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Empirical Research Article

Knowledge Map Analysis of Smart Tourism Research: Comparison of Chinese and English Papers

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Abstract

Smart tourism and associated topics have been extensively discussed by scholars around the world. The goal of this study is to make available an all-inclusive database-based analysis of the longitude status of research on smart tourism. Three databases, Web of Science (WoS), Science Direct and China Knowledge Network (CNKI), were utilized to gather papers published from 2011 to 2020. The data results were analyzed and results were generated using CiteSpace. The results of Chinese and English papers were evaluated to form the conclusion of this study. The implication formed the prediction of future research trends and development suggestions.

1. Introduction

Smart tourism is the use of mobile digital links to create smarter, more meaningful and sustainable associations between tourists and cities (Molz, 2012). Since there is a need for data-driven destination management decisions and enhanced tourism experiences, this can be made available by smart tourism. Therefore, scholars refer to smart tourism as ubiquitous tourism information services that individual tourists receive during their tourism activities (Li, Hu, Huang, & Duan, 2017). Advances in internet-based technology, the development of mobile devices, and the generation of big data have led to the development of smart tourism (Mariani, Baggio, Fuchs, & Höepken, 2018).

The initiation of smart tourism in China has made some progress, and a diverse range of scenic spots have been included on local scenic websites. A number of distributed and integrated functions have been established in the smart tourism and scenic spot stages, which are at present entering the intelligent stage (Liu & Ma, 2021). Research on smart tourism by some Chinese scholars' investigates the smart tourism service industry in terms of its conception, creation and development system, research and development contents, and applications, such as: the perspective of tourism change (Zhang, Li, & Liu, 2012), and smart tourism information ecosystem (Zhang, Cheung, & Law, 2018), big data (Xu, Li, & Wu, 2020), and information services (Li et al., 2017), along with other topics (Chen, Tian, Law, & Zhang, 2021).

Foreign practice has established that smart tourism is significant for researchers, industry professionals and tourists because it offers useful and up-to-the-minute data and creates links between tourism stakeholders (Gretzel, Sigala, Xiang, & Koo, 2015; Boes, Buhalis, & Inversini,, 2015; Li et al., 2017; United Nations World Tourism Organization, 2018). Some research elements in the English papers have classified the research on smart tourism, for example, Kontogianni and Alepis (2020),

classified the elements that affected smart tourism into 6 main categories and 28 subcategories, and attempted to investigate smart tourism through the application level (Shafiee, Ghatari, Hasanzadeh, & Jahanyan, 2019).

Bibliometric studies are frequently used to detect indiscernible universities (Racherla & Hu, 2010), particularly via the visualization of dissertation and bibliometric data. A number of scholars have attempted to utilize regular databases including Science Direct, Elsevier's Scopus, Google Scholar, and Web of Science (Law, Qi, & Buhalis, 2010). Documents from these databases were collated and citation information was analyzed using bibliometric techniques (Lu & Stepchenkova, 2015; Schuckert, Liu, & Law, 2015) to detect significant issues and trends in research associated with "smart tourism" (Morehouse & Saffer, 2018).

Firstly, the existing line of research assists in addressing the studies on research focus and trend analysis (Li & Law, 2020; Johnson & Samakovlis, 2019) and progresses towards a more sophisticated academic field by comprehending the construction of a hypothetical structure for smart tourism (Johnson & Samakovlis, 2019), nevertheless, the present research is restricted to the analysis of English or Chinese papers for analysis. Secondly, only journal papers just selected were analyzed, rather than all of them. Thirdly, some value is found in having research groups based on an individual knowledge of networks or collaborations (Morehouse & Saffer, 2018), but the knowledge maps of scholars' networks, themes and trends of research are yet to be developed. Fourthly, a comparative analysis of the Chinese and English papers to form an integration of the state of affairs of the development of smart tourism on a global perspective has not been conducted by any scholars. Consequently, this study asks a number of research questions as found below.

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• RQ1 What are the commonalities and differences between Chinese and foreign scholars that are shaping smart tourism?

• RQ2 What are the themes and keywords, and who are authors promoting the expansion of smart tourism at home and abroad?

• RQ3 What is the development trend of smart tourism for the future？

Information from the Web of Science database was used as a wide-ranging database of international interdisciplinary publications in the social sciences, and the Science Direct database was added to enhance the dependability of the study outcomes; additionally, the China National Knowledge Internet (CNKI) database was used. The analysis and visualization process was completed with the aid of CiteSpace. The innovation of the study is found in the visualization and analysis of both Chinese and English papers to shape the research trend of smart tourism in a worldwide perspective.

2. Literature Review

2.1 Understanding Smart Tourism

The appearance of new technologies has given rise to the notions of smart environments and smart tourism (Albino et al., 2015). As a theme, smart tourism as an interdisciplinary topic of growing academic attention includes knowledge from the areas of sustainability, information technology, and library intelligence management (Almobaideen et al., 2016). The area of tourism has added to the definition of smart tourism in diverse ways. Some studies classify intelligence as the interweaving of technology with offline activities, infrastructure and online portals (Ho & See-To, 2018; Li et al., 2017). Conversely, a number of authors suggest that it is the prevalence and accessibility of digital data based on the dealings between stakeholders such as suppliers and government agencies (Boes et al., 2016; Gretzel et al., 2015; Li et al., 2017). Gretzel et al. (2015) defined smart tourism and suggested it consists of three basic components: smart business ecosystems, smart destinations and smart experiences, supported by the creation processing and exchange of data. Boes et al. (2016) build on a service-led logic and advocate that the central parts of smart components include ICT, innovation, leadership, and social and human capital. Li et al. (2017) reviewed existing definitions of smart tourism, and conceptualized the expression as an individual tourism support system with omnipresent information services at its heart; based on the ever-present character of information services, they combine traditional and new forms of tourism data flow and distribution, emphasizing the significance of personalized information. Additionally, amid other industries associated with smart tourism, Buhalis and Leung (2018) suggested an outline for an integrated and connected smart hotel. This would consist of three layers: a network layer with sensors for collecting external data, a cloud data layer for storage and processing of data, and an artificial intelligence layer to automate operations and make decisions. The significance of elements such as information services, platforms and data to smart tourism is clarified. This study uses Li et al. (2017) and Buhalis and Leung (2018) as a basis to comprehend smart tourism. Nevertheless, diverse perspectives and hypothetical foundations of the research field are presently formed due to dissimilar interpretations of the meaning of smart tourism (Dredge & Jamal, 2015; Gretzel et al., 2015). Smart tourism must be explored from a worldwide perspective.

2.2 Development of Smart Tourism in China

The "Golden Travel Project," initiated by the National Tourism Administration in 2001, has helped China to attain promising outcomes in tourism e-government, tourism destination marketing, and tourism enterprise informatization, and has birthed several smart tourism information network enterprises (Chen et al., 2012). Smart tourism is a systematic and intensive management transformation based on a new generation of information technology to meet the personalized needs of tourists, offer high quality and high satisfaction services, and realize the sharing and effective utilization of tourism and social resources (Zhang et al., 2012), that appeared in the context of the deepening of tourism informatization and the building of smart cities (Huang, 2017). The development of smart tourism is an unavoidable prerequisite to transform and upgrade the tourism industry and improve the quality of tourism service, and the advantages, such as the importance of the status of the tourism industry at the national level, the strong growth of the local tourism market, and the maturity of the technical conditions for the development of smart tourism, will speed up the process for its development in China. In the tourism academic community, researchers are gradually putting their focus on smart tourism as a new direction of tourism research (Zhang et al., 2012). China has made quite a few accomplishments in the practice, policy concerns and hypothetical development of smart tourism.

