1.484
Authors' Keywords (DE)	4.072
Authors (Total)	3.033
Authors of Single Authored Studies	189
Authors of Multi-authored Studies	2.844
Single Authored Works	206
Number of Studies per Author	3.14
International Co-authorship (%)	25.82

Source: Prepared by the authors

According to Table 1, it is seen that the analysed studies consist of a total of 1.277 publications published between 2003 and 2024. These studies were distributed in 114 different sources. The total number of references of these publications was determined as 46.186. There are 3033 authors in total, of which only 189 are in single-author studies and 2844 are in multi- author studies. The average number of studies per author is 3.14 and the international co- authorship contribution rate is 25.82%. The results obtained in order to analyse the publication types of 1.277 publications on the subject are given in Table 2.

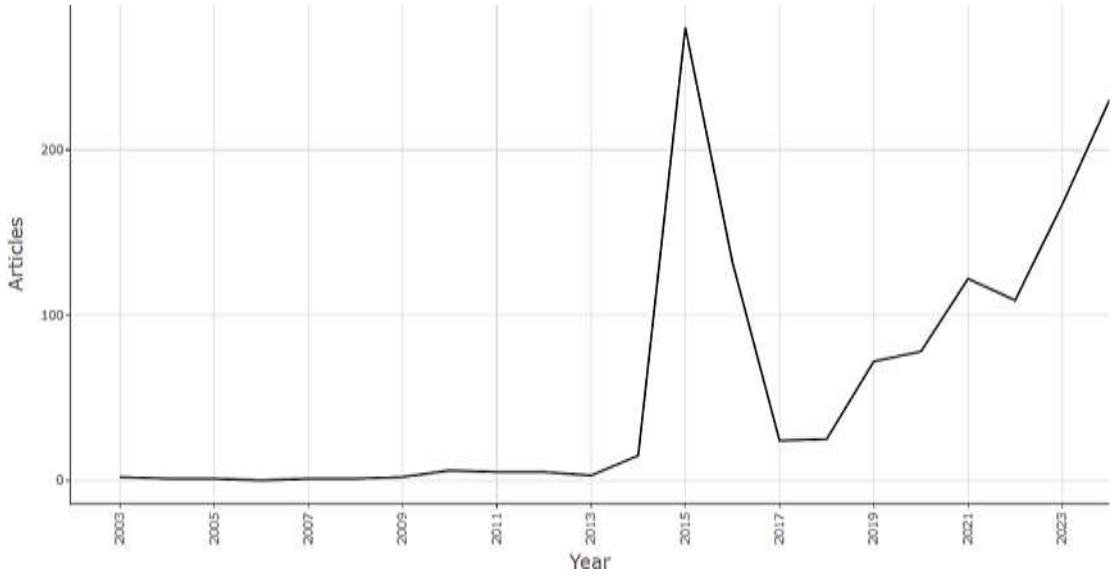
Table 2. Types of Publications

Publication Type	**Number of publications**
Article	750
Book	2
Book Chapter	57
Declaration	433
Other (conference review, editorial, book review, etc.)	35
Total	**1.277**

Source: Prepared by the authors

According to Table 2, it is observed that the publication types of 1,277 studies are distributed as follows: 750 studies were published as journal articles, 2 as books, 57 as book chapters. Additionally, 433 studies were presented as conference papers, and 35 studies were classified under other publication types. It is important to distinguish between "articles" and "papers" in this context. While "articles" refer to peer-reviewed journal publications, "papers" generally denote research presented at scientific conferences. This distinction highlights that the analysed literature mainly consists of journal-based studies, but also includes a substantial number of conference proceedings that reflect emerging trends and scholarly discussions in the field.

Figure 1. Distribution of Studies on Tourism and AI by Years



Source: Prepared by the authors

According to Figure 1, the first study on tourism and AI was conducted in 2003. When the change in the academic studies on tourism and AI between 2003 and 2024 is analysed some clear trends emerge. Between 2003 and 2014, studies in this field remained at a very limited and constant level. However, in 2015 there was a significant increase in the number of studies in this field. This leap can be attributed to the realisation of the potential effects of AI in the tourism sector. After this sharp increase in 2015, there was a serious decline in the number of studies in 2016. Since 2018, an upward trend has been observed again. This increase continued to gain momentum in the 2020s and reached one of the highest levels by 2023. In Table 3, the number of studies in the mentioned years is presented in tabular form.

Table 3. Distribution of Studies on Tourism and AI by Years

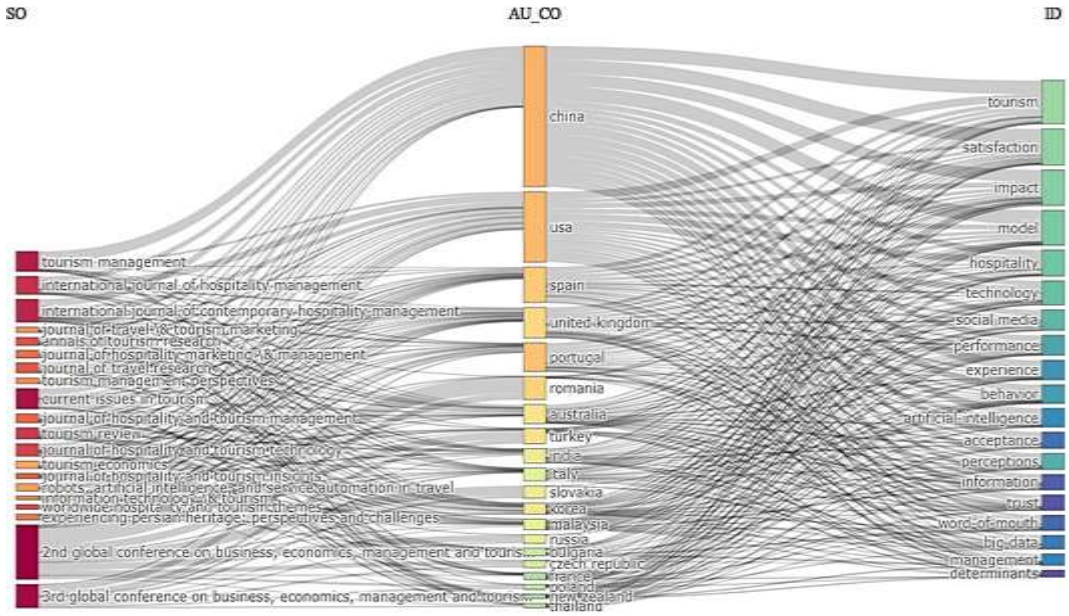
Year	Study
2024	230
2023	167
2022	109
2021	122
2020	78
2019	72
2018	25
2017	24
2016	132
2015	274
2014	15

Source: Prepared by the authors

The three-field graph used in bibliometric analysis is an important tool that allows visualisation of relationships in the scientific literature. This type of graph contains three main columns and through these columns, the

relationships between countries, journals and keywords belonging to a particular dataset can be examined more clearly. Figure 2 presents the journals in which academic studies are published, the countries in which these studies are produced and the research topics they focus on.

