Intellectual structure on artificial intelligence studies in tourism and hospitality: a bibliometric analysis

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Abstract

Purpose – The paper aims to reveal the intellectual structure of studies on artificial intelligence (AI) in the fields of tourism and hospitality. Evaluations regarding the intellectual structure have been made based on co-author, co-word and citation.

Design/methodology/approach – The study is exploratory in nature. The study, using bibliometric analysis, provides a Web of Sciences (WOS) overview. The data has been obtained from the WOS database by coding as "artificial intelligence" and "tourism" and "hospitality." VOSviewer program has been used to obtain and analyze the data.

Findings – The findings of the research show that studies on the use of AI in tourism and hospitality have become very popular, especially in the last 4 years. The authors of the study are working in the tourism and hospitality fields and have a high h-index. Generally, in current AI studies in tourism, topics such as robot, automation, ChatGPT, technology adoption and mechanical learning are studied. It has also been determined that topics related to the future of destinations and literature reviews are also discussed.

Research limitations/implications – Although this paper examines all studies identified as a result of filtering, the analysis is limited to 195 studies. However, due to the widespread use of AI in tourism-related studies recently, bibliometric analysis has been made with extensive filtering. As studies on the subject become more widespread in the coming years, it would be useful to repeat similar studies by filtering with more specific quotas.

Originality/value – There are a few similar studies on the subject in the field. However, these studies need to be repeated at certain periods. This paper contributes to monitoring the literature of AI studies, which are new to use in tourism and hospitality, and to the formation of a theoretical framework on the subject.

Keywords Artificial intelligence, Tourism, Hospitality, Bibliometric analysis

Paper type Literature review

1. Introduction

Technological developments revise their place in human life to become more important day by day. The position of WEB1 technology, which represents www (World Wide Web), which emerged in the 1990s, in human life has been debated for a long time. While these discussions have not yet ended, since 2006, WEB2 technology (social network) has quickly gone beyond being a part of daily life and turned into an indispensable routine in people's lives (Şengel, 2021). Although there are many innovations brought by WEB 2 technology, the fact that each user/consumer has also turned into a content producer makes this technology different and special from previous technological developments (Zhao and Kemp, 2013; Jena *et al.*, 2020). Another feature that makes this technology special is that it increases the interaction between individuals, companies or countries.

Current technological developments are not limited to web technology only, but manifest themselves in many different dimensions. Every developing technology has been used for various purposes in different areas. In fact, it is seen that technological innovations have started to be used in many points of the tourism industry, where it is frequently evaluated that the use of technology will be limited due to its focus on service and the human factor playing an

important role. Smith and Rupp (2004) emphasize that reservation and ticketing automations used in the hospitality and travel sectors are the earliest and most important examples of technologies in tourism. Also, Oktavia *et al.* (2023) electronic and quick-response (QR)-coded menus in restaurants, Belanche *et al.* (2021) reported the use of robots in the service industry, although not very common, and Buhalis *et al.* (2022) highlights the technological developments used metaverse in tourism, which is on the agenda for use in many areas of the industry. As the technological developments mentioned here become widespread in tourism and used in different areas, they also become the subject of academic studies in the relevant field.

Nearing the end of the first quarter of the 21st century, a completely different technological innovation, artificial intelligence (AI), has begun to be discussed. AI takes its place on the world agenda with the innovations it brings at many points. From the moment it emerged, it began to be used in different areas, and on the other hand, its widespread use began to be criticized. Because the unlimited innovations it creates both provide opportunities and pose various risks. Since its emergence, it has been used in many areas such as production in tourism (Chen and Wei, 2024), management (Huang *et al.*, 2022), education (Skavronskaya *et al.*, 2023). In parallel with this use, it has recently become one of the most popular topics of academic studies on tourism (Knani *et al.*, 2022; Ali *et al.*, 2023). Studies have focused on many different points, including compilations or research on many tourism-related issues. In this context, the study aims to reveal the intellectual structure of studies on AI in the field of tourism and hospitality. The study, which stands out with its exploratory nature, offers a bibliometric overview. There are a few similar studies on the subject in the field. However, there is a need to renew these studies in order to monitor the developments in the literature on this new subject and to create a theoretical framework.

2. Literature review

The first use of the concept of AI, which critically affects people on a global or individual level, dates back to 1956. The concept was put forward at that time with the idea of instant reaction at the social level, but it could not have the expected effect. For this reason, AI, which has fallen off the agenda, has started to come to the agenda again in recent years. It is becoming widespread everywhere every day and has become almost a basic need for people such as water, electricity, Internet. The passage of time has helped to see and adopt the effects of developments in AI as a result of experiments. AI is little understood today due to its current state, and from time to time, it is accepted by different circles as the magic of the age we live in. It is compared to electricity in the period when first appeared, in terms of its transformation and meanings (Hutson *et al.*, 2022). Since the time when electricity first appeared, the place it has gained in people's lives has made people's curiosity about the future of AI even deeper.

The term AI has had a wide impact in the world in recent years, and this situation continues to increase day by day. It should be stated that this important concept has a complex environment regarding its meaning. Often, different people or societies may attribute different meanings to AI. However, it is a phenomenon that defines a certain class of technology, is growing rapidly and is becoming widely and deeply involved in many areas of human life. A significant portion of people associate AI with robotic developments. However, at this point, it has a meaning that finds a place in most areas that have important places in social life, especially social life, business and education and fulfills important functions in shaping the future of these areas (Littman *et al.*, 2021). Reducing possible risks should be one of the basic principles when shaping these areas that are important for human life. Russell *et al.* (2015) AI states that it has a complex structure and a wide functional capacity due to its roles in human life and has the ability to solve basic problems in many sectors and industries. As time goes by, it solves more complex problems with the help of deep machine learning such as neural networks.

