

A Comprehensive Overview of World Mapping Analysis Research Trends on Impact of Artificial Intelligence in Tourism from 2000 to 2022: A Literature Review and Bibliometric Analysis

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Received: 09 June 2022	Available Online: 11 September 2022
Revision: 19 July 2022	Published: 11 September 2022
Accepted: 16 August 2022	Volume-3, Issue-3
✔ Cite This: <i>ICRRD JOURNAL</i> , 2022, 3(3), 122-130	

ABSTRACT: Artificial Intelligence (AI) has revolutionised several industries across the world. The objective of this article is to present a literature review and bibliometric analysis of the impact of AI in tourism around the world from 2000 to 2022. A textual query on Scopus (245 documents) and WoS (100 documents) using the term (“Impact” OR “effect”) AND (“artificial intelligence” OR “AI”) AND (“tourism”) was performed on 23 June 2022 retrieved 345 documents for in-depth analysis. Rstudio 4.2.0 and biblioshiny for bibliometrix were used to analyse research trends. According to the findings, annual scientific production in Scopus and Web of Science databases has increased from 2016 to 2021. The most popular journals in Scopus are Advances in Intelligent Systems and Computing meanwhile Sustainability journals in Web of Science. In Scopus, the most frequently used author’s keywords and keyword plus are “artificial intelligence” meanwhile in Web of Science showed “artificial intelligence” and “impact”. Li X (Scopus) and Bai B (WoS) are the most popular authors. China produced the most scientific articles in Scopus and Web of Science. In Scopus and Web of Science, between India and France, between China and United Kingdom have among of the world’s highest participation and collaboration.

Keywords: *Impact, Artificial Intelligence (AI), tourism, bibliometric analysis, Rstudio, biblioshiny*

INTRODUCTION

As new global markets emerge in developing countries and offbeat locales, firms in the tourism industry are putting into practise innovative methods to increase their level of competitiveness in the industry [1, 19]. Technologies that use artificial intelligence (AI) are currently being developed and tested within the travel and tourism industry. As a direct consequence of improvements made with big data, there have been significant advances made in artificial intelligence (AI) systems and robots. This is a component of the fourth industrial revolution [21]. Furthermore, AI and data analytics might

be utilised to make predictions about the future of the tourism industry as well as potential responses to the economic downturn caused by Covid-19 [20]. Therefore, nowadays AI is being integrated into more aspects in daily operations throughout the tourism industry, which ultimately will influence these firms' ability to compete. Big data, artificial intelligence, and robots are all being used in the tourism industry to increase productivity and provide more value to customers [25, 27]. When trying to address the challenges and difficulties that face the tourism sector, it is essential for businesses in this field to make use of the advantages offered by AI systems. The adaptability of the market in the modern period, whether measured in terms of tourist demand, preferences, or the motivations of rivals, contributes to better operational efficiency, which in turn increases the firm's competitiveness [8]. Therefore, in recent years there has been a growth in the tourism industry's when using artificial intelligence (AI) as a strategic tool. The use of artificial intelligence (AI) as a technique of business strategy is becoming more widespread in the tourism sector.

Utilizing artificial intelligence in the travel and tourism industry may result in several positive effects. To begin, the tourism industry creates new opportunities for employment and financial investment while also fostering the development of related industries such as accommodation, transportation, business, and a few other industries. Additionally, the tourism industry creates new opportunities for businesses to attract new customers. In addition to the potential economic benefits, the use of artificial intelligence in the tourism industry may also improve participation from marginalised groups of people. People who have disabilities or pregnant women, for example, may benefit from services based on artificial intelligence that give suggestions and equipment that is relevant and adapted to their specific needs. Finally, the technology of artificial intelligence has the potential to revolutionise the tourism industry in a manner that is kind to the environment. This could be accomplished by reducing pollution in the air, land, and water and eradicating environmental damage [12].

The progression of technology has led to several developments, which have made it possible for new economic sectors to arise and have increased the efficiency of existing economic sectors. Like manufacturing automation and increased production, the service sector has grown significantly simultaneously with the accessibility of technology applications. The development of new technologies is beneficial to one of the most significant service tourism industries [2, 9, 31].

Studies of artificial intelligence have started since the 1990s. It has been used in tourism research projects to estimate hotel occupancy and demand [22, 23]. It is widely believed that artificial intelligence (AI) is the next stage for the tourism industry [5, 11, 17]. Artificial intelligence can handle complicated connections and challenges between ideas [28]. It is easily capable of managing massive volumes of data as well as complex human activities such as driving, shopping, and other aspects of daily life [15]. Like how the human brain works, artificial intelligence (AI) thinks, learns, and draws conclusions based on facts. Developing a system that enables robots to carry out tasks autonomously without relying on human brains is the core aim of artificial intelligence [32].

Even though artificial intelligence (AI), with its enhanced processing and problem-solving capabilities, offers wholly different solutions for potential and future challenges in the tourism industry, there is a lack of academic study on AI in the context of tourism [11]. Therefore, this research decided to conduct a literature review as well as a bibliometric analysis review to analyse the growth, research themes, and statistical data of AI in the tourism field within the scope of data obtained from Scopus and Web of Science database. The findings of this research have a lot of significant implications to consider. This study provides an overview of the relevant subject matter, including key studies, authors, collaborations, and developing themes, for those in the fields of social science and tourism

research who are interested in AI. AI, a relatively new and multidisciplinary area, has the potential to provide a variety of perspectives on social sciences, and it may assist in comprehending more difficult societal problems [29].

A bibliometric analysis review provides an overview of the body of research that has been conducted within the topic area and has been thoroughly examined in a sufficient number of publications. As a result of this condition, the main goal of this research is to present a literature review and in-depth analysis of the present status of artificial intelligence's impact in tourism via bibliometric analysis utilising the tools RStudio and biblioshiny. Bibliometric analysis review it might help with understanding trends research. These findings will aid academics and researchers in identifying the present status and trends of global impact of artificial intelligence in tourism research throughout the world.

There are four sections to this article. The introduction is the first section, after which we go on to a review of the literature on the idea of how artificial intelligence may affect tourism research. In section 3, the sources and methodology used to compile the references that make up the study's empirical foundation are then described. Part 4 explains and discusses the main findings and conclusions reached in the study of the fundamental bibliometric analysis are discussed in Part 5 of the article. Each section may be divided into subheadings that provide a concise and unambiguous overview of the experimental results, interpretation, and any potential experimental conclusions.

LITERATURE REVIEW

The Role of AI Systems in Tourism Industry

Artificial intelligence is the process of developing applications that solves problems in a manner that is intended to imitate intellect humanity [24]. AI is usually defined as, the capabilities of machines to behave like humans, like solving problems, without needing to use hand-coded software with detailed instructions [38]. Aside from that, AI is mostly about making computers behave like intelligent people based on what they know about the world [26]. AI is getting more and more common in the tourism and hospitality industry. This is helping the firms and the industry financially and making them more competitive [3].

There are many different ways in which artificial intelligence systems might be beneficial to the tourism industry. AI helps customers locate better and more relevant information, gives more flexibility, and facilitates decision-making, all of which contribute to an overall improvement in the tourism experience [13, 39]. From a business perspective, artificial intelligence (AI) can be utilised to improve productivity and promotion. By persuading consumers to see the world from a more social viewpoint, artificial intelligence is also anticipated to promote more environmentally friendly tourism [6, 39].