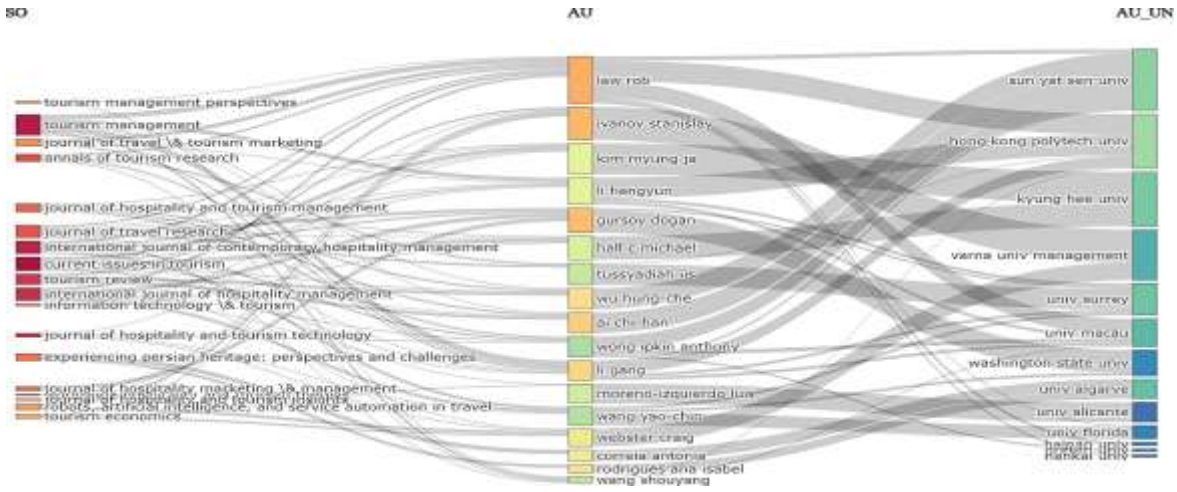
Figure 2. 3 Area Graphs for Source, Country, Keywords



Source: Prepared by the authors

According to Figure 2, it is observed that countries such as China, the USA, and SpAI n are the most prolific in producing academic studies on tourism and hospitality. These studies are most frequently published in journals such as Tourism Management, International Journal of Hospitality Management, and International Journal of Contemporary Hospitality Management. In addition to academic journals, it is also noteworthy that international events such as the 2nd Global Conference on Business, Economics, Management and Tourism stand out as prominent sources in the publication landscape. When the keyword distribution is examined, the most prominent themes include tourism, satisfaction, and hospitality. However, other frequently occurring keywords such as impact, model, technology, and experience indicate a growing interest in the effects of AI - based innovations on tourism performance and the modeling of service quality outcomes. These keywords reflect the academic community's tendency to investigate both conceptual frameworks (e.g., models and constructs) and practical outcomes (e.g., impact and user experience). This multidimensional focus presents that the field is evolving toward both theoretical depth and real-world application. The three area graphs created as a result of the analysis on the basis of source, author and university are presented in Figure 3 below.

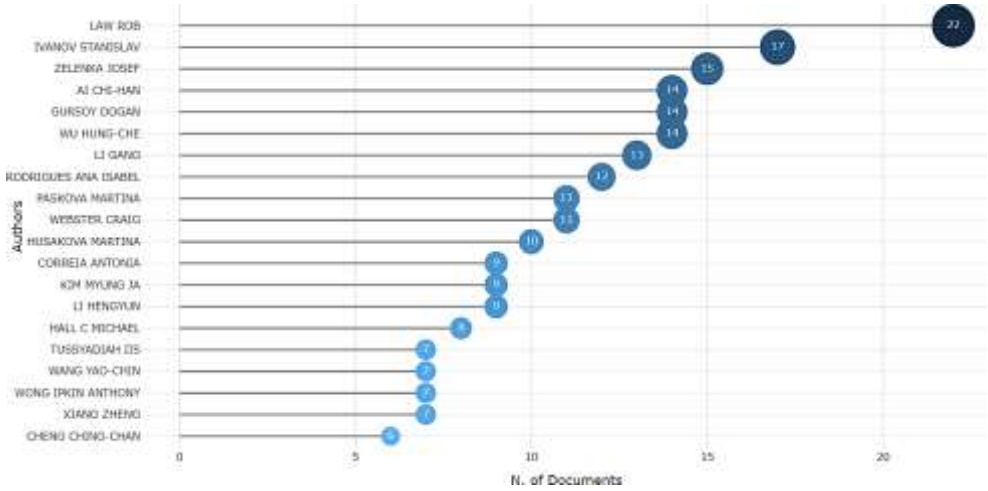
Figure 3. 3 Field Graphic of Source, Author, University



Source: Prepared by the authors

When the three-field graph is analysed in terms of sources, authors, and affiliated institutions, clear patterns of scholarly collaboration in tourism and hospitality research are revealed. For instance, Tourism Management and Annals of Tourism Research are frequently associated with Rob Law, who maintains strong institutional links with Kyung Hee University, underlining the multi-institutional nature of his contributions. Similarly, Annals of Tourism Research is also connected to Kim Myung Ja, who is affiliated with Hong Kong Polytechnic University. The Journal of Hospitality and Tourism Management is prominently linked to Li Hengyun, affiliated with Jinan University, while Hall C. Michael, frequently publishing in Tourism Review, is shown to be affiliated with Varna University of Management. Moreover, Gursoy Dogan, who contributes to multiple leading journals such as Tourism Management and International Journal of Contemporary Hospitality Management, is associated with Sun Yat Sen University, suggesting a wider scope of institutional collaboration than previously assumed. In addition, Moreno-Izquierdo Luis, publishing in Journal of Hospitality and Tourism Technology, is linked with University of Alicante, and Wong Ipkin Anthony appears affiliated with University of Macau, reinforcing known institutional connections. The visualization highlights the international and cross-institutional dynamics shaping the contemporary landscape of tourism and hospitality scholarship. Figure 4 presents the authors with the highest number of publications on tourism and artificial intelligence.