There is an opinion that, despite all its risks, AI will increasingly take part in human lives in the future. It seems that it will cause 400–800 million people to lose their jobs by 2030, especially as a result of its widespread use, because it is estimated that it will create a value of approximately 13 trillion (Smithies, 2017). Although this situation is met with reaction from time to time by different disciplines, AI is quietly strengthening its place in human life.

One of the areas where AI is increasingly used is the tourism industry. It is known that AI themed studies/activities are taking place in many areas of tourism. The view that the impact of technological and mechanical developments will be limited in the service-oriented tourism industry seems to change with AI. Huang and Rust (2018) state that AI has benefits such as its functions, its ability to reshape services and its power to create a source of innovation. However, it is also considered that it has negative aspects that may threaten the jobs of people in the service sector. However, one of the most important features that make the tourism industry different is that it is a people-oriented industry. The prevailing view is that technology-based developments will have a limited impact on the human factor (Şengel et al., 2022) because the mass receiving service may prefer to receive service from a human who acts with their emotions rather than a machine or robot. Despite this information, the use of AI in services is becoming widespread and tourism is also affected by this situation.

The oldest application of AI in tourism is automation systems. Today, its diversity has increased with its uses. It is known that robots are used especially in food and beverage production and service. It is thought that as the social interaction and autonomy (ability to work independently) in robots increases, robot applications in tourism will begin to be published (Ivanov and Webster, 2017). One of the popular uses of AI applications in tourism is the "chatbots" application. Thanks to chat experiences with machines instead of humans, people's decision-making processes are tried to be influenced. Although this practice dates back to 1966, it has become widespread in recent years. After it proved to be worth the investment, gradually increased and gained a significant market share, its use in the tourism industry has become widespread. It is seen that tourists especially communicate with the chatbots system on issues such as obtaining reliable information, understanding the reservation process and getting travel advice (Zlatanov and Popesku, 2019).

It is possible to diversify the use of AI applications in tourism at many different points. AI can be used in the process of making hotel occupancy and demand forecasts. Detection and forecasting of international tourist flows and tourism arrivals can also be addressed in this context. It is known that tourism businesses benefit from AI in resource management. With some special research, such as facial expression evaluation systems, the effect of tourists' experiences on their happiness and its reflections on repeated travel behavior can be examined. In addition to all these, AI also makes significant contributions to the use of social media, which is indispensable for human life in tourism and which is emphasized in the context of WEB 2 technology in the introduction part of the study. It is thought that the use of AI in tourism will increase because it allows online reviews, makes smart suggestions and is flexible compared to traditional methods (Kırtıl and Aşkun, 2021). In addition, it also provides contributions in areas such as ease of financing, learning, communication and services. It brings innovations and advantages in subjects such as machine learning and big data in tourism. It provides solutions to individualized demands in marketing with the ease of automation and segmentation it provides. It also takes an active role in the processes of measuring pre-travel/tour organizations and post-travel/tour experiences in travel and tours (Filieri et al., 2021). The current situations confirm this. As the use of AI in tourism increases, academic studies in the field will increase. For this reason, it is important to conduct bibliometric analyzes and periodically to determine periodic developments on the subject in terms of creating a theoretical framework.

3. Method

In study, bibliometric analysis and a literature review of AI studies in tourism and hospitality were conducted. Bibliometric analysis analyzes studies related to a field of study with a systematic and holistic understanding and provides important projections for future studies. Thus, it is possible to carry out studies on the research gaps identified in the literature. Related to this context, Aria and Cuccurullo (2017) state that bibliometric analysis examines many elements together, such as articles, journals, authors, keywords, citations and topics covered. This analysis technique, which aims to visualize the general structure of the research field, especially by grouping, reveals the general structure of the literature on a particular subject and the existing gaps.

Bibliometric analysis is a complex method that seems simple but is quite comprehensive and includes many parameters. In order to be successful, it is beneficial to use techniques that apply appropriate procedures. In this context, Öztürk (2021) states that strict adherence to the two-stage structure in the realization of bibliometric analysis will bring success. The first stage is to determine the data set to be analyzed under appropriate conditions, and the second stage is to perform bibliometric analysis of the determined/prepared data set. In the first stage, article scanning is carried out by making appropriate filters in appropriate databases and data is obtained. In the second stage, bibliometric analysis of the obtained data set is performed in accordance with basic procedures such as science mapping and performance analysis (Cobo *et al.*, 2011). Although it is important to stick to both stages, it is important to plan certain stages as a research design and act accordingly. Although analyzes specific to the research problem were made in this study, the analyzes were carried out by following the stages presented by Öztürk and Dil (2022). These stages are given with the help of Table 1.

Bibliometric analysis generally analyzes studies in databases such as WOS or Scopus. Since these two databases are the most prestigious international databases, they have an important mission in the formation of a theoretical framework on a subject. WOS database was preferred in this study. Şengel and Koç (2022) state that WOS stands out with its features such as having a high impact factor, very comprehensive library memberships and therefore fast and rich access, wide classification opportunities, high reputation at the international level and a format suitable for data analysis programs. Due to these features, it is a popular database for bibliometric analysis.

