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REVIEW

Enhancing Literature Review and Understanding Under Global Pandemic

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Abstract: As the continuous public health crisis, the communicable diseases of COVID-19, OMI and Monkeybox fallout are striking parallels to the whole world. The scope and duration of these disasters are unprecedented. The tourism industry has become one of the hit hardest industries, and research on tourism risks and safety of public health are more of big concerns in recent years. In this study, 751 SSCI articles on risk and tourism from 2008 to 2022 were selected through literature retrieval using the Web of Science core collection database, and visual analysis was performed using CiteSpace to show the knowledge evolution process, research hotspots and future trends in this field. The analysis results show that there has been an overall upward trend in the number of research studies on risk and tourism in the past 15 years. Secondly, there is an international trend toward cooperation between scholars. The main cooperation network centers are Australia, England, the United States and China. In addition, there are seven main clusters of research topics in the field of risk and tourism. Finally, the change of research hotspots is also closely related to catastrophic events. After the outbreak of the COVID-19, public health and the recovery of the tourism industry has attracted more and more scholars' attention. By examining and analyzing the research content of risk, public health and tourism studies over the past 15 years, this study provides suggestions for the risk management of tourism and tries to predict the new development trend of tourism in the post-COVID-19 era.

Keywords: risk, public health, tourism sustainable development, post-covid-19, bibliometrics, CiteSpace

Introduction

Risk is inherent in our life, and is also present in the context of tourism.[1] However, the sensitivity of the tourism industry and the uncertainty of tourism risks have made the tourism industry extremely vulnerable to various risks.[2,3] Risks such as terrorist attacks, political unrest, economic downturns, biosecurity threats and natural disasters can all hit tourism hard.[4] Therefore, how to effectively prevent and resolve tourism crisis through crisis management and crisis communication is of great significance to the overall improvement of social crisis management and sustainable social development.[5]

Since the COVID-19, a major international public health event, it has hit all sectors of the globe hard, and the tourism industry as well. The COVID-19 crisis has impacted global travel and tourism even more than any other sector in the world.[6] According to statistics comparing the year 2020 to 2009, the number of international tourists reduced by 74%, and the loss of export income caused by the collapse of international travel was approximately USD 1.3 trillion, which was more than 11 times the loss during the global economic crisis in 2009.[7] A gradual recovery in travel demand has begun as vaccine coverage and inoculation rates increase, although it will take considerable time to return to pre-covid-19 levels.[8]

In a series of major crises and disasters such as the 9/11 terrorist attacks, SARS, and Indian Ocean tsunami have dealt a severe blow to the tourism industry, which has led scholars to focus on the study of risk and tourism, a concern that reached its peak after the COVID-19 epidemic. In addition to the heavy economic blow that risk can inflict on tour operators, it can also have an impact on the psychology of tourists, which in turn can change their behavior.[9,10] After the COVID-19 pandemic, due to public health anxiety, tourists perceived more health risks than before, so there were three changes in tourism modes: from general to exquisite, from open to closed, and from radical to conservative.[11] Tourists

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began to prefer short-distance travel as individuals or small groups, and preferred to minority destinations.[12] In particular, natural-based and eco-tourism has become a trend after the pandemic.[13] In order to further promote the sustainable development of tourism, Fenitra et al[14] believes that after the COVID-19 pandemic, more emphasis should be placed on the responsible behavior of tourists, which will contribute to the healthy development of tourism. In the current situation where the COVID-19 pandemic is normalized, the psychology of travelers has also undergone a social change from health anxiety to getting used to the new.[15] In addition, crises such as terrorist attacks and natural disasters will also damage the image and reputation of tourist destinations, among which media reports play an important role in building the image of destinations in crisis, as it has the ability to aggravate or mitigate the impact of the situation.[16]

Although the research on tourism risk is increasing rapidly, there are still few reviews on tourism risk research, with those in existence mainly focusing on specific research areas of risk and tourism, such as the impact of the tourism crisis on tourism destinations and tourism[17,18] or gender differences in tourism risk perception,[19] and so on. There is a lack of research on the overall scientific structure of risk and tourism. In addition, although an increasing number of articles use CiteSpace to visually analyze the literature, its application in the field of risk and tourism is still limited.

Given the fragility and instability of tourism industry, risk research has been particularly concerned with the shadow of the COVID-19. Regular literature reviews are important for understanding the evolution of knowledge for academic researches.[20] Therefore, review articles are indispensable pieces of tourism risk and disaster science. Given the diversity of tourism risk research, this study aims to present the evolution of knowledge, research hotspots and future trends in this field through a visualized bibliometric analysis of the literature on risk and public health in the context of tourism between 2008 and 2022. Our analysis is expected to answer the following research questions: RQ1. Which journals, authors, institutions and countries have the highest bibliometric impact on risk and public health literature? RQ2. What are the key trends in risk and public health literature in tourism?

Literature Review

Risk and Public Health in Tourism

Tourism risk is defined as "any occurrence which can threaten the normal operation and conduct of tourism related businesses; damage a tourist destination's overall reputation for safety, attractiveness and comfort by negatively affecting visitors' perceptions of that destination; and, in turn, cause a downturn in the local travel and tourism economy and interrupt the continuity of business operations for the local travel and tourism industry by the reduction in tourist arrivals and expenditures.[21]

Public health was largely seen as the partnership of science and art to prolong lifespan and improve health care through organized social activities.[22] However, the realization of public health system depends on adequately addressing risks that endanger human health.[23] Therefore, public health activities and risk reduction have an inseparable relationship. The well-trained publics and their activities on a broad range may contribute to improving health care services and reducing relevant risks.[23] In this article, public health was developed to identify individuals at risk of public health events and their responses, which are essentially needed.

Specifically, risks can be divided into subjective and objective risks according to their nature, which can be considered from the perspective of tourists, tour operators or destinations.[1] From the perspective of subjective risk, researchers mainly focus on the impact of different tourists' risk perception regarding their travel behavior. Some scholars have paid attention to gender differences in the risk perception of subjects, and studied the risk perception and travel safety of female tourists.[24–26] Chew and Jahari[27] focused on the impact of tourism risk perception on the image of tourism destinations. From the perspective of objective risks, scholars are concerned about the impact of different risks, such as economic crisis, political crisis and public health on the tourism and hotel industry.[28–30] In addition to the direct impact of risks, there is also concern about the role of social media in the spread of the crisis and its impact on destinations.[31] Given that tourism is vulnerable to risks, some scholars have proposed that tourism operators and tourist destinations should carry out risk management to enhance disaster resilience and reduce losses.[32] Overall, research on risk in the context of tourism has made some achievements, which are very extensive and interdisciplinary, involving collaborations with researchers from psychology, medicine, geography and other disciplines. After the public health

event of COVID-19, risk research has received unprecedented attention. It's necessary to organize and review the literature related to risks and tourism.