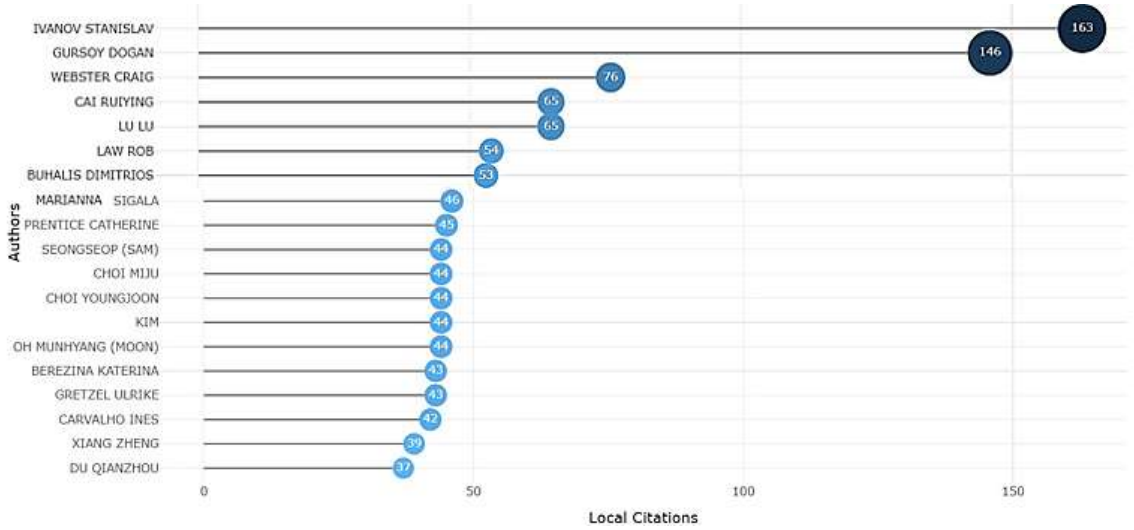
Figure 4. Authors with the Most Publications on Tourism and AI



Source: Prepared by the authors

Figure 4 presents the top 20 most prolific authors who have published the highest number of studies on tourism and artificial intelligence, based on data from the WoS database. According to this list, the author with the highest number of publications is Law Rob with 22 publications, followed by Ivanov Stanislav with 17 publications and Zelenka Josef with 15 publications. These findings reveal that certain authors have made a significant contribution to the literature in these fields. Figure 5 presents the most cited authors in the field of tourism and artificial intelligence.

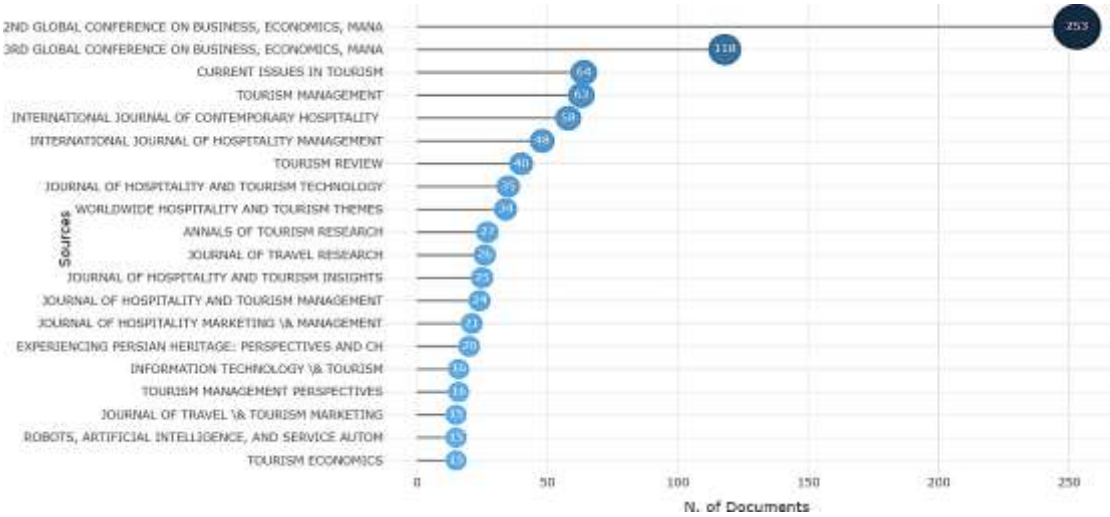
Figure 5. Most Cited Authors on Tourism and AI



Source: Prepared by the authors

Figure 5 presents the authors with the highest number of citations in the field of tourism and artificial intelligence. According to the citation analysis, Ivanov Stanislav ranks first with 163 citations, followed by Gursoy Dogan with 146 citations — a notable lead over the rest. Webster Craig (76 citations), Cai Ruiying (65 citations), and Lu Lu (65 citations) are ranked third, fourth, and fifth, respectively. Other influential authors with fewer than 50 citations include Buhalis Dimitrios, Sigala Marianna, and Gretzel Ulrike. This distribution indicates that the studies conducted by Ivanov and Gursoy have had a strong academic impact and are widely referenced in the literature. Figure 6 presents the journals with the highest number of publications on tourism and artificial intelligence.

Figure 6. Journals with the Most Publications on Tourism and AI



Source: Prepared by the authors

Figure 6 presents the sources with the highest number of publications on tourism and artificial intelligence. According to the results, the 2nd Global Conference on Business, Economics, Management and Tourism leads with 253 publications, followed by the 3rd Global Conference on Business, Economics, Management and Tourism with 118 publications. Other leading journals include Current Issues in Tourism (64 publications), Tourism Management (63 publications), and International Journal of Contemporary Hospitality (58 publications). This distribution demonstrates that, alongside peer-reviewed journals, international conferences also play a crucial role in disseminating knowledge on tourism and artificial intelligence. The high volume of papers presented in these events indicates a growing interest and academic engagement with the topic across interdisciplinary platforms. In Table 4, the most cited publications on a global scale are presented in detail.