		Identification of database	WOS (web of sciences)
Identification of the studies	*Step 1*: Initial Search Process	Identification of search terms (keywords)	3 different keywords • Artificial intelligence • Tourism • Hospitality
	Step 2: Sceering of Paper	Inclusion and exclusion criteria	195 paper retained as final decision
Bibliometric analysis	*Step 3*: Performance Analysis	Quantitative overview of data set	• Paper by years • Productive authors • Popular topics • Influential Publications
	Step 4: Science Mapping of the Artificial Intelligence in Tourism Literature	Visualizing bibliometric networks	• Co-author analysis • Co-word analysis

Source(s): Created using (Öztürk and Dil, 2022)

Table 1.
Step of the research

On March 20, 2024, a search was made in the WOS database search tab by filtering the words -"artificial intelligence" and "tourism" and "hospitality"-. Tourism and hospitality have searched by filtering separately with AI, and just over 600 articles for tourism and nearly 300 articles for hospitality were accessed. However, in order to strengthen the connection between studies on the use of AI in tourism and tourism, 3 words were filtered together and the resulting 195 papers were included in the analysis process. In this context, the distribution of the 195 papers obtained according to the categories in WOS is given with the help of Figure 1. 124 of the studies examined had the opportunity to be published in journals scanned in the Social Sciences Citation Index (SSCI) and 43 in the Emerging Sources Citation Index (ESCI). The data obtained was analyzed to find answers to the questions given below.

Which authors have carried out the most studies on the use of AI in tourism? What are the connections of these authors?

What are the most frequently used keywords in studies on the use of AI in tourism? Which of these keywords are used together?

What are the topics and areas where studies on the use of AI in tourism focus?

Which studies on the use of AI in tourism received the highest number of WOS citations?

VOSviewer package program has been used to analyze the data. VOSviewer mediates all kinds of categorization of the obtained data and especially the systematic performance of co-word, co-author and co-citation analysis (van Eck and Waltman, 2010). The program makes it easier to understand the problems, especially with the help of the maps and visuals it provides. Thanks to its features such as panning, zooming, zoom metaphors, special labeling algorithms and search functions, it makes it suitable for displaying even very large maps. The program can provide three different visuals and mappings: network, layer and density (Orhun, 2021). In this study, network analysis from three techniques was used.

4. Findings
According to the filtering applied, AI studies in the field of tourism and hospitality have started to be carried out in the Web of Science (WoS) database since 2015. Although the history of publications goes back further when tourism and hospitality are filtered
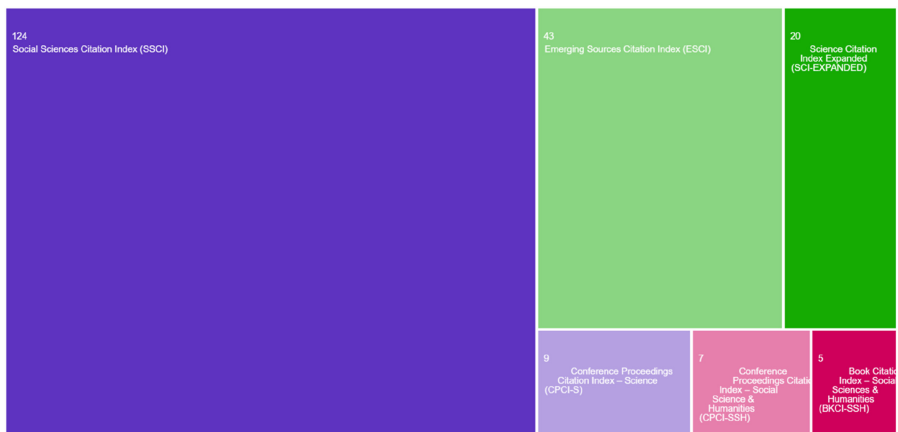

Figure 1.
Distribution of reviewed studies by WOS categories

Source(s): Created by web of sciences

separately, this result emerges when the two concepts are considered together. In parallel, the curve showing the citations of these publications reveals that citations tend to increase after 2015. According to the chart, the reason why the number of publications and citations in 2024 is low is because it includes studies until March 20, 2024. Apart from that, it is seen that both the number of publications and citations increased linearly after 2015 and peaked in 2023. While the number of publications reaches a maximum of 60, there are also 2,400 citations. Technological developments and, in this context, the tendency for AI to be on the agenda of the world public opinion, it shows that the use of AI in the field of tourism and hospitality will increase day by day. It is estimated that academic publications in the field will tend to increase in parallel with these developments (see Figure 2).

Among the 195 studies analyzed, it was determined that some authors had multiple publications (Figure 3) It is seen that authors with many publications generally consist of authors with high h-index in the tourism and hospitality field. There are 5 studies each by Dogan Gursoy, Rob Law and Dimitrios Buhalis on the subject. Craig Webster has 8 publications and Stanislav Ivanov has 11 publications.

Hospitality, Leisure, sport and Tourism categories are the subjects on which 195 studies are concentrated (Figure 4). It can be stated that the filtering used in the analysis process is effective in this. However, when the keyword AI is considered alone, it is clear that the subject stands out as a phenomenon of interest in the field of tourism. Although the combination of AI-tourism-hospitality was sought in the review, the large number of articles in the management and business categories also draws attention as an important result. It is also important to have studies on environment and sustainability issues such as environmental studies, green sustainable Science Technology and environmental sciences. Because this situation shows that technological developments can also be used in the sustainability of tourism and reveals that scientific studies have a tendency in this direction. Finally, in a bibliometric study examining the combination of AI-tourism-hospitality, it is an interesting finding that 6 out of 195 studies included the sociology category.

