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A Scientometric Review of Generative Artificial Intelligence Research in Tourism

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Abstract: Background: With the rapid and widespread adoption of generative artificial intelligence (GenAI) in the tourism sector, scholars have examined this technology from multiple perspectives. However, a comprehensive and systematic overview of GenAI research in tourism remains lacking. Objective: This study aims to map the current research landscape, identify research hotspots, and trace the developmental trajectory of this emerging field using visualization-based scientometric tools. Methods: Relevant literature indexed in the core collection of the Web of Science was selected as the data source. CiteSpace was used to analyse collaboration networks and keyword co-occurrence, HistCite was applied to construct citation chronologies, and Pajek was employed to identify main research paths. Results: A total of 111 publications on GenAI in tourism (2023–2025) were retrieved. The findings reveal an exponential growth in the research output and demonstrate active collaboration among authors, institutions, and countries. Existing studies are mainly focused on GenAI's technical characteristics, acceptance of technology, and practical applications. The literature exhibits strong cross-citation patterns, and a clear developmental path of knowledge evolution has been identified. Conclusion: Research interest in GenAI within tourism is expected to continue to increase. Nevertheless, cross-institutional and interdisciplinary collaboration requires further strengthening, and the scope of research topics and perspectives needs to be broadened as the field matures. Implications: This study fills an important gap by providing the first visualization-based scientometric review of GenAI research in tourism, offering valuable insights for scholars and practitioners seeking to understand and advance this rapidly evolving field.

Keywords: Generative Artificial Intelligence, Tourism, CiteSpace, HistCite, Pajek, Bibliometric Analysis, Technology Adoption

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1. Introduction

Bibliometrics is a discipline that measures and analyzes the development status of specific scientific fields. As a systematic quantitative research method, it holds significant value in evaluating long-term research outputs within particular domains. This approach enables scholars to holistically understand the structural framework of a research field and obtain detailed insights into its themes and developments. Bibliometrics can also extend to examining individual academic achievements at the micro level, complementing traditional structured literature reviews (van Raan 2005; Hall 2005; Jiang et al. 2017). Literature reviews integrate existing research findings to help scholars understand the diversity of knowledge, grasp emerging trends, address information overload, and guide future research efforts (Jiang et al. 2017). Analyzing existing literature further allows researchers to trace the evolution of research trajectories and identify cutting-edge developments (Yuan et al., 2015).

As a multidimensional field, tourism research encompasses tourism economics, social impacts, tourist behavior, technological innovation, and more. In recent years, with the rapid development of the tourism industry and continuous technological advancement, related research has become increasingly complex and diversified, resulting in a more extensive body of literature. Therefore, bibliometrics plays a crucial role in literature screening, identifying research trends, and uncovering research gaps through quantitative analysis. By conducting bibliometric reviews, scholars can quickly identify key themes within the broader context of tourism and technology integration and obtain valuable guidance for future research.

Research on generative artificial intelligence (GenAI) in the tourism industry has already produced a considerable volume of literature, with its scope and thematic diversity continuing to expand. Current reviews on GenAI in tourism primarily employ qualitative content analysis, offering comprehensive evaluations of thematic characteristics, theoretical foundations, and methodological approaches (Li et al. 2025; Dai et al. 2025).

However, no study has yet attempted to systematically summarize research progress, current developments, hot spots, and future trends using knowledge-mapping techniques. To address this gap, we analyze and discuss GenAI research in tourism based on the Web of Science (WoS) database and apply the bibliometric tools CiteSpace, HistCite, and Pajek. This paper examines the evolution and current status of the field, identifies research hotspots, and clarifies the development trajectory, thereby providing a structured reference for future scholarship. This paper is organized into the following sections: (i) statistical analysis of publication volume to examine trends; (ii) assessment of research status through collaboration networks of authors, institutions, and countries; (iii) identification of research hotspots via keyword analysis and clustering; (iv) construction of a citation chronology to identify key documents and citation relationships; and (v) main pathway analysis to trace the knowledge development of the field.

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2. Literature Review

Tourism research is widely recognized as an interdisciplinary field that draws from a broad range of academic traditions and methodological approaches (Tribe, 1997). As tourism scholarship has expanded, new themes have emerged, and research has branched into increasingly specialized areas. This diversification has also highlighted the contributions of individual scholars, research institutions, and academic organizations. Consequently, bibliometric analysis has become an indispensable research tool, offering systematic and quantitative insights into the dynamics of tourism knowledge production (Burdge 1983; Hall 2011). Because tourism literature spans multiple disciplines and involves varied research methods and analytical techniques, the need for rigorous and integrative literature reviews has grown increasingly important.

In recent years, the rapid increase in tourism-related publications has further contributed to fragmentation within the field. The expansion of research topics and methodological diversity often leads to scattered findings, making it difficult for scholars to obtain a holistic understanding of research trends. Therefore, continuous and systematic reviews of the literature serve a crucial role in consolidating knowledge, identifying research gaps, and guiding future inquiry (Jiang et al. 2017). For instance, Calero and Turner (2020) reviewed literature related to regional economics in tourism and revealed that the significance of tourism within regional development had been historically overlooked. Their findings suggested that the marginal positioning of tourism in broader economic research contributed to the formation of an agenda that did not fully align with tourism's distinct developmental needs. Likewise, Pradhan et al. (2025) developed an integrative framework for gamification research, identifying five major clusters through bibliometric methods, while Isik et al. (2022) conducted a bibliometric and visual analysis of tourism innovation literature. Their study categorized tourism innovation scholarship into conceptual studies, literature reviews, and methodological contributions and emphasized the growing interest in sustainability, open innovation, and the sharing economy as emerging focal points.

In the context of service innovation, Park et al. (2023) analyzed publications on technology-driven innovation and demonstrated the central role of technological integration in strengthening both operational efficiency and sustainable strategy implementation. Their findings pointed to key research domains such as human resource management, strategic planning, emerging technologies, and digital transformation. Ye et al. (2022), in their literature review of robot applications in tourism, found that existing research predominantly centers on consumer perceptions, particularly within the hotel sector. Furthermore, Rathjens et al. (2025) examined contactless technology in tourism and identified major antecedents of technology acceptance, including system-related, user-related, and environmental factors. In addition to these topics, scholars have increasingly examined specialized tourism themes such as dark tourism (Pilelienė et al. 2024), ecotourism (Paul & Roy 2023), and rural tourism (Choudhary et al. 2025). Across these diverse areas, researchers employ qualitative, quantitative, and mixed-method approaches to review developments in smart tourism, social media usage, and technological innovation, while also offering new theoretical perspectives.

The growing volume and complexity of tourism literature have made bibliometric visualization tools indispensable for synthesizing knowledge and mapping intellectual structures. Software such as CiteSpace has become particularly influential in tourism bibliometric studies due to its ability to generate collaboration networks, co-citation maps, and keyword co-occurrence clusters. These knowledge-graph techniques help reveal thematic evolution, research frontiers, and disciplinary interconnections. Bibliometric methods have been widely adopted to analyze various tourism subfields, including intangible cultural heritage tourism (Chen et al. 2022), sustainable tourism (Geng et al. 2024a), and tourism marketing (Geng et al. 2024b). For example, Chen et al. (2022) used visualization tools to analyze digital tourism literature from 1991 to 2022, identifying foundational disciplinary pillars in social and environmental sciences. Their study also emphasized the importance of strengthening collaboration between countries such as China, the United States, and European nations with emerging regions in Africa and South America. Likewise, Geng et al. (2024a) highlighted sustainable tourism as a rapidly developing field and demonstrated how visualization tools reveal dynamic trends and new research orientations.