2.3 Research on Smart Tourism of Chinese and English Papers

Existing review articles have evaluated the progress of research connected to smart tourism (Feng, 2017), but there has not been an inclusive comprehensive review of databases and visualization methods for smart tourism and there is no contrast of domestic and international research on smart tourism. The latest study is a review and analysis of smart tourism English papers in 2021using Citespace, to find the impact of forming COVID-19 on smart tourism (Chen et al., 2021) and a literature review methodology to analyze all reviewed papers from 2016-2020, resultant of 11 themes (Mehraliyev et al., 2020). Although scholars have attempted to investigate the development of smart tourism, they have merely analyzed the research results based on Chinese or English.

2.4 Bibliometric Analysis

Bibliometric analysis can be conducted in several ways. One such approach is to use quantitative network analysis to analyze literature data to recognize and examine research structures through visual depiction (Dzikowski, 2018; Li & Law, 2020). Bibliometric analysis is viewed as a significant method to objectively analyze the quality of quantifiable data and identify interdisciplinary researchers and topics (Albort-Morant & Ribeiro-Soriano, 2016; Bouyssou & Marchant, 2011).

In the area of tourism research, indexing can be difficult due to the specialization of the research field (Hall, 2011; Hirsch, 2005) and the need for recurrent publication to keep pace with indexing requirements. This can eventually lead to alterations in the quality and range of research (Dredge & Jamal, 2015). Based on this, a stage-by-stage econometric analysis of academic research is important.

Bibliometric research has appeared in tourism research and smart tourism (Buhalis & Law, 2008), and network analysis in tourism looks at the diverse connections, discussions and cooperation between researchers (Johnson & Samakovlis, 2019). The application of econometric analysis processes intends to clarify collaborative relationships between researchers and form the outcomes of exploring research trends (Racherla, Hu, & Hyun, 2008), and promote the research development (Johnson & Samakovlis, 2019).

3. Analytical Framework

The main steps in this framework include data collection, preliminary analysis and network analysis (Figure 1). Firstly, paper data from WoS, Science Direct and CNKI were amassed.

Secondly, the English and Chinese papers were analyzed respectively by CiteSpace. Thirdly, the comparative analysis results of commonality and individuality were formed.
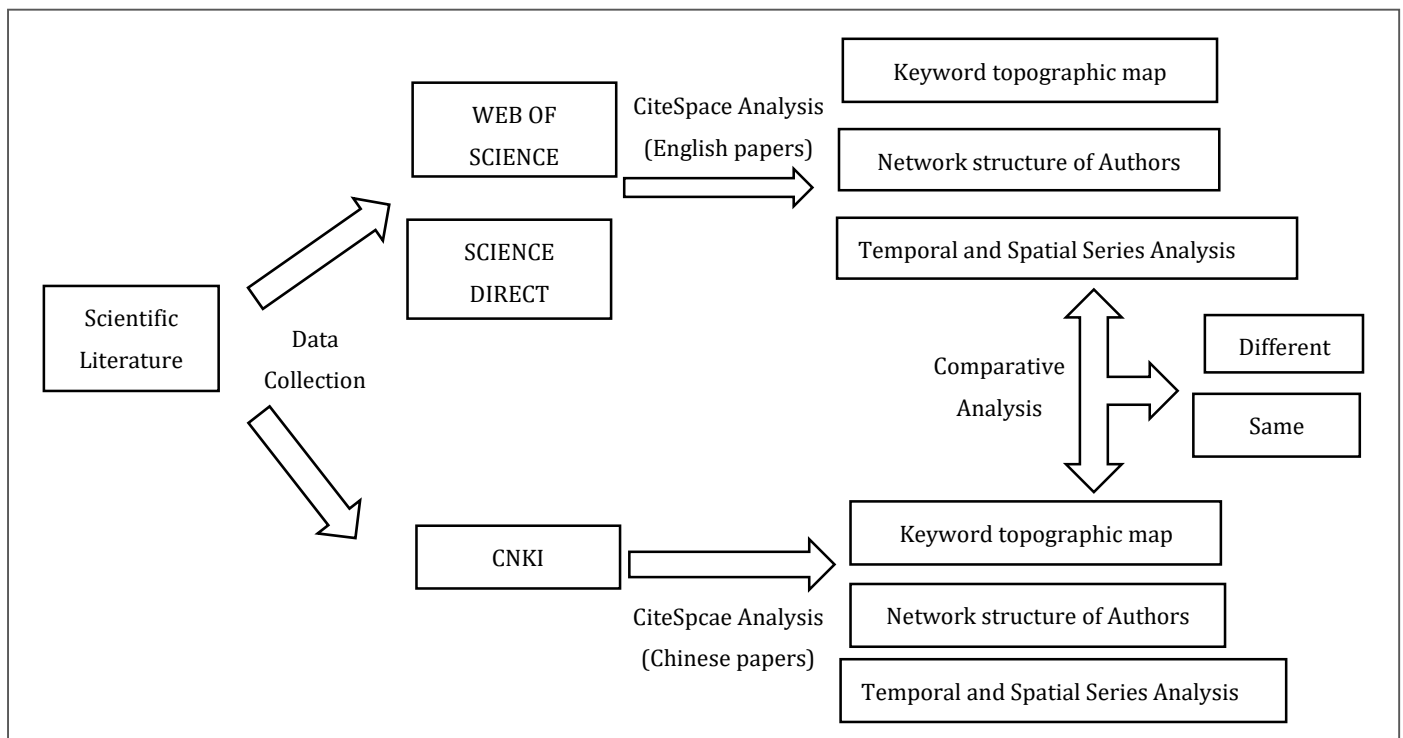

Fig. 1. Analytical framework to evaluate publications

3.1. Data Base Choice

The database used to appraise the publications was created from search engines and popular databases, such as Google Scholar, Science Direct, Springer and Web of Science (Leung, Law, Van Hoof, & Buhalis, 2013). Each data supplier has its benefits. McKercher, Shoval, and Birenboim(2012) argued that Google Scholar was helpful for citation analysis due to its immense database and ease of use. McKercher et al. (2012) attained data from Google Scholar, inclusive of 54 journals in hospitality and tourism, and utilized Publish or Perish software to suggest an influence ratio measure to evaluate the impact of the journals. Lee, Law, and Ladkin (2014) examined authorship, length, collaboration and citation counts in chosen publications by using data from Google Scholar. Published journals or conference proceedings can also be useful benchmarks when assessing the articles' quality. However, Google Scholar was criticized for its incorrectness and replication issues (Lu & Stepchenkova, 2015). Secondly, Google continually changes its interface and algorithm, chiefly in the ranking of historical data, and thirdly (Pan & Li, 2017), Springer databases can produce issues with missing information during the procedure of collecting information. The database retrieved from Web of Science was regularly used by existing studies due to its extensive coverage and authority (Li et al., 2017). In addition, Li and Law used Science Direct and the Web of Science for data collection in 2020 and developed the results (Li & Law, 2020). So this paper used the Web of Science and Science Direct for English data collection. In addition, CNKI database was used for Chinese papers collection (Feng, 2017).

3.2 Data Collection

Records of conference proceedings, editorials and reviews in Web of Science up to 2020, each contain a number of pertinent

attributes of the publication, such as authorship, number of citations, journal published and references cited. Applicable keywords and search engines ought to be chosen for the search in order to collect an entire data set. Firstly, keywords must be significantly linked to a particular topic. Consequently, we used the term "smart tourism" as a keyword because it expresses the appropriate subject matter of the chosen publication. Secondly, the search engine must give authoritative and accurate results. Thus, we selected Web of Science as our main search resource because it retrieves publications from Science Citation Index, Social Science Citation Index, the Index, Social Science Citation Index, Arts and Humanities Citation Index and Publications from the New Sources Citation Index, Index to Citations and the Emerging Sources Citation Index. To make possible the comparative design, two separate data connected to smart tourism were acquired, a total of 469 papers. In addition, the Science Direct Citation Database was chosen for the literature supplement, and CNKI database was used for collection of Chinese papers, a total of 2835 papers.