Table 4. Most Cited Publications on a Global Scale

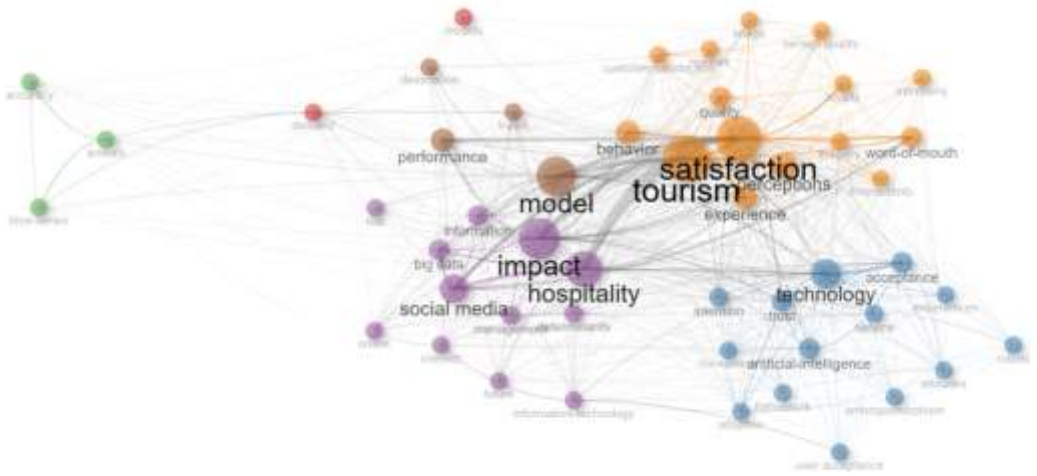
Publication	Total Citation	Total Citation per Year	Normalized Total Citation
Xiang, Z. (2017). Tourism Management	496	62.00	12.90
Lu, L. (2019). International Journal of Hospitality Management	391	65.17	7.49
Zeng, Z. (2020). Tourism Geographies	309	61.80	6.24
Buhalis, D. (2019). Journal of Travel & Tourism Marketing	296	49.33	5.67
Song, H. (2019). Annals of Tourism Research	294	49.00	5.63
Alaei, A.R. (2019). Journal of Travel Research	292	48.67	5.59
Tussyadiah, I. (2020). Annals of Tourism Research	281	56.20	5.67
Li, J.J. (2019). Tourism Management	280	46.67	5.36
Kim, S.S. (2021). International Journal of Hospitality Management	277	69.25	9.28
Pillai , R. (2020). International Journal of Contemporary Hospitality Management	276	55.20	5.57

Source: Prepared by the authors

Table 4 presents the top 10 most cited publications on a global scale. According to this table, the publication with the highest number of citations in total is "A Comparative Analysis of Major Online Review Platforms: Implications for Social Media Analytics in Hospitality and Tourism" with 496 citations. This study, authored by Xiang Zheng, Du Qianzhou, Ma Yufeng, and Fan Weiguo, was published in Tourism Management in 2017. It provides a comparative analysis of leading online review platforms—TripAdvisor, Expedia, and Yelp—by examining user-generated reviews of hotels in New York City. This study offers a methodological foundation for social media analytics and makes a valuable academic contribution by demonstrating how digital data can be utilized in hospitality and tourism research. The second ranked article is "Developing and Validating a Service Robot Integration Willingness Scale" by Lu et al. This study focuses on the development and validation of the Service Robot Integration Willingness (SRIW) scale, a multidimensional tool designed to assess consumers' readiness to accept service robots in hospitality settings. By empirically testing this scale, the study provides a comprehensive framework for understanding the factors that influence customer acceptance of service robots, offering valuable insights for both researchers and practitioners in the field. In third place is the article titled "From High-Touch to High-Tech: COVID-19 Drives Robotics Adoption" with 309 citations. The study highlights how various robotic technologies—such as humanoid robots, autonomous vehicles, and drones—have been deployed to minimize human contact and manage the spread of the virus in settings like hospitals, Airports, hotels, and restaurants. The authors discuss the implications of this technological shift, noting that while concerns about job displacement and data privacy persist, the integration of robotics is likely to continue post-pandemic. They call for tourism scholars to explore robotic applications that enhance tourist experiences and promote sustAI nable development in the industry. These citation rankings show the academic impact of each publication on the topic and its importance in the research field.

Within the scope of this study, a co-occurrence analysis was conducted to explore the intellectual structure of 1,277 academic publications. In this type of network visualization, nodes (dots) represent keywords, while edges (lines) represent the strength of co-occurrence relationships between them. Co-occurrence analysis allows for the identification of thematic clusters and key concepts by mapping how frequently terms appear together within the literature. As shown in Figure 7, keywords such as *tourism*, *satisfaction*, *technology*, and *hospitality* emerge as central themes, illustrating the conceptual landscape of tourism and artificial intelligence research.

Figure 7. Keywords Co-occurrence Network Analysis



Source: Prepared by the authors

Figure 7 shows that core concepts such as “tourism”, “satisfaction”, “hospitality”, “impact”, and “model” are positioned centrally in the network, reflecting the fundamental themes of the field. The blue cluster, containing terms like “technology”, “artificial intelligence”, “chatbots”, and “user acceptance”, illustrates the increasing role of digital transformation and intelligent systems in tourism research. The orange cluster emphasizes behavioral and experiential dimensions, with terms such as “experience”, “perceptions”, “customer satisfaction”, and “word-of-mouth”. Meanwhile, the purple and violet clusters highlight interest in data-driven strategies and technological infrastructure, as shown through keywords like “social media”, “big data”, “performance”, and “information technology”. Overall, the network structure demonstrates that the field is evolving through both conceptual modeling and practical outcomes, bridging theory and practice in AI-supported tourism studies. The word cloud obtained from the analysis carried out to determine the density of keywords used by the authors is presented in Figure 8 below.

