

The current state of smart tourism research: a bibliometric analysis

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Abstract

In the digital era, smart tourism has gained significant prominence, revolutionising the tourism industry through advanced technologies that enhance efficiency, sustainability, and visitor experience. This study presents a bibliometric analysis of 531 documents on smart tourism published between 2014 and February 2025, using data from Scopus. The analysis is conducted using Microsoft Excel, BiblioMagika, OpenRefine, and VOSviewer to examine publication trends, influential studies, and emerging research themes. By leveraging bibliometric tools and leading academic databases, this research provides insights into the intellectual structure of smart tourism literature and identifies future research directions. The findings contribute to a deeper understanding of the evolution of smart tourism research, offering valuable implications for scholars and industry practitioners.

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1. Introduction

Industry 4.0 (I4.0) has brought transformative changes across various sectors, including tourism, by integrating advanced digital technologies to enhance interconnected and autonomous processes (Rodrigues et al., 2024). In tourism, I4.0 technologies enable smart tourism, incorporating artificial intelligence (AI)-driven recommendations, internet of things (IoT)-enabled smart cities, augmented reality (AR), mobile applications (app), geotag services, and big data analytics to enhance traveller satisfaction and experience (Bilotta et al., 2021).

One example of smart tourism is Hilton Worldwide, which offers a digital key feature through the Hilton Honors app, enabling guests to bypass the front desk and access their rooms directly using their smartphones to reduce waiting times and enhance convenience (Hilton, 2025). Besides, AirAsia's AI-powered chatbot, called AskBo is designed to assist passengers with flight bookings, rescheduling, refunds, baggage policies, and loyalty program inquiries in multiple languages (AirAsia Berhad, 2025). Additionally, Google Pixel Buds offer real-time translation through Google Translate, facilitating seamless communication across multiple languages and enhancing travellers' ability to interact with locals in foreign destinations (Google, 2025).

According to Mali (2024), Cognitive Market Research reported that the global smart tourism market was valued at USD 29,154.2 million in 2024, with North America holding the largest market share of over 40% (USD 11,661.68 million) and Europe contributing more than 30% (USD 8,746.26 million). The market is projected to expand at a compound annual growth rate (CAGR) of 7.00% in North America and 7.3% in Europe from 2024 to 2031.

Despite the importance of smart tourism, there are several issues related to smart tourism. Firstly, adoption in the tourism industry is hindered by usage barriers (technological complexity and lack of digital literacy), value barriers (perceived lack of benefits), risk barriers (concerns over data privacy and security risk), and traditional barriers (resistance to change and reliance on established practices). Besides, the extensive use of big data, IoT, and AI for personalised recommendations and smart city management raises concerns about data privacy, security risk, and ethical AI practice. Tourists may feel uncomfortable about sharing their personal information, which directly affects their behavioural intentions regarding their stay in smart hotels. In addition, not all regions have access to smart tourism technologies, creating a digital divide where only developed regions benefit, while developing destinations struggle to implement these advancements.

Addressing these issues requires a deeper understanding of the research landscape in smart tourism. Therefore, this study conducts a bibliometric analysis to examine the subject area, current publication trends, highly cited documents, leading authors, and author keywords analysis.

To achieve these objectives, the study aims to address the following research questions:

RQ1: What are the current publication trends in the field of smart tourism, and how have they evolved over time?

RQ2: Which article is the most highly cited in smart tourism research?

RQ3: Who are the most productive authors in smart tourism studies?

RQ4: What are the key themes emerging from co-occurrence analyses of author keywords in smart tourism studies?

This bibliometric study will provide valuable insights into the development of smart tourism research, helping scholars, practitioners, and policymakers understand the key trends, contributions, and challenges in this evolving domain.

2. Literature review

2.1. Smart tourism on bibliometric analysis

Smart tourism is a rapidly growing field that has gained significant interest from both academics and industry professionals (Ye et al., 2020). Smart tourism is defined as the integration of traveller experiences with advanced smart technologies to enhance and transform the tourism experience (Gretzel et al., 2015a; Jeong & Shin, 2020). According to Li et al. (2017), smart tourism utilises innovative technologies such as IoT, AI, and big data analytics to create seamless, personalised and sustainable experiences for tourists while enabling destinations and businesses to optimise operations and improve decision-making.