Yuan et al. (2015) provided a comprehensive overview of bibliometric tourism research and identified five principal dimensions that have shaped the field: (i) the research output of individuals and institutions; (ii) the flow of knowledge and social network structures; (iii) thematic trends and long-term intellectual evolution; (iv) journal rankings and scholarly impact; and (v) highly cited scholars and foundational works. These dimensions collectively illustrate the multi-layered nature of tourism knowledge development. Through these perspectives, bibliometric studies provide more precise and systematic insights into the structure, evolution, and influence of tourism scholarship.

Technological innovation remains a dominant theme across tourism studies, and the integration of new technologies continues to reshape research directions. The pace of technological development requires scholars to regularly summarize and synthesize the literature to capture key achievements and identify new opportunities. For example, Ye et al. (2022) reviewed robot applications in tourism and highlighted the predominance of research focused on consumer responses and operational implications. Gonzáles-Santiago et al. (2024) examined the application of artificial intelligence, robotics, and virtual reality in tourism services, offering insights into the future of intelligent service systems. Similarly, Scott et al. (2019) reviewed eye-tracking technology in tourism research and demonstrated its potential for understanding tourist behavior and decision-making. These reviews not only consolidate existing knowledge but also influence the adoption and implementation of technological innovation within the tourism industry.

Generative artificial intelligence (GenAI) has recently emerged as one of the most transformative technologies across industries. GenAI enables automated content creation, personalized service delivery, and advanced data analysis through natural language processing, multimodal generation, and algorithmic enhancement (Fakfare et al. 2025; Wong et al. 2025; Dogru et al. 2023). Its technological capabilities allow tourism businesses to streamline operations, improve guest experiences, support marketing personalization, and strengthen sustainable practices (Wang & Zhang 2025). In other fields, GenAI-related reviews have illustrated the importance of ethical frameworks, privacy protection, model transparency, and bias mitigation (Baig et al. 2024; Dwivedi et al. 2024; Kleib et al. 2024). However, most GenAI reviews remain focused on healthcare, education, academic publishing, and other non-tourism sectors. Tourism-related GenAI research remains relatively new and has not benefited from systematic bibliometric synthesis.

Within tourism, early GenAI studies have begun to explore both theoretical and practical implications. Scholars have examined GenAI's technological characteristics, the mechanisms by which it fosters tourism innovation, and the psychological and behavioral responses of users (Fakfare et al. 2025; Suanpang and Pothipassa, 2024; Seyfi et al. 2025). Practical studies have investigated GenAI applications in improving customer service, enhancing marketing effectiveness, supporting destination management, and advancing cultural communication (Bilgihan et al. 2024; Buhalis et al. 2023). At the same time, critical concerns about data security, skill gaps, job displacement, and ethical risks have gained attention (Paul et al. 2023; Carvalho & Ivanov 2024; Tussyadiah 2020). Although these studies provide useful insights, the current research landscape is highly fragmented, lacking a coherent framework that integrates existing findings or systematically maps research hotspots.

In conclusion, regular and systematic reviews are vital for identifying research gaps and ensuring the sustainable growth of emerging fields. Bibliometric visualization methods allow researchers to convert large amounts of unstructured literature into intuitive knowledge maps that reveal research patterns and intellectual relationships. Although GenAI has attracted substantial attention, research in the tourism domain remains in its early stages, with limited integration and no established conceptual or methodological framework. A bibliometric review can therefore provide a timely and comprehensive overview of current GenAI research in tourism, offering insights into its development, structure, and future directions.

3. Methodology

This study uses the Social Science Citation Index within the WoS core database as the primary index source, as WoS provides the most comprehensive citation coverage and the most reliable download functionality (Chen et al. 2008). We set the search topics to "GenAI" (including GAI, Gen AI, generative AI, generative artificial intelligence, ChatGPT, and AI-generated content) and "tourism." Each topic was searched sequentially without merging synonyms. To ensure the reliability of the selected literature, four editorial materials and one letter were removed according to the WoS document type classification. Additionally, four non-relevant publications were excluded after examining the article titles, abstracts, and full texts. The downloaded files were imported into CiteSpace for data cleaning. The original dataset contained 208 documents, from which 97 duplicates were removed. Ultimately, 111 valid publications were obtained, covering the period from 2023 to 2025. Figure 1 illustrates the data processing procedure.

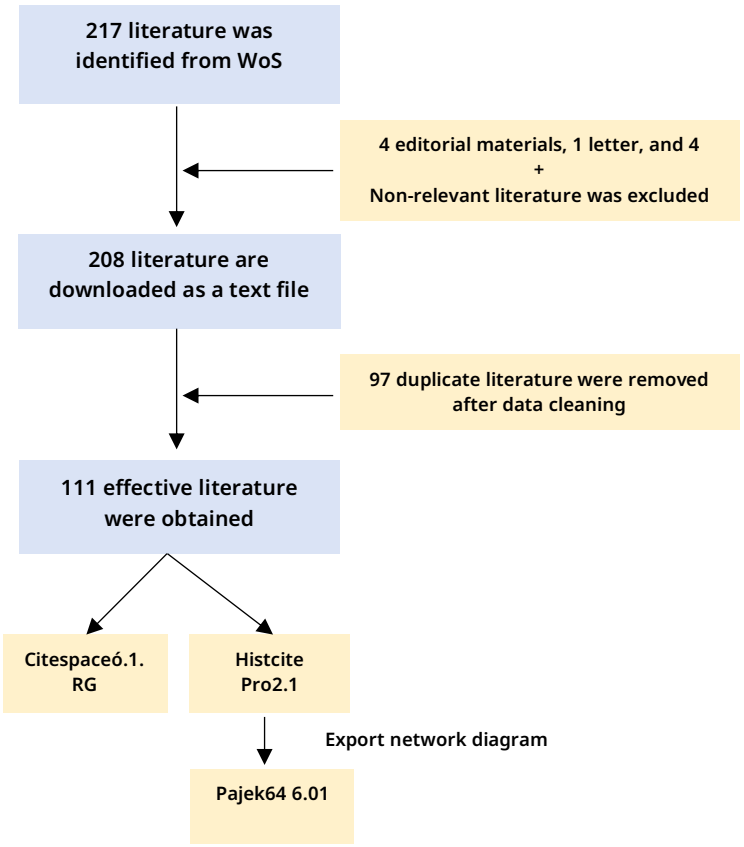

Figure 1: Data processing (figure by the author)

In this study, CiteSpace, HistCite, and Pajek were used to visualize the retrieval results. CiteSpace is a software tool designed for analyzing and visualizing emerging trends and citation patterns, enabling users to identify key features efficiently (Chen et al. 2008). It provides a platform for exploring innovative concepts and comparing existing methods (Chen 2004). CiteSpace is commonly used for co-occurrence analysis and clustering analysis, and its applicability has been validated in research areas such as mass extinction and terrorism (Chen 2006), as well as orphan drugs and rare diseases (Chen et al. 2014). HistCite is a tool for identifying key literature and associated networks. It is primarily used to calculate citation frequency, generate citation lists, and create citation networks (Liu et al. 2022). HistCite can generate time-series charts of literature collections based on discipline, author, institution, or journal, and it supports sorting by time, author, and institution (Garfield 2009). Typical applications of this software include studies on higher-order thinking (Liu et al. 2022) and labor and capital dynamics (Liang 2023). Pajek is used for analyzing and visualizing large networks to clarify citation relationships (Batagelj & Mrvar, 2008). Studies on kinship relationships (Batagelj & Mrvar, 2008) and depression (Yu et al., 2022) have used this method.