In the tourism industry, artificial intelligence technologies can either be standalone or integrated into current applications and systems. Recommendation systems, customization approaches, forecasting tools, autonomous agents, language translation apps, and smart tourism destinations are all examples of these systems. A lot of the time, tourists will interact with technologies that incorporate a few of these different systems. A conversational system, a recommender system, or an autonomous agent, depending on the requirements, may be incorporated into a robot that a

guest may use to speak. It's possible that a chatbot or voice assistant will be the one to help facilitate the communication with the user. Smart tourism ecosystems are developed in places when these sophisticated technologies are applied alongside other social and organisational elements [7]. Figure below illustrates the relationship between the AI systems and tourism industry.

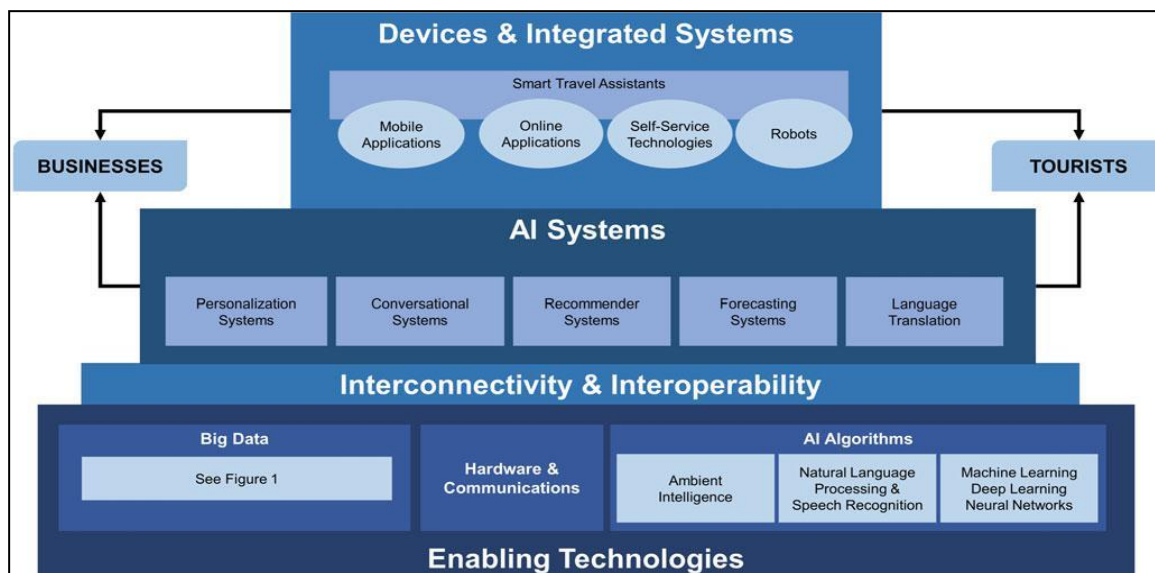


Figure 1: Relationship between the AI systems and tourism industry

Source: (Bulchand-gidumal, 2020)

Impact of AI to tourism

Based on what has been learned in the past, AI interventions in tourism have a number of effects. To begin, there are certain impacts that result from the intervention of AI in the tourism industry, such as gains in productivity, increases in financial performance, and increases in the level of satisfaction experienced by tourists.

If we talk about productivity, the World Economic Forum said in 2017 that technologies like cloud computing, robots, and artificial intelligence added \$305 billion in value to tourism companies because they made them more productive [36]. The rise of AI in the tourism business is a good sign. It is due to it demonstrates that the sector is capable of making the most of the most recent technologies to improve both its productivity and efficiency [33].

In addition, when it comes to financial performance, the presence of AI intervention in the tourism industry demonstrates a rise in the industry's overall performance. This may be shown by the fact that increased levels of competitiveness and improved financial performance may be achieved when a company uses its resources and skills to the fullest extent possible but however, the link between a company's financial success and its competitiveness but it is not constant. It has also been reported that there has been an increase in rivalry when AI has been used in the tourism industry [4].

As a conclusion, we will discuss the ways in which the intervention carried out by AI has led to an increase in the level of satisfaction experienced by tourists. There is an increase in terms of tourist

satisfaction with the existence of AI involvement in the tourism industry, according to certain research, which states that this may be attributed to the presence of AI. Among them are statements made by Ivanov & Berezina [16], which state that excellent customer satisfaction may be achieved with the use of interactive AI technology; however, not all services are required to be automated. A fantastic experience for the customer ultimately results in increased financial success for the company and, as such, should be the primary priority of the organisation. Furthermore, according to Kumar et al. [18] regarding to this discussion the technologies being used make workers more productive and save them time, which has a big effect on how tourists are treated and leads to higher customer satisfaction.

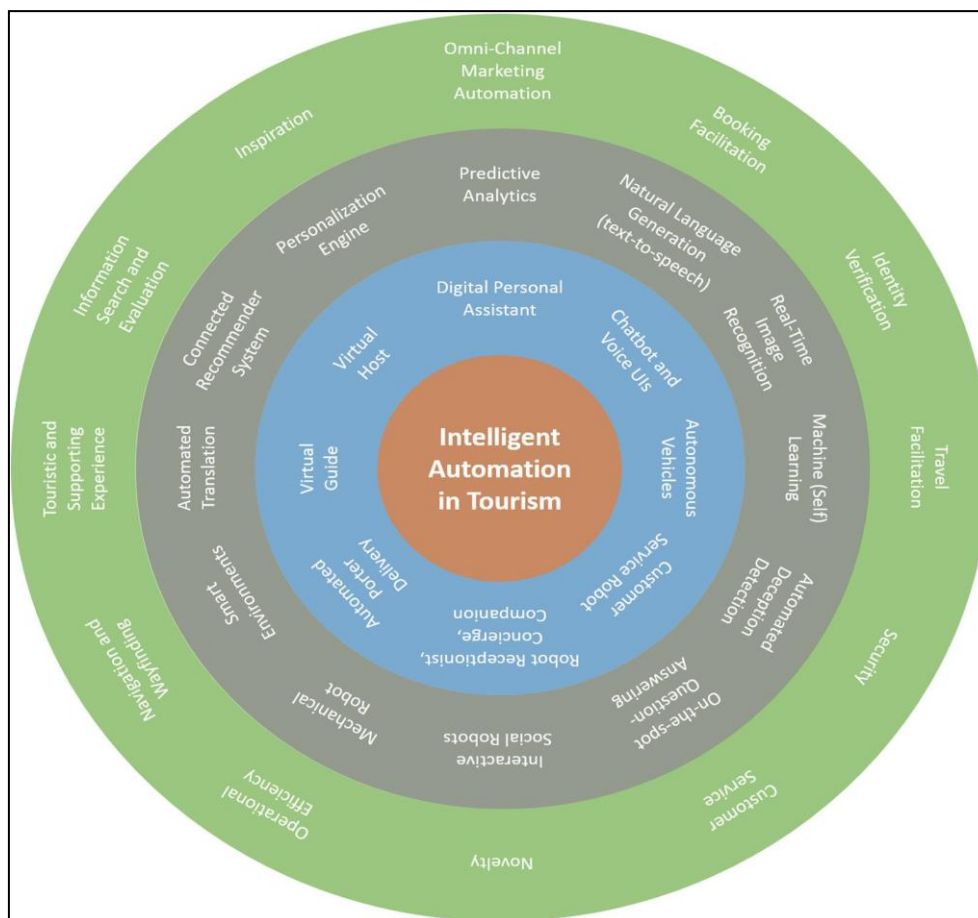


Figure 2: Applications of automation in tourism experiences

Source: (Tussyadiah, 2020)

METHODOLOGY

The PRISMA criteria, which stand for Preferred Reporting Items for Systematic Reviews and Meta-Analyses, were followed throughout the bibliometric analysis review. It is usual practise to give an assessment of the quality and reliability of a review on the relevant and appropriate information provided by publishing guidelines. PRISMA recommends the following four methods for discovering and obtaining information for a bibliometric analysis review;

Data source and Search strategy (Identification)

In order to collect the necessary data for this analysis, a comprehensive search query was run using two online databases, namely Scopus and Web of Science. Despite the fact that the Web of Science (WoS) database is a popular option for bibliometric analysis among scholars, the Scopus database has a significant number of articles in the social sciences, particularly after 1996 [37, 40].