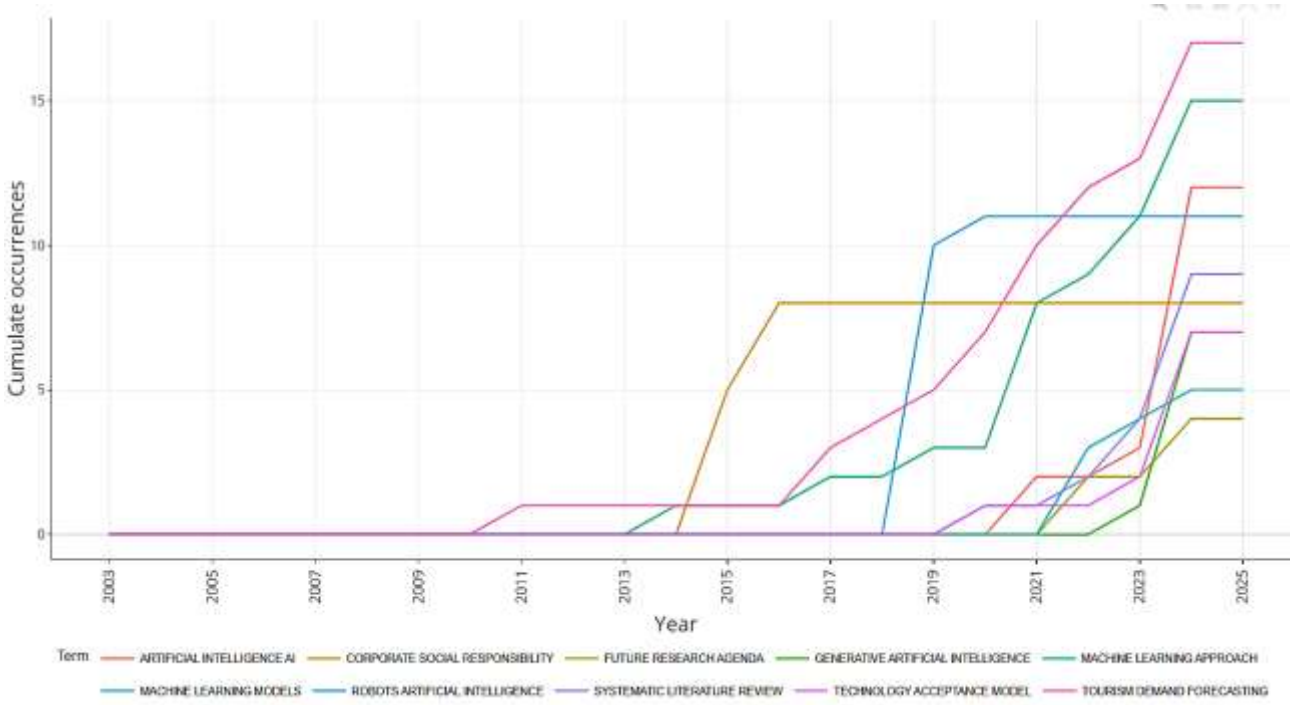
Figure 8. Word Cloud

Source: Prepared by the authors

Figure 8 presents the word cloud created according to the author keywords of the studies on tourism and artificial intelligence. According to Figure 8, "artificial intelligence", "tourism", "machine learning" and "hospitality" are the most frequently occurring keywords according to the keywords of 1.277 studies on tourism and artificial intelligence. These words reflect the conceptual trends in the literature and show that the

relations between tourism and AI are particularly concentrated in these four main themes. Figure 9 presents the keyword trends

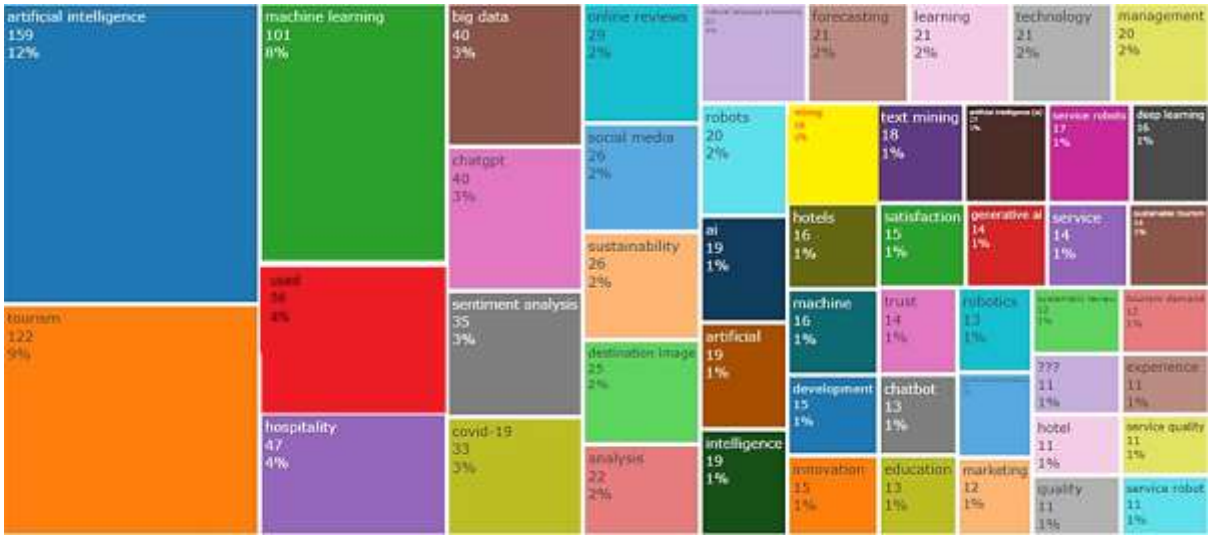
Figure 9. Keyword Trends



Source: Prepared by the authors

According to the keywords trend analysis in Figure 9, there is a noticeable upward trend in the use of the keyword "artificial intelligence". This trend has particularly accelerated after 2018, indicating a growing academic focus on AI-driven research in tourism and hospitality studies. In parallel, other terms such as "machine learning models", "technology acceptance model", and "robots artificial intelligence" have also shown significant increases in cumulative occurrences over the past five years. Moreover, the emergence of keywords like "generative artificial intelligence" and "future research agenda" in recent years reflects the field's expanding interest in innovation, predictive modeling, and setting long-term research priorities. This growing body of literature suggests that AI and its subcomponents are becoming integral to the future of tourism research particularly in areas such as customer behavior modeling, automation, and decision support systems. Figure 10 illustrates the relative density of according to author keyword in the literature using a TreeMap Chart.