Crisis Management and Tourism Sustainable Development

The best way to manage crises is to prevent them, and the best way to prevent them is to anticipate them.[33] Crisis and disaster management is critical in order to reduce impacts and shorten recovery times at the organizational and destination levels. The degree of exposure and vulnerability to disaster risks and the level of risk management also determine the tourism competitiveness of a region.[34] Moreover, crisis management is a complex process involving multiple stages and involves different stakeholders, whose responses to risks may be influenced by their location and relationships with other players in the industry,[35] Effective crisis and disaster management usually consists of three steps: (1) planning and preparedness activities prior to a crisis or disaster; (2) Coping strategies in case of crisis or disaster; (3) Evaluation and improvement after the crisis or disaster.[36] The crisis management policies of the destination government and tourism industry, as well as the publicity and marketing activities during the risk period, play a crucial role in the recovery of tourism after the risk.[37]

Crisis management is closely related to the sustainable development of tourism, Roe et al[38] developed a three-stage risk assessment model, that is, assessment, evaluation and management to assess the environmental sustainability of tourism. The United Nations World Tourism Organization defined sustainable tourism as "Tourism takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities".[39] Sustainable tourism aims to protect the environment, maintain cultural integrity, establish social justice and promote economic benefits, and meet the needs of people in terms of improving their standard of living, it emphasizes both the sustainable growth of tourism's contribution to the economy and society, and the sustainable use of resources and the environment.[40] In the context of the current Covid-19 outbreak and the high risk of future pandemics, balancing public health issues with tourism development issues is a new challenge for sustainable tourism.

Materials and Methods

Data Analysis

CiteSpace is a scientific literature analysis tool jointly developed by Dr. Chaomei Chen from the College of Information Science and Technology of Redsell University and the WISE laboratory of Dalian University of Technology. It can be used to explore the dynamic changes of a research field from the emerging trends and abrupt changes to the intellectual bases to explore the key path and knowledge turning point of the evolution of the subject field.[41] Compared to other software, CiteSpace has a strong advantage in detecting emerging research frontiers and intellectual turning points through citation burst algorithms that identify keywords or articles that have received a spike in citation counts over a specific period of time.[42]

CiteSpace can perform collaborative network analysis, co-citation network analysis, and co-occurrence network analysis on the selected documents. The map distinguishes the merged network using nodes and connections of different colors. The color of the network connection indicates the year when the co-citation connection was first established. The change of lines from cold to warm colors represents the change of time from early to recent. In addition, Burst detection determines keywords or articles with surged frequency counts; thereby identifying new emerging research fronts and key turning points in a certain period.[42] The nodes are composed of "tree rings" of different colors. The thicker the rings, the more times the article has been cited. Red circles indicate citation burst, which means that the number of citations in a year has increased sharply, and purple rings indicate the degree of centrality between the nodes. Centrality quantifies the important position of a node in the network by measuring the percentage of the number of shortest paths in the network to which a given node belongs.[41] Nodes with high centrality (>0.1) connect one conceptual cluster with another conceptual cluster.[42] The reason why CiteSpace has specifically marked the red and purple nodes is because they are the characteristics of important scientific discoveries. Moreover, CiteSpace provides three visualization views of clustering, timeline and time zones to show the dynamic bibliometric networks. The clustering focuses on the knowledge structure

and patterns of different research topics, while similarity layouts present by timeline and time zones. The former reveals topic clusters on the horizontal timeline, the latter describes the evolution trend of each research topic over time and the relationship between the fields.[41] This research is based on CiteSpace using the following analysis methods: the analysis of the co-authorship network and collaboration network between authors' countries, co-citation analysis of cited references and co-occurrence analysis of keywords.

Bibliometrics is the quantitative study of physical publishing units or bibliographic units or their substitutes.[43] Bibliometric analysis aims to detect the scientific structure and evolution process of a certain research field. Citation analysis within bibliometric analysis is the core technical process, involving the matching of citing reference and cited reference, followed by the membership relationship between publications and research institutions behind them.[44] Bibliometrics methods are to assess the performance of individuals and institutions in research and publish, or to map the structure and evolutionary dynamics of science,[45] and it encourages researchers to identify publishing activity, citation impact, scientific collaboration, and co-occurrence networks.[46] Bibliometric methods are complementary to traditional and structured literature reviews. Bibliometrics analyses progress a quantitative perspective for literature reviews, which can envision the knowledge domain and rigor of literature analysis, thereby avoiding the subjective bias of researchers.[47] At present, bibliometric analysis has been widely used in various research fields, including tourism.[48,49]

Data Collection

The Web of Science Citation Database is the product of the American Information Science Institute (ISI). It is the largest comprehensive academic information resource covering most disciplines worldwide. It includes the most influential core academic journals in the social sciences, natural sciences, engineering technology, biomedicine and other research fields. WOS publishes the Journal Citation Report (JCR) every year, which contains the influence factors of the journal. The influence factors have become the universal journal evaluation index in the world. The articles selected in this study mainly come from SSCI indexed journals, which to some extent can represent a current situation and trend of mainstream research. Therefore, this article adopted WOS database. This study used "core collection" as the target database in August 2022, and combined "risk", "crisis", "disaster", "public health risk", "recover" and "COVID-19" with "tourism" for six subject retrievals, and the time span is from January 1, 2008 to August 13, 2022. Finally, "OR" was used to specify combinations of the above six retrievals, and a total of 4779 records were obtained. There were a total of 162 journal categories in the obtained records. Through preliminary screening, irrelevant journal categories were removed. Table 1 shows the top ten categories that were eliminated in the preliminary screening. After exclusion, selected the literature type as "article", "review", and the literature samples were reduced to 4183. Then, after reading the titles, abstracts and keywords, deleted literatures that were obviously irrelevant to the theme. Finally, 751 literature samples related to risk and tourism research topics were obtained.

Results

Network of Journals

Figure 1 shows the annual publication of tourism risk-related studies. According to the annual publication number, the 15 years can be roughly divided into three stages. The first is the embryonic period from 2008 to 2013, when the total

Table 1 Top ten Excluded Journal Categories

Journal Categories	Count	Journal Categories	Count
Marine Freshwater Biology	37	Medical Ethics	21
Education Educational Research	33	Energy Fuels	18
Health Care Sciences Services	24	Psychiatry	17
Information Sciences Library Science	24	Mathematics Interdisciplinary Applications	16
Engineering Environmental	21	Social Sciences Mathematical Methods	16