Therefore, we conducted separate analyses of research characteristics, citation relationships, and development trajectories using these three software tools.

After data preprocessing, the cleaned dataset was imported into each software tool for analysis. First, the retrieval results were downloaded as “full-text records and cited references” in text format and imported into CiteSpace 6.1.R6 for data conversion, producing the final dataset for analysis. During data processing, the number of publications was counted, and publication trends were examined. CiteSpace was then used to analyze collaboration networks among authors, institutions, and countries, as well as to conduct keyword co-occurrence and clustering analyses. The time slice was set to one year. The threshold was set at 10% to select the top 10% of nodes by reference frequency or occurrence within each slice. Node types included authors, institutions, countries, and keywords. The Log-Likelihood Ratio (LLR) was used to extract clustering labels, as it best reflects the uniqueness of each cluster. All other parameters were retained at their default settings. Data statistics were compiled and visualized through mapping diagrams to summarize the research status and hot topics in GenAI applications within the tourism industry.

Subsequently, the dataset was imported into HistCite Pro 2.1 to calculate the global citation score (GCS) and local citation score (LCS) for each literature node in the database. Core literature was identified, and LCS was used as the threshold for generating a citation chronology to analyze the development and inheritance of research within the field. Finally, Pajek 64 6.01 was used for the main path analysis. The citation network exported from HistCite was imported into Pajek to generate the main path and analyze the knowledge flow process. The SPC algorithm was selected for assigning values to non-cyclic networks because it comprehensively considers all citation relationships, and this approach is consistent with the HistCite methodology (Lucio-Arias & Leydesdorff, 2008). Additionally, because no universally accepted standard exists for parameter settings at each step, the parameter selection in this study involves a certain degree of subjectivity.

4. Results

4.1. Analysis of Research Status

4.1.1. Analysis of the Number of Publications

The distribution of the number of publications can show the overall level and development trend of the research field, reflecting the attention and investment of scholars in the field. The literature in the field of tourism GenAI application research obtained from the WoS database is statistically calculated every six months, as shown in **Error! Reference source not found.**. (H1 2023 means data for the first half of 2023, and H2 2023 means data for the second half of 2023). Considering that the data in the second half of 2025 is not complete, only the first five data points are listed for analysis.

The earliest research on tourism-generated AI appeared in March 2023, and the overall number of publications showed a continuous increase with a fast growth rate, and no peak has been seen yet. With the help of drawing trend lines for further analysis, the index trend line ($y = 1.6262e^{0.6859x}$) and the coefficient of determination ($R^2 = 0.997$) were obtained. R^2 is very close to 1. This means that the curve is highly consistent with the trend line, and the number of posts almost increases in an exponential form.

This trend primarily stems from several pivotal events: In November 2022, the launch of ChatGPT sparked widespread attention to AI's evolution from "discrimination" to "creation". In March 2023, the release of GPT-4 propelled GenAI into the spotlight, with its demonstrated advantages in specialised tests that accelerated its integration in industries. As major models emerged one after another, GenAI became a hot topic in research fields. Currently, ChatGPT remains the fastest-growing consumer application in history, with its download numbers continuing to increase. These key time points align with the volume of publications in the chart, demonstrating that the practical implementation and application of technology directly drive the advancement of research.

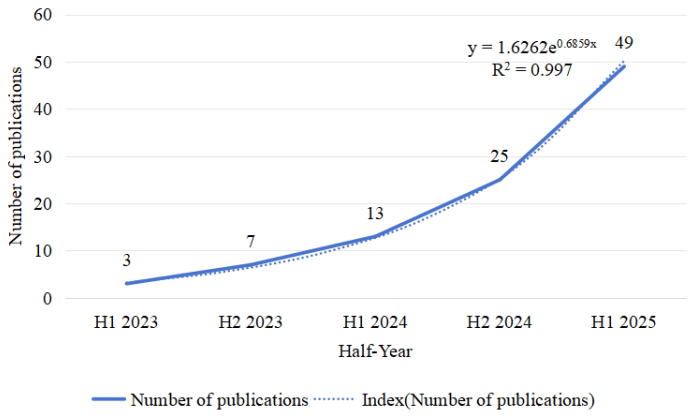

Figure 2: Number of research publications (figure by the author)

The record shows that although research is in its infancy, this field has received extensive attention, and the research enthusiasm is increasing. Therefore, we can predict that the popularity of the research will continue to show an upward trend and will start a rapid growth stage in the future.

4.1.2. Analysis of the core authors and their collaborative networks

Author co-occurrence analysis can identify the core figures in a research field and the cooperative relationships between researchers. The author’s co-occurrence network analysis of tourism GenAI research is shown in. Each node represents an author, and the size of the node reflects the frequency and importance of the node. The connection between the nodes reflects the collaborative relationship between the authors. The thicker the line, the closer the cooperative relationship is. The color

reflects the time. A total of 108 nodes and 215 connections were formed in the network, with a network density of 0.0372. Scholars generally believed that when the network density reaches 0.01, the connection is relatively close. That is to say, there is a strong connection between scholars. However, as shown in Figure 2, although a certain number of collaborative teams have been established, cooperation between teams remains limited. In other words, the close connections between scholars are mainly within their teams. Therefore, we infer that the reason for the formation of this form may be that the research is still in the initial stage, so the current research of scholars is still focused on a certain field, and there is not enough time to form in-depth cross-field research.

In terms of individual publication volume, the high-output authors include Dwivedi, Han, and Kim. Table 1 lists the top 10 authors in terms of number of publications, as Kizildag et al. and 38 others produced two publications, so they are not listed in the table. According to the minimum number of publications calculated by the core author of Price's Law $N_{min} = 0.749\sqrt{N_{max}}$ (N_{max} is the number of publications by the most productive authors; here, the value of N_{max} is 6), the calculation results in N_{min}=1.83. This means that the author publishing at least two papers is called a core author. Statistics show that between 2023 and 2025, there were 47 core authors in this field, and a total of 40 articles have been published. That's about 36% of the total number of publications. This number fails to meet the standard outlined in Price's Law, which requires core authors' publications to represent 50% of the total number of publications. It shows that the research on GenAI in tourism is still in its infancy, and there is no core group of authors yet. The size of the core author cohort and their cumulative publication count require further development.