Using the online databases Scopus and Web of Science, a comprehensive search was done on June 23, 2022. Searches were restricted to a single day to avoid bias from being initiated by the database's frequent updates. As part of the analysis, researchers focused on articles published between 2000 and 2022 in the Scopus and WoS databases about the impact of artificial intelligence in tourism. The following search technique provides an illustration searching in both databases using BOOLEAN operations (OR, AND) as seen in the following;

Topic: ((“Impact” OR “effect”) AND (“artificial intelligence” OR “AI”) AND (“tourism”))

Refined by: Document types in Scopus and Web of Science (there was no restriction on the type).

Criteria: “titles, abstract and keywords (topic area)”

Year Published: 2000-2022.

Language: English

Table 1: The search string

Database Search string	Search string strategy Boolean operators	No. Articles
Scopus	TITLE-ABS-KEY ((“Impact” OR “effect”) AND (“artificial intelligence” OR “AI”) AND (“tourism”)) AND (LIMIT-TO (PUBYEAR,2022) OR LIMIT-TO (PUBYEAR,2021) OR LIMIT-TO (PUBYEAR,2020) OR LIMIT-TO (PUBYEAR,2019) OR LIMIT-TO (PUBYEAR,2018) OR LIMIT-TO (PUBYEAR,2017) OR LIMIT-TO (PUBYEAR,2016) OR LIMIT-TO (PUBYEAR,2015) OR LIMIT-TO (PUBYEAR,2014) OR LIMIT-TO (PUBYEAR,2013) OR LIMIT-TO (PUBYEAR,2012) OR LIMIT-TO (PUBYEAR,2011) OR LIMIT-TO (PUBYEAR,2010) OR LIMIT-TO (PUBYEAR,2009) OR LIMIT-TO (PUBYEAR,2008) OR LIMIT-TO (PUBYEAR,2007) OR LIMIT-TO (PUBYEAR,2005) OR LIMIT-TO (PUBYEAR,2004) OR LIMIT-TO (PUBYEAR,2003) OR LIMIT-TO (PUBYEAR,2002) OR LIMIT-TO (PUBYEAR,2000)) AND (LIMIT-TO (LANGUAGE, “English”))	245
Web of Science	TS=((“Impact” OR “effect”) AND (“artificial intelligence” OR “AI”) AND (“tourism”)) AND 2022 or 2021 or 2020 or 2019 or 2018 or 2017 or 2016 or 2015 or 2014 or 2013 or 2012 or 2011 or 2010 or 2009 or 2008 or 2007 or 2006 or 2005 or 2004 or 2003 or 2001 or 2000 (Publication Years) AND English (Languages)	100
Scopus & WoS	Total databases	345

To analyse all the essential data included in the publishing databases, namely Scopus and Web of Science. For data extraction, researchers carefully download data from each database. Web of Science was obtained in *Text Document format whereas Scopus was downloaded in *CSV format. This data consists of the title of the article, the name and affiliation of the authors, the abstract, the keywords, the name of the journals, the references, etc. The researcher analysed the gathered data using RStudio software version 4.2.0 and the biblioshiny web interface 4.0. After narrowing the

database release, 245 articles were downloaded from Scopus, whereas only 100 were obtained from Web of Science. Utilizing the bibliometric tool known as biblioshiny, it can visualise and analyse patterns of artificial intelligence's impact in tourism. The aim of the article is to examine the current situation throughout the nation from 2000 to 2022 and provide the findings about those trends.

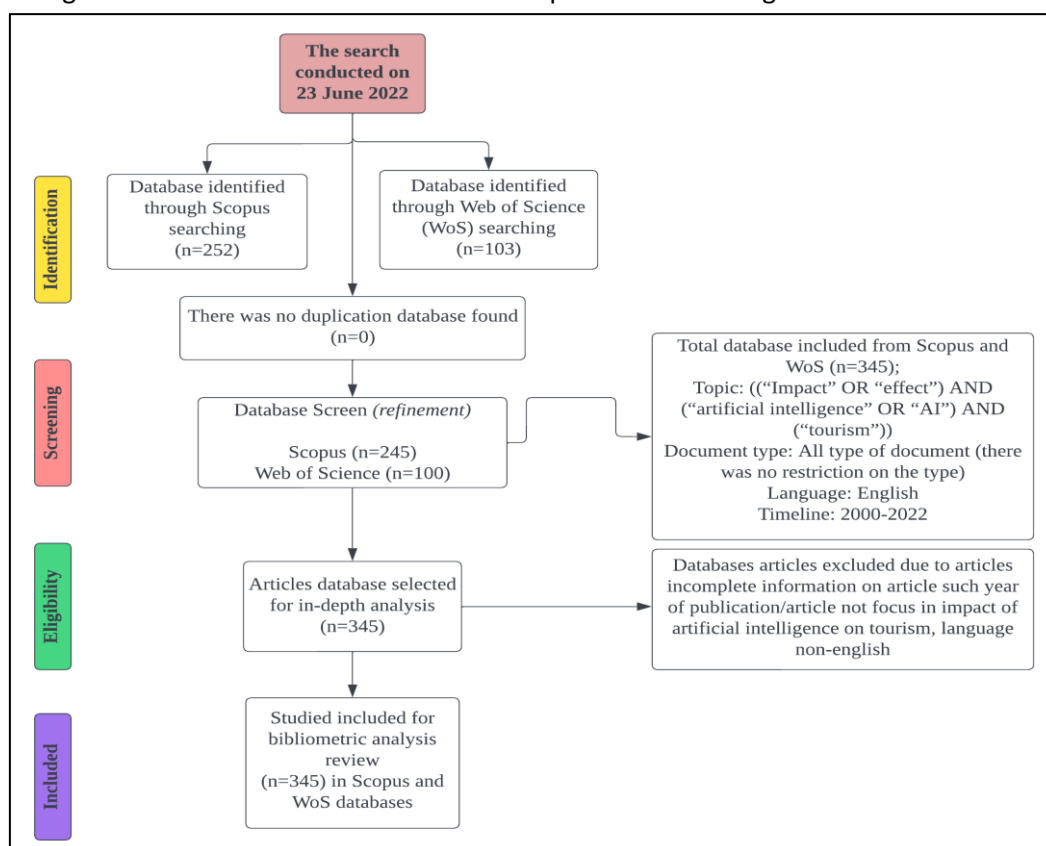


Figure 3: Flowchart for study selection

Eligibility criteria (Screening process)

The researchers analysed 245 out of the 345 publications in the Scopus database, while 100 articles were analysed in the Web of Science database. At this stage, it is essential to conduct an in-depth analysis of all publications, paying close attention to the publications' titles, abstracts, and primary contents, to determine whether the publications fulfil the inclusion criteria, whether they are suitable for use in the current research, and whether they meet the goals. According to the findings of the study about the impact that artificial intelligence would have on the tourism industry, a total of 345 articles that comply will have to be analysed. The selection process was limited to papers published between the years 2000 and 2022. In addition, there was no limitation placed on the categories of articles that may be featured: no kind of article was restricted, except English.