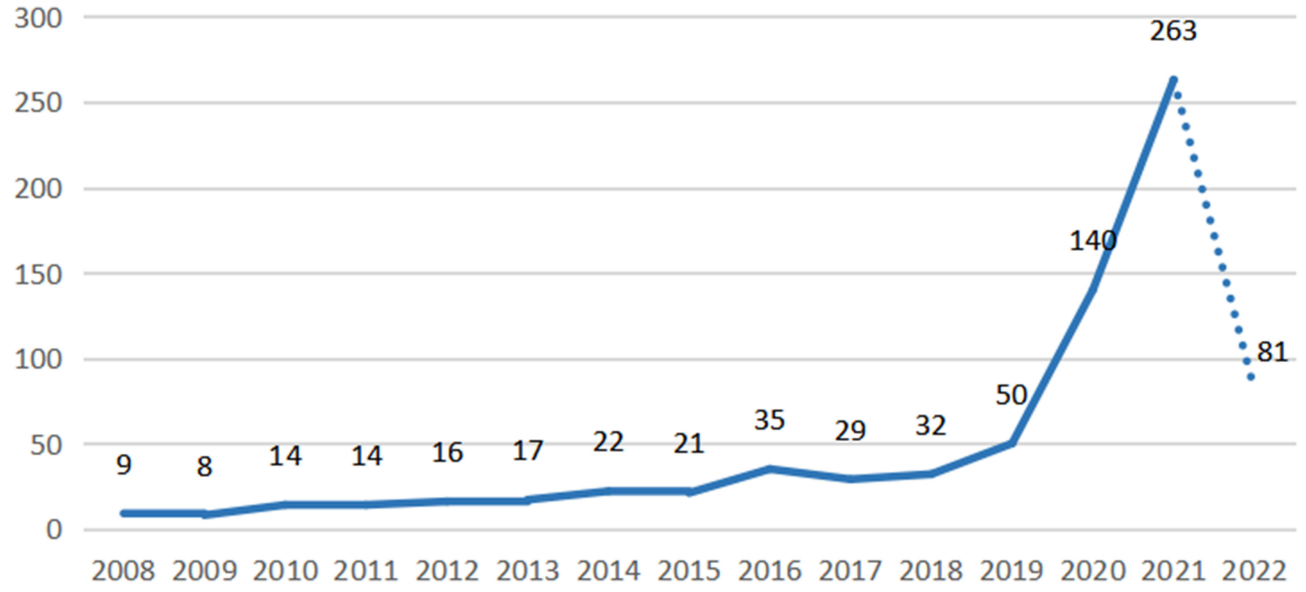

Figure 1 Yearly publication from Web of Science.

number of studies on risk and tourism was small, and annual publications totaled less than 20 studies. In 2010, there was a significant increase in the number of articles published, which was mainly based on previous global economic crises, terrorist attacks and natural disasters. The second stage is the exploratory period from 2014 to 2018. Compared with the previous stage, more articles were published and there was a slow upward trend, but the total number of articles was still small. The publication of articles in the first two stages remained below 32 articles. The third stage is the rapid development period from 2019 to the present. Affected by the COVID-19 pandemic, scholars began to pay attention to the research on risk and tourism, and the number of published papers also increased significantly; especially after 2020, the number of published papers suddenly increased to more than 140. Although the number of tourism risk articles published in 2022 as of August was 81, the research topics surrounding the COVID-19 epidemic have not diminished, and as the epidemic becomes more normalised, research on tourism risk is beginning to gradually shift towards the sustainable development and transformation aspects of tourism. More and more scholars have become aware of the significance of research on tourism risks and risk management for the sustainable development of the tourism industry. However, the overall number of studies is still small. With COVID-19 sweeping the world, there is still a lot of room for research in this field, whether currently or in the future.

Figure 2 shows the categories of journals that published tourism risk papers during the research period. We identified 106 journals and 32 journal categories based on journal citation reports provided by WOS. Most journals have more than one subcategories, we have listed the top ten journal categories with the most publications related to tourism risk, including Hospitality, Leisure, Sports and Tourism (533, 70.972% of the 751 articles), Management (204, 27.164%), Environmental Studies (165, 21.971%), Environmental Sciences (113, 15.047%), etc. These journals reflect the close relationship between tourism risk researches and the disciplines as management, economics, and environmental studies. The interdisciplinary efforts of risk and tourism research have become more apparent over effective time zones.

Figure 3 reveals a dual-map overlay of research topics between citing and cited journals in the field of risk and tourism research. The dual-map overlay function can show the field distribution of the journals to which the citing and cited journals belong, and the citation relationship between the two, thus revealing the intersection between the research field and other disciplines.[50] The vertical and horizontal axes of the ellipse in the figure represent the number of journals and the number of authors, respectively. It can be found that there is a wide intersection and integration between the risk and tourism field and various disciplines. There are two of the most dominant citation paths, the light blue path indicating

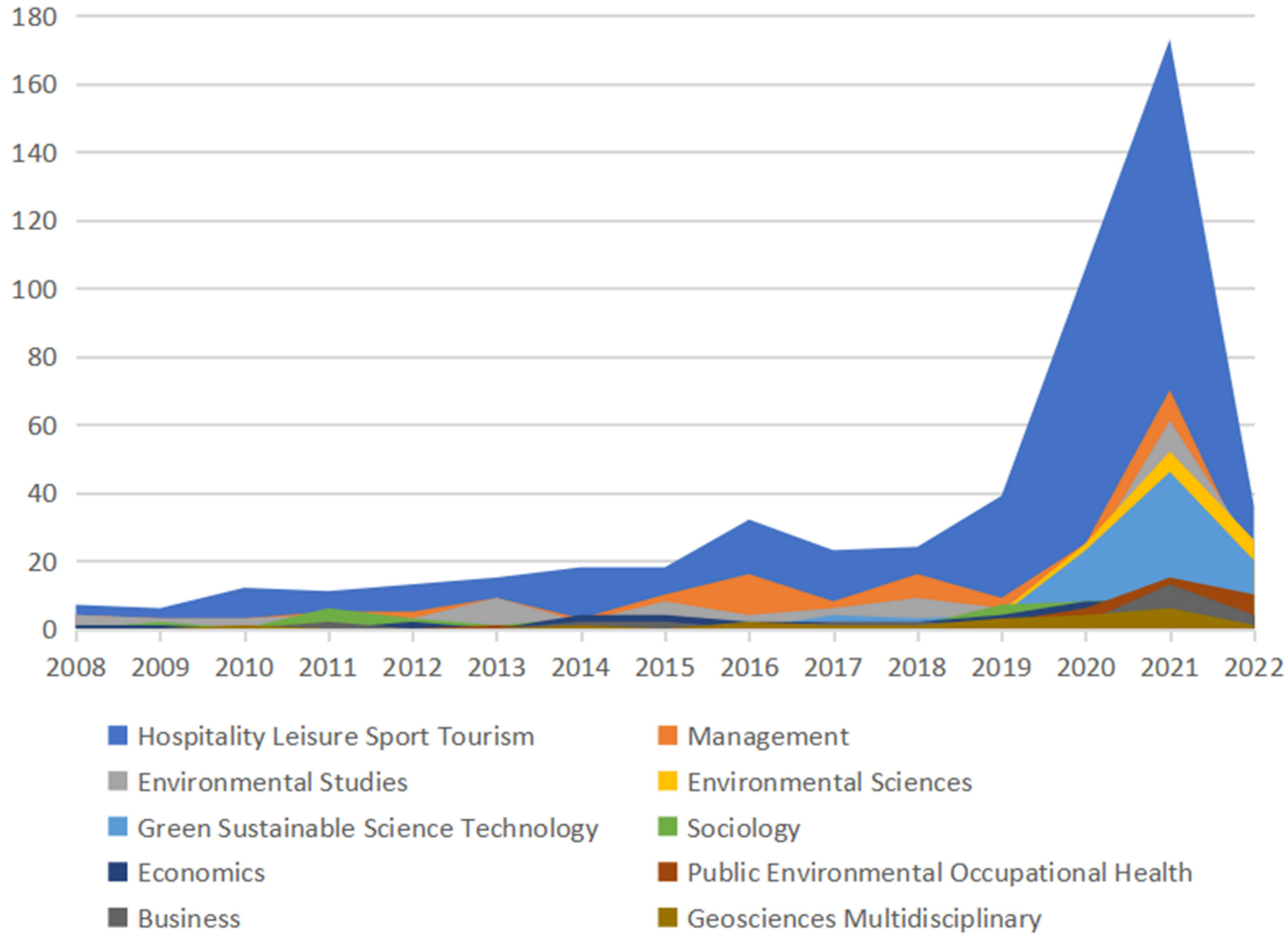

Figure 2 Annual article output in the top 10 subject categories.