This study employs bibliometric analysis to investigate the field of smart tourism. Bibliometric analysis is a quantitative research method that assesses the impact, structure, and trends within scientific literature by examining bibliographic data, including citations, authorship, keywords, and journal influence (Kumar et al., 2023). It helps identify emerging technologies such as AI, IoT, and big data analytics that shape the evolution of smart tourism. Bibliometric analysis also provides valuable insights for researchers and policymakers to enhance innovation, governance, and the visitor experience in smart tourism development (Della Corte et al., 2019; Asif & Fazel, 2024).

2.2. Previous studies on bibliometric analysis

Table 1 summarises the bibliometric analysis of smart tourism destinations and smart technology, artificial intelligence in tourism and hospitality, and digital tourism, emphasising their search strategy, data source and scope, total documents examined, and key bibliometric indicators.

Bastidas-Manzano et al. (2021) focused on smart tourism destinations, using Web of Science (2013-2019) to analyse 258 documents, covering publication trends, citation mapping, thematic networks, and future research directions. Besides, Kirtil and Askun (2021) explored AI in tourism, using Scopus (2003-2020) with 102 documents, analysing scientific production, most cited papers, collaborations, and co-occurrence analysis of author keywords.

In addition, Sustacha et al. (2022) studied smart tourism destinations and smart technologies, using Scopus and Web of Science (2013-2021) with 395 documents, examining geographical distribution, key authors, journals, and research themes. Knani et al. (2022) also reviewed AI in tourism and hospitality, using Scopus and Web of Science (1984-2020) with 1035 documents, investigating influential papers, authors, institutions, co-citation networks, and keyword analysis.

Kalia et al. (2022) analysed digital tourism, using Scopus (1987-2020) with 827 documents, focusing on citations, top authors, institutions, collaboration networks, emerging trends, and thematic mapping. Chen et al. (2022) examined digital tourism, using Web of Science (1991-2022) with 1013 documents, analysing author collaborations, institutional and national cooperation, keyword clusters, and research trends.

Ercan (2023) investigated smart tourism destinations, using the Web of Science (1975-2021) with 70 documents, studying publication trends, country collaborations, institutional productivity, co-citation networks, and keyword frequency. Furthermore, Prihandini and Triyono (2023) focused on augmented reality in tourism, using Scopus (2013-2022) with 166 documents, analysing bibliographic coupling, trend research, and potential future research. Lastly, Wider et al. (2023) studied digital tourism, using the Web of Science (1996-2023) with 1079 documents, conducting publication trend analysis, co-citation networks, co-word analysis, and keyword mapping.

Table 1. Previous articles on bibliometric analysis of smart tourism

Author(s)	Domain/ search strategy	Data source and scope	Total documents examined	Bibliometric indicators
Bastidas-Manzano et al. (2021)	Smart tourism destination	Web of Science, 2013-2019	258	Publications trends, journals with the highest number of publications, citation mapping, thematic network, main research topics, potential lines for future research
Kirtil and Askun (2021)	Artificial intelligence in tourism	Scopus, 2003-2020	102	Annual scientific production, most cited papers and collaborations, prominent countries and institutions, co-citation analysis, thematic and co-occurrence analysis of author keywords
Sustacha et al. (2022)	Smart tourism destinations and smart technology	Scopus and Web of Science, 2013-2021	395	Publications by year, geographical distribution, most influential authors, journals, articles, author co-citation network, conceptual and thematic structure
Knani et al. (2022)	Artificial intelligence in tourism and hospitality	Scopus and Web of Science, 1984-2020	1035	Publications by year, most cited sources, most productive and influential authors, institutions, and countries, author's co-citation network, most cited and influential papers, keywords analysis, main research topics
Kalia et al. (2022)	Digital tourism	Scopus, 1987-2020	827	average citations per year, most relevant sources and their impact, top five authors and citations, author's dominance, most cited documents, most relevant affiliations, country specific production, collaboration network, most frequent words, word growth, trend topics, emerging research directions, co-occurrence network, thematic map, topic dendrogram
Chen et al. (2022)	Digital tourism,	Web of Science, 1991-2022	1013	Publications by year, map of author collaboration, core authors, maps of institutional, national cooperation, and disciplines distribution, core institutions, keywords cluster analysis, keywords with strongest citation bursts
Ercan (2023)	Smart tourism destination	Web of Science, 1975-2021	70	Annual number of articles, WoS categories and indexes, most productive countries, network of country collaborations, most productive institutions, co-citation network of journals, most cited articles, author co-citation network and co-citation counts, most used author keywords
Prihandini and Triyono (2023)	Augmented reality in tourism	Scopus, 2013-2022	166	Bibliographic coupling of the documents, source, authors, institution, countries, trends research, potential research
Wider et al. (2023)	Digital tourism	Web of Science, 1996-2023	1079	Publication trends, co-citation analysis, top 10 documents based on co-citation and total link strength, co-occurrence of keywords, co-words analysis