Table 2: The inclusion and exclusion criteria

Database Criteria	Eligibility	Exclusion
Document type	All type of document (there was no restriction on the type)	Not applicable

Language	English	Non-English
Timeline	2000 - 2022	<2000
Location and Country	Worldwide (there was no restriction on the type)	Not applicable

Data Analysis

RStudio and biblioshiny were used to perform a bibliometric analysis research based on a systematic analysis of literature on the impact of artificial intelligence in tourism. Open-source tools, like the bibliometrix R-package, are specifically created for bibliometric and scientometric analysis and include the relevant and cost-free R programming language. The bibliometrix R-package is a useful, versatile, and modifiable tool for the bibliometric studies in this research.

The researcher used RStudio 4.2.0 on a PC running on windows 8.1. To install the bibliometric packages, researchers will run RStudio and execute `>install.packages("bibliometrix")` in the command line. After installing bibliometrix, the researcher should execute `>library(bibliometrix)`, then `>biblioshiny(bibliometrix)` on RStudio's command terminal to start the biblioshiny web-interface [10]. Researchers used the biblioshiny programme to analyse data imported from the Scopus and Web of Science databases. A bibliometric analysis of the impact of artificial intelligence in tourism research was performed to obtain a research output analysis of annual scientific production, country scientific production, the most relevant authors, the most relevant journals, the most frequent words and co-occurrence network, and country collaborations. The figure below depicts the characteristics of the biblioshiny web-interface that may be used to analyse data.

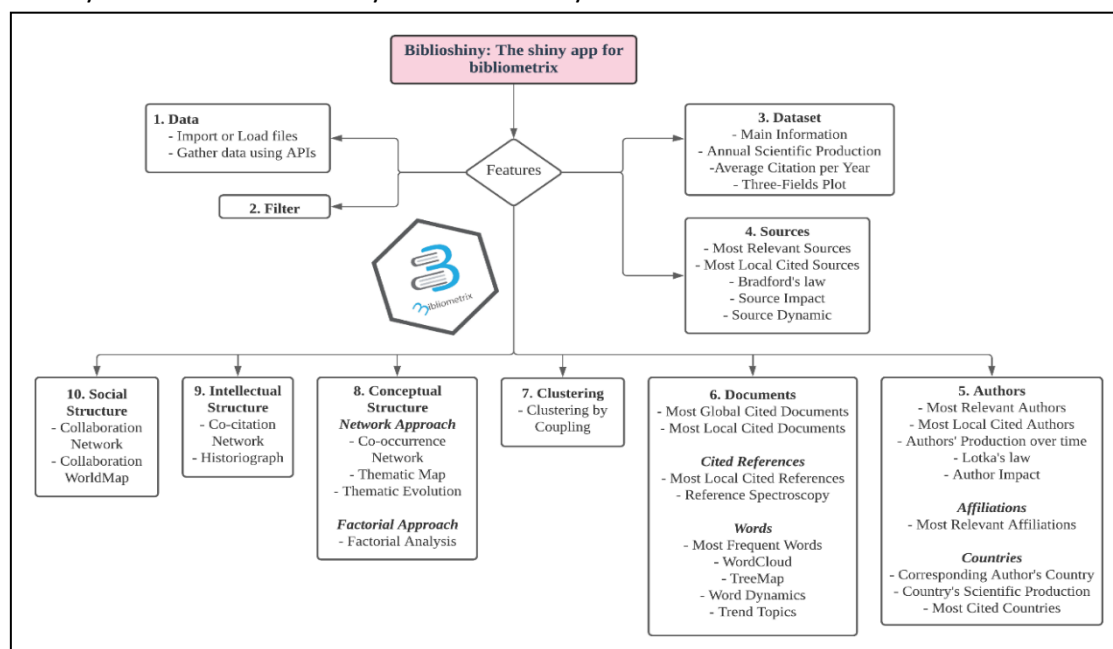


Figure 4: Features of Biblioshiny app for bibliometrix

Source: (Fakruhayat et al., 2022)

RESULTS AND DISCUSSION

Researchers obtained 345 databases of publications (journal, book, book chapter, conference paper, review, etc.) on relevant topics to the impact of artificial intelligence in tourism from 2000 to 2022 by using the search strategy that was described above. These databases were obtained from two different sources that were indexed by Scopus and Web of Science.

Annual Scientific Production and Average Citation Per Year

Scopus (245 articles) and Web of Science (100 articles) published 345 documents relating to the impact of artificial intelligence in tourism publications between 2000 and 2022. The year with the most papers published in the Scopus database (71 of 245) was 2021, whereas the years with the fewest were 2001 and 2006, when no articles were published. Furthermore, world trends in yearly scientific production in the Scopus database show a significant growth from 2017 to 2021. According to Web of Science's annual scientific productivity, the year with the most papers published was 2021 (26 of 100). Furthermore, from 2016 to 2021, world trends in yearly scientific production indicated a significant growth in the number of publications. Furthermore, the annual growth rate was 16.16% (Scopus) and 18.14% (WoS).

Table 3: Annual scientific publications and average citation per year from 2000 to 2022.

Year	Scopus			Web of Science		
	N. Documents	MeanTCperYear	CitableYears	N. Documents	MeanTCperYear	CitableYears
2000	1	0.00	22	0	0.00	0
2001	0	0.00	0	0	0.00	0
2002	1	0.05	20	0	0.00	0
2003	1	6.00	19	0	0.00	0
2004	1	0.00	18	0	0.00	0
2005	2	19.85	17	1	8.76	17
2006	0	0.00	0	0	0.00	0
2007	3	3.07	15	0	0.00	0
2008	4	0.20	14	0	0.00	0
2009	4	2.90	13	1	0.00	13
2010	7	0.80	12	2	1.21	12
2011	10	0.15	11	0	0.00	0
2012	2	0.30	10	0	0.00	0
2013	7	0.41	9	0	0.00	0
2014	6	1.15	8	0	0.00	0
2015	4	3.39	7	0	0.00	0
2016	3	1.89	6	1	5.67	6

2017	13	1.00	5	4	2.50	5
2018	16	2.52	4	7	3.54	4
2019	16	8.56	3	12	10.86	3
2020	46	4.49	2	18	4.19	2
2021	71	4.37	1	26	9.65	1
2022	27	0.00	0	17	0.00	0