3.3 Data Collection Steps

Aguinis, Ramani, and Alabduljader (2018) systematic valuation procedure was used to make certain of methodological transparency in this bibliometric analysis, with a focus on smart tourism. This study intercepted five steps of the methodology to investigate (Figure 2) (Aguinis et al., 2018).

The first step was to decide on the reason for the review, which was to use bibliometric analysis to scrutinize the knowledge development in smart tourism research.

Zhang, Wang, Hao and Yu (2016) conducted an appraisal of the literature on smart tourism in the Chinese academic research community using the Chinese Academic Journals Database (CAJD). Nonetheless, as this article just examined articles from China, is it

possible that the Chinese academic literature has a dissimilar conceptualization of smart tourism (Li et al., 2017). Other authors commented on the likelihood of the language of publication. Research articles written in English are more likely to be cited than non-English articles due to the fact that they can be read by a wider audience, and thus are more likely to have a bigger impact in academia (Di Bitetti & Ferreras, 2017). There is also evidence that there are smart tourism initiatives outside of China, as they can be found in other countries around the globe, including South Korea (Celdrán-Bernabeu, Mazón, Ivars-Baidal, & Vera-Rebollo, 2018) and European destinations such as Spain and the Netherlands (Boes et al., 2016). It is therefore essential to consider the overall development of the concept in a greater geographical context and to evaluate and contrast the studies of Chinese and foreign scholars, which will help to answer the first research question.

The second step in the review process was to choose the databases and develop sets for the bibliometric analysis. The Web of Science (WoS) core collection database was selected because it is apparently deemed to be the major database used by scholars of tourism (De La Hoz-Correa, Muñoz-Leiva, & Bakucz, 2018), in prior tourism reviews (Benckendorff, 2008; De La Hoz-Correa et al., 2018; Garrigos-Simon et al., 2018). The database offers access to numerous sub-databases, thus integrating a wide range of published articles (Garrigos-Simon et al., 2018). Due to this, there is a dearth of breadth of research in the tourism and hospitality science network (Benckendorff & Zehrer, 2013). Hence, the Science Direct database amplifies the dependability of the data and ensures a comprehensive database. Both databases are also compatible with bibliometric software, which is essential to make the analysis (Benckendorff, 2008). Additionally, the Chinese Academic Journals Database was chosen for the Chinese papers collection in line with preceding studies.

After choosing the chief database, the third step was to choose articles on smart tourism written in English. An online search and collection using Web of Science and Science Direct papers containing the keyword "smart tourism" was selected for the period January 2011 to December 2020.

The fourth step was to choose articles on smart tourism written in Chinese. The online search and collection using CNKI (China National Knowledge Infrastructure) containing the keyword "smart tourism" was chosen for the period January 2011 to December 2020.

This step was the specific choice of the documents. The period 2011 to 2020 was selected for the study to generate the database for analysis. The general database search results for the Smart Tourism study revealed a high proportion of conference proceedings and journal articles. As conference processes are not always subject to a detailed peer review process in comparison with journal articles and can be deemed less credible and relevant, only journal papers were collected as research documents (McKercher, 2018).

The fifth step involved the finalization of the documents to be used. In addition, in this stage, because a number of articles in the Science Direct database did not exhibit keywords to form the raw data for final use, 2 researchers cleaned the data from Science Direct and Web of Science and excluded 3 papers with no keywords.

3.4 Analysis Content

Firstly, authorship, keyword co-occurrence and temporal sequence clustering were analyzed using using CiteSpace. Secondly, comparative analysis was performed to form similarities and differences.
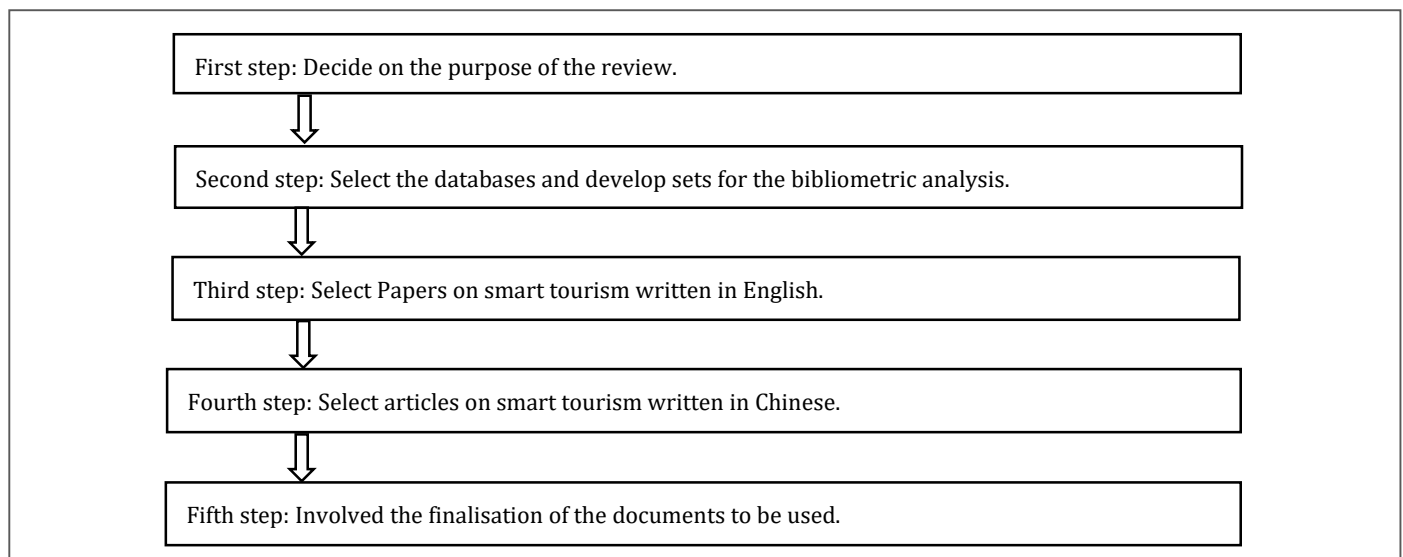

Fig. 2. Data collection steps

4. Analysis Results

4.1 CNKI Analysis

4.1.1 Keywords Co-occurrence Analysis

In the keyword co-occurrence analysis, the keywords that appeared were ranked according to rate of recurrence and 15 key subject terms were screened (Table 1). The hot areas of smart tourism research in China are largely focused on the construction and application level of smart tourism (Feng, 2017), that is centered on the development of technology and techniques (big data, informatization, Internet of Things, cloud computing, etc.),

management decisions and applications in different scenarios (e.g., cultural tourism, ecotourism and rural tourism) (Figure 3).

4.1.2 Temporal and Spatial Series Analysis

In the time-series analysis and time-zone map analysis, 10 themes with smart tourism as the core were formed, focusing on the years 2014-2018 (Table 2, Figure 4 and Figure 5). It was verified that the hot spot areas of smart tourism research in China are mainly focused on the construction and application level of smart tourism (Feng, 2017), complemented by two new themes of talent development and tourism resources.