3. Methodology

This study collected all data from the Scopus databases as of February 8, 2025. A bibliometric analysis was conducted to examine various aspects of research on smart tourism, including subject areas, publication trends, highly cited documents, the most productive authors, and author keyword analysis.

The search strategy focused on retrieving all relevant documents related to smart tourism by applying a title-based search in Scopus. The search was restricted to journal articles published in English between 2014 and February 2025. The following query was used: TITLE["smart destination" OR "smart hospitality" OR "AR in tourism" OR "augmented reality

in tourism" OR "artificial intelligence in tourism" OR "AI in tourism" OR "internet tourism" OR "technology tourism" OR "intelligen* tourism" OR "e-tourism" OR "electronic tourism" OR "digital tourism" OR "smart tourism"] AND PUBYEAR > 2013 AND PUBYEAR < 2026 AND (LIMIT-TO (DOCTYPE,"ar")) AND (LIMIT-TO (LANGUAGE,"English"))).

This search initially retrieved 532 documents. A manual screening process was then conducted to assess the relevance of each document based on its title. As a result, one document was removed due to irrelevant contents, leaving a final dataset of 531 documents for further analysis. The document selection process is illustrated in Figure 1.

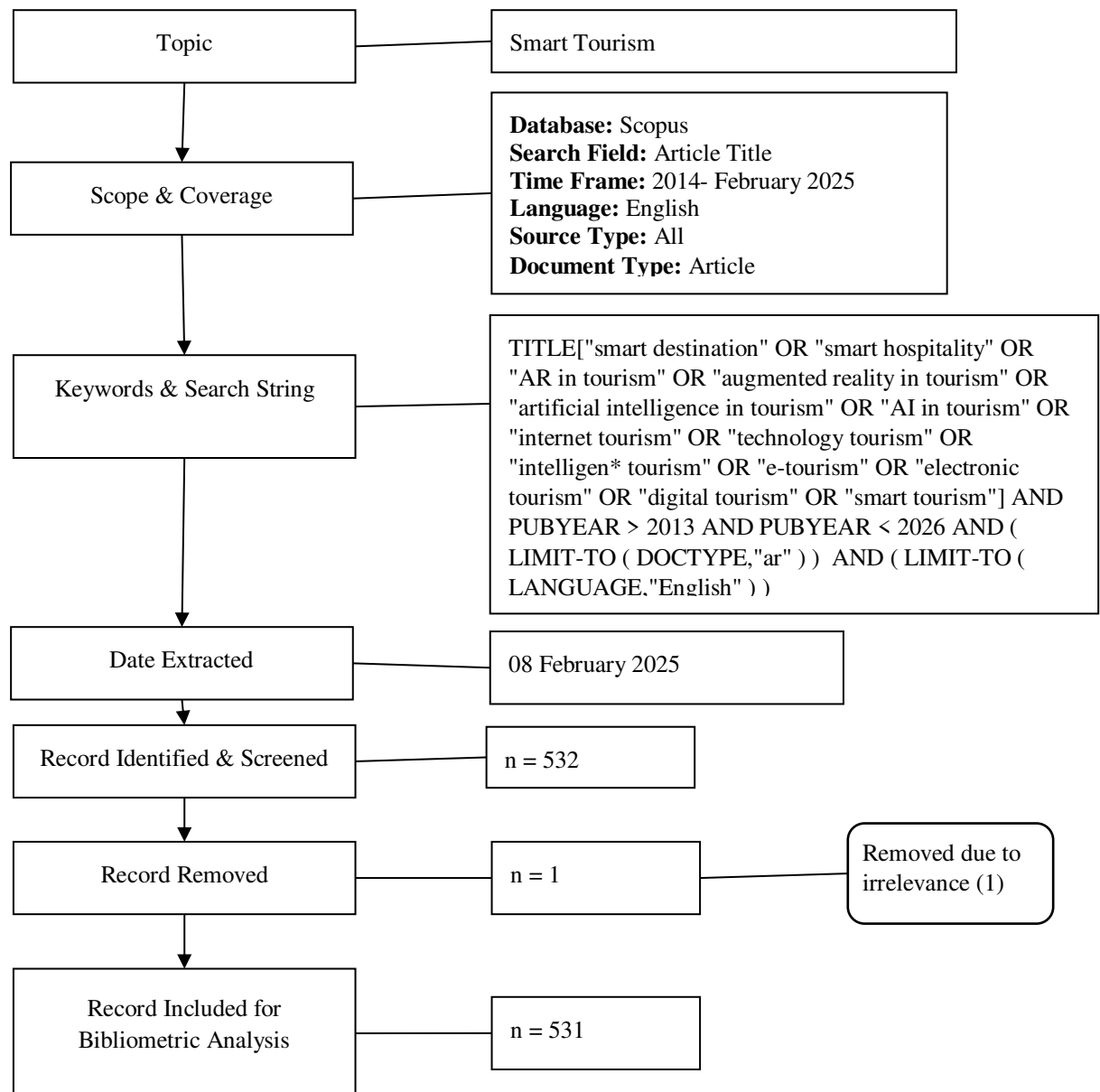


Figure 1. Flow diagram of the search strategy

The final dataset was converted into a comma-separated value (CSV) format for bibliometric analysis using BiblioMagika (Ahmi, 2024). Data cleaning and harmonisation were performed using OpenRefine (Le Bras et al., 2025), ensuring consistency in author names, institutional affiliations, and keyword standardisation. VOSviewer, a free and open-source

software tool, was used in this study to create and visualise networks of scientific relationships including keyword co-occurrences, co-authorship, and citation patterns (Kumar et al., 2024).

4. Results and discussions

4.1. Subject area