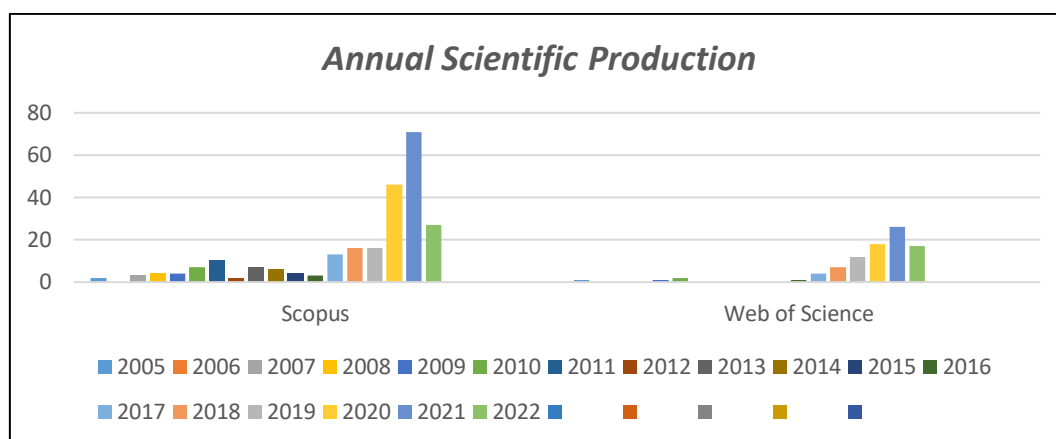


Figure 5: Annual scientific publications from 2000 to 2022

Most Relevant Journals (Sources)

The Scopus database discovered 163 journals in 245 publications. The table below displays the top ten most relevant journals that published a large number of publications related to the impact of artificial intelligence in tourism research. According to the study's findings, the most popular journals are *Advances in Intelligent Systems and Computing* and *Journal of Physics: Conference Series*, which have 10 articles published respectively. *Sustainability (Switzerland)* journals ranked third with 9 published articles, while *Lecture Notes in Networks and Systems* ranked tenth, with 4 articles published. *Tourism Management* journals have received the highest total citations (299).

Table 4: Top 10 most relevant journals articles in impact of artificial intelligence in tourism research (Scopus)

Most Relevant Journal (Scopus)	N. Documents	h_index	g_index	m_index	TC
<i>Advances in Intelligent Systems and Computing</i>	10	2	3	0.25	13
<i>Journal of Physics: Conference Series</i>	10	2	4	0.5	21
<i>Sustainability (Switzerland)</i>	9	4	5	1.333	25
<i>Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)</i>	8	2	4	0.095	18

2011 2nd International Conference on Artificial Intelligence, Management Science and Electronic Commerce, Aimsec 2011 - Proceedings	7	1	1	0.083	5
Acm International Conference Proceeding Series	7	0	0	0	0
Tourism Management	5	3	4	0.375	299
E3S Web of Conferences	4	1	1	0.5	1
Journal of Hospitality and Tourism Technology	4	2	3	0.5	40
Lecture Notes in Networks and Systems	4	0	0	0	0

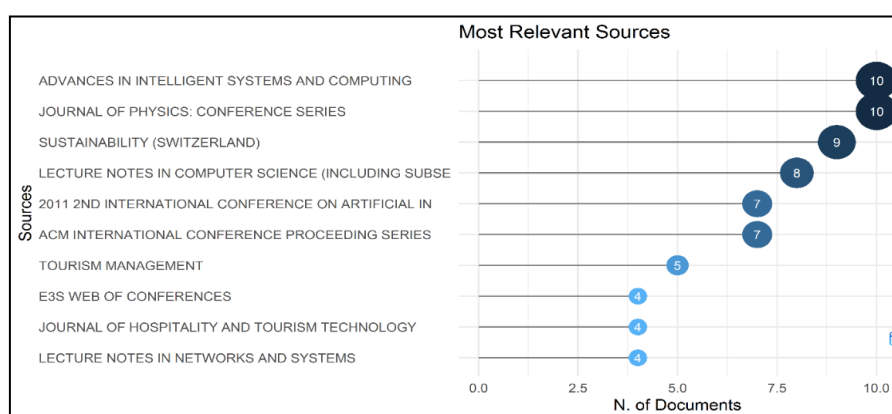


Figure 6: Top 10 most relevant journals articles in impact of artificial intelligence in tourism research (Scopus)

The analysis of the most relevant journal in the topic of artificial intelligence's impact in tourism research found 79 different journals in the 100 Web of Science online database. The top ten journals in the Web of Science database are shown in the table below. Sustainability, which includes 5 articles, is one of the most frequently read journals. The Journal of Electronic Markets and the International Journal of Contemporary Hospitality Management each had four published articles, while Worldwide Hospitality and Tourism Themes ranked tenth with two published articles. The Journal of Travel & Tourism Marketing has the most overall citations with 159 citations.

Table 5: Top 10 most relevant journals articles in impact of artificial intelligence in tourism research (WoS)

Most Relevant Journal (Web of Science)	N. Documents	h_index	g_index	m_index	TC
Sustainability	5	2	3	0.667	15
Electronic Markets	4	0	0	0	0
International Journal of Contemporary Hospitality Management	4	3	3	1	67
International Journal of Hospitality Management	3	2	3	1	23
Journal of Hospitality and Tourism Technology	3	2	3	0	32
Tourism Management	3	2	2	0.667	30

Tourism Review	3	2	3	0	36
Journal of Hospitality Marketing & Management	2	1	2	0.5	9
Journal of Travel & Tourism Marketing	2	1	1	0.25	159
Worldwide Hospitality and Tourism Themes	2	2	2	0.333	40

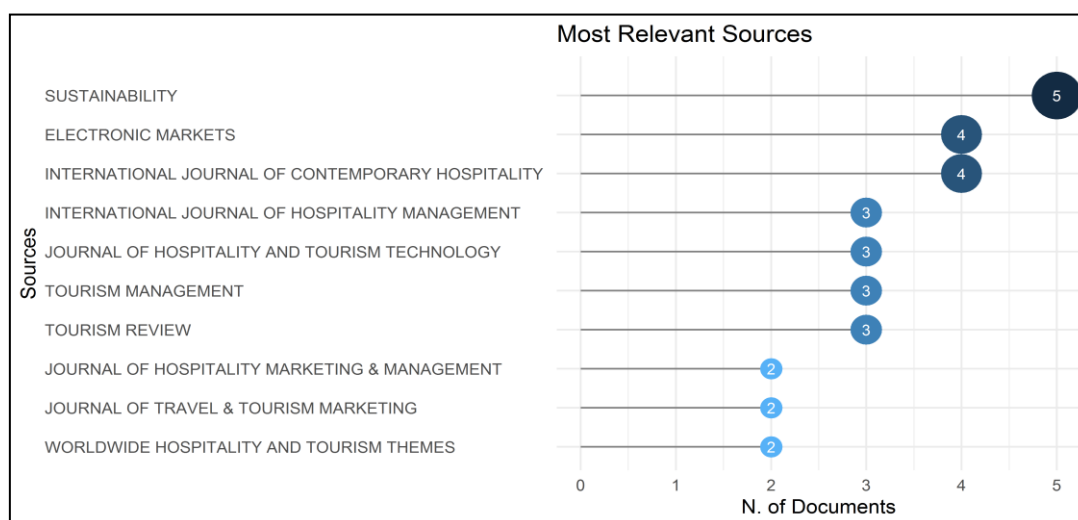


Figure 7: Top 10 most relevant journals articles in impact of artificial intelligence in tourism research (WoS)

Most Frequent Words and Co-Occurrence Network

In bibliometric analysis, keywords are very important for finding out the trend in the field of study. For the purposes of keyword analysis, the author's keyword and keyword plus can be split into two groups. According to Zhang et al. (2019), the author's keyword is an essential indicator of the study aims and interests of researchers. The author's keyword has a total of 804 occurrences, whereas the number of keyword plus occurrences is 650. The research of keyword co-occurrence networks will provide a comprehensive overview of the relational ties between several terms by direction of nodes. The table that follows provides 20 keywords that are used most often in research on the impact of artificial intelligence in tourism that published in Scopus database. These keywords are included in the table below. The author's most often used keywords in this area of research include "artificial intelligence" (51 times), "tourism" (31 times), "covid-19" (13 times), and "machine learning" (10 times), and many others. The findings of the analysis of keyword plus indicated that the keyword "artificial intelligence" has been used the most (135 times), followed by "tourism" (53 times), followed by "decision support systems" (27 times), and "decision making" (17 times), among other relevant words.