Table 1. Keywords co-occurrence analysis (CNKI)

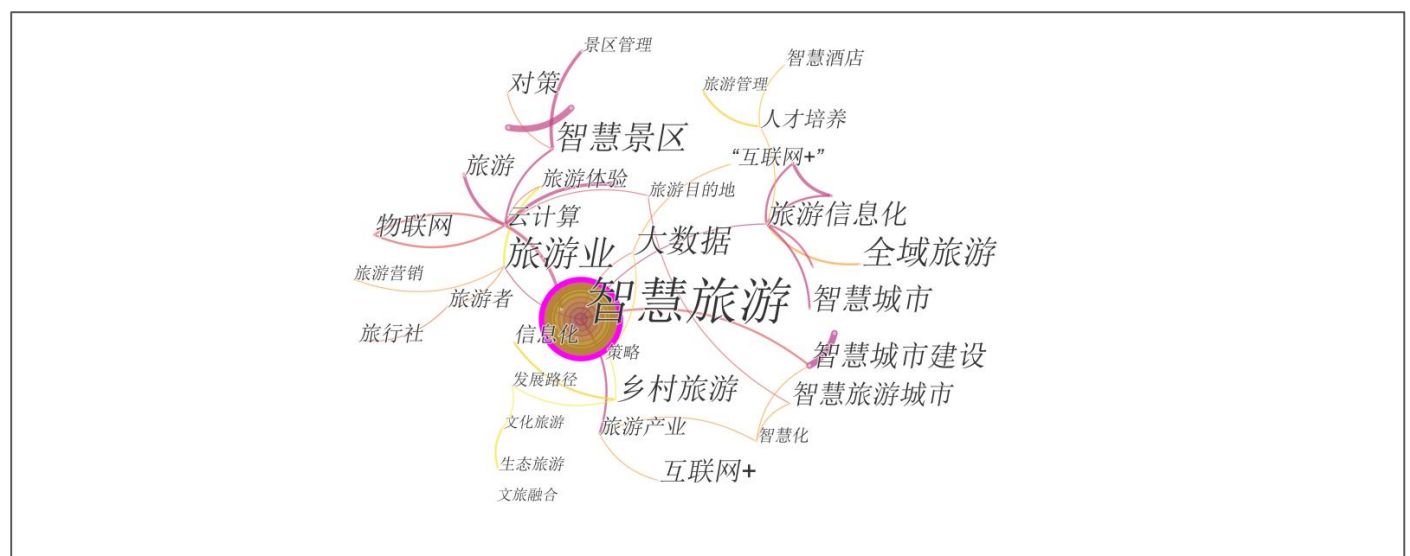| No.	Frequency	Degree centrality	Centrality	Keywords	Keywords（English）
1	1891	6	1.05	智慧旅游	Smart Tourism
2	179	4	0.65	旅游业	Tourism Industry
3	120	3	0.16	智慧景区	smart famous scenic site
4	115	1	0	全域旅游	All-for-one Tourism
5	106	3	0.16	大数据	Big Data
6	76	1	0	智慧城市	Smart City
7	66	3	0.3	乡村旅游	Rural Tourism
8	59	3	0.14	智慧城市建设	Smart City construction
9	49	7	0.57	旅游信息化	Tourism Informatization
10	42	1	0	互联网+	Internet +
11	41	2	0.09	智慧旅游城市	Smart Tourism City
12	37	1	0	对策	Countermeasure
13	36	1	0	物联网	Internet of Things
14	31	7	0.54	云计算	Cloud Computing
15	30	1	0	旅游	Tourism

Fig. 3. Keywords co-occurrence analysis (CNKI)

Table 2. Temporal and spatial series analysis (CNKI)

| No.	Frequency	Centrality	Year	Theme	Theme (English)
0	37	0.93	2015	智慧旅游	Smart Tourism
1	22	0.976	2014	文化旅游	Culture Tourism
2	22	0.986	2014	信息化应用	Application of Informatization
3	19	0.943	2016	大数据	Big Data
4	18	0.971	2015	旅游产业	Tourism Industry
5	18	0.985	2014	智慧城市	Smart City
6	17	0.986	2016	人才培养	Cultivation of talents
7	17	0.965	2015	智慧旅游城市	Smart Tourism City
8	16	0.98	2014	旅游供应链	Tourism Supply Chain
9	15	0.977	2018	互联网+	Internet +
10	14	0.901	2015	旅游资源	Tourism Resources
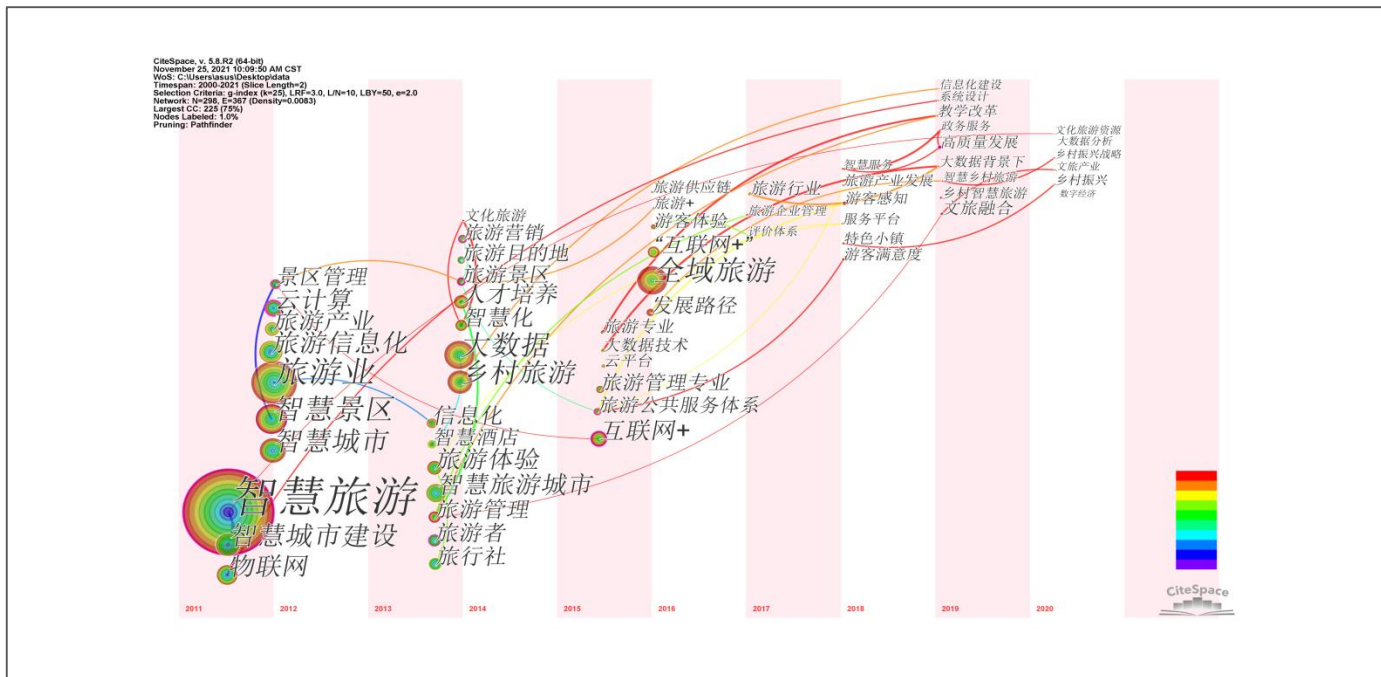
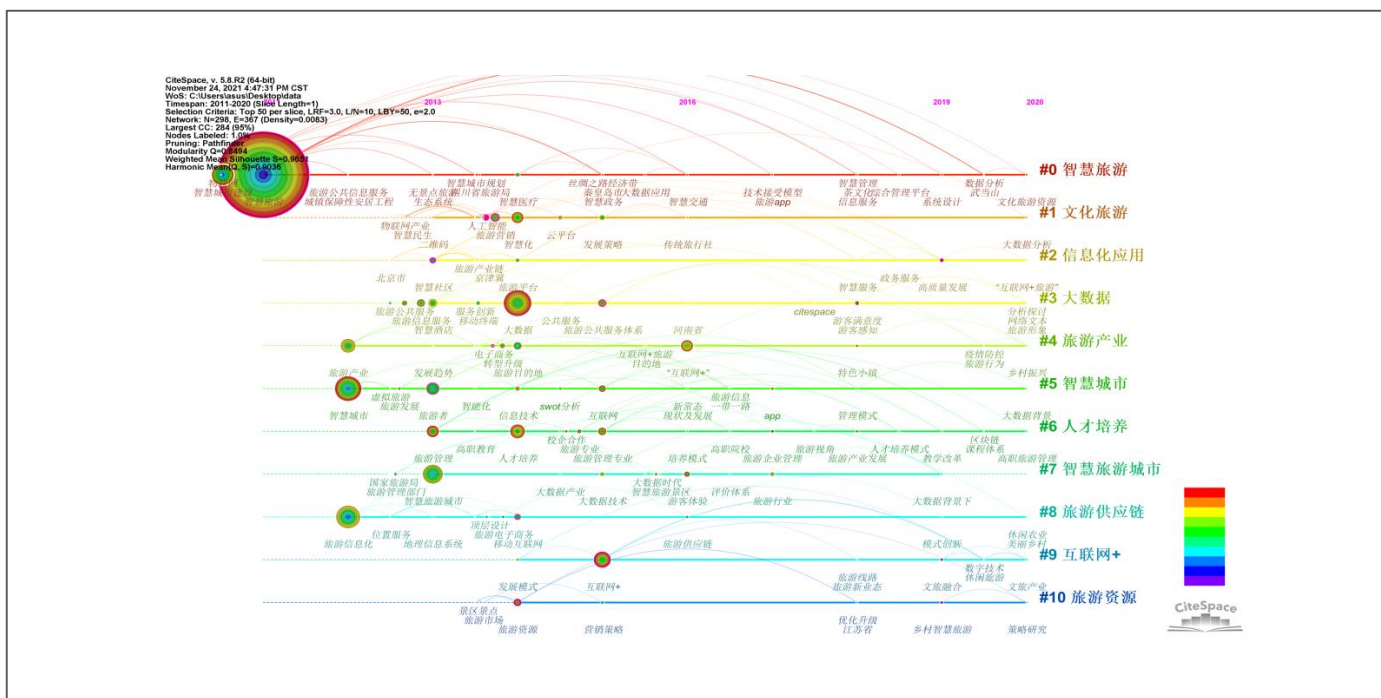**Fig. 4.** Time zone cluster analysis diagram (CNKI)