This study presents the published documents according to their subject area, as presented in Table 2. The highest number of publications are found in the field of business, management and accounting (255 documents) and social sciences (240 documents), indicating that smart tourism is largely explored from economic and social perspectives. Significant contributions from Computer Science (205 documents) and Engineering (94) highlight the role of technology in tourism while publications in Environmental Science (102) and Energy (50) suggest a focus on sustainability. It is important to note that the publications are categorised based on source title classification, meaning some source titles appear in multiple subject areas.

Table 2. Subject area

Subject area	Total publications
Business, management and accounting	255
Social sciences	240
Computer science	205
Environmental science	102
Engineering	94
Energy	50
Mathematics	47
Economics, econometrics and finance	34
Decision sciences	24
Arts and humanities	20
Psychology	14
Earth and planetary sciences	13
Materials science	13
Agricultural and biological sciences	8
Physics and astronomy	8
Neuroscience	7
Biochemistry, genetics and molecular biology	5
Multidisciplinary	5
Chemistry	4
Chemical engineering	2
Medicine	2
Pharmacology, toxicology and pharmaceuticals	1

4.2. Publication trajectory

Figure 2 illustrates the publication trajectory and citation trends for smart tourism research from 2014 to 2025. The bars represent the total number of publications per year, showing a steady increase, particularly from 2017 onward, with a peak in 2024 with 109 publications. The line represents total citations per year, peaking in 2020 at 3443 citations before declining, despite the continued rise in publications. This trend suggests that earlier studies had a significant academic impact, while recent publications have yet to accumulate substantial citations. The decline in both publications and citations in 2025 is likely due to the year still being in progress. Overall, the data indicates growing research interest in smart tourism, but

the declining citation trend highlights the need for future studies to produce more impactful contributions that gain academic recognition over time.