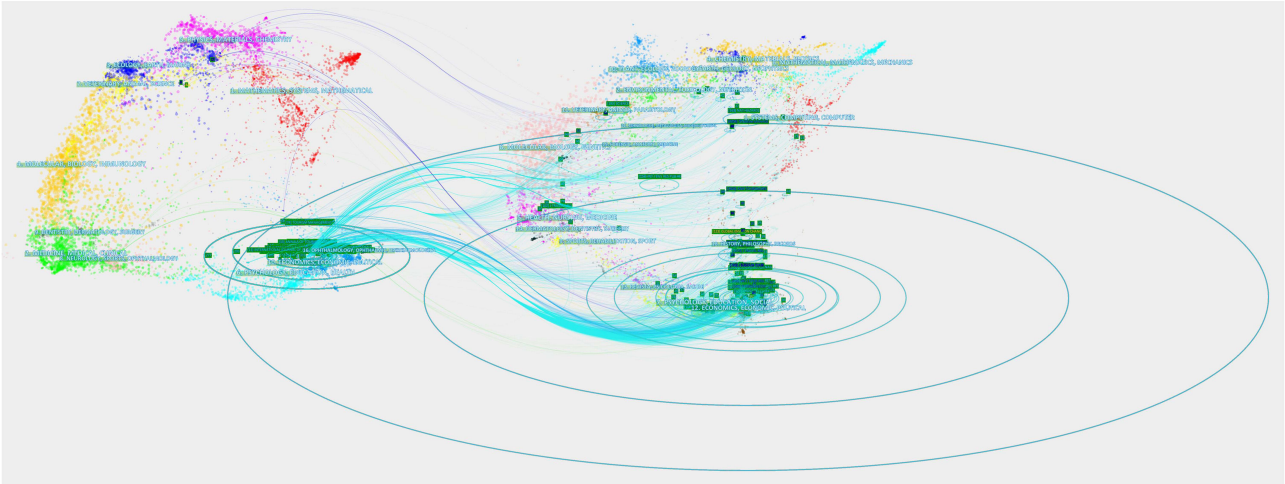

Figure 3 A dual-map overlay of journals that published work related to risk and tourism research.

that the literature published in the journals "psychology, education, health" is mainly quoted from "psychology, education, social" and "economics, economics, political", and these two cited fields contain a large number of cited articles.

Table 2 Top Journals in Risk and Tourism Research

Source Title	Total Publications	Citations	Citations per Publication	Impact Factor
CURRENT ISSUES IN TOURISM	88	670	7.61	7.578
SUSTAINABILITY	82	126	1.54	3.889
TOURISM MANAGEMENT	74	1192	16.11	12.879
JOURNAL OF HOSPITALITY AND TOURISM MANAGEMENT	37	189	5.11	7.629
TOURISM MANAGEMENT PERSPECTIVES	35	161	4.60	7.608
ANNALS OF TOURISM RESEARCH	33	459	13.91	12.853
JOURNAL OF DESTINATION MARKETING & MANAGEMENT	26	144	5.54	7.158
INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH	25	61	2.44	4.614
JOURNAL OF TRAVEL RESEARCH	24	340	14.17	8.933
ASIA PACIFIC JOURNAL OF TOURISM RESEARCH	24	55	2.29	4.074
Total	448	3397		
(%)	59.65	66.25		

Note: Self-compiled

Table 2 shows the top ten journals with the most publications. The publication of articles from these journals accounted for 59.65% of the total number of articles published, and the citations accounted for 66.25%, indicating that the quality of the research literature on risk and tourism in these journals is very high. Among them, Current Issues in Tourism is ranked first in the number of articles published. And the citations and citations per article of Tourism Management are the highest, which reflects the high impact of the journal and its publications. It is worth noting that although Journal of Travel Research and Annals of Tourism Research are not dominant in the number of publications on this topic, their citations per article are next only to Tourism Management.

Collaboration Between Authors

The analysis of co-authorship networks can reveal the cooperative relationship between authors in a research field. The co-authorship network in this study is relatively fragmented, but the clustering structure of author collaboration networks centered on Ritchie in Australia and Pennington-Gray in the United States is significant (Figure 4). The size of the node is proportional to the number of citations of the paper, and authors with a large number of publications are usually located at the center of the cooperative network. In the data of this study, Ritchie published the most articles (23 papers), followed by Pennington-Gray (11 papers).

The Impact of Institutions

Table 3 ranks the research institutions in the field of tourism risk research based on the number of articles cited. According to the number of publications and citations, the University of Queensland has the greatest influence in this field, followed by the Griffith University. Remarkably, despite the research institute of the University of Surrey having published only 21 articles, these articles have been cited a lot, with an average of up to 19.95 citations, indicating that the institute's research quality is very high. In addition to the characteristics of the number of studies, these institutions also have obvious characteristics in terms of regional distribution. Australia has the largest number of institutions, followed by China, and England.

Collaborations Between Countries/Regions

Figure 5 shows the collaboration network of the authors' countries/regions. The evolution of cooperation between countries/regions can be clearly seen through the timeline view, in which the horizontal axis is the time when the article