Fig. 5. Temporal and spatial series analysis (CNKI)

4.1.3 Author Network Analysis

For the author collaboration network, since the collaboration between authors is reciprocal, the edges shaped by the node connections are undirected (Table 3 and Figure 6) By comparing the results of CNKI database analysis of CSSCI papers we discovered that the author collaboration network formed by analysis of all papers is not accurate; only Yao, Guozhang overlaps

with the analysis of CSSCI papers. Zhou, Bo and Li, Yunpeng only show on the legend (Figure 6 and Figure 7), the study found that although China has many famous scholars of smart tourism, such as Chen, Wanming; Liang Changyong; Wang, Hongqi et al. (Table 4), but do not show up in the author list(Table 3). One potential reason is that a dependable network of author collaborations has not yet been created in China and young people publish a lot of papers.

Table 3. Author analysis (CNKI)

No.	Frequency	Degree centrality	Author
1	8	4	Wang, Keyue
2	7	4	Hao,Ying
3	7	4	Xie,Ran
4	7	4	Yue,Pinying
5	7	4	Guo,Xiang
6	6	0	Liu,Jiafeng
7	6	0	Yao,Guozhang
8	6	0	Sun,Hongjuan
9	5	0	Ge,Jingjing
10	4	1	Chen,Nan

Table 4. Author analysis (CNKI - CSSCI)

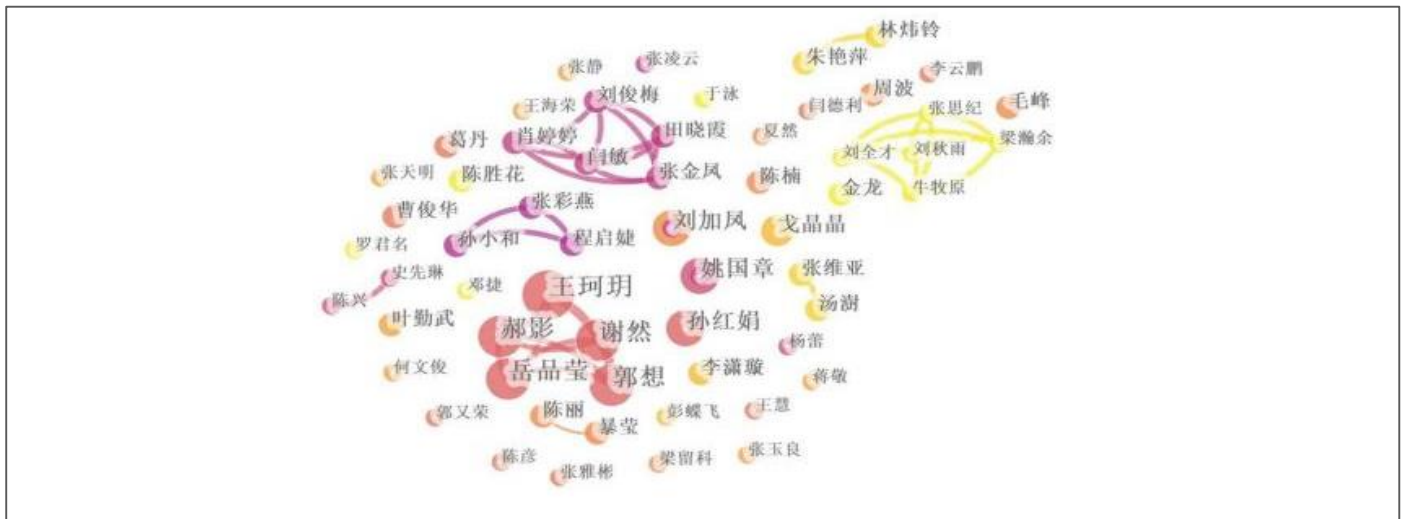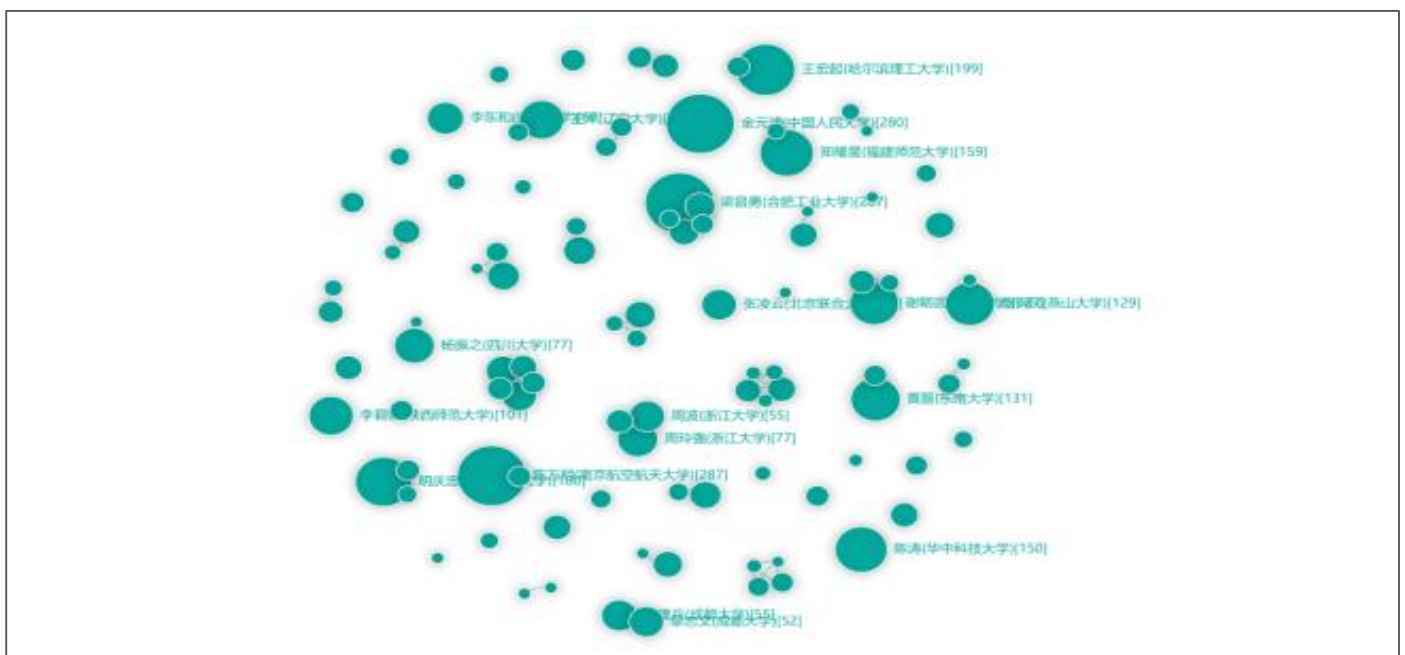| No.	Citations	Author（English）	Author(Chinese)
1	287	Chen, Wanming	陈万明
1	287	Liang, Changyong	梁昌勇
3	280	Jin, Yuanpu	金元浦
4	199	Wang, Hongqi	王宏起
5	159	Zheng, Yaoxing	郑耀星