As a result of the filters used to obtain data in the study ("Artificial Intelligence" and "Tourism" and "Hospitality"), 13 studies with more than 100 citations among the 195 academic studies examined are given in Table 2. The number of citations of these studies from different data sources is higher than the statistics here. Because this study presents a
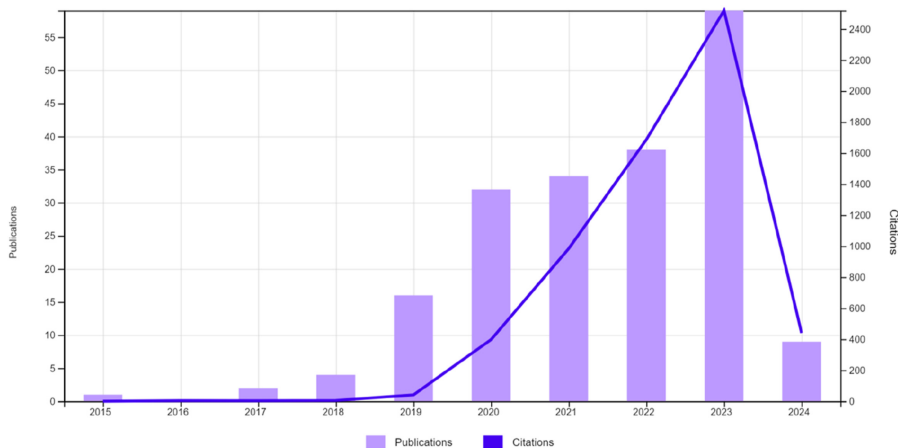
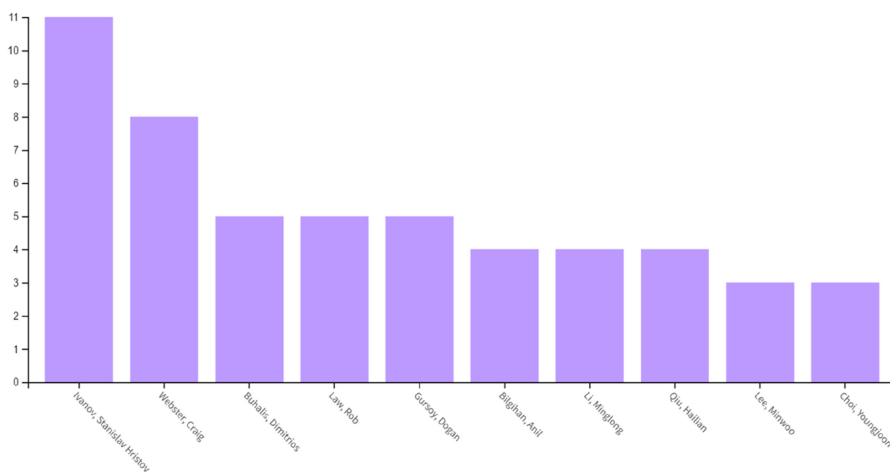**Source(s):** Created by web of sciences

Figure 3.
Distribution of studies by authors

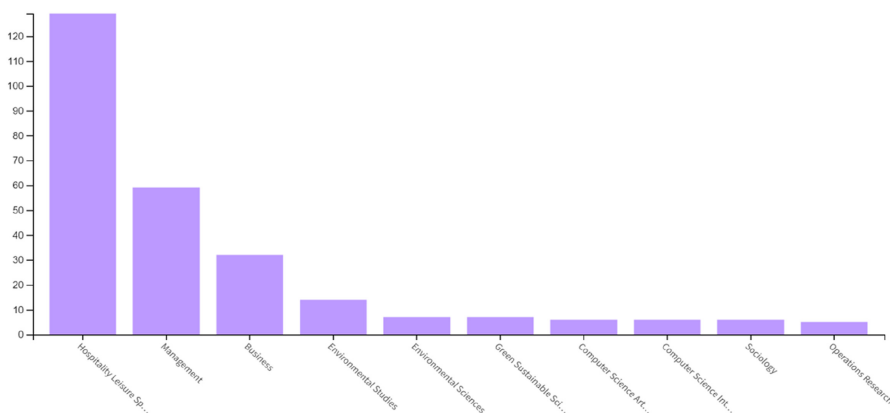**Source(s):** Created by web of sciences

Figure 4.
Distribution of studies by fields-topics

Source(s): Created by web of sciences

WOS overview and the citation numbers here express the citation of the papers received in the WOS database from the date of publication until March 20, 2024.

The authors who carried out the studies are generally world-famous researchers and professionals with high h-indexes. Jones *et al.* (2023) rank first on the list with 363 citations, even though its study was published in 2023. Including this paper, a total of 8 studies have exceeded 200 citations. All 13 publications examined were published in reputable journals with the theme of Tourism and technology. Journals with high impact factors such as Tourism Management and Annals of Tourism Research are also included in the list. It is noticeable that the publications were mostly published in 2020 and later. In terms of content, it is seen that the studies focus on the use of topics such as AI, ChatGPT, robots, robotics adoption and disruptions in tourism.

The co-authors of the studies analyzed in the study (Figure 5) were examined. This analysis shows the authors who carried out the studies and also points out the connections

Authors	Paper	Journals	2020	2021	Citations 2022	2023	2024	Total
Jones *et al.* (2023)	So what if ChatGPT wrote it? Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy	*International Journal of Information Management*	–	–	–	279	84	*363*
Lu *et al.* (2019)	Developing and validating a service robot integration willingness scale	*International Journal of Hospitality Management*	41	66	104	108	18	*344*
Zeng *et al.* (2020)	From high-touch to high-tech: COVID-19 drives robotics adoption	*Tourism Geographies*	25	113	84	67	4	*293*
Buhalis *et al.* (2022)	Technological disruptions in services: lessons from tourism and hospitality	*Journal of Service Management*	50	67	82	61	11	*272*
Buhalis and Sinarta (2019)	Real-time co-creation and nowness service: lessons from tourism and hospitality	*Journal of Travel & Tourism Marketing*	60	73	62	59	10	*271*
Kim *et al.* (2021)	Preference for robot service or human service in hotels? Impacts of the COVID-19 pandemic	*International Journal of Hospitality Management*	–	56	102	83	5	*246*
de Kervenoael *et al.* (2020)	Leveraging human-robot interaction in hospitality services: Incorporating the role of perceived value, empathy and information sharing into visitors' intentions to use social robots	*Tourism Management*	15	53	75	84	11	*238*
Pillai and Sivathanu (2020)	Adoption of AI-based chatbots for hospitality and tourism	*International Journal of Contemporary Hospitality Management*	–	27	59	107	19	*212*
Choi *et al.* (2020)	Service robots in hotels: understanding the service quality perceptions of human-robot interaction	*Journal if Hospitality Marketing & Management*	5	37	62	67	10	*181*