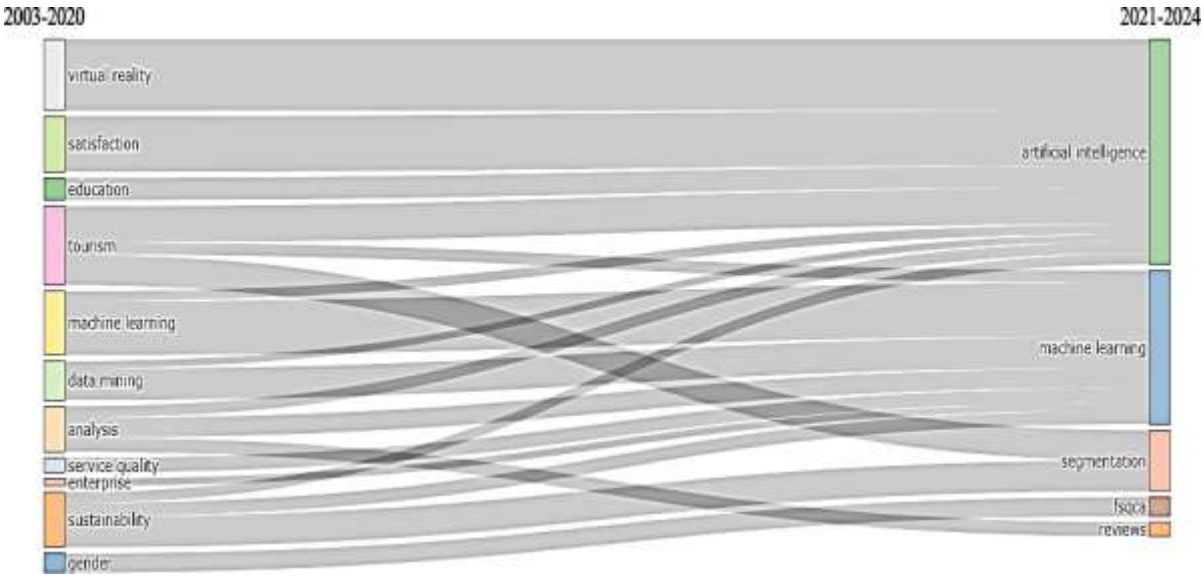
Figure 10. Tree Map (According to Author Keyword)



Source: Prepared by the authors

In terms of author keywords, the three most frequently used words are "artificial intelligence" (159 times), "tourism" (122 times) and "machine learning" (101 times). This distribution is a natural result of searches using the keywords "tourism and artificial intelligence". The thematic change of the most frequently used words in the titles over the years is shown in Figure 11.

Figure 11. Thematic Evolution

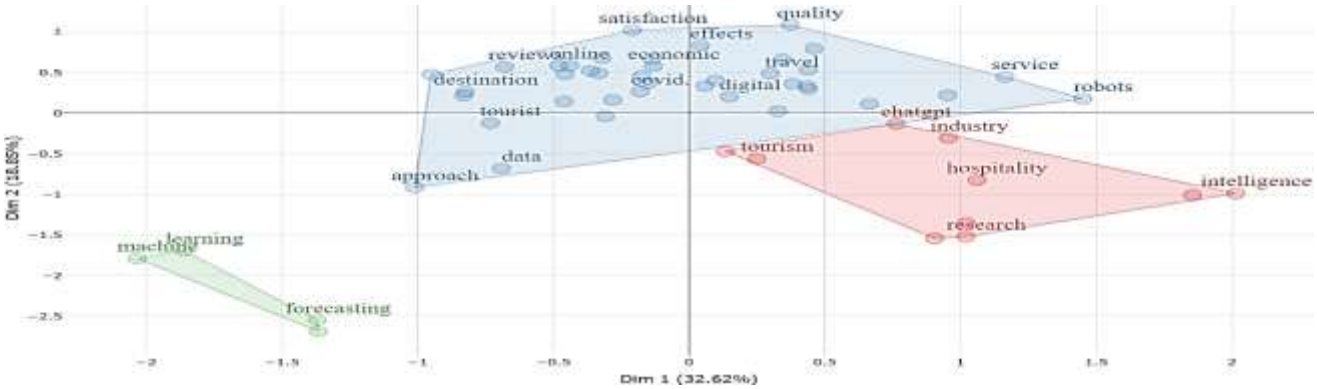


Source: Prepared by the authors

According to Figure 11, while a wide range of themes such as "virtual reality", "satisfaction", "education", "machine learning", "data mining" were prominent in the 2003-2020 period, in the 2021- 2024 period, these themes were replaced by more specific and advanced technology- oriented themes, especially "artificial intelligence", "machine learning", "segmentation", "fsqca" and "reviews".

Factor analysis was performed to determine the connections between the words in the titles of the studies within the scope of the research. This analysis aims to reveal the main themes and conceptual connections in the literature by identifying common factors and relationships between words. As a result of this analysis, the conceptual structure map presented in Figure 12 was obtained. The conceptual structure map visualises the relationships and thematic connections between the key words in the headings, showing how these words are related to each other and the conceptual structure within the literature. This map facilitates the understanding of the basic concepts in the literature on the subject and the relationships between them.

Figure 12. Conceptual Structure Map (Multiple Correspondence Analysis)

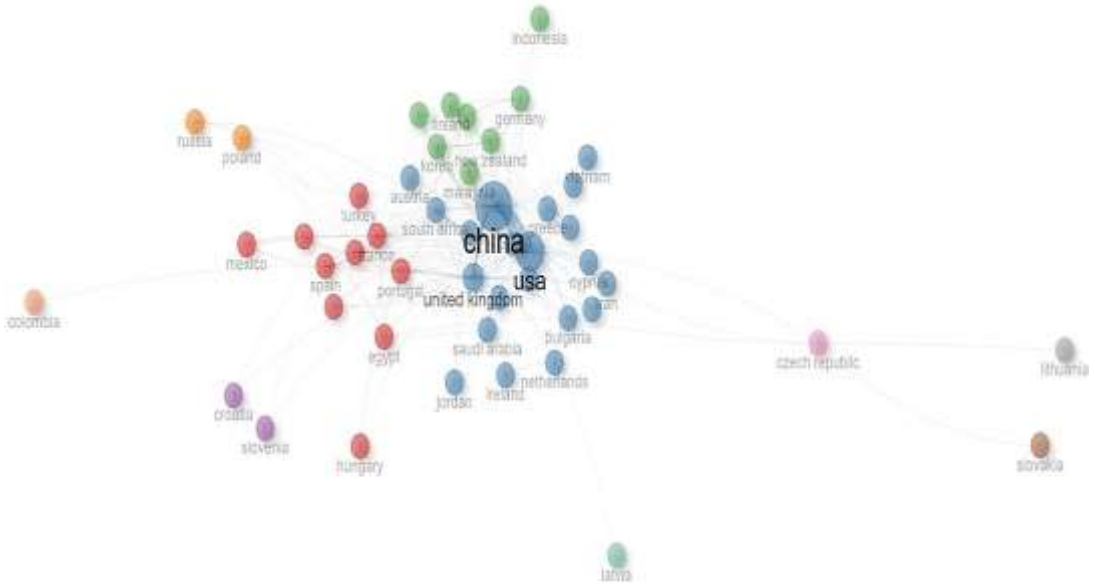


Source: Prepared by the authors

Figure 12 presents the multiple correspondence analysis map showing the thematic distribution of studies in the field of tourism. In this way, it is revealed that the research topics are organised around three main clusters.