Fig. 6. Author network analysis (CNKI)

Fig. 7. Author network analysis (CNKI CSSCI PAPER). Source: CNKI Database Analysis Results

4.2 Web of Science and Science Direct Analysis

4.2.1 Keywords Co-occurrence Analysis

According to the keyword path calculation method, the co-occurrence frequency and centrality of keywords were planned to attain the keyword co-occurrence knowledge map of "smart tourism" (Figure 8).

The dimension of the circles represents the frequency of keywords, and the thickness of the lines between the circles represents the frequency of co-occurrence between keywords (Table 5). The larger the circles of keywords are, the greater the attention of the field by researchers is. From the chart, it can be summarized that the present research on smart tourism in English papers mostly focuses on: research on smart tourism technology application, management of scenic areas, consumer experience and sustainable development.

4.2.2 Temporal and Spatial Series Analysis

In the time-series analysis and time-zone map analysis, 10 themes were developed with smart tourism as the nucleus, focusing on the years 2015-2018. Studies in the English papers focused on smart city building, and sharing economy, innovation and consumer experience platforms (Table 6, Figure 9 and Figure 10).
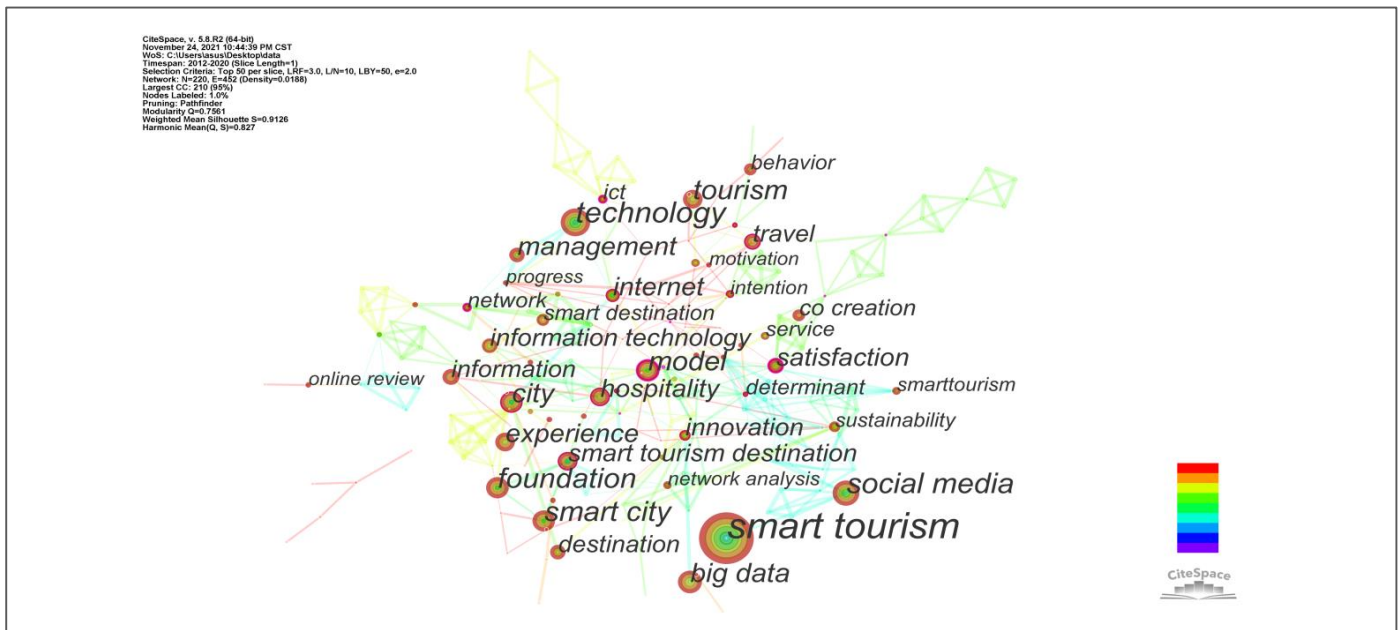

Fig. 8. Keywords co-occurrence analysis (Web of Science and Science Direct)

Table 5. Keywords co-occurrence analysis (Web of Science and Science Direct)

No.	Frequency	Degree centrality	Centrality	Keywords
1	163	1	0.07	Smart Tourism
2	50	3	0.01	Technology
3	48	7	0.1	Social Media
4	44	5	0.03	Smart City
5	41	4	0.01	Foundation
6	37	2	0.02	Tourism
7	37	11	0.26	Model
8	36	2	0.03	Big data
9	34	5	0.11	City
10	32	4	0.02	Management
11	31	1	0.03	Experience
12	30	6	0.19	Internet
13	29	4	0.1	Hospitality
14	29	14	0.33	Satisfaction
15	27	8	0.16	Smart Tourism Destination
16	27	3	0.02	Information technology
17	25	6	0.15	Innovation
18	24	4	0.03	Information
19	23	5	0.12	Travel
20	23	2	0.01	Destination
21	23	1	0.07	Impact
22	20	1	0.04	Co-creation
23	17	14	0.22	System
24	15	2	0.02	Smart Destination
25	15	10	0.13	Determinant
26	15	14	0.37	Network
27	15	6	0.24	China
28	15	9	0.22	ICT