(*continued*)

Table 2.
Studies with more than 100 WOS citations among the studies examined

Authors	Paper	Journals	2020	2021	Citations 2022	2023	2024	Total
Ivanov *et al.* (2019)	Progress on robotics in hospitality and tourism: a review of the literature	*Journal if Hospitality and Tourism Technology*	30	35	46	35	7	*159*
Lv *et al.* (2021)	Does a cute artificial intelligence assistant soften the blow? The impact of cuteness on customer tolerance of assistant service failure	*Annals of Tourism Research*	–	20	48	56	5	*129*
Belanche *et al.* (2021)	Frontline robots in tourism and hospitality: service enhancement or cost reduction?	*Electronic Markets*	1	26	38	37	6	*108*
Bowen and Morosan (2018)	Beware hospitality industry: the robots are coming	*Worldwide Hospitality and Tourism Themes*	21	22	38	14	6	*104*

Table 2.

Source(s): Created using Web of Sciences
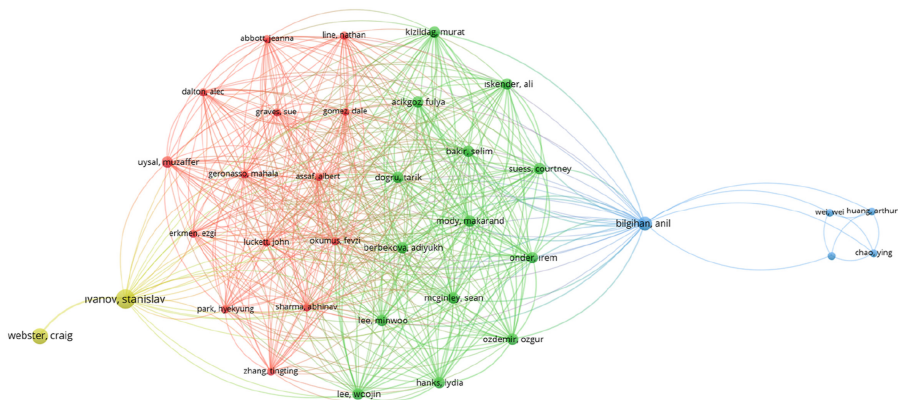
Figure 5.
Overlay visualization
of co-author for
clustering

Source(s): Created by VOSviewer

between these authors. Each of the different colors forms a separate cluster, and according to the co-author in the study, 4 clusters were formed. 35 items and 446 links were detected in these 4 clusters, which means approximately 13 links per item (author). These data can be considered high for an area that is current and whose history is not very old. It can be seen that there are many authors in the Yellow and Red clusters and that there is a very strict connection between the authors. The number of writers in the Yellow Cluster is small, and Stanislav Ivanov is at the forefront. The yellow cluster is more connected to the red cluster among the other 3 clusters. In the blue cluster, Anil Bilgihan is at the forefront. The blue cluster has more connections with the green cluster than the other three clusters.

Common keywords (Figure 6) of the studies analyzed in the research were examined. This analysis provides important ideas about the topics on which the studies focus and shows the link strength of the keywords used in the articles. Different colors each represent a separate
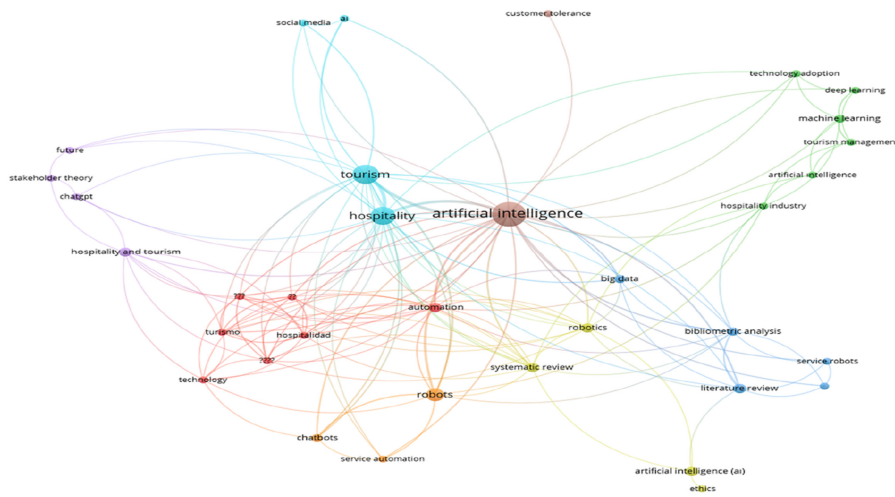
Source(s): Created by VOSviewer

cluster. According to the analysis results and color separation, 7 different clusters were formed. It is also seen that different words from each established cluster create connections with AI. There are some clusters that are evident in the study. The red cluster generally contains words related to technology and automation topics. The green cluster focuses on topics related to learning and adoption, such as deep learning, machine learning and technology adaptation. The purple cluster uses keywords like stakeholders, future and ChatGPT. It is interesting that destination management, ChatGPT and the future in this context are used as common words. The yellow cluster shows that keywords such as robotics, robots, chatbots, service automation and AI ethics are used together in current AI studies in tourism. Finally, one of the most interesting findings in the co-word analysis is that subjects such as bibliometric analysis and literature review are being studied in the blue cluster. Although the studies on the subject are new and fewer in number compared to many other subjects, the fact that these keywords are prominent in the majority reveals that studies have been carried out in line with the need to identify the gap in the literature and shape the theoretical background.