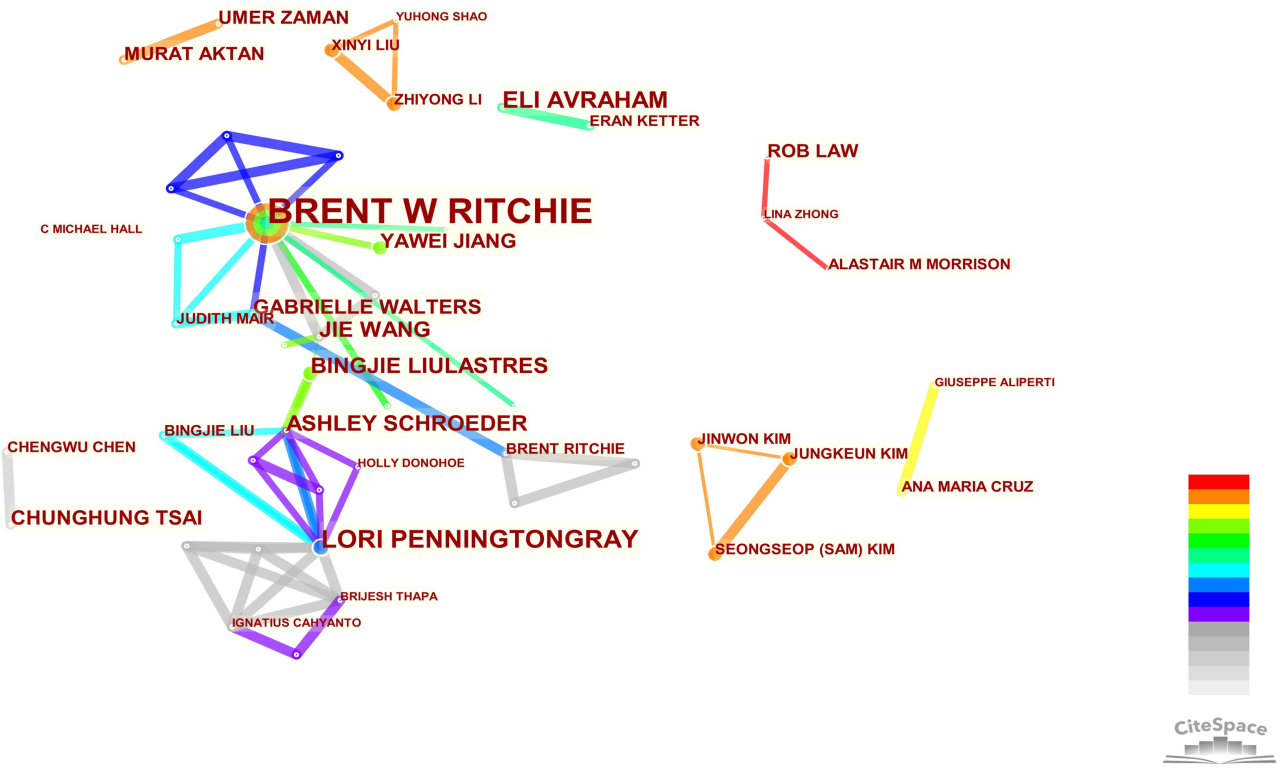

Figure 4 A cluster view of the co-authorship network.

first appeared. In this study, countries/regions such as Australia, the USA and England have already conducted related research in 2008, and then in 2010, China and Spain were the basis for cooperation with other countries/regions. In addition, the purple circle of the node represents betweenness centrality. According to the ranking of centrality, the highest is Australia (0.33), the second is England (0.2), the third is the USA (0.16). A higher centrality value indicates that a country plays a more significant role in this research field.[51] It can be seen that scholars in Australia, England and the USA began to study risk and tourism earlier, and their articles have certain influence in the whole research field. From the node size and the number of connections of the cooperation network between countries/regions, it is not difficult to see that the cooperation among Australia, the USA, England and China has become closer, and these countries/regions play an important role in the whole field.

Table 3 Top Institutions in Risk and Tourism Research

Rank Institutions	Publications	Citations	TC/TP	First Authors	Countries
1 Univ Queensland	38	691	18.18	23	Australia
2 Griffith Univ	30	205	6.83	15	Australia
3 Sichuan Univ	30	77	2.57	21	China
4 Univ Florida	29	396	13.66	14	USA
5 Hong Kong Polytech Univ	25	224	8.96	12	China
6 Univ Surrey	21	419	19.95	6	England
7 James Cook Univ	19	200	10.53	7	Australia
8 Sun Yat Sen Univ	16	135	8.44	4	China
9 Bournemouth Univ	14	171	12.21	7	England
10 Univ Johannesburg	14	122	8.71	1	South Africa

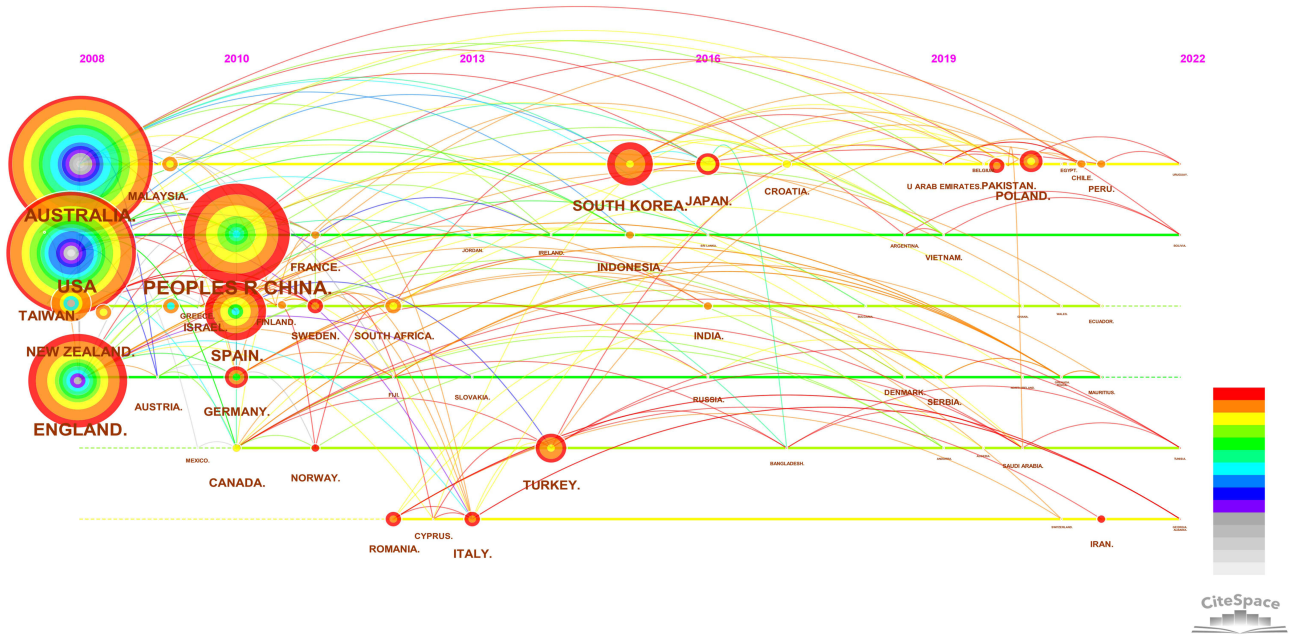

Figure 5 A time-line view of the country/region collaboration.

Evolution of the Conceptual Structure

Keywords are the research core and key point of an article. Figure 6 is a time-zone map of keyword co-occurrence in the field of risk and tourism. The occurrence of keywords is arranged from left to right in chronological order to highlight the time evolution between a research frontier and its intellectual base.[41] It can be seen from the figure that there were a lot of keywords with a very high frequency from 2008 to 2013, mainly including "risk", "impact", "management", "terrorism", "persistent risk", and so on. At this time, scholars had begun to pay attention to the impact of various risks on the tourism