The first cluster includes studies focusing on the integration of the tourism industry and artificial intelligence, represented by concepts such as "tourism", "hospitality", "industry", "intelligence" (red region). The second cluster includes studies that are shaped around titles such as "satisfaction", "quality", "economic", "covid", "travel", "robots" and examine the effects of customer satisfaction, service quality, economic impacts, digitalisation and pandemic process in tourism (blue zone). The third cluster includes studies that are represented by topics such as "machine learning" and "forecasting" and focus on machine learning and forecasting techniques (green zone). This thematic structure presents how different topics in tourism research are differentiated and each has a specific research focus. Figure 13 presents a map showing the countries with the highest number of publications as a result of the analysis carried out to determine the frequency of studies on the subject in which countries.

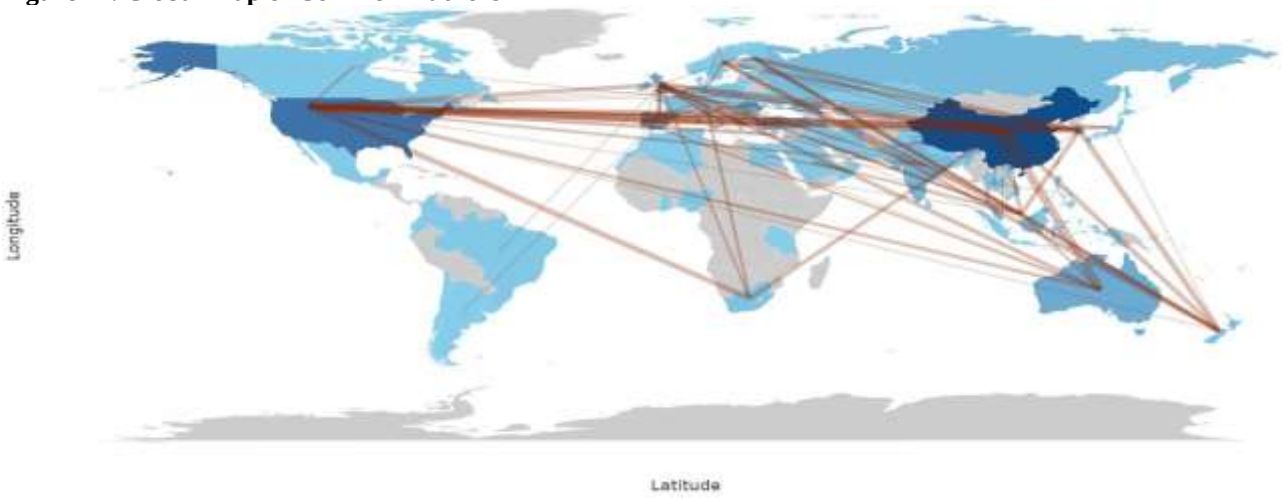
Figure 13. Countries with the Most Publications



Source: Prepared by the authors

According to the map in Figure 13, the countries with the highest number of studies on the subject are China, the USA and the United Kingdom. This map presents the intensity and scope of the research activities of these countries in this field. The prominence of China, the USA and the UK indicates that these countries have conducted more academic studies on the subject and play an important role in this field. Figure 14 presents a map showing the cooperation and interactions between co-authors globally. This map visualises the collaborations and international collaborations of authors from different countries and institutions. The co-authors map reveals the degree and weight of global collaboration in the research field, allowing for analyses of international academic networks and interactions in this field.

Figure 14. Global Map of Common Authors



Source: Prepared by the authors

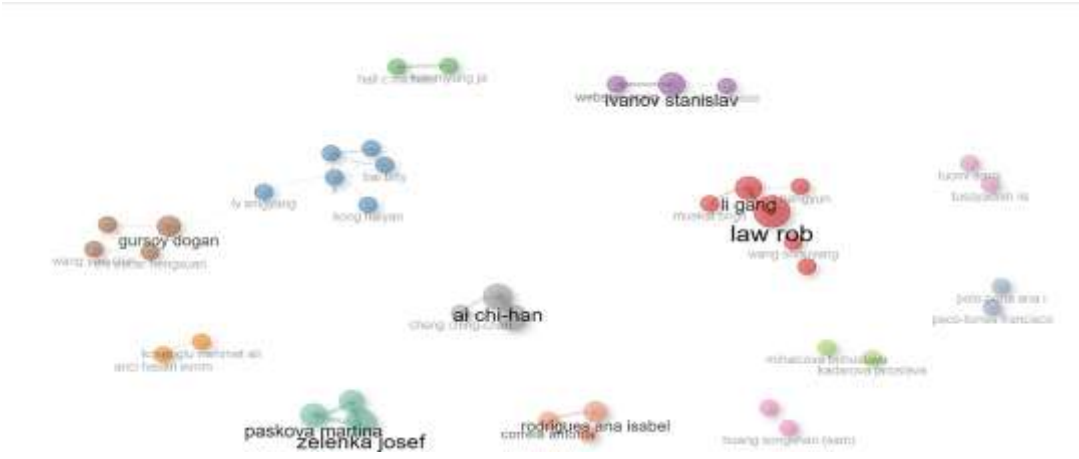
Table 5. Number of Studies of International Co-authors

Country Name	Country Name	Number of Studies
China	USA	45
China	Australia	30
China	United Kingdom	24
China	Korea	16
USA	South Africa	15
Korea	New Zealand	12
USA	Korea	12
New Zealand	Sweden	10
USA	Bulgaria	10
USA	United Kingdom	10

Source: Prepared by the authors

Table 5 presents the details of the collaborations between countries on the subject. According to this table, the highest number of co-authored studies is 45 and these collaborations are between China and the USA. In addition, the authors who collaborated with the most different countries were from China (USA, Australia, United Kingdom, Korea) and the USA (South Africa, Korea, Bulgaria, United Kingdom), and both countries established partnerships with 4 different countries. The collaboration network and the intensity of the co-authors' collaboration on the topic is visualised in Figure 15. This figure clearly presents the extent and intensity of the collaborations between authors and illustrates the structure and breadth of international academic interactions.