5. Conclusion and discussion

This study reveals the studies intellectual structure in the tourism and hospitality field. When tourism and hospitality are considered together, it becomes clear that academic studies in the field have intensified in the last four years. Knani *et al.* (2022) emphasize in their study the numerical increase in studies on the subject in recent years. Although the publications have a short history, the number of authors who have published more than one work is quite high. These are writers with a high h-index in the field of tourism and hospitality. This is an important reference that reveals the popularity of the subject. Despite the keyword tourism and hospitality, the fact that AI workers in this field are associated with disciplines such as management, business, sustainability and sociology reveals both the interdisciplinary identity of the tourism and hospitality field and the fact that AI is beginning to be widely used in many fields day by day. The results of the study produced parallel results with the study conducted by Hutson *et al.* (2022). While they put forward the importance of the harmony of interdisciplinary use of AI, they stated that it is increasingly used widely in many fields.

Studies on AI in the field generally focus on topics such as robots, automation, ChatGPT, technology adoption and learning (Bowen and Morosan, 2018; Buhalis and Sinarta, 2019; Pillai and Sivathanu, 2020; Lv *et al.*, 2021; Jones *et al.*, 2023). The keywords of the studies conducted on these subjects reveal a grouping appropriate to the relevant themes, including tourism, hospitality and AI. When we look at the citation capacity of the studies, studies focusing on issues such as ChatGPT, robotization and the use of robots in service, adaptation to AI technologies have reached a higher number of citations.

The current popularity of AI overshadows its 60–70-year history. This study also refers to this history of the use of AI. In particular, the results detected in the common keyword analysis of the studies examined reveal this. It is also noteworthy that in tourism studies where AI is studied, there are topics that are older in use in tourism, such as reservation automation, management and Internet (www) technologies. While discussing the use of information and communication technologies in tourism, Buhalis (2000) emphasizes the elements that are said to be past in tourism. In addition, it seems that studies on the development of robotic technologies in tourism, especially in service delivery, have maintained their popularity until today. Although it is possible to trace the history of studies on the use of robots in tourism back to the early 2000s, it is seen that the subject is also studied in current studies (Chiu, 2004; Rybski *et al.*, 2007). It can be said that the issues and robot models addressed in current studies on the use of robots in tourism are quite functional compared to the past (Go *et al.*, 2020; Huang *et al.*, 2023).

5.1 Implications and future studies
This study exhibits the use of AI, which is on the world's agenda day by day, in tourism and hospitality studies and reveals important findings within certain criteria. Both the fact that the subject is current and the fact that academic studies on the subject are increasing day by day indicate that it would be beneficial for authors to focus on studies on this subject in the near future. Future studies can focus on the incentive and risk-bearing aspects of the use of AI in different areas of the tourism industry, as well as bibliometric evaluations made at certain periods.

Although this study reveals the intellectual structure of academic publications, it is also important evidence that AI will occupy the world agenda in the future. The way the examined studies approach the subject also provides clues that AI will increasingly become a part of human life in the future. In this regard, it is recommended that public authorities and private sector representatives produce policies that will balance the risky aspects of AI and benefit from the opportunities it offers.

5.2 Limitations
The study discusses a bibliometric review on a current issue. This suggests that accessing data on the subject may be easy. However, systematic evaluation of issue and time are important limitations of this study. By making appropriate filters in the world's most prestigious database, data appropriate to the focus of the subject can be obtained. Thus, the important limitations of the study, both making a systematic evaluation and using time effectively, were tried to be eliminate.

References

Ali, F., Yasar, B., Ali, L. and Dogan, S. (2023), "Antecedents and consequences of travelers' trust towards personalized travel recommendations offered by ChatGPT", *International Journal of Hospitality Management*, Vol. 114, 103588, doi: 10.1016/j.ijhm.2023.103588.

Aria, M. and Cuccurullo, C. (2017), "Bibliometrix: an R-tool for comprehensive science mapping analysis", *Journal of Informetrics*, Vol. 11 No. 4, pp. 959-975, doi: 10.1016/j.joi.2017.08.007.

Belanche, D., Casaló, L.V. and Flavián, C. (2021), "Frontline robots in tourism and hospitality: service enhancement or cost reduction?", *Electronic Markets*, Vol. 31 No. 3, pp. 477-492, doi: 10.1007/s12525-020-00432-5.

Bowen, J. and Morosan, C. (2018), "Beware hospitality industry: the robots are coming", *Worldwide Hospitality and Tourism Themes*, Vol. 10 No. 6, pp. 726-733, doi: 10.1108/whatt-07-2018-0045.

Buhalis, D. (2000), "Tourism and information technologies: past, present and future", *Tourism Recreation Research*, Vol. 25 No. 1, pp. 41-58, doi: 10.1080/02508281.2000.11014899.

Buhalis, D. and Sinarta, Y. (2019), "Real-time co-creation and nowness service: lessons from tourism and hospitality", *Journal of Travel & Tourism Marketing*, Vol. 36 No. 5, pp. 563-582, doi: 10.1080/10548408.2019.1592059.

Buhalis, D., Lin, M.S. and Leung, D. (2022), "Metaverse as a driver for customer experience and value co-creation: implications for hospitality and tourism management and marketing", *International Journal of Contemporary Hospitality Management*, Vol. 35 No. 2, pp. 701-716, doi: 10.1108/ijchm-05-2022-0631.

Chen, C. and Wei, Z. (2024), "Role of Artificial Intelligence in travel decision making and tourism product selling", *Asia Pacific Journal of Tourism Research*, Vol. 29 No. 3, pp. 1-15, doi: 10.1080/10941665.2024.2317390.