Table 6: The most top 20 frequently utilized author's keywords in impact of artificial intelligence in tourism research (Scopus)

Author's Keywords		Keywords Plus	
Words	Occurrences	Words	Occurrences
artificial intelligence	51	artificial intelligence	135

tourism	31	tourism	53
covid-19	13	decision support systems	27
machine learning	10	decision making	17
big data	8	sustainable development	17
robotics	8	tourism development	17
decision support system	5	climate change	15
hotel	5	leisure industry	15
robots	5	economic and social effects	14
smart tourism	5	forecasting	13
climate change	4	tourism industry	13
deep learning	4	commerce	8
destination image	4	competition	8
hospitality	4	information systems	8
service robots	4	planning	8
AI	3	tourism management	8
arima	3	artificial intelligence technologies	7
Artificial Intelligence (AI)	3	automation	7
augmented reality	3	big data	7
automation	3	decision support system	7



Figure 8: Tree map of top 50 frequently utilized a) author’s keywords and b) keyword plus in impact of artificial intelligence in tourism research (Scopus)

In the Web of Science database of 100 publications, the author's keyword is recorded as 421 and the number of keywords plus is recorded as 316. Researchers from across the world have established that these keywords will be used in impact of artificial intelligence in tourism study. In the following table, you'll find a list that contains the top 20 author’s keywords and keyword plus combinations that appear most often in research publications about the impact of artificial intelligence on tourist studies. The most often used author's keywords in the impact of artificial intelligence in tourism study field are “artificial intelligence” (33 occurrences), “tourism” (19 occurrences), “covid-19” (8 occurrences), etc meanwhile the keyword plus analysis showed that “impact” has been used the most (23 times), followed by “tourism” (22 times), “artificial-intelligence” (11 times), and so on.

Table 7: The most top 20 frequently utilized author’s keywords and keyword plus in impact of artificial intelligence in tourism research (WoS)

Author's Keyword		Keyword Plus	
Words	Occurrences	Words	Occurrences
artificial intelligence	33	impact	23
tourism	19	tourism	22
covid-19	8	artificial-intelligence	11
machine learning	7	experience	10
hospitality	6	model	10
service robots	6	hospitality	9
artificial intelligence (ai)	4	management	8
big data	4	big data	7
hotel	4	information-technology	7
customer experience	3	service	7
hotels	3	future	6
robotics	3	satisfaction	6
robots	3	behavior	5
social media	3	customer satisfaction	5
sustainability	3	information	5
systematic review	3	quality	5
technology	3	user acceptance	5
virtual reality	3	attributes	4
anthropomorphism	2	experiences	4
arima	2	lessons	4



Figure 9: The most top 20 frequently utilized author's keywords and keyword plus in impact of artificial intelligence in tourism research (WoS)

Most Relevant Authors

A total of 661 authors contributed to the research related to the impact of artificial intelligence in tourism in 245 documents in Scopus. The top ten authors are shown in the table below. According to the findings, an author by the names of Li X and Li Y each recorded a total of five articles in that research. This author was followed by Liu Y, who has four publications, Dhir S, who has three publications, and Chang S-F, who has two articles. The table also shows that the publication with the most total citations among the top ten overall authors is Buhalis D, which has 167 citations.

Table 8: Top 10 most relevant author in impact of artificial intelligence in tourism (Scopus)

Author's Name	Articles	Percentage (%)	h_index	g_index	m_index	TC
---------------	----------	----------------	---------	---------	---------	----

Li X	5	2.00	1	1	0.5	1
Li Y	5	2.00	2	2	0.182	5
Liu Y	4	1.60	2	3	1	63
Dhir S	3	1.20	1	1	1	1
Jain M	3	1.20	1	1	1	1
Li C	3	1.20	1	2	0.5	32
Sharma K	3	1.20	1	1	1	1
Wang S	3	1.20	1	2	0.5	5
Buhalis D	2	0.80	1	1	0.25	167
Chang S-F	2	0.80	0	0	0	0

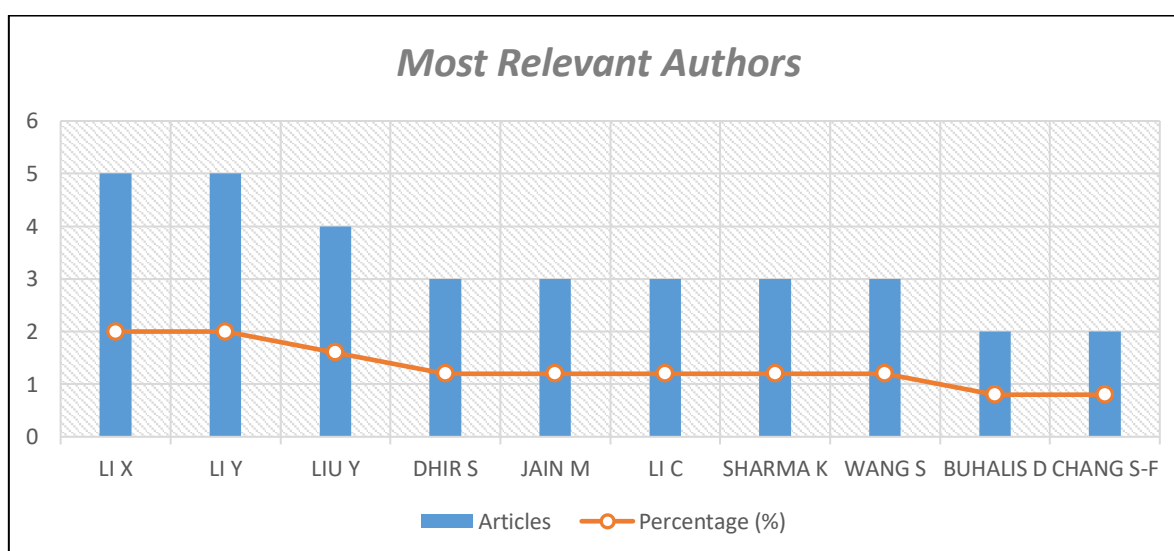


Figure 10: Top 10 most relevant author in impact of artificial intelligence in tourism (Scopus)

The analysis has discovered 324 different authors in study articles about the impact of artificial intelligence in tourism that were published in WoS database. There was a list of the top ten authors. These researchers, Bai B, Buhalis D, Li ML, and Qiu HL, each had a total of three publications published in the subject of research that this study was investigating. The study results also indicate that another author has published two publications articles. According to the statistics, Buhalis D. is the author that has received the most total citations of any of the top 10 overall authors. His article has received 306 citations in total.