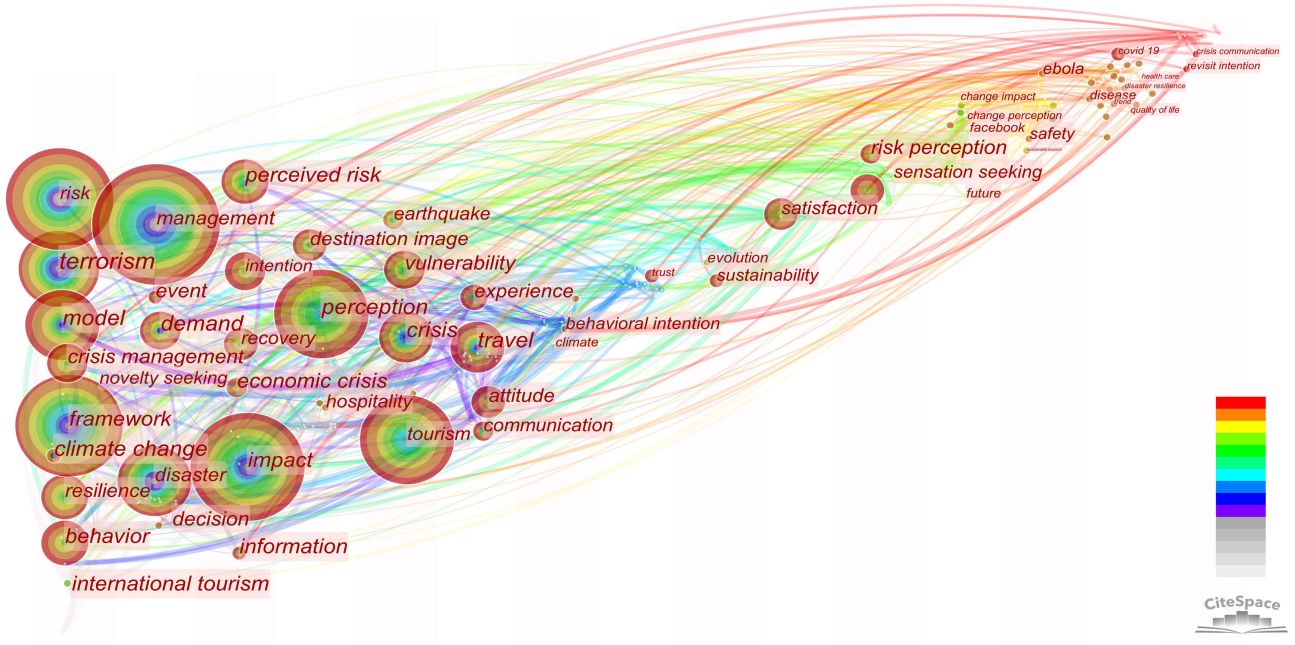

Figure 6 A time-zone view of keywords with high frequencies.
Notes: Each circle in the figure represents a keyword, and the italicized text is the keyword name. The figure shows the change of time from the past to the present from left to right, where the time zone of the keyword is the year in which it first appeared in the literature.

industry, and proposed to strengthen risk management and build a risk management framework. Keywords such as "trust", "behavioral intention", "risk perception" and "satisfaction" appeared in 2014–2018. At this stage, the authors paid more attention to research on the behavior, risk perception and travel intention of tourists. From 2019 to 2022, there are many nodes, but the nodes are small, and the frequency of keywords is low, which means that the research topics are more extensive and diverse. New keywords such as "change impact", "future", "safety" and "covid-19" have emerged. Under the influence of the COVID-19 pandemic, scholars have paid more attention to the study of tourism risks, concerned about the transformation of tourism after the pandemic and how to promote the sustainable development of tourism.

Figure 7 shows the top 12 keywords with the strongest citation bursts from 2008 to 2022. An outbreak of keywords indicates an emerging trend in the research field.[42] Firstly, from 2008 to 2013, "disaster", "terrorism" and "climate change" broke out, among them, "disaster" was cited for the longest time and had the strongest strength. Subsequently, "management", "crisis", "framework" and "worry" began to be valued, this also means that for various risks, scholars have begun to pay attention to risk management and tourists' reflection on risks. Finally, five keywords broke out from 2019 to 2022, of which "health", "satisfaction" and "image" have been mentioned the most frequently since 2021, indicating that the perspective of health and tourist satisfaction have become research hotspots in recent years, and scholars have tried to focus on the restoration of destination image and explore the sustainable development of tourism in the post-COVID-19 era.

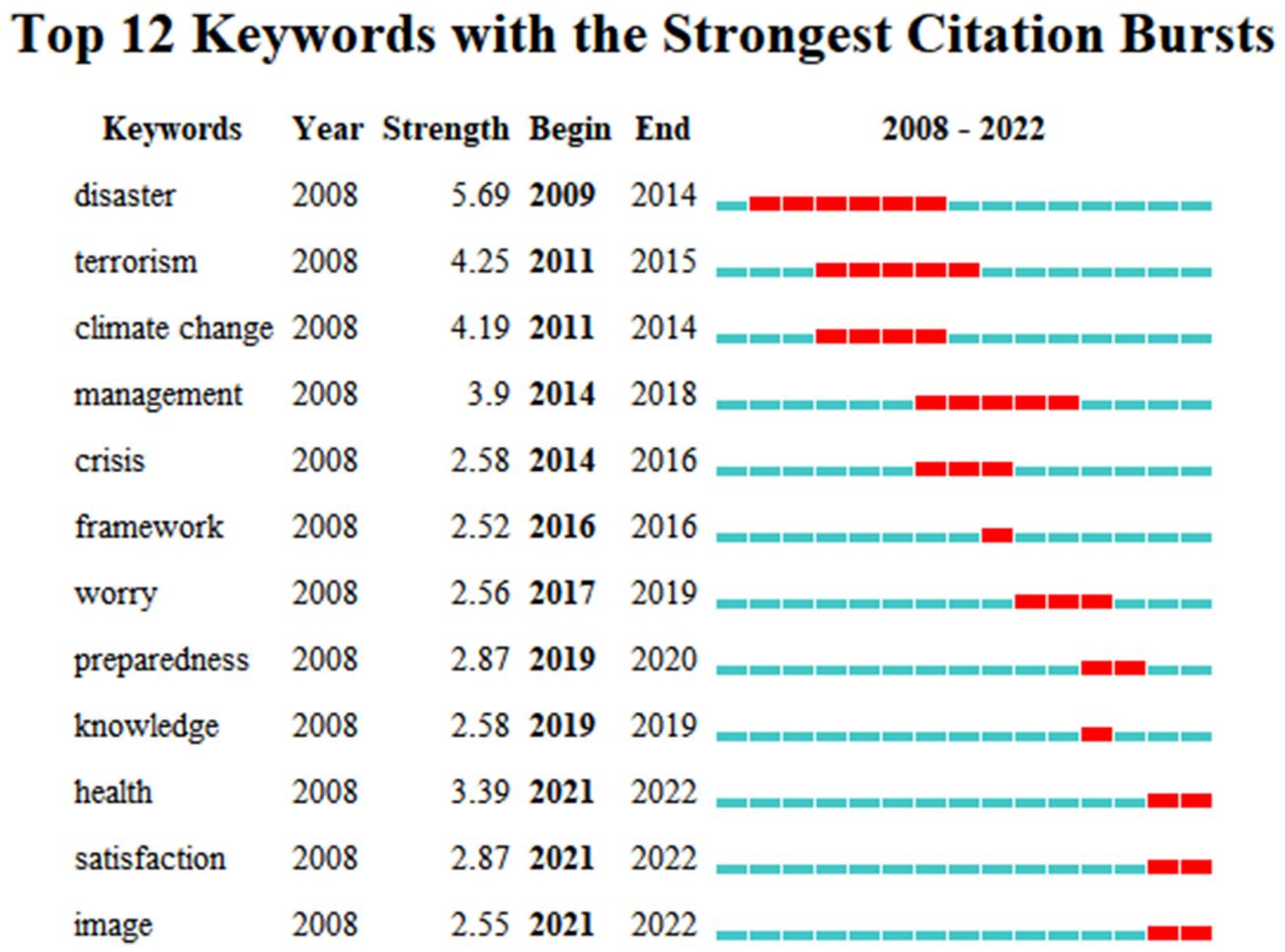

Figure 7 Top 12 keywords with the strongest citation bursts.
Notes: Citation bursts of keywords indicate the significant increase in the use frequency of the keywords in a short period of time. In the figure, "year" refers to the time when the keyword appears, "strength" refers to the intensity of the citation burst, "begin" and "end" are the start and end time points of the citation burst, and the red segment refers to the duration of the citation burst of keyword.