Chiu, C. (2004), "The Bryn Mawr tour guide robot", Senior Thesis, available at: http://mainline.brynmawr.edu/TourGuide/thesis.pdf (accessed 23 March 2024).

Choi, Y., Choi, M., Oh, M. and Kim, S. (2020), "Service robots in hotels: understanding the service quality perceptions of human-robot interaction", *Journal of Hospitality Marketing and Management*, Vol. 29 No. 6, pp. 613-635, doi: 10.1080/19368623.2020.1703871.

Cobo, M.J., López-Herrera, A.G., Herrera-iedma, E. and Herrera, F. (2011), "Science mapping software tools: review, analysis, and cooperative study among tools", *Journal of the American Society for Information Science and Technology*, Vol. 62 No. 7, pp. 1382-1402, doi: 10.1002/asi.21525.

de Kervenoael, R., Hasan, R., Schwob, A. and Goh, E. (2020), "Leveraging human-robot interaction in hospitality services: Incorporating the role of perceived value, empathy, and information sharing into visitors' intentions to use social robots", *Tourism Management*, Vol. 78, 104042, doi: 10.1016/j.tourman.2019.104042.

Filieri, R., D'Amico, E., Destefanis, A., Paolucci, E. and Raguseo, E. (2021), "Artificial intelligence (AI) for tourism: an European-based study on successful AI tourism start-ups", *International Journal of Contemporary Hospitality Management*, Vol. 33 No. 11, pp. 4099-4125, doi: 10.1108/ijchm-02-2021-0220.

Go, H., Kang, M. and Suh, S.C. (2020), "Machine learning of robots in tourism and hospitality: interactive technology acceptance model (iTAM)–cutting edge", *Tourism Review*, Vol. 75 No. 4, pp. 625-636, doi: 10.1108/tr-02-2019-0062.

Huang, M.H. and Rust, R.T. (2018), "Artificial intelligence in service", *Journal of Service Research*, Vol. 21 No. 2, pp. 155-172, doi: 10.1177/1094670517752459.

Huang, A., Chao, Y., de la Mora Velasco, E., Bilgihan, A. and Wei, W. (2022), "When artificial intelligence meets the hospitality and tourism industry: an assessment framework to inform theory and management", *Journal of Hospitality and Tourism Insights*, Vol. 5 No. 5, pp. 1080-1100, doi: 10.1108/jhti-01-2021-0021.

Huang, D., Jin, X., Huang, J. and Kong, S. (2023), "Tourist acceptance of robot chefs in gastronomy experiences: a behavioural reasoning perspective", *Tourism Management Perspectives*, Vol. 48, 101172, doi: 10.1016/j.tmp.2023.101172.

Hutson, J., Jeevanjee, T., Vander Graaf, V., Lively, J., Weber, J., Weir, G., Arnone, K., Carnes, G., Vosevich, K., Plate, D., Leary, M. and Edele, S. (2022), "Artificial intelligence and the disruption of higher education: strategies for integrations across disciplines", *Creative Education*, Vol. 13 No. 12, pp. 3953-3980, doi: 10.4236/ce.2022.1312253.

Ivanov, S., Gretzel, U., Berezina, K., Sigala, M. and Webster, C. (2019), "Progress on robotics in hospitality and tourism: a review of the literature", *Journal of Hospitality and Tourism Technology*, Vol. 10 No. 4, pp. 489-521, doi: 10.1108/JHTT-08-2018-0087.

Ivanov, S.H. and Webster, C. (2017), "Adoption of robots, artificial intelligence and service automation by travel, tourism and hospitality companies–a cost-benefit analysis", Artificial Intelligence and Service Automation by Travel, Tourism and Hospitality Companies–A Cost-Benefit Analysis. 19-21 October 2017, Safia/Bulgaria.

Jena, A.K., Bhattacharjee, S., Devi, J. and Barman, M. (2020), "Effects of web 2.0 technology assisted slideshare, YouTube and WhatsApp on individual and collaborative learning performance and retention in tissues system", *Online Submission*, Vol. 8 No. 1, pp. 25-36.

Jones, P., Junglas, I, Khorana, S., Kraus, S., Larsen, K.R., Latreille, P., Laumer, S., Malik, F.T., Mardani, A., Mariani, M., Mithas, S., Mogaji, E., Nord, J.H., O'Connor, S., Okumus, F., Pagani, M., Pandey, N., Papagiannidis, S., Pappas, I.O., Pathak, N., Pries-Heje, J., Raman, R., Rana, N.P., Rehm, S., Ribeiro-Navarrete, S., Richter, A., Rowe, F., Sarker, S., Stahl, B.C., Tiwari, M.K., Aalst, W., Venkatesh, V., Viglia, G., Wade, M., Walton, P., Wirtz, J. and Wright, R. (2023), "'So what if ChatGPT wrote it?' Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy", *International Journal of Information Management*, Vol. 71, 102642, doi: 10.1016/j.ijinfomgt.2023.102642.

Kim, S.S., Kim, J., Badu-Baiden, F., Giroux, M. and Choi, Y. (2021), "Preference for robot service or human service in hotels? Impacts of the COVID-19 pandemic", *International Journal of Hospitality Management*, Vol. 93, 102795, doi: 10.1016/j.ijhm.2020.102795.

Kırtıl, I.G. and Aşkun, V. (2021), "Artificial intelligence in tourism: a review and bibliometrics research", *Advances in Hospitality and Tourism Research (AHTR)*, Vol. 9 No. 1, pp. 205-233, doi: 10.30519/ahtr.801690.

Knani, M., Echchakoui, S. and Ladhari, R. (2022), "Artificial intelligence in tourism and hospitality: bibliometric analysis and research agenda", *International Journal of Hospitality Management*, Vol. 107, 103317, doi: 10.1016/j.ijhm.2022.103317.