Table 9: Top 10 most relevant author in impact of artificial intelligence in tourism (WoS)

Author's Name	Articles	Percentage (%)	h_index	g_index	m_index	TC
Bai B	3	3.00	1	2	0.5	18
Buhalis D	3	3.00	2	3	0.0	306
Li ML	3	3.00	1	2	0.5	18

Qiu HL	3	3.00	1	2	0.5	18
Ceylan D	2	2.00	1	1	0.0	1
Cizel B	2	2.00	1	1	0.0	1
Karakas H	2	2.00	1	1	0.0	1
Li CX	2	2.00	1	1	0.5	31
Liu YQ	2	2.00	1	1	0.5	31
Luo JJ	2	2.00	1	1	0.5	31

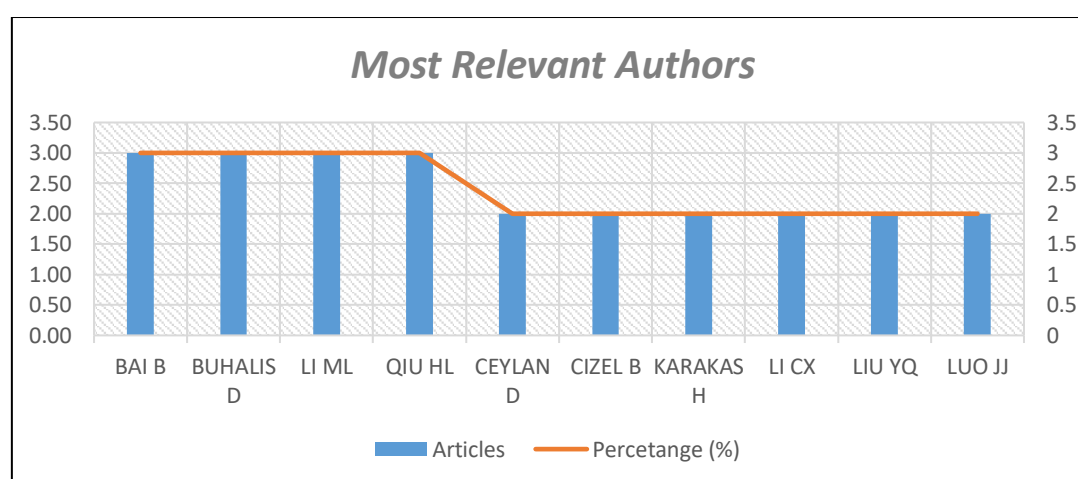


Figure 11: Top 10 most relevant author in impact of artificial intelligence in tourism (WoS)

Country Scientific Production And Collaboration Among Countries

In this part, the researchers have looked at the numerous patterns of scientific production and collaboration that are prevalent throughout the world in the Scopus database. China has published around 142 publications, making it the country with the highest level of international scientific production. Nonetheless, India comes in close behind with around 55 publications, and Spain, which comes in third with a total of 50 publications and is the most prolific country in terms of publication production, is the nation that takes the top spot. The list indicates that each of the other countries got at least the minimum amount of outputs, which was somewhere about 19 articles. According to the findings of the researcher's analysis, there are already 54 international partnerships devoted to the investigation of the impact that artificial intelligence will have in tourism all over the world. The research conducted for this study has been contributed to by a minimum of 10 different countries, all of which are included in the accompanying table. According to the list, the number of times that two different countries may work together is limited to a maximum of two. For instance, India and France, Malaysia and Ghana, Turkey and Lithuania, and the United States of America and Bulgaria are some examples of such pairings. In the meanwhile, all of the other countries on the list have established at maximum only one collaboration each.

Table 10: The top 10 country scientific production most collaboration among countries in impact of artificial intelligence in tourism research (Scopus)

Country Scientific Production		Collaboration Among Country		
Country	Frequency	From	To	Frequency
China	142	India	France	2
India	55	Malaysia	Ghana	2
Spain	50	Turkey	Lithuania	2
USA	37	USA	Bulgaria	2
Portugal	24	Australia	Belgium	1
UK	23	Australia	Korea	1
Italy	22	Bulgaria	Czech Republic	1
Turkey	21	Bulgaria	Ukraine	1
Malaysia	20	Canada	Poland	1
France	19	China	Ghana	1

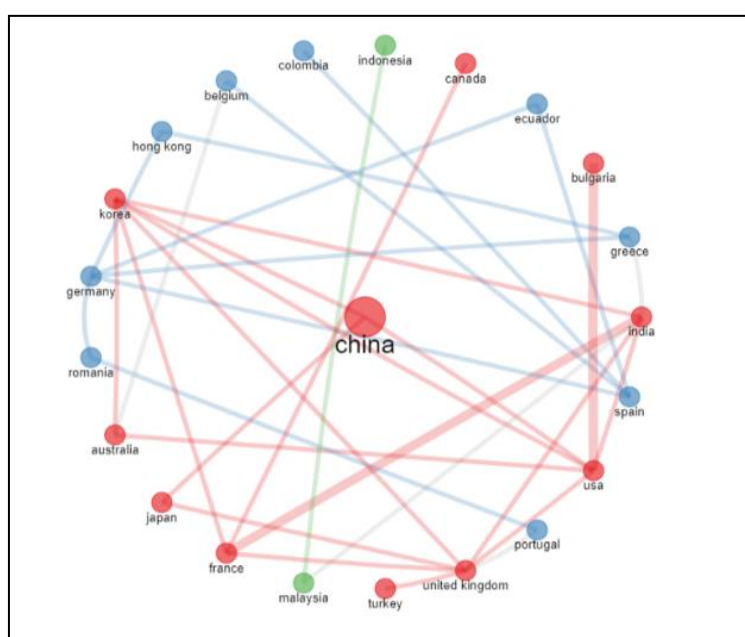


Figure 12: Collaboration network among countries around the world in the impact of artificial intelligence in tourism study (Scopus)

When we analyze the contribution that each nation has made to the body of knowledge included inside the Web of Science database, we discover that China has made the most significant contribution, with a total of 54 articles to its credit. It is then followed by the United States of America, which typically has approximately 24 publications, and Spain, which has 20, making it the third biggest nation in terms of the overall number of publications that it produces. Then, if we focused on the country with the fewest publications, Portugal and Malaysia both had seven total publications. In addition, the results of the researcher's study indicate that there are a total of 43 international collaborations in the field of tourism-related artificial intelligence research. Following is a list, in

highest to the lowest, of the top ten countries that cooperate the most with one another in tourism-related artificial intelligence research topics. According to the list, China and the United Kingdom, as well as China and the United States, have worked together on four separate occasions, making them the countries with the highest frequency of working together out of all the countries in the world. On the contrary, every other country on the list obtained at least one collaboration.