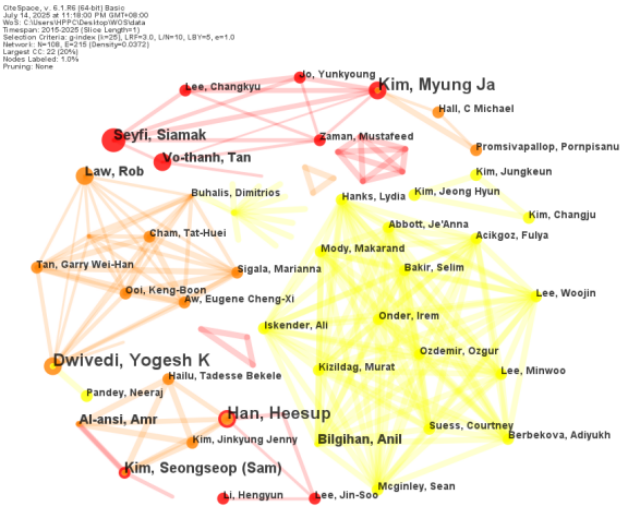

Figure 2: Author Collaboration Network (figure by the author)

4.1.3. Research Institutions Cooperate In Network Analysis

Research institutions are an important part of the research force in a certain field. The institutional cooperation network is shown in Figure 3. The network consists of 111 nodes linked by 329 connections, with a calculated density of 0.0539. Each node represents the institution participating in the relevant research cooperation. The size of a node denotes the number of papers published by the corresponding institution, and links between nodes represent cooperative interactions among institutions, with line thickness reflecting the degree of closeness in cooperation. As shown in the figure, institutions exhibit robust collaborative relationships. The main research forces include Hong Kong Polytechnic University, University of Macau, Kyung Hee University, Sejong University, University of Oulu, etc. Table 1 shows the top 10 institutions in terms of publications, with City Univ Macau and Prince Songkla Univ producing five papers each and tying for 10th place. In terms of literature ownership, universities are the main research force. In terms of geographical scope, these institutions are mainly from China, South Korea, and Finland. As the main position of academic research, universities can be in contact with new technologies and grasp emerging research directions earlier, so the result is reasonable.

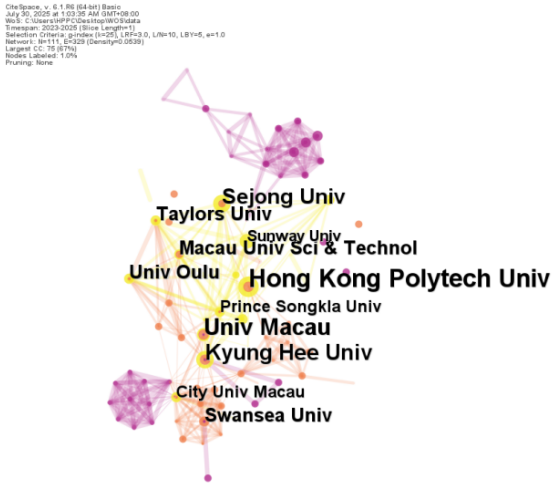

Figure 3: Institution Collaboration Network (figure by the author)

4.1.4. Analysis of national cooperation networks

Featuring 47 nodes and 220 relational connections, the national cooperation network exhibits a density value of 0.2035. There are dense connections between countries. As shown in Figure 4, there are marked differences in the number of works published by various countries in this domain. The countries with more publications are China, the USA, South Korea, England, and India. Table 1 presents the top 10 nations ranked by their publication count in this field, with Australia and France both producing 7 papers and tying for 10th place.

The data shows that China ranks first in the number of publications, with the figure being twice that of the second-ranked country. Therefore, we separately counted the number of posts from China: 5 articles were published in 2023,14 in 2024, and 32 in 2025. It is explained that since the end of 2024, China's research on GenAI in tourism has seen explosive growth. One reason is that China has the largest number of universities (refer to the ranking released by CWUR in 2025), with a huge research force, and the corresponding output of achievements is relatively rich. This is consistent with the previous text. In addition, we noticed that in 2025, China's AI software Deepseek surpassed ChatGPT and topped Apple's APP download rankings in the US and China. This matter directly boosted Chinese scholars' attention to the technology and applications of GenAI.

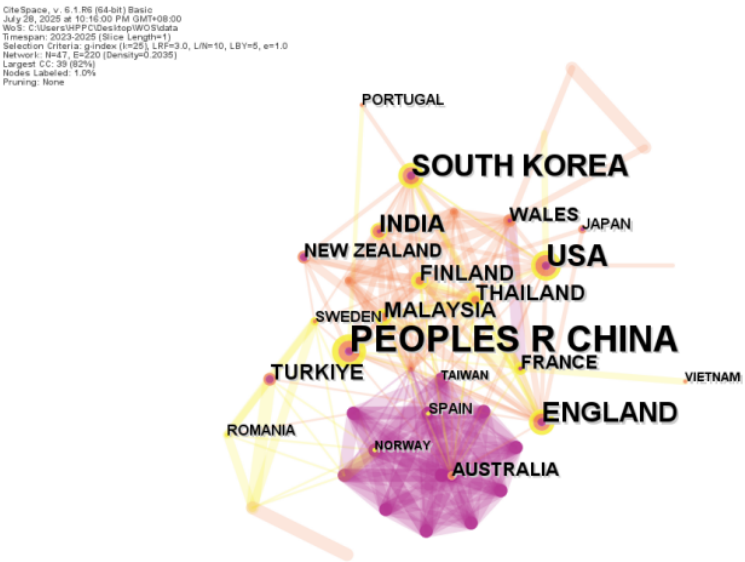

Figure 4: Country Collaboration Network (figure by the author)

Table 1: Top 10 authors, institutions, and countries by number of publications

No.	Author	Count	Institution	Count	Country	Count
1	Dwivedi, Yogesh K	6	Hong Kong Polytech Univ	14	Peoples R China	51
2	Han, Heesup	5	Univ Macau	11	USA	24
3	Kim, Myung Ja	5	Kyung Hee Univ	10	South Korea	21
4	Kim, Seongseop	4	Sejong Univ	9	England	19
5	Seyfi, Siamak	4	Macau Univ Sci & Technol	6	India	10
6	Vo-thanh, Tan	3	Swansea Univ	6	Thailand	9
7	Al-ansi, Amr	3	Univ Oulu	6	Malaysia	8
8	Bilgihan, Anil	3	Taylors Univ	6	Finland	8
9	Law, Rob	3			Turkey	8

Source: Compiled by the author

4.2. Research Hotspots

4.2.1. Analysis of keyword co-occurrence

Keywords represent the authors' concise summary of an article's core content. The frequency, centrality, relevance, clustering, and emergence of keywords can reflect the research hot topics and development trends to a certain extent. In this study, Citespace is used to extract high-frequency keywords of literature, and redundant words such as "GenAI", "GenAI", and "GenAI" are merged to obtain the keyword co-occurrence network in Figure 5. In the figure, each node denotes a keyword, with node size reflecting the keyword's frequency of occurrence, and the connection between nodes means that there is a co-occurrence relationship between keywords. A total of 129 different keywords and 486 connections were obtained, with a network density of 0.0589. It shows that the research hotspots are relatively concentrated. Table 2 lists the top 20 most frequent keywords.

The Betweenness Centrality (BC) of a keyword refers to the mediating ability to link other nodes (keywords) within the entire network map. The node whose value is higher than 0.1 is called the key node, and the key node plays a strong hub role in the network structure. In addition to the frequently occurring keywords, the words with high Betweenness Centrality are also included: credibility (BC=0.29), AI adoption barrier (BC=0.26), architecture (BC=0.25), big data (BC=0.19), bibliometric analysis (BC=0.16), perceived ease (BC=0.15), and technology adoption (BC=0.15). These nodes serve as a bridge between different research topics and play a positive part in boosting tourism growth with the assistance of GenAI.

We can see that the research hotspots mainly focus on the technology basis and adaptability of GenAI, service model, and supply chain innovation, as well as consumer acceptance and behavioral intention of GenAI. These themes hold considerable significance for the sustainable development of the tourism industry. In order to further integrate the analysis of research hotspots, we cluster the keywords on this basis.