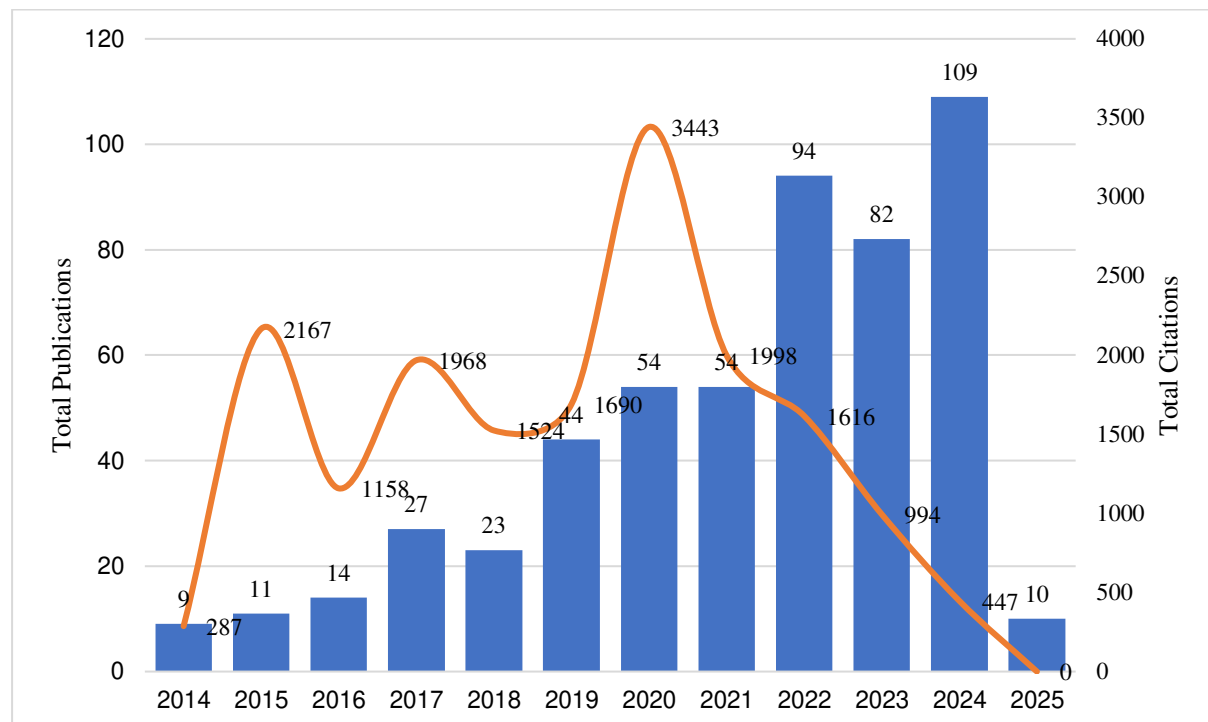


Figure 2. Total publications and citations by year

4.3. Highly cited documents

Table 3 highlights the top 10 highly cited documents in smart tourism research. The most cited document, “Smart tourism: Foundations and developments” by Gretzel et al. (2015b), has accumulated 1228 citations with an annual citation rate of 111.64, indicating its significant influence in the field. The high citation count suggests that this article has played a critical role in shaping smart tourism research, serving as a reference point for both theoretical development and practical applications.

4.4. Most productive authors

According to Table 4, Rob Law and Josep Ivars-Baidal are the most productive authors in smart tourism research, each contributing 10 publications. However, a high publication count does not necessarily mean a high academic impact. Citation counts provide a more accurate measure of influence, as they indicate how frequently an author's work is referenced by other scholars. For example, Ulrike Gretzel, with only 8 publications, has accumulated 2442 citations, demonstrating significant academic influence. This distinction between productivity and impact highlights the importance of quality over quantity in academic research, as highly cited works tend to contribute more substantially to theoretical advancements and practical applications in smart tourism.