Table 6. Temporal and spatial series analysis (Web of Science and Science Direct)

| No.	Frequency	Centrality	Year	Theme
0	22	0.911	2016	Healthcare Tourism
1	22	0.895	2016	Network analysis
2	20	0.812	2018	Social Media
3	20	0.985	2017	Recommender Systems
4	18	0.942	2016	Elaboration likelihood model
5	16	0.792	2017	E-tourism
6	15	0.921	2015	Hotel Industry
7	13	1	2017	Innovation
8	12	0.822	2017	Smart City
9	12	0.917	2015	Augment Reality
10	12	0.929	2017	Sharing Economy
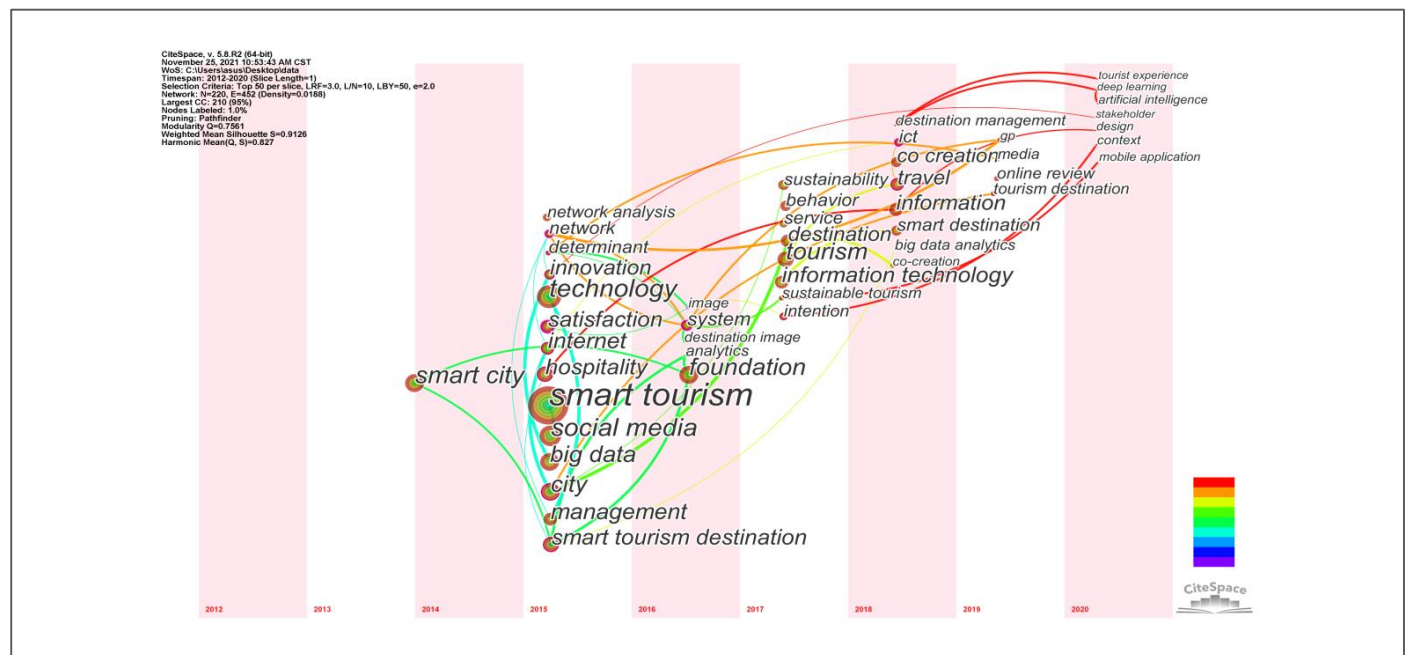
Fig. 9. Time zone cluster analysis diagram (Web of Science and Science Direct)
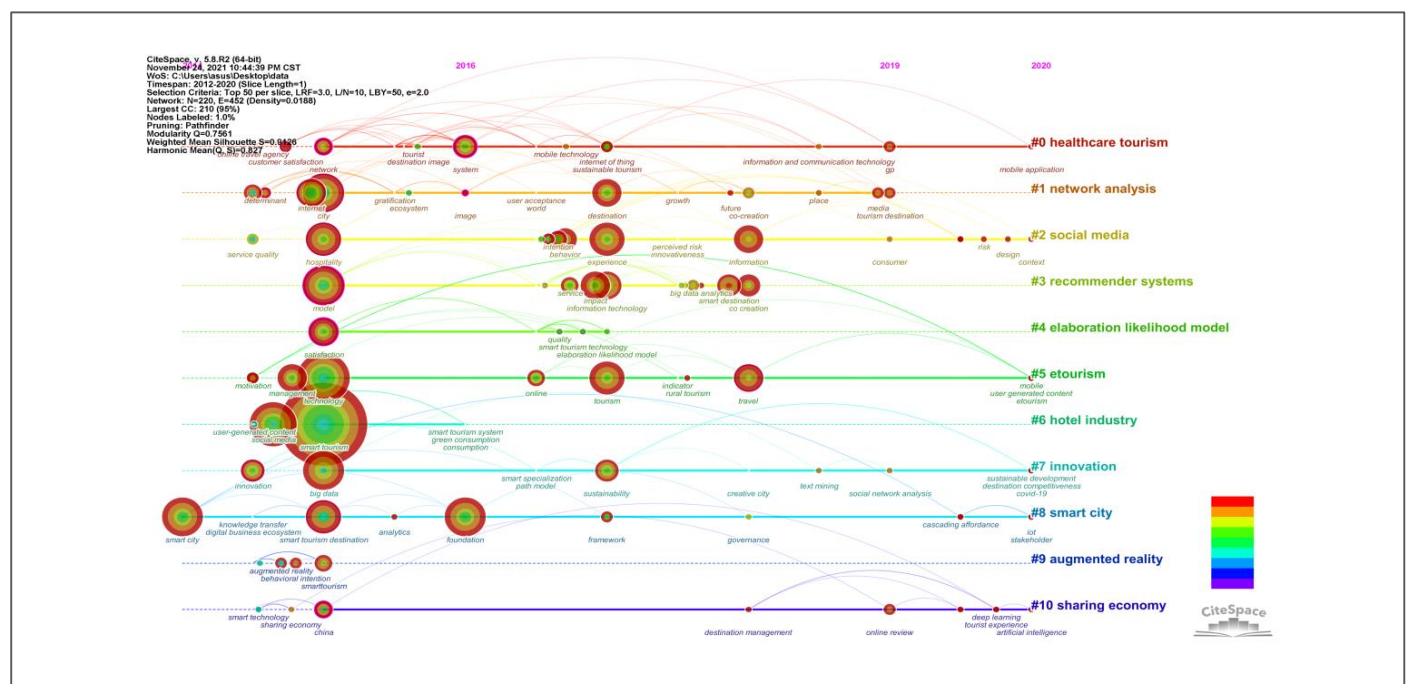

Fig. 10. Temporal and spatial series analysis (Web of Science and Science Direct)

4.2.3 Author Network Analysis

For the author collaboration network, the edges formed by the node connections were undirected because the collaboration between authors was mutual (Figure 11).