Table 2: Top 20 keywords by ranking

No.	Count	BC	Key Words	No.	Count	BC	Key Words
1	61	0.10	GenAI	11	5	0.16	Technology acceptance model
2	15	0.31	Technology	12	5	0.14	Consumer
3	10	0.33	Adoption	13	5	0.04	Acceptance
4	10	0.32	Tourism	14	5	0.00	Large language model
5	9	0.17	Model	15	4	0.39	Travel planning
6	8	0.09	Intention	16	4	0.25	Word of mouth
7	7	0.01	Hospitality	17	4	0.17	Social media
8	6	0.20	Trust	18	4	0.14	AI-generated content
9	6	0.15	Impact	19	4	0.14	Attitude
10	5	0.19	Internet	20	4	0.10	Satisfaction

Source: Compiled by the author

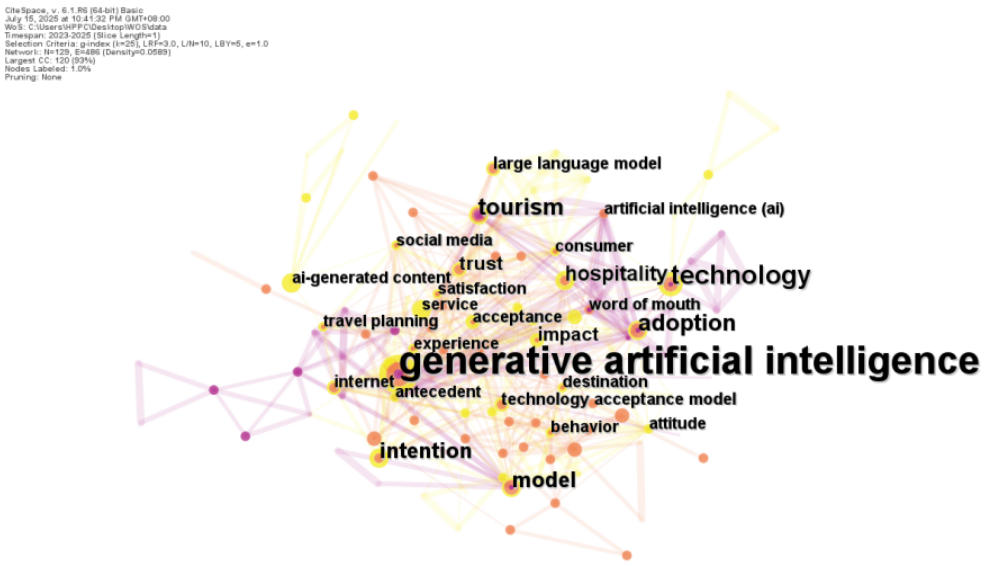

Figure 5: Keyword co-occurrence network (figure by the author)

4.2.2. Cluster Analysis of Keywords

Cluster analysis of keywords can provide a thematic perspective on the research in this field and present the connections between different research concerns and hot spots. In this paper, the LLR is adopted to carry out cluster analysis on hot keywords in order to best reflect the uniqueness of clustering. Scholars generally believed that a module value $Q > 0.3$ denotes a significant clustering structure, whereas an average contour value $S > 0.7$ suggests that the clustering is efficient and convincing. The keyword clustering diagram is shown in Figure 6. The clustering map shows that Q=0.482 and S=0.8181, implying that the clustering is effective and the credibility is high. The larger the number of the clustering sequence, the fewer the keywords contained in the cluster.

Each cluster is labeled with keywords from the co-occurrence network, totaling 9 labels representing 9 clusters, each cluster label is named based on the keywords in the cluster: #0 Innovation Resistance Theory, #1 Technology Adoption, #2 Rasgos de Personalidad (a Spanish term that means 'Personality Traits'), #3 Natural Language Processing, #4 Research Agenda, #5 Parasocial Interaction, #6 Destination Marketing, #7 AI prompts and #8 AI-generated Content. The labels show that the research on tourism GenAI mainly revolves around these 9 clusters. Among them, #3 and #8 are related to the characteristics of GenAI technology, #0, #1, and #2 are related to user behavior and attitude, and #4, #5, #6, and #7 are related to the deep application of specific fields. Therefore, these 9 clusters are divided into three major themes. Table 3 shows theme classification information. Keywords are selected from the cluster results that can reflect the topic.

The data reveals that the research on "Characteristics of GenAI technology" primarily focuses on the inherent characteristics of the technology. The research focuses on the technical foundations of GenAI, such as natural language processing and deep learning, with an emphasis on content generation capabilities and the analysis of technical characteristics, such as credibility and reliability. Under the theme of "The behavior and psychology of GenAI users in tourism", the keywords mainly involve the innovation resistance theory, technology acceptance model, and other major theoretical models, as well as trust, personality traits, needs, and other influencing factors. It also discusses the acceptance and barriers to use. The theme of "In-depth application research of GenAI in the specific field of tourism" features a rich array of keywords. Regarding application potential, it explores its potential in design fields such as IP, landmarks, and architecture. In terms of marketing capabilities, it covers word-of-mouth and AI prompts. Additionally, it also focuses on human-computer interaction and dwell time. For further analysis, we have sorted out the relevant research results.

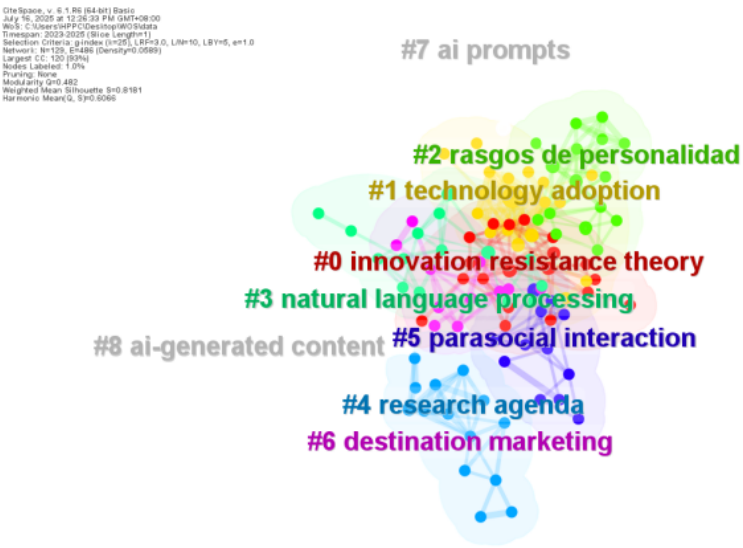

Figure 6: Keyword clustering map (figure by the author)

Table 3: Theme classification information

Theme	Cluster	Keywords
Characteristics of GenAI technology	#3 Natural Language Processing #8 AI-generated Content	Natural language processing, AI-generated content, large language model, credibility, aspect-based text summarization, deep learning models, AI content detection
The behavior and psychology of GenAI users in tourism	#0 Innovation Resistance Theory #1 Technology Adoption #2 Rasgos de Personalidad	Innovation resistance theory, technology adoption, trust, technology acceptance model, acceptance, attitude, AI adoption barrier, personality traits, psychological needs
In-depth application research of GenAI in the specific field of tourism	#4 Research Agenda #5 Parasocial Interaction #6 Destination Marketing #7 AI prompts	Research agenda, parasocial interaction, destination marketing, AI prompts, word of mouth, architecture, city landmarks, long-term stays, product design, tourism ip product, color matching

Source: Compiled by the author

(1) Characteristics of Genai Technology

With core capabilities that include natural language processing and content generation, GenAI technology serves a crucial function in multiple dimensions and builds an innovative application framework for tourism. As for the technical characteristics of GenAI, Fakfare et al. (2025) studied the characteristics and acceptance of ChatGPT, and believed that the innovative characteristics of ChatGPT include relative benefits, compatibility, complexity, observability, and trialability. They also proposed that the innovative characteristics have an impact on the cognitive, affective, and behavioral responses of travelers.