Littman, M.L., Ajunwa, I., Berger, G., Boutilier, C., Currie, M., Doshi-Velez, F., Hadfield, G., Horowitz, M.C., Isbell, C., Kitano, H., Levy, K., Lyons, T., Mitchell, M., Shah, J., Sloman, S., Vallor, S. and Walsh, T. (2021). "Gathering strength, gathering storms: the one hundred year study on artificial ıntelligence (AI100) 2021 study panel report", Stanford University, September 2021, available at: http://ai100.stanford.edu/2021-report (accessed 22 March 2024).

Lu, L., Cai, R. and Gursoy, D. (2019), "Developing and validating a service robot integration willingness scale", *International Journal of Hospitality Management*, Vol. 80, pp. 36-51, doi: 10.1016/j.ijhm.2019.01.005.

Lv, X., Liu, Y., Luo, J., Liu, Y. and Li, C. (2021), "Does a cute artificial intelligence assistant soften the blow? The impact of cuteness on customer tolerance of assistant service failure", *Annals of Tourism Research*, Vol. 87, 103114, doi: 10.1016/j.annals.2020.103114.

Oktavia, T., Krisdy, S., Nathaniel, M., Adiwidjaja, J.J., Kurniawan, J.M. and Ong, S. (2023), "Digital menu transformation: usability testing approach for the food and beverage ındustry's", *Journal of Theoretical and Applied Information Technology*, Vol. 101 No. 10, pp. 3778-3792.

Orhun, U. (2021), "Bibliyometrik araştırmalarda kullanılan paket programlar: Bir karşılaştırma", in Öztürk, O. and ve Gürler, G. (Ed.), *In Bir Literatur Incelemesi Aracı Olarak Bibliometric Analiz*, Nobel Publishing, Ankara, pp. 111-123.

Öztürk, O. (2021), "Bibliyometrik araştırmaların tasarımına ilişkin bir çerçeve", in Öztürk, O. and ve Gürler, G. (Eds), *In Bir Literatur Incelemesi Aracı Olarak Bibliometric Analiz*, Nobel Publishing, Ankara, pp. 33-53.

Öztürk, O. and Dil (2022), "Bibliometric analysis of organizational ecology theory (OET): to review past for directing the future of the field", *Ege Academic Review*, Vol. 22 No. 2, pp. 195-212, doi: 10.21121/eab.980638.

Pillai, R. and Sivathanu, B. (2020), "Adoption of AI-based chatbots for hospitality and tourism", *International Journal of Contemporary Hospitality Management*, Vol. 32 No. 10, pp. 3199-3226, doi: 10.1108/ijchm-04-2020-0259.

Russell, S., Dewey, D. and Tegmark, M. (2015), "Research priorities for robust and beneficial artificial intelligence", *AI Magazine*, Vol. 36 No. 4, pp. 105-114, doi: 10.1609/aimag.v36i4.2577.

Rybski, P.E., Yoon, K., Stolarz, J. and Veloso, M.M. (2007), "Interactive robot task training through dialog and demonstration", *In Proceedings of the ACM/IEEE international conference on Human-robot interaction*, March/2007, pp. 49-56, doi: 10.1145/1228716.1228724.

Şengel, Ü. (2021), "Chronology of the Interaction between the Industrial revolution and modern tourism flows", *Journal of Tourism Intelligence and Smartness*, Vol. 4 No. 1, pp. 19-30.

Şengel, Ü. and Koç, A. (2022), "Bibliometric review of studies on sustainable tourism and climate change in 2019", *Turismo y Sociedad*, Vol. 31, pp. 161-176, doi: 10.18601/01207555.n31.09.

Şengel, Ü., Çevrimkaya, M., Işkın, M. and Zengin, B. (2022), "The effects of corporate websites usability of travel agencies on their technological capabilities", *Journal of Quality Assurance in Hospitality & Tourism*, Vol. 23 No. 6, pp. 1575-1595, doi: 10.1080/1528008x.2021.2004570.

Skavronskaya, L., Hadinejad, A. and Cotterell, D. (2023), "Reversing the threat of artificial intelligence to opportunity: a discussion of ChatGPT in tourism education", *Journal of Teaching in Travel & Tourism*, Vol. 23 No. 2, pp. 253-258, doi: 10.1080/15313220.2023.2196658.

Smith, A.D. and Rupp, W.T. (2004), "E-traveling via information technology: an inspection of possible trends", *Services Marketing Quarterly*, Vol. 25 No. 4, pp. 71-94, doi: 10.1300/j396v25n04_05.

Smithies, J. (2017), "Artificial intelligence, digital humanities, and the automation of labour", in *The Digital Humanities and the Digital Modern*, Palgrave Macmillan, London, pp. 79-111.

van Eck, N.J. and Waltman, L. (2010), "Software survey: VOSviewer, a computer program for bibliometric mapping", *Scientometrics*, Vol. 84 No. 2, pp. 523-538, doi: 10.1007/s11192-009-0146-3.

Zeng, Z., Chen, P.J. and Lew, A.A. (2020), "From high-touch to high-tech: COVID-19 drives robotics adoption", *Tourism Geographies*, Vol. 22 No. 3, pp. 724-734, doi: 10.1080/14616688.2020.1762118.

Zhao, F. and Kemp, L. (2013), "Exploring individual, social and organisational effects on Web 2.0-based workplace learning: a research agenda for a systematic approach", *Research in Learning Technology*, Vol. 21, pp. 1-15, doi: 10.3402/rlt.v21i0.19089.

Zlatanov, S. and Popesku, J. (2019), "Current applications of artificial intelligence in tourism and hospitality", *Sinteza 2019-International Scientific Conference on Information Technology and Data Related Research*, Singidunum University, pp. 84-90.

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