4.5. Author keywords analysis

Figure 3 shows a network visualisation of co-occurrences analysis of author keywords generated using VOSviewer. This study identifies 1208 author keywords from the selected documents. A minimum threshold of 8 occurrences is set for author keywords to be included in the visualisation, resulting in 44 author keywords meeting this criterion. The cluster analysis of author keywords in smart tourism research, shown in Figure 3, identified seven distinct clusters, each representing a thematic area within the field, with a minimum cluster size of 1.

Table 3. Top 10 highly cited documents

No.	Authors	Title	Source title	Cites	Cites per year
1.	Gretzel et al. (2015b)	Smart tourism: foundations and developments	Electronic Markets	1228	111.64
2.	Buhalis (2020)	Technology in tourism-from information communication technologies to eTourism and smart tourism towards ambient intelligence tourism: a perspective article	Tourism Review	668	111.33
3.	Gretzel et al. (2015c)	Conceptual foundations for understanding smart tourism ecosystems	Computers in Human Behavior	510	46.36
4.	Boes et al. (2016)	Smart tourism destinations: Ecosystems for tourism destination competitiveness	International Journal of Tourism Cities	447	44.70
5.	Gretzel et al. (2020)	e-Tourism beyond COVID-19: a call for transformative research	Information Technology and Tourism	378	63.00
6.	Li et al. (2017)	The concept of smart tourism in the context of tourism information services	Tourism Management	358	39.78
7.	Huang et al. (2017)	Smart tourism technologies in travel planning: the role of exploration and exploitation	Information and Management	335	37.22
8.	Buhalis and Leung (2018)	Smart hospitality—interconnectivity and interoperability towards an ecosystem	International Journal of Hospitality Management	325	40.63
9.	Wang et al. (2016)	How smart is your tourist attraction? Measuring tourist preferences of smart tourism attractions via a FCEM-AHP and IPA approach	Tourism Management	292	29.20
10.	Vecchio et al. (2018)	Creating value from social big data: implications for smart tourism destinations	Information Processing and Management	281	35.13

Table 4. Most productive authors

Author's name	TP	NCP	TC	C/P	C/CP	<i>h</i>	<i>g</i>	<i>m</i>	PYS
Law, Rob	10	10	829	82.90	82.90	9	10	0.750	2014
Ivars-Baidal, Josep	10	10	814	81.40	81.40	10	10	1.429	2019
Koo, Chulmo	9	9	2036	226.22	226.22	5	9	0.455	2015
Gretzel, Ulrike	8	8	2442	305.25	305.25	7	8	0.636	2015
Suanpang, Pannee	7	6	121	17.29	20.17	5	7	1.000	2021
Femenia-Serra, Francisco	7	7	584	83.43	83.43	7	7	0.875	2018
Chung, Namho	6	6	404	67.33	67.33	5	6	0.556	2017
Jwa, Jeongwoo	5	5	23	4.60	4.60	3	4	0.375	2018
Buhalis, Dimitrios	5	5	1594	318.80	318.80	5	5	0.500	2016
Tavitiyaman, Pimtong	4	4	168	42.00	42.00	3	4	0.600	2021

Notes: TP=total number of publications; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; *h*=*h*-index; *g*=*g*-index; *m*=*m*-index; PYS= publication year start