In tourism, GenAI is mostly used to enrich the content presentation of tourism products. Seo et al. (2025) pointed out that AI-generated works not only present content but also represent AI works. Therefore, tourists have a dual cognition of AI-generated content. The cognition will lead to additional emotional attitude evaluation of the works, and then affect behavioral decisions and evaluations. There is a significant difference in authenticity and reliability between AI-generated videos and human-made ones. Audiences are more likely to question the content generated by AI, but the credibility and authenticity of videos will directly affect tourist satisfaction and loyalty (Islam 2025). In the process of travel planning, tourists also tend to think that human-made plans are more reliable than those made by GenAI (Wong et al. 2025). Mellors (2025) found that ChatGPT has a significant tendency to recommend landmark attractions and high-density tourism hotspots. This condition leads to the consideration of the impact of conversational AI on the formation of tourism interests and the distribution of attention. Furthermore, Zhang et al. (2024) carried out targeted research on the role of AI-generated content (AIGC) in digital tourism interpretation. The AI-generated content significantly underperformed in comparison to professionally generated content (PGC) in three dimensions: informational value, emotional appeal, and empathy. However, AIGC could provide content support for interpreters. This indicates that while AIGC cannot replace PGC, there exists potential for human-machine collaboration. The research also examines the behavioral patterns and psychological motivations of AI-generated content users in the tourism industry

(2) The Behavior And Psychology of Genai Users In Tourism

As a driving force to reshape the pattern of tourism, GenAI is most closely related to consumers and employees of tourism enterprises. In terms of consumers' acceptance and application of GenAI, two studies are particularly prominent. One study applied the innovation resistance theory (IRT) and used the qualitative analysis method of semi-structured interviews. The study argues that the core elements of IRT: use barriers, value concerns, risk concerns, image concerns, and traditional constraints, remain relevant in revealing why tourism is resistant to GenAI applications. But resistance is not static, and can be reshaped by cultural conventions, social environments, and personal identities. At the same time, it is proposed that the image barrier is not only a concern about external cognition, but also a threat to identity and reconstruction of social roles (Seyfi et al.

2025a). Another study applied both quantitative and qualitative methods, combined with IRT and generation theory. It was found that users did not emphasize the value perception of GenAI as a key factor. This finding is different from previous studies. Perhaps because the advantages of GenAI have been accepted by users, they pay less attention to value-related issues. It is also suggested that barriers have different effects on the adoption of GenAI patterns among different generations (Seyfi et al. 2025b). In addition, Xu et al. (2024) proposed social influence and perceived value as external stimulus factors to shape tourists' trust in tourism information and professional cognition. Then promote the parasocial interaction with ChatGPT, which in turn determines tourists' willingness to adopt and actually use ChatGPT. Meanwhile, Duong et al. (2025) proposed that tourists' satisfaction and parasocial interaction have a beneficial effect on their intention to continue using ChatGPT for travel.

In terms of employees, AI can assist employees to improve work efficiency (Carvalho & Ivanov, 2024). But in the face of the uncertainty brought by the application of AI, they show increased work pressure and unemployment concerns, and their cognition of AI will affect their work behavior (Huang & Gursoy, 2024). Zhao et al. (2024) believe that employees' perceived employment threat risk will lead to technological fear, but the perception of realism, habitual awareness, and personal investment will reduce their technological fear of AI. Additionally, anxiety about AI technology can result in negative behaviors such as avoidance or job reduction. Consequently, it holds substantial significance to standardize the use of GenAI to improve employees' awareness and skills of AI technology, clarify the scope of technology application, and legal responsibility.

(3) In-Depth Application Research of Genai In The Specific Field of Tourism

GenAI is widely used in chatbots, travel guides, virtual travel experiences, and promotional material creation, showing great potential in optimizing processes, improving operational efficiency, and enhancing customer experience (Carvalho & Ivanov, 2024; Buhalis et al., 2023). For example, analysing customer feedback can accurately identify feedback elements and significantly improve processing efficiency (Jeong et al. 2024). The analysis of tourism data can provide an in-depth analysis of the long-term development trend of the industry and tourists' needs, to make a more reasonable plan for the future development of enterprises (Haluza & Jungwirth, 2023). When tourists use GenAI, tourists' preferences, demands, time, and budget constraints will be comprehensively considered, and massive information will be filtered and evaluated to recommend the optimal itinerary for specific target groups (Wong et al. 2023). Furthermore, GenAI can also be used to develop interactive games based on historical culture, because tourists will become historical figures to participate in role-playing. This immersive experience will bring more vivid and attractive communication effects for cultural heritage protection (Gursoy et al. 2023).

GenAI can quickly analyze large amounts of data to help companies improve their operational capabilities, provide personalized services, and generate promotional content (Dwivedi et al. 2023). But there are also risks such as excessive reliance on its output results, potential job losses, and cybersecurity threats (Carvalho & Ivanov, 2024). Thus, exploring how the application of GenAI is combined with tourism and GenAI's impact on the sustainable development of tourism holds substantial significance.

GenAI features widespread use in product innovation and service innovation. User satisfaction with intelligent tourism systems is influenced by three factors: the quality of tourism experience, itinerary planning and interactive elements, and emotional experience (Suanpang and Pothipassa, 2024). The application of GenAI to the smart hotel ecosystem can drive dynamic customer engagement and co-creation of value. This application improves efficiency and enhances customer experience in the process (Buhalis et al. 2023). And in the process of providing personalized recommendations or human customer service, GenAI has a similar understanding ability and flexibility to human beings (Dwivedi et al. 2023). Tourist-chatbot interaction, as an indispensable element in tourism, can enhance the image of destinations and increase the willingness to visit through the richness of information during the interaction process. Moreover, a good destination image will directly prompt tourists to have the idea of traveling there (Tosyali et al. 2025). Song et al. 2025) found that the landmark images optimized by AI painting could significantly improve consumers' willingness to travel. Meanwhile, Wu et al. (2025) put forward a design approach for tourism IP cultural products based on multimodal generative large models, providing ideas and guidance for intelligent product design.

Among many studies, the application of GenAI in marketing has received more and more attention. In tourism, AI-generated content is mainly used to build an image, AI prompt is used for precision marketing, and real-time interaction is used to attract more tourists and improve the competitive capacity of destinations. Bilgihan et al. (2024) considered the capabilities of three types of intelligence forms on GenAI: mechanical GAI, thinking GAI, and feeling GAI. They also comprehensively analyzed the three key areas: adoption factors, marketing stages, and outcomes. The GenAI marketing model by matching the role and results of GenAI in each marketing stage was proposed. This model provides an entry point for further exploration of GenAI's potential in tourism marketing. And in terms of marketing effectiveness, the selection of appropriate prompt word design methods exerts a pivotal role in improving customer experience and enhancing operational efficiency of GenAI (Saleh 2025). GenAI can provide real-time responses to customer inquiries, and prompt design can provide guided services during the dialogue process to stimulate customers' interest in new service selection (Dwivedi et al. 2024), and significantly affect the effectiveness of AI-generated content (Fan et al. 2025).