Table 11: The top 10 country scientific production most collaboration among countries in impact of artificial intelligence in tourism research (WoS)

Country Scientific Production		Collaboration Among Country		
Country	Frequency	From	To	Frequency
China	54	China	United Kingdom	4
USA	24	China	USA	4
Spain	20	China	Australia	3
Turkey	17	India	France	2
Uk	17	Spain	Chile	2
India	12	United Kingdom	France	2
Australia	10	USA	United Kingdom	2
France	9	Bulgaria	Czech Republic	1
Malaysia	7	Canada	Poland	1
Portugal	7	China	Germany	1

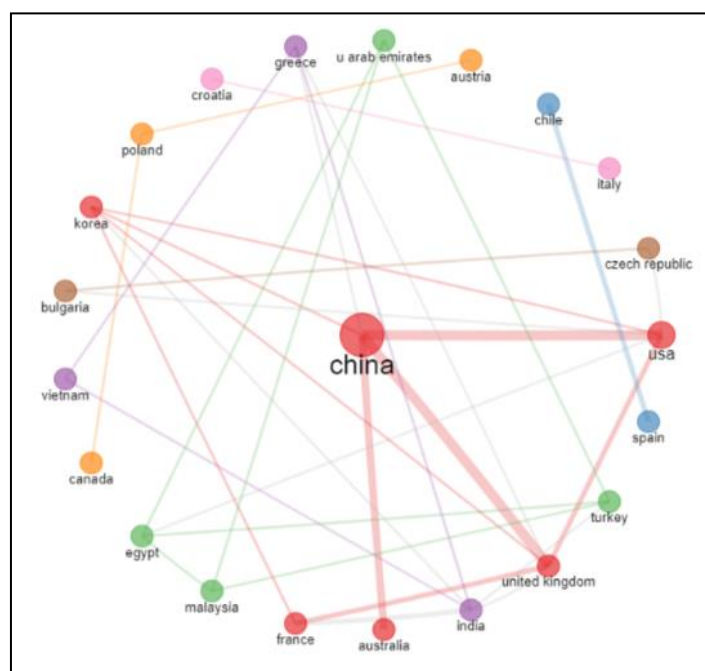


Figure 13: Collaboration network among countries around the world in the impact of artificial intelligence in tourism study (WoS)

DISCUSSION

There are certain positive effects that artificial intelligence can have on the tourism industry, particularly in the areas of economics, technology, society, and the environment. The contributions of artificial intelligence to the tourism industry may be evaluated by the increased economic value it generates through enabling technologies that facilitate new forms of collaboration and value creation, hence fostering innovation, entrepreneurship, and competitiveness [14]. This transformation in tourism services has a direct impact in tourism revenue because it increases the profits of stakeholders. The primary objective of artificial intelligence (AI) applications in the tourism industry is to establish a new work environment that results in an increase in the effectiveness of service facilities while simultaneously reducing the amount of money required to provide a service that requires a significant amount of maintenance. The financial well-being of stakeholders is enhanced when technological innovations that are highly efficient are utilised rather than traditional processes. This is due to the fact that technological innovations utilise less energy, less natural resources, or fewer human resources than traditional processes.

In addition, the application of artificial intelligence in the tourism industry may accelerate the development of new technologies. The facilitation of accommodation, transportation, and many other services that are associated to tourism may be facilitated by technological improvements, which may potentially increase competitiveness in the tourism industry. In addition, developments in the uses of artificial intelligence in the tourism industry make it easier for disadvantaged people to engage in social life. When navigating a facility, those with physical disabilities, the elderly, and pregnant women may require additional assistance. This assistance may take a specific form. For instance, the application of artificial intelligence to the tourism industry can assist in fulfilling such requirements through the development of innovative solutions such as robots, mobile equipment, elevators, and so on. The tourism sector is now benefiting from and will continue to see the benefits of artificial intelligence's use in the future. Nevertheless, there are substantial challenges and risks connected with artificial intelligence.

Scopus and web of science databases were used to conduct the first bibliometric analysis of the impact of AI in tourism research. Researchers use bibliometric analysis to find the connections between publications and research trends by analysing scientific articles quantitatively [35]. A bibliometric analysis was performed to analyze global trends in impact of AI in tourism research from 2000 to 2022, with a focus on specific topics within the area. Annual scientific production and average citations per year, most relevant journals, most frequent keywords, most relevant authors and author's production over time, country scientific production, and collaboration across countries to get research output have all been analyzed.

The articles that were published on this subject between the years 2000 and 2022 were analyzed in order to construct a comprehensive summary of the research. As a direct consequence of this, a comprehensive bibliometric analysis overview of the output and visibility of research activity in impact of AI in tourism has been provided. In the current analysis, the researcher came to the conclusion that the number of annual scientific publications in Scopus have significant increase in global trends since 2017 to 2021, whereas the number of scientific publications in Web of Science databases have significant increase from 2016 to 2021. A variety of factors contribute to the increase of research on the impact of artificial intelligence in tourism. Among these factors are improvements

in facility conditions and technical breakthroughs, an increase in the number of researchers, and an expansion of government regulations that support the sector [36]. The most popular journals, according to the findings of the analysis, are *Advances in Intelligent Systems and Computing* in Scopus meanwhile *Sustainability journals* in Web of Science. The most frequently used author's keywords and keyword plus in topic discipline are "artificial intelligence" in Scopus meanwhile in Web of Science showed author's keywords is "artificial intelligence" and keyword plus is "impact". According to the findings, it was found that an author by the name of Li X is most famous author in Scopus and meanwhile in Web of Science databases is Bai B. The country of China has the highest contribution of scientific articles production in Scopus and Web of Science. The country between India and France, between China and United Kingdom is highest collaboration among other countries around the world.

CONCLUSION

In a conclusion, the use of artificial intelligence within the tourism industry has a wide range of positive effects, both on individuals and on the natural environment. As was mentioned earlier in this article, artificial intelligence systems are able to increase the total revenue derived by tourism stakeholders. Artificial intelligence contributes to further technological developments as people become familiar with these services and recognise the importance of technological devices in facilitating human lives, increasing the degree to which social inclusion is achieved in society by providing a means for disadvantaged people to socialise, and boosting the environment. This article presents a literature review and bibliometric analysis of impact in artificial intelligence in tourism to determine the areas within which the annual scientific production and average citations per year, most relevant journals, most frequent keywords, most relevant authors and author's production over time, country scientific production, and collaboration among others countries. The bibliometric analysis used of 345 research documents gathered from the Scopus, and Web of Science.

The main outcomes in this study is according to the bibliometric analysis, there has been a significant increase since 2017 until 2021 in the annual scientific production in Scopus, while in Web of Science databases has significant increase from 2016 until 2021. Findings demonstrated that the most popular journals in Scopus are *Advances in Intelligent Systems and Computing* meanwhile *Sustainability journals* in Web of Science. The most frequently used author's keywords and keyword plus in topic discipline are "artificial intelligence" in Scopus meanwhile in Web of Science showed author's keywords is "artificial intelligence" and keyword plus is "impact". It was discovered that Li X is the most popular author in Scopus and Bai B in Web of Science databases. In Scopus and Web of Science, the countries of China contributed the most in terms of scientific article production. One of the world's highest levels of collaboration is found in the region between India and France, between China and United Kingdom in Scopus and Web of Science database. This study was carried out to cover gaps in previous studies by using the Scopus and Web of Science databases, as well as to perform a comprehensive result analysis on the impact of artificial intelligence in tourism research from 2000 to 2022. Researchers recommend for future research evaluate and focus on articles from other databases to discover if comparable trends for the impact of AI in tourism and other relevant issues exist.

ACKNOWLEDGEMENT

There's no any acknowledgments in this research study

CONFLICTS OF INTEREST

There are no conflicts to declare.

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