The analysis revealed NAMHO CHUNG, CHULMO KOO, ULRIKE GRETZEL, HEEJEONG HAN, KICHAN NAM, ROB LAW, HYUNAE LEE, DIMITRIOS BUHALIS, JINYOUNG KIM and SANGWON PARK as core authors (Table 7), and formed an effective author collaboration network.
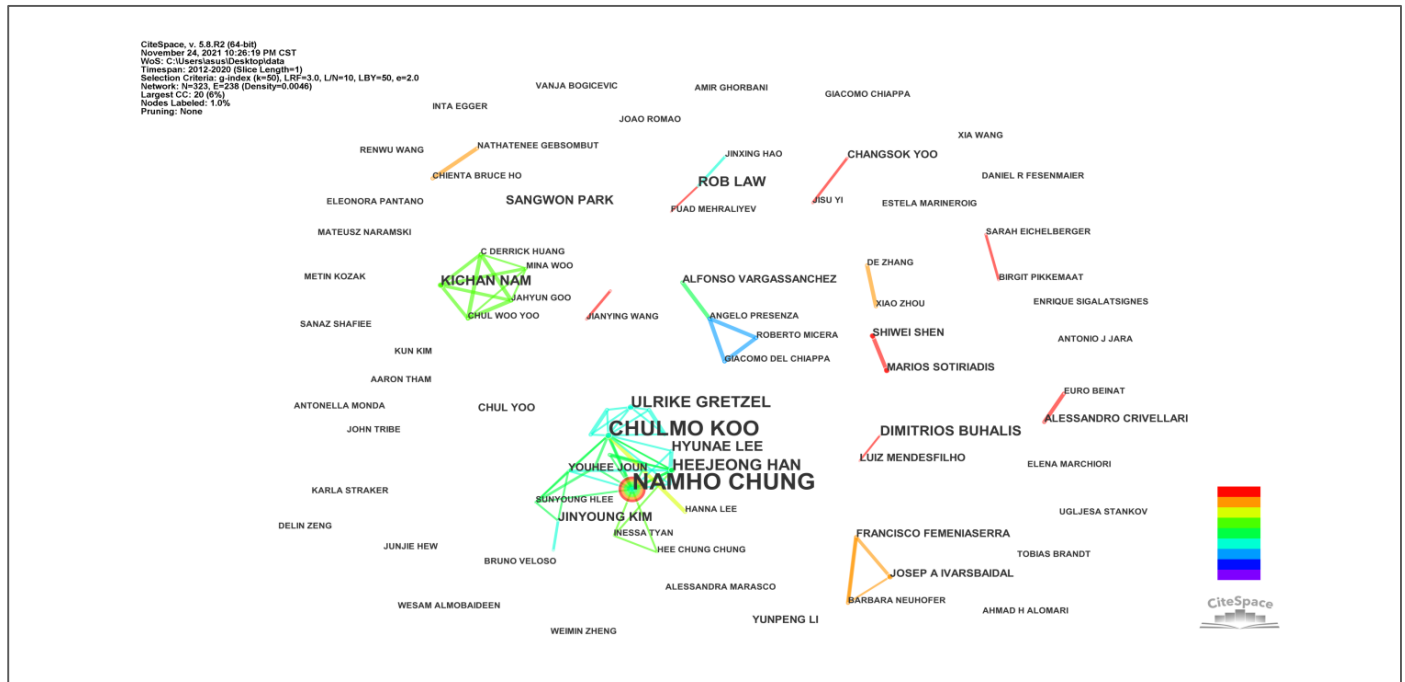

Fig. 11. Author network analysis (Web of Science and Science Direct)

Table 7. Author network analysis (Web of Science and Science Direct)

No.	Frequency	Degree centrality	Author
1	22	11	NAMHO CHUNG
2	15	13	CHULMO KOO
3	7	5	ULRIKE GRETZEL
4	7	6	HEEJEONG HAN
5	5	4	KICHAN NAM
6	5	7	ROB LAW
7	5	3	HYUNAE LEE
8	5	3	DIMITRIOS BUHALIS
9	4	3	JINYOUNG KIM
10	4	1	SANGWON PARK

4.3 Comparative Analysis of Studies

4.3.1 Analysis of Commonalities

Chinese and English papers shared a number of similarities. Firstly, the hotspot area of smart tourism research is mostly focused on the level of smart tourism and application (Feng, 2017), and smart tourism mainly focuses on the development of technology and techniques (big data, informatization, Internet of things, cloud computing, etc.) and the application of diverse scenarios; secondly, the hot spot area of smart tourism research in both Chinese and English papers is focused on 2015-2018; thirdly, both Chinese and English papers focus on the application of practice.

4.3.2 Analysis of the Differences

Chinese and English papers have several development differences. In the analysis of author cooperation network, the authors of English papers formed an efficient cooperation relationship network in comparison with the authors of Chinese papers. Amongst the research themes, the focus of Chinese papers was on the synergistic research of smart tourism and other tourism as well as talent training research, while the focus of English papers was on the quantitative analysis of tourists' experience and formed a model framework. In addition, the English papers focused more on actual cases, while the Chinese papers focused more on the construction and application level of smart tourism.

5. Discussion of Research Trends

5.1 Technology-Oriented Smart Tourism Research

Smart tourism destinations are regarded as a form of tourism destinations built on an advanced technological infrastructure that can smooth the progress of interaction between tourists and their destinations, enhance the quality of the experience, and thus realize sustainable development of the destination (Chen et al., 2021). A number of existing studies regard smart tourism

destinations to be characterized by all-embracing use of technology (Baggio & Valeri, 2020). Even though smart tourism is viewed as a new paradigm for the development of destinations, only a small number of studies of established smart tourism applications can be found, and the endorsement of additional applications of new technologies in smart tourism destinations still needs to be explored (Gomis-Lopez & Gonzalez-Reverte, 2020). In line with the results of the English papers analysis in this study, technology-oriented smart tourism research could become a new research hotspot.

5.2 Construction of a Hypothetical Research Framework for Smart Tourism

The studies already conducted have comprehensively investigated the wisdom of smart tourism in terms of its concept, construction and development system, R&D content, and application. Remaining at the level of conceptual and experiential macro studies, the relationship with the original pertinent hypothetical system is weak. In line with the analysis results of the English paper of this study, conducting in-depth case studies or forming a hypothetical system relationship may become a key issue for development.

5.3 Cross-Disciplinary Marketing Service Model of Smart Tourism

The analysis established that Chinese scholars focused more on interdisciplinary research in the field of cultural tourism and ecotourism, and foreign scholars focused more on research in the context of a shared economy. Future research may perhaps form realistic studies of diverse service contexts of smart tourism with diverse experiential approaches.

5.4 Collaborative Network Building Between Chinese and Foreign Scholars in the Field of Smart Tourism

Based on the analysis of all the papers in CNKI database and the comparison of CSSCI papers, it was established that a successful author partnership network was not formed in China. A comparison of local and foreign studies reveals that the distribution of smart tourism research scholars in China is scattered, the associations between academic scholars is weak, and there are not many prolific scholars, signifying that scholars in respected core fields have not thus far appeared. There are authoritative core authors in the field of smart tourism overseas, with a high density of association between scholars. China's smart tourism ought to play to its realistic strengths in future research, reinforce cooperation between scholars, and form authoritative core scholars. Additionally, Chinese scholars and foreign scholars may opt to work together internationally to form a global perspective on smart tourism research.

6. Research Contributions and Limitations

This study reflects on the development of knowledge about smart tourism and contributes to a more profound comprehension of the debates in this field. It discloses the development of smart tourism research through teamwork and what themes can be found when researchers collaborate. The analysis also investigates the reality of unseen academies and knowledge networks in the field of smart tourism through a graphical representation of the evolution of research. The unseen academies that drive the smart tourism dialogue are comparable to the associations that have been established. In addition, a comparative analysis of Chinese and English papers was conducted.

The major contribution of this study is that, firstly, it formed the analysis of keywords, major research areas and key authors in

the field for both Chinese and English papers. Secondly, this study discussed the results of the analysis of Chinese and English papers and formed the results of similarities and differences. Thirdly, this study formed the prediction of future research trends and development suggestions.

This study also has a number of limitations. Due to the chosen keywords, the study was unable to cover the entire range of research related to smart tourism in big data (Li & Law, 2020). Future research may integrate different relevant keywords to produce a wide-ranging database of smart tourism research from diverse providers. In addition, future research could apply machine learning methods, rather than only manual checking, to find and remove extraneous publications and enhance the effectiveness and correctness of database construction.

Declaration of competing interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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