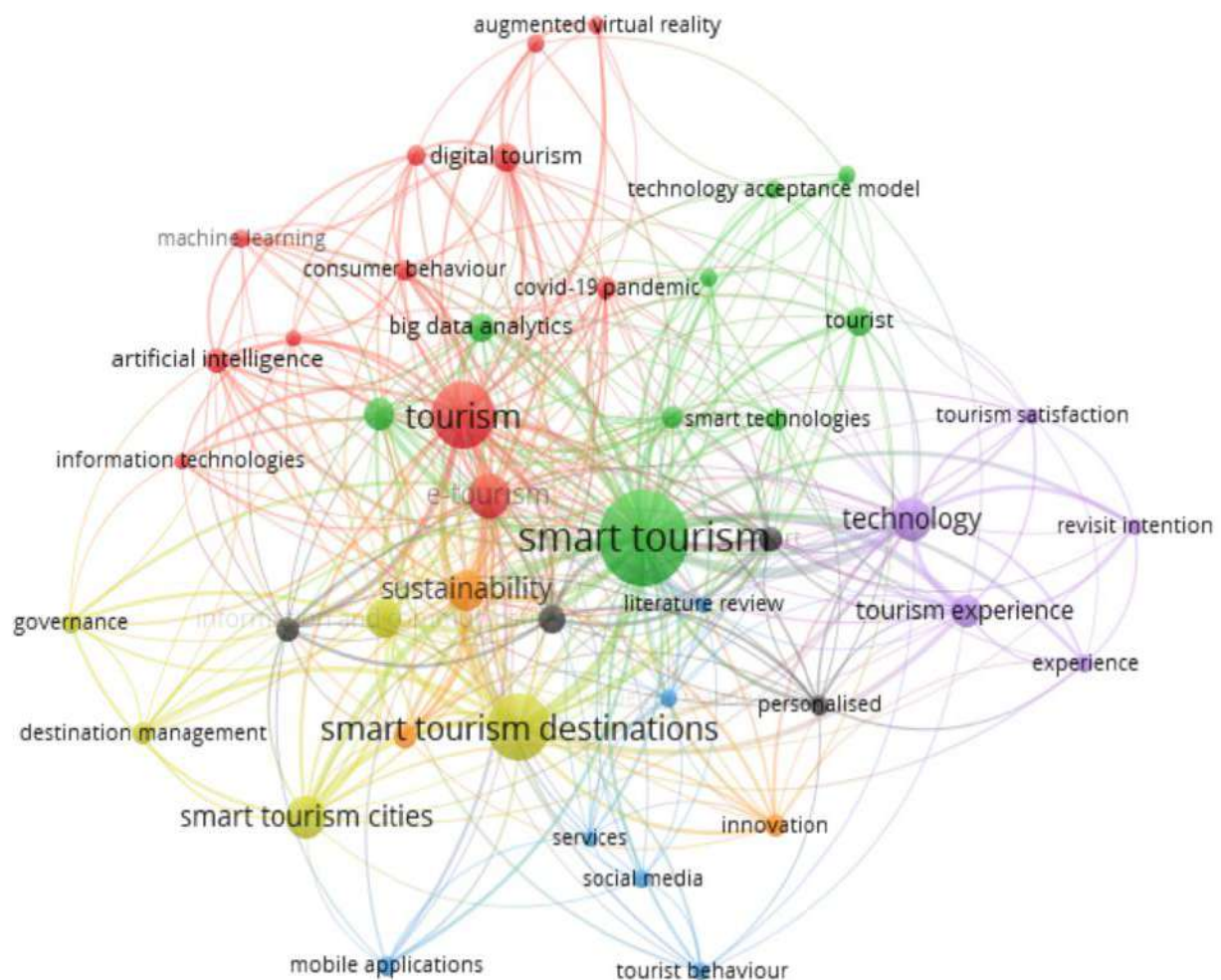


Figure 3. Co-occurrences analysis of author keywords

According to Table 5, red cluster (technology-driven digital tourism) explores how new technologies such as AI, virtual reality, and machine learning are changing tourism by improving digital experience, customer engagement, and innovation, especially after the COVID-19 pandemic. Green cluster (smart tourism and digital adoption) focuses on how smart technologies, big data analytics, and the Internet of Things (IoT) improve tourism services, enhance tourist experiences, and influence how people accept and use new technologies in travel. Blue cluster (digital engagement and tourist behaviour) explores how social media, mobile apps, and digital services influence tourist behaviour, improve interactions, and enhance value co-creation in the tourism industry. Yellow cluster (smart tourism governance and infrastructure) highlights the role of governance, information and communication technology (ICT), and destination management in developing smart tourism cities and improving tourism infrastructure for better sustainability and efficiency. Purple cluster (technology-enhanced tourism experience and satisfaction) explores how technology improves tourism experiences, influences revisit intentions and enhances overall tourist satisfaction. Black cluster (smart technologies for personalised tourism) explores how intelligence-driven systems, recommender technologies, and smart solutions create personalised travel experiences, improving convenience and customer satisfaction. Orange cluster (sustainable tourism and innovation) focuses on the role of innovation and technological development in promoting sustainable tourism, ensuring long-term growth while balancing environmental, social, and economic factors.