Co-Citation Analysis by Thematic Clusters

The co-citation cluster diagram clearly shows the distribution of this research field. In this study, we clustered references with keywords as tag words. There are 16 clusters composed of 674 nodes in the co-citation network. As shown in Figure 8, there are seven significant clusters. The labels of the clusters are algorithmically extracted from citing articles, the smaller the number in front of the cluster label, the more references of the cluster. The thickness of the connecting line between the cluster nodes represents the strength of the co-citation relationship. The color of the node represents the time when the node was first co-cited. Modularity and silhouette value present the structure and nature of the cluster networks. The former divides the network into different cluster blocks, while the latter represents the similarity within the clusters. Modularity and silhouette value should be together to ensure a reasonable interpretation of the cluster networks in CiteSpace.[52] The modularity (Q) of co-citation clusters in this study is 0.8163, which means that the community structure divided in this study is significant. In addition, when the mean silhouette of clusters is greater than 0.7, the clustering is convincing;[42] the mean silhouette in this study is 0.9183.

Cluster #0 (silhouette = 0.897) is the largest cluster, which contains 90 articles. The color of the lines in the cluster is mainly orange and red, and the label is "covid-19". This means that the theme of risk management has been paid attention to in the past two years, which is closely related to the impact of COVID-19 on tourism. The articles in this cluster are mainly concerned with pre-disaster risk assessment and planning, as well as the relationship between post-disaster risk management and resilience. The resilience and post-disaster development of the tourism industry has always been accompanied by risk studies, clusters #2 (silhouette = 0.854) and #8 (silhouette = 0.945) mainly focus on risk management and post-disaster recovery of the tourism industry. The development of tourism destinations is inseparable from tourists, but risk perception will affect tourists' tourism behavior and destination choice. Therefore, the research on the impact of tourists' risk perception on their tourism behavior in cluster #3 (silhouette = 0.865) has always occupied an important position in the research field. The article cited in this cluster mainly discusses how demographic characteristics and tourism preferences will affect tourists' risk perception differences and risk tolerance.

Clusters #4 (silhouette=0.958) and #6 (silhouette=0.962) are an ensemble of the literature network on objective risk, which focuses on the impact of various types of risk on tourism, while cluster #5 (silhouette=0.965) highlights the role of social media in risk management. After the disaster, the destination should adopt appropriate marketing methods to

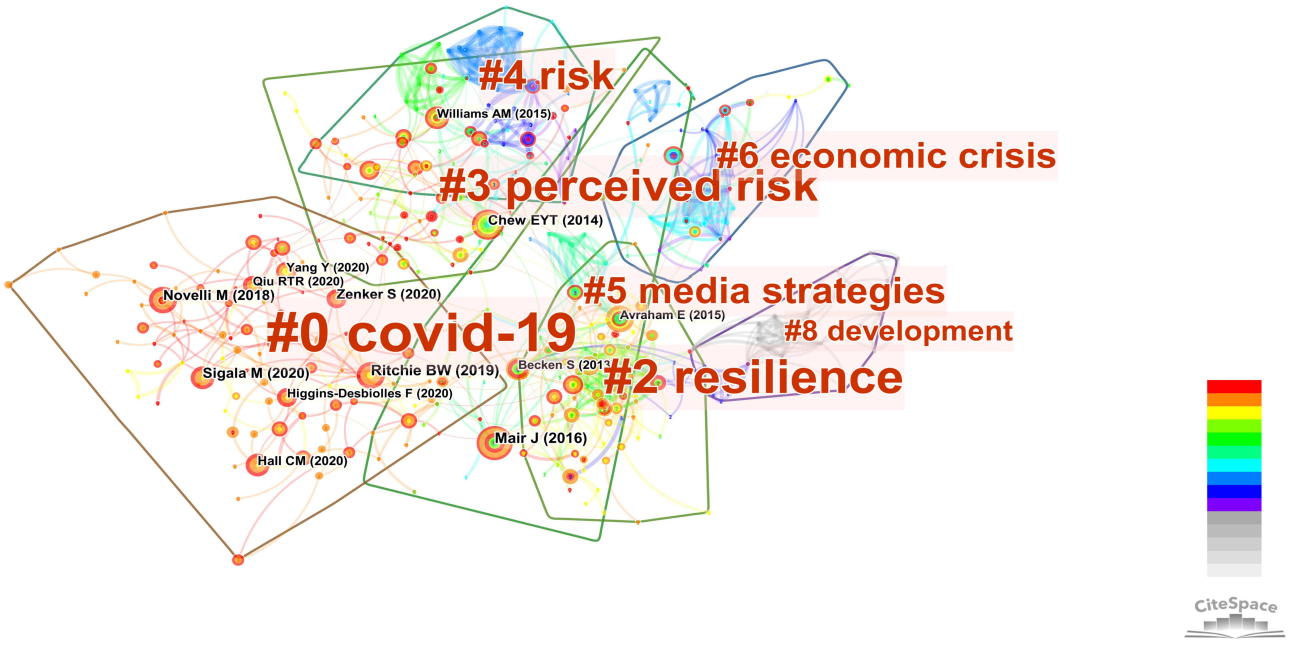

Figure 8 Overview of the reference co-citation network.

Notes: Each node in the reference co-citation network represents the co-cited reference, and different topic clusters are formed among the co-cited references, and the label word of each cluster is derived from the keyword of the citing reference. The larger the cluster block, the larger the font of the label word.

Article	Strength	Begin	End	2008–2022
Ritchie (2004)[53]	10.3	2008	2012	
Lepp (2003)[57]	5.13	2009	2011	
Lepp (2008)[58]	9.93	2010	2017	
Hystad (2008)[54]	13	2011	2016	
Hall (2010)[55]	12.52	2012	2018	
Rittichainuwat (2009)[56]	5.75	2013	2017	
Fuchs (2011)[62]	8.96	2014	2019	
Walters (2012)[59]	6.9	2015	2020	
Avraham (2015)[60]	3.68	2016	2019	
Becken (2013)[63]	7.67	2017	2020	
Orchiston (2016)[61]	5.73	2018	2020	
Becken (2013)[70]	3.7	2019	2020	
Brouder (2020)[64]	3.88	2020	2022	

Figure 9 Top references with the strongest citations bursts in the same year.

promote the recovery of tourism, in which social media plays an important role in crisis communication and destination recovery, and is also one of the important dissemination and communication media for tourism information. In addition, in the face of various disasters and risks that threaten life and safety, how to improve tourists' risk awareness and preparation for risk avoidance by building a risk defense tourism system and improving risk information communication channels in tourist destinations, so as to minimize future losses, is also an issue that scholars are trying to discuss.

In general, there is a very wide range of research topics in the field of risk and tourism, ranging from pre-disaster risk planning and the impact of risk on different disaster-bearing bodies to post-disaster tourism recovery, tourists' risk perception, tourism marketing and so on. Scholars provide strategies and insights into how to reduce tourism losses in risk disasters and how to enhance the ability and resilience of destinations to cope with risks. On this basis, given the vulnerability of tourism and the context of the COVID-19 pandemic, more predictive research is needed to explore the spillover effects of the crisis on tourism.