Based on the above analysis, we can conclude that existing research remains focused on three major aspects: technology, users, and applications. These three themes have further branched out into various sub-themes, continuously enriching and refining research on GenAI in tourism. Simultaneously, these three themes exhibit a progressive relationship and reflect the development of the field: The technical characteristics of GenAI serve as the foundation, reshaping the underlying logic of tourism services. While the unique creative abilities of GenAI have driven its widespread adoption, issues like authenticity concerns have also constrained public acceptance. The research of this topic is consistent with Innovation Diffusion Theory; User behavior and psychology is a further study based on technology. Technical acceptance, satisfaction, and behavioral feedback are influenced by both technological factors and social personal elements, and directly impact the scope and depth of GenAI applications. This topic mainly indicates the Technology Acceptance Model; The advanced applications of GenAI include prompt settings, human-machine interaction, and marketing strategies are all developed through practical implementation. This theme implied the Technology-Organization-Environment Framework.

4.3. Research on Development Path Analysis

4.3.1. Core literature analysis

The citation frequency of a paper highlights the value of the paper within the corresponding research domain. The analysis of core literature was carried out by Histcite, and the indicators mainly included LCS and GCS. They were used to identify the most cited core literature. Among them, LCS represents the citation frequency of a certain literature within the scope of the processed literature set. Since the retrieval terms of the literature in the data set are highly relevant, it can be considered as the citation of the same research direction; GCS represents the total number of citations of a paper in the WoS database, including articles that cite the reference paper that are not related to the target research direction. If the LCS of a paper is high, then the paper is cited more frequently by the literature in the same field, and it can be considered as the core literature in this research field. If the GCS value of a document is high, we can know that the document has received attention from other disciplines. In this study, LCS was used to sort the literature records to obtain the top 10 core literature by citation frequency, as shown in Table 4. As can be seen from the values in the table, the GCS of the literature with a larger LCS is also larger, and the GCS value is much larger than the LCS value, indicating the spillover and diffusion of knowledge, that is, the literature in this field is also of great significance to other studies.

To be more specific, the article by Carvalho and Ivanov (2024) was cited most frequently, with the LCS being 47. This article analyzes the utilization of ChatGPT alongside large language models in tourism and the potential benefits and risks to stakeholders based on the literature. They believe that GenAI can optimize service processes, improve operational efficiency, and enhance employee productivity. This article is one of the first studies to investigate the impact of ChatGPT on tourism. The second study is by Dwivedi et al. (2024), and the LCS is 41. The application potential, challenges, and risks of GenAI are analyzed based on the perspectives of suppliers, demanders, and regulatory authorities. In addition, the future research direction and problems are proposed from many aspects, such as finance, human resources, information systems, and marketing. This article is a pioneering study to systematically assess the potential and risks of technology application. The study by Wong et al. (2023) ranked third with an LCS of 34. This paper analyzes the cases of different application scenarios of GenAI in three stages of tourism: pre-trip, en-route, and post-trip, focusing on the analysis of the tourism decision-making process and how GenAI improves customer experience. This article systematically explains how GenAI can bring new value to the tourism industry as a digital assistant. Dogru et al. (2025) studied LGC as 74, critically examined the impact of GenAI on tourism stakeholders, and explored how academia responds to the complexity of research with the rapid evolution of technology. Ranked fifth is the research of Mich & Garigliano (2023). This article summarizes the technical capabilities, applications, limitations, and risks of ChatGPT based on the analysis of its technical characteristics, and puts forward preliminary guidance for the application of ChatGPT in tourism.

Table 4: The top 10 important papers in this field

No.	First Author	Time	Title	LCS	GCS
22	Carvalho I	2024	ChatGPT for tourism: applications, benefits and risks	47	209
19	Dwivedi Y K	2024	Leveraging ChatGPT and other GenAI (AI)-based applications in the hospitality and tourism industry: practices, challenges and research agenda	41	190
8	Wong I K A	2023	Autonomous travel decision-making: An early glimpse into ChatGPT and GenAI	34	119
74	Dogru T	2025	GenAI in the hospitality and tourism industry: Developing a framework for future research	24	97
2	Mich L	2023	ChatGPT for e-Tourism: a technological perspective	22	65
3	Demir M	2023	Is ChatGPT the right technology for service individualization and value co-creation? Evidence from the travel industry	18	41
9	Kim J H	2023	Do you trust ChatGPTs? Effects of the ethical and quality issues of GenAI on travel decisions	16	44
66	Kim J H	2025	When ChatGPT gives incorrect answers: the impact of inaccurate information by GenAI on tourism decision-making	13	52
78	Christensen J	2025	Understanding the role and impact of GenAI (AI) hallucination within consumers' tourism decision-making processes	12	48
25	Law R	2044	AI research in hospitality: a state-of-the-art review and future directions	9	63

Source: Compiled by the author

4.3.2. Main Path Analysis

In a non-cyclic network, the main path refers to a route extending from the starting node to the terminal node, and the arcs of this path have the highest traversal weight. The main path analysis is intended to simplify a complex research network into one or more main paths composed of some key nodes and their links, to investigate the important research trajectory within a particular field. The main path can not only reflect the process of information and knowledge transmission, but also reflect the main trunk of the discipline research, and show most of the knowledge flow in this research field.

The citation chronology chart is compiled from the perspective of LCS with a threshold of 40. That is, the first 40 records are selected, and the citation chronology is generated according to the chronological order, as shown in Figure 7. The size of the elliptical figure corresponds to the frequency of citation of the literature, and the connected line with an arrow represents the citation relationship between the literature nodes. The literature pointed by the arrow is the cited literature, and the number marked in the circle indicates the serial number of the literature node in the literature set. As shown in the figure, the core nodes are 22,74,19,2, 3, 8, and 9, and the research topics are closely connected and have a strong mutual citation relationship. In 2023, there were 5 widely used papers. But the overall number of nodes was small, indicating that the research was still in the pioneering stage. Since 2024, the number of nodes has increased significantly, and influential papers have appeared, indicating that the research on this topic has become active.