Table 5. Author keywords

Author keywords	Cluster	Links	Total link strength	Occurrences	Themes
Artificial intelligence	1	17	41	15	Red cluster (technology-driven digital tourism)
Augmented virtual reality	1	7	16	10	
Bibliometric analysis	1	14	28	11	
Consumer behaviour	1	15	31	11	
Covid-19 pandemic	1	19	35	14	
Digital tourism	1	20	36	21	
E-tourism	1	27	67	52	
Information technologies	1	9	19	8	
Internet	1	12	24	8	
Machine learning	1	12	23	10	
Tourism	1	39	216	113	
Virtual reality technology	1	7	17	10	
Behavioural intention	2	12	20	9	Green cluster (smart tourism and digital adoption)
Big data analytics	2	19	47	20	
Ecosystems	2	19	40	13	
Internet-of-things	2	20	56	27	
Smart hospitality	2	13	17	9	
Smart technologies	2	16	34	14	
Smart tourism	2	41	386	226	
Technology acceptance model	2	10	16	10	
Tourist	2	15	34	21	
Literature review	3	14	22	8	Blue cluster (digital engagement and tourist behaviour)
Mobile applications	3	8	20	12	
Services	3	11	16	8	
Social media	3	10	11	9	
Tourist behaviour	3	10	19	9	
Value co-creation	3	14	22	10	
Destination management	4	10	28	14	Yellow cluster (smart tourism governance and infrastructure)
Governance	4	10	30	12	
Information and communication technology	4	26	96	39	
Smart tourism cities	4	18	84	45	
Smart tourism destinations	4	34	215	112	
Experience	5	9	24	9	Purple cluster (technology-enhanced tourism experience and satisfaction)
Revisit intention	5	8	27	8	
Technology	5	29	118	46	
Tourism experience	5	21	77	29	
Tourism satisfaction	5	12	24	8	
Intelligence	6	15	35	17	Black cluster (smart technologies for personalised tourism)
Personalised	6	15	30	11	
Recommender system	6	15	47	22	
Smart	6	17	40	15	
Development	7	16	38	15	Orange cluster (sustainable tourism and innovation)
Innovation	7	14	33	14	
Sustainability	7	29	111	43	

5. Conclusions

This study presents a bibliometric analysis of 531 documents on smart tourism published between 2014 and February 2025. The total number of publications per year has shown a steady increase, particularly from 2017 onward, peaking in 2024 with 109 publications. However, total citations per year peaked in 2020 at 3443 citations before declining, despite the continued rise in publications. Besides, the most cited document, Gretzel et al. (2015b), has accumulated 1228 citations with an annual citation rate of 111.64, indicating its significant influence in the field. In addition, Rob Law and Josep Ivars-Baidal are the most productive authors in smart tourism research, each contributing 10 publications. This study also identifies 1208 author keywords, with 44 meeting the minimum threshold of 8 occurrences, revealing seven clusters in smart tourism research.

Despite valuable insights offered by this study, there are some limitations. Firstly, this study relied solely on the Scopus database. Although Scopus is one of the largest online databases for scholarly works, it does not cover all available sources. No search query can perfectly capture all scholarly works in this field.

This study suggests several future directions. Firstly, expanding the bibliometric analysis by incorporating additional databases, such as Web of Science and Google Scholar, could provide a more comprehensive view of smart tourism research. Secondly, exploring the role of emerging technologies, such as artificial intelligence and blockchain, in smart tourism could provide valuable insights into future developments. Thirdly, the researcher can explore future research on smart tourism risks, including data privacy, cybersecurity, or digital inequality. Lastly, further research is needed to explore smart tourism's sustainability, governance, and socio-economic impacts, including its environmental effects, regulatory frameworks, and influence on local economies and communities.

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