Tourism Research Progress Under the Impact of COVID-19: ——Bibliometric Visualization Analysis based on Citespace

Wu Yu Xin, Mohd Hizam-Hanafiah and Zhang Yin

Tourism Research Progress Under the Impact of COVID-19: ——Bibliometric Visualization Analysis based on Citespace

Wu Yu Xin[1], Mohd Hizam-Hanafiah[2] and Zhang Yin[3]

[1]Faculty of Business, Information & Human Sciences, Infrastructure University Kuala Lumpur, [2]Faculty of Economics and Management, Universiti Kebangsaan Malaysia (The National University of Malaysia), [3]Faculty of Leisure Services and Sports, PAI CHAI UNIVERSITY

Abstract

Through citespace visualization and quantification methods, the analysis of academic research trends in the field of tourism under the COVID-19 situation can analyze the research hotspots in this field, grasp research trends, gain insight into research gaps, and provide ideas for subsequent researchers. This study collects 828 publications about tourism research under the context of COVID-19 from *Web of Science Core Collection* by topic searching, which use "tourism" AND "COVID-19" as the search terms. *Citespace* is used for visual exploration of the collected literature since it is more objective and reliable, and the presentation of visual atlas is also more concrete and intuitive. The result indicates that at present, a core author group has not been formed in this research field, most researchers are in the state of independent research. The cooperation between scholars, institutions and countries needs to be strengthened as the density of cooperative network connections is very low. China started research earlier and has various achievements in this field, but the research depth needs to be improved. Existing research hotspots mainly focus on exploring the impact of COVID-19 on the tourism industry, crisis management, satisfaction. In the future, more attention should be paid to "sustainable tourism" and "tourism innovation". Future research could consider expanding the scope of literature sources and incorporating keyword burst analysis.

Keywords: COVID-19, Tourism Industry, Cluster, Bilbliometric Visualization Analysis, Cooperative Network，