Figure 15. Co-operation Network



Source: Prepared by the authors

When Figure 15 is analysed, it is observed that the collaboration network is gathered in 13 different clusters and these clusters are of different sizes. In the collaboration network, authors who collaborate with each other are shown in different groups. Hali Cho and Nam Hyung Ja are in a green group, while Ivanov Stanislav and Wei Yan work together in a purple group. Liu Xinyang, Xu Weiyuan and Kong Jiayan form a blue group, while Ji Gang, Wang Anqi and Law Rob collaborate in a red group. Arc Haisam Evolution, Wang Yi and Gursoy Dogan work together in the orange group. Ai Chi-Han and Cheng Chia-Jung are in the grey group, while Paskova Martina and Zelenka Josef collaborate in the green-blue group. Rodrigues Ana Isabel and Correia Antonia work together in the light orange group, Tussupova Inis and Tuomisto Helena in the pink group. Poloczek Anna, Peco Tomas Francisco, Mihalovskà Eva and Kadárová Jaroslava are in a green-brown group, while Huang Songshan (Sam) is alone in the light green group. The co-operation between these authors is also supported by their position in the image.

Conclusion and Recommendations

This study aims to comprehensively reveal the current situation and developing trends in the field by conducting a bibliometric analysis of scientific publications on tourism and artificial intelligence. The main objective of the study is to determine how AI has gained a place in the tourism sector, which topics are prominent, in which geographies and by which authors these topics are addressed, and the level of interdisciplinary interactions.

As a result of the analysis of 1.277 studies published between 2003 and 2024, it was determined that scientific production in the field of tourism and AI has shown a significant increase over time. Especially in the last decade, there has been a noticeable increase in the number of studies in this field, which presents that the applications of AI in tourism have attracted increasing interest in academic circles. This increase is directly related to the innovative solutions offered by AI technologies in the tourism sector and the potential impact of these solutions on the sector.

The findings of this study clearly indicate that the academic literature on tourism and artificial intelligence is both quantitatively extensive and qualitatively rich. The predominance of co-authored publications reflects the interdisciplinary nature of the field and highlights the collaborative tendencies among researchers, which in turn contributes to higher research quality through the integration of diverse expertise. The fact that most publications are in the form of journal articles underlines the academic orientation of this research area and the value placed on peer-reviewed dissemination within the scientific community.

Bibliometric analysis has uncovered a wide thematic diversity, with frequently used keywords such as "personalized recommendation systems," "chatbots," and "tourism demand forecasting" pointing to key application domains of AI within tourism. This thematic breadth illustrates the varied ways in which AI technologies are embedded across different sub-sectors of tourism, thereby enriching the overall body of literature and expanding the field's scope.

Geographically, the concentration of studies in developed countries—particularly the United States, China, and European nations—can be attributed to better access to AI infrastructure and stronger institutional support for research. Nevertheless, the increasing number of contributions from other regions signals a growing global interest, transforming tourism and AI into a worldwide research focus.

Furthermore, the dense citation networks and co-authorship structures observed in this field reflect a well-established foundation of scholarly engagement and a high level of intellectual connectivity. The strong interdisciplinary integration—especially with fields such as computer science, economics, business administration, and sociology—facilitates a broader exchange of knowledge and enhances the innovative potential of AI applications in tourism. These interdisciplinary collaborations not only advance theoretical frameworks but also promote practical innovations that can shape the future of tourism.

In the light of the findings, suggestions for future research can be presented as follows:

- The interactions between AI and tourism have become an increasing focus of interest. However, most of these studies have been limited to specific disciplines. Interdisciplinary approaches should be encouraged in future research. In particular, the integration of fields such as sociology, psychology, economics, and law with AI applications in tourism may allow for a more comprehensive approach to these issues. Interdisciplinary studies can provide both theoretical contributions and a rich framework to better understand the implications of practical applications (Özdemir, 2023)

- The integration of AI technologies with next-generation tools such as virtual reality (VR), augmented reality (AR), and blockchain presents a transformative potential for smart tourism applications. Future research should empirically investigate how these technologies can enhance tourism experiences, especially in terms of personalization, security, and sustainability. In particular, the use of decentralised applications (DApps), digital identity systems and crypto-payments in combination with AI systems offer promising directions to improve both customer experience and operational efficiency (Keckes and Tomicic, 2017; Rejeb and Rejeb, 2019; Buhalis and Yen, 2020; Caddeo and Pinna, 2021; Rashideh, 2020; Treiblmaier, 2020; Tussyadiah, 2020).

- The widespread use of AI applications in tourism may bring along various ethical and legal issues. Therefore, future research should focus more on the ethical and legal dimensions of AI technologies. In particular, examining data privacy, algorithmic biases and problems that may arise in the interaction between AI and humans will contribute to the shaping of regulations in this field(Lin et al., 2011; Buhalis and Yen, 2020; Essien and Chukwukelu, 2022; Amiri et al., 2024).

- The impact of AI applications on customer experience and satisfaction in the tourism sector has not yet been sufficiently analysed. Future studies should conduct more comprehensive and long-term analyses to measure the effectiveness of these applications. In particular, studies on how AI applications are perceived in different cultural contexts and how these perceptions affect customer behaviour can help the industry develop global strategies (García-Madurga and Grilló-Méndez, 2023).

- Most studies focus on the relationship between AI and tourism, but more research is needed on how this relationship is shaped in different sub-sectors of the industry (e.g. accommodation, transport, food and beverage). Future studies should examine AI applications in these tourism sub-sectors in more detail and analyse the impact of these applications on the different actors in the sector.

These recommendations aim to expand the literature in the field of tourism and AI and identify future research topics. Future studies will deepen knowledge in this area and provide a more comprehensive and interdisciplinary approach to studying innovation in the sector.

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