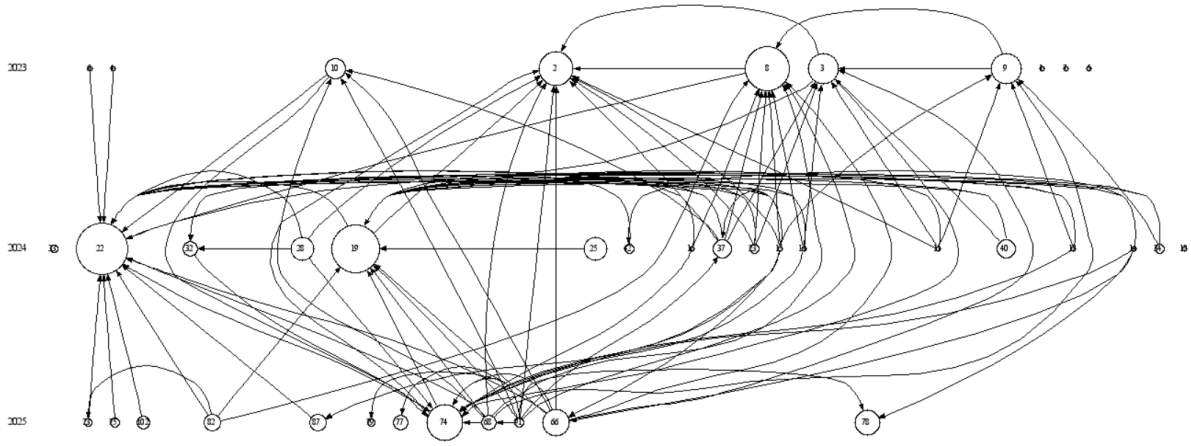

Figure 7: Chronological chart of citations of key documents (figure by the author)

For further analysis, the directed data network generated by Histcite was imported into Pajek, and the SPC algorithm was used to calculate the traversal weight and obtain the main path of the citation network, as shown in Figure 8. The main path structure is clear, with a total of 8 key nodes, forming the central structure of the whole network. The two paths have different source points, but all other points are the same. Table 5 details the information about key nodes. Except for the articles numbered 91 and 68, the other articles were cited in the top ten. The starting point of the total path is Mich & Garigliano (2023). Then Carvalho & Ivanov (2024), Dwivedi et al. (2024), Dogru et al. (2025), Demir & Demir (2023), Kim et al. (2023), Han et al. (2025), Saleh (2025). The articles by Carvalho, Dwivedi, and Dogru were published online in 2023.

Figure 8: The main path based on SPC (figure by the author)

Table 5: Main path nodes

No.	First Author	Title	Time
2	Mich L	ChatGPT for e-Tourism: a technological perspective	2023
22	Carvalho I	ChatGPT for tourism: applications, benefits and risks	2024
19	Dwivedi YK	Leveraging ChatGPT and other GenAI (AI)-based applications in the hospitality and tourism industry: practices, challenges and research agenda	2024
74	Dogru T	GenAI in the Hospitality and Tourism Industry: Developing a Framework for Future Research	2025
3	Demir M	Is ChatGPT the right technology for service individualization and value co-creation? evidence from the travel industry	2023
9	Kim JH	Do you trust ChatGPTs? Effects of the ethical and quality issues of GenAI on travel decisions	2023
68	Han HS	Determinants of approach behavior for ChatGPT and their configurational influence in the hospitality and tourism sector: a cumulative prospect theory	2025
91	Saleh MI	GenAI in hospitality and tourism: future capabilities, AI prompts and real-world applications	2025

Source: Compiled by the author

5. Discussion

5.1. Findings

This study conducted a visual analysis of tourism GenAI literature published in WoS from 2023 to 2025. After data screening and refinement, 111 articles were identified. This paper employs CiteSpace to analyze the current research status and hotspots from the perspectives of authors, countries, institutions, and keywords, and categorizes these hotspots into three themes for systematic organization. HistCite was used to generate a citation timeline and identify key documents, and Pajek was applied for main path analysis. The following conclusions were drawn:

(1) According to the analysis of publication trends, research enthusiasm in this field is increasing. Since 2023, when studies on this topic began to emerge, the number of publications has grown exponentially. It is predicted that academic interest in this field will continue to rise and enter a rapid growth stage. GenAI will remain a significant research topic in tourism for the foreseeable future.

(2) Analysis of author, institution, and national networks shows strong connections among scholars. Research on GenAI is still in its infancy, and a core author group has not yet formed. The main research forces originate from universities, and extensive collaboration exists among institutions in China, South Korea, Finland, and other countries.

(3) From the analysis of keyword co-occurrence and clustering, research hotspots are relatively concentrated. Terms such as technology adoption, trust, consumer behavior, impact, and AI-generated content have become high-frequency words in GenAI-related tourism research. Current research interests include generative AI technological features and application frameworks, consumer and employee psychology and behavior, and focused application research in specific tourism fields. This paper categorizes existing studies into three major themes: technology, user, and application. These studies largely rely on traditional theoretical frameworks. In terms of technological characteristics, the five-stage framework emphasizes the information processing process and plays an important role in understanding individual innovation adoption (Fakfare et al. 2024). In terms of user perspectives, the Technology Acceptance Model explains adoption through perceived usefulness and ease of use, while Innovation Resistance Theory (Seyfi et al. 2025a) examines reasons for rejection. Some studies further integrate Generational Theory to deepen behavioral analysis (Seyfi et al. 2025b). Additionally, new marketing models have been constructed and applied (Bilgihan et al. 2024).

(4) From the analysis of the research development path, the overall structure of this topic is relatively cohesive. Strong mutual citation relationships exist in the literature. Since 2024, research activity on this topic has increased significantly, and the main path structure has become more clearly defined.

With further expansion of GenAI research, regional collaboration should be strengthened to facilitate the exchange and mutual learning of experiences. Cross-disciplinary integration between tourism and other fields also needs to be deepened, providing more comprehensive perspectives, theories, and methods. Although substantial progress has been made, there remains considerable room for further exploration. Existing studies emphasize the functional utility of GenAI, but potential social challenges, such as impacts on the labor market, technological dependence, and algorithmic discrimination, require more attention. Additionally, although research methods are diverse, existing studies are primarily based on case analyses, interviews, questionnaires, and literature reviews. Future research should further broaden methodological approaches.

The integration of GenAI with tourism, as an emerging technological frontier, has opened new research avenues and given rise to novel theoretical perspectives. Although current studies largely rely on established frameworks such as the Technology Acceptance Model and Innovation Diffusion Theory, GenAI's human-like characteristics and interactivity differ substantially from traditional technologies. Mogaji et al. (2024), for example, argued that the applicability of the Technology Acceptance Model requires further scrutiny. These divergences may drive theoretical advancement. Moreover, as GenAI applications expand, ethical and legal concerns will intensify, generating new issues that may reshape the theoretical landscape of tourism research.

5.2. Limitations and Research Directions

This study also has some limitations. First, the data source exhibits certain bias. All literature used in this study was derived from the WoS database. WoS primarily indexes English-language publications, and some scholars prefer other databases. This may result in the omission of important documents not included in WoS. Data screening focused on core journals and excluded other document types, including books and conference papers. Because "title," "keyword," and "abstract" were used as screening criteria, articles lacking these target terms were removed, potentially introducing bias. Future research could expand the range of data sources. Scopus and Google Scholar are widely used in tourism research; Scopus offers broader journal coverage, while Google Scholar includes citation information for books and other academic materials.

Second, the time span is relatively short. Data collection for this study was completed in July 2025 and covers only two and a half years. Because GenAI is still in its early stages, the sample size is limited. However, based on the increasing number of publications, research outputs will continue to grow. Research in this area is time-sensitive, and new publications may influence conclusions. Future studies should track GenAI-related tourism research over a longer period. For more robust analysis, updated reviews could be conducted in the next two years or when the field becomes more mature.

Third, software limitations exist. Due to the absence of standardized parameter-selection rules, threshold settings involve subjective judgment. CiteSpace generates static visualizations, which restrict deeper exploration of data relationships. The citation chronology produced by HistCite highlights citation sequences by year but does not reflect the degree of citation closeness, limiting interpretation. Future studies should incorporate more advanced tools such as VOSviewer, which offers intuitive interfaces and visually appealing network, overlay, and density visualizations. Future research may benefit from combining VOSviewer with CiteSpace to strengthen analysis.

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