Articles with Citation Bursts

The dynamic changes of research topics in this field can be found through the burst detection of cited articles.[42] Figure 9 shows the most cited articles in the same year. The most cited articles during 2008–2013 focused on crisis management,[53,54] crisis events,[55,56] and risk perceptions of tourists.[57,58] The article by Lepp[58] has been cited for the longest duration and the article by Hystad[54] has the strongest citation strength. Articles related to disaster recovery[59–61] and risk reduction[62,63] saw a surge in citations between 2014 and 2018. Emerging cited articles during 2019–2022 also focus on post-risk tourism resilience, with Brouder[64] pointing out that if sufficient institutional innovation occurs on both the demand and supply sides of tourism, there is a potential path can guide the tourism industry to achieve transformation.

Conclusion and Future Research

Conclusion

The core focus of this paper is to review the overall scientific structure of risk and tourism in the past 15 years. Risk knowledge is crucial to the sustainable development of tourism. However, influenced by traditional views, the academic

circle mainly emphasizes the entertainment, celebration, feeling and adventure features of tourism, and the vulnerability of tourism has not attracted wide attention until recently.[3]

By using CiteSpace for bibliometric analysis, we can clearly understand the research process of tourism risk in the past 15 years and current research hotspots. The main analysis items used in this paper are collaboration network analysis, co-occurrence analysis and co-citation analysis. Compared with traditional literature analysis techniques, these techniques have the following four advantages: First, by measuring and visualizing the network relationships of different nodes, insights into the knowledge domain can be more clearly presented.[41] Secondly, clustering technology can learn which topics dominate the entire research field and find important articles linking multiple clusters. Third, bibliometric visualization can vividly reflect the collaborative network in the research field and identify key authors, institutions and countries/regions in the research field. Finally, this paper uses burst term detection and co-occurrence analysis of keywords to help identify emergent hot spots and emerging trends in the research field.

Through a visual bibliometric analysis, this study found the following three characteristics of risk and tourism research in the last 15 years. Firstly, in the context of globalization, there is an international trend toward cooperation between scholars, and cooperation between different countries is also increasing. In the field of risk and tourism research, Australia, England, the United States and China are the main cooperation network centers, and the research institutions of these four countries are also at the forefront of research. Secondly, the research topics in the field of risk and tourism are very extensive, and the research content has interdisciplinary characteristics, mainly combining with psychology to explore the relationship between tourists' risk perception and tourist behavior, and combining with geography to explore the coping strategies of destinations in the face of natural disasters and climate change. Finally, the research hotspots of risk and tourism research are closely related to the present situation. The change of hotspots is also closely related to catastrophic events; the number of articles published in this field increases after catastrophic events. After the outbreak of the COVID-19 pandemic, the number of related research increased sharply, and the research content has also paid more attention to the recovery and transformation of tourism after the outbreak.

One of the main lessons for tourism after the COVID-19 pandemic is risk communication, which is an integral part of the preparation and response to emergencies, the subjects involved in the communication include countries, government departments, enterprises, social organizations and tourists.[65] Effective risk communication is much more than formulate qualified risk management and response strategies between various sectors of the tourism industry, rather, it aims to influence tourists' risk perception and tourism decision-making.[66] Risks and crisis are clearly absent to certainty, the need of risk management is stressed in the sustainable development of the tourism industry. Tourism industry should take into account the relevant technical information of risk management. To reach the objective of monitor and evaluation of risk information through advanced digital technology, risk management has to lay interactive risk communication and timely information disclosure. In addition, communication tools such as government announcements, mass media and social software can also influence people's judgement of risk levels.[67] Therefore, it is significant to provide more discrete forms of information at the national or international level to build public trust in travel information to manage individual judgments about risk.[68]

Reliant on bibliometric methods, this study systematically provides an overview knowledge framework in the field of tourism risk research. Through the analysis of literatures, journal influence, cooperation network, co-occurrence network and citation network in the past 15 years, the paper reveals the critiques on evolution process of knowledge and the changing trend of research hotspots. From these analyses, we outline potential future research direction topics. The paper argues that the limited use of theory existing in tourism risk research. Thus, this study combines the impact of public health events and public health risks into the tourism industry, and provides suggestions for the future sustainable development and risk management of the tourism industry.

Future Research

From the perspective of subjective and objective risks, in the short term, the research on risk and tourism will still be carried out around COVID-19. The future research trend of risk and tourism mainly has the following characteristics. In terms of subjective risk, scholars need to continue to focus on how to reduce the perceived health risks of tourists, so as to stimulate tourists to generate tourism demand, and resume tourism activities. In addition, the difference between different tourists' risk perception level still needs further study by scholars. Different tourists can have different

personalities, different cultural backgrounds, and are even in different risk environments. Studying the impact of these differences on tourists' tourism behavior will help the destination to formulate and improve risk management policies. In addition, in the context of the new media era, the dissemination of risk information and the impact of public opinion on tourists' subjective risk perception and tourism decision-making cannot be ignored. In terms of objective risk, in addition to focusing on the crisis event itself and its impact, research on the governance of objective risk in tourist destinations is also worthy of continued attention. Furthermore, feasible risk response and control measures should be discussed from a multidimensional perspective, together with how to help the destination build a flexible tourism ecosystem, especially in the context of COVID-19.

In terms of future theoretical research, currently, conceptual and theoretical research papers in the field of tourism risk and disasters are quite limited mainly on the risk response and recovery by qualitative case analysis.[1] Therefore, future studies will pose on further clarifying the conceptual connotation and research framework of tourism risks and disasters, enriching the breadth and depth of existing knowledge, and working on the combination of multiple cases, in order to provide more empirical research in early risk prevention and preparation plus later feedback phase. In addition, previous review provided a wide range of research topics for tourism risks and disasters with the characteristics of interdisciplinary. Therefore, through cross-disciplinary research, scholars and managements are able to innovate their exploration on theories and methods for tourism risk and provide theoretical supports for tourism risk prevention and control. Meanwhile, future research should more apply theoretical approaches to investigating tourism risks and disasters.[69]

In addition, future research needs to be more rooted in real-world situations. Researches of tourism risk and disasters are inseparably linked with real and relevant risk events. So the academic insights work better with practical outcomes for the benefits of tourism industry. The knowledge development aims to provide the aids for tourism recovery strategies, that is, the ultimate goal of tourism risk and disasters researches is to effectively prevent and manage risks and disasters to protect the rights and interests of tourism objective and subjective. The applied studies should further deepen the understanding of the relationship between perceived tourism risk and destination image,[27] and the role of tourism media, to mitigate tourists' perceived risk and restore the destination image. Surely, more new technologies also needed to be introduced into the practice of tourism to improve tourism risk management and build a resilient tourism ecosystem. With the normalization of the new crown epidemic, issues of practical significance, such as whether there have been new changes in tourists' risk perception and travel decision-making, are also worthy of further consideration by scholars.

Finally, this study has some limitations. Firstly, considering the quality of documents and the matching of CiteSpace, this study is based on the core database of Web of Science for SSCI journal article screening, meaning that the articles came from a single data source; future research can expand the article screening channel and make the visualization results more comprehensive and accurate. Secondly, for the research direction of future risk and tourism, this paper mainly gives suggestions from the aspects of subjective and objective risk, theory and practice, limited by the length of the article, the future research trend is not further analyzed in an in-depth and comprehensive way. In addition, due to the author's language constraints, this study is limited to journals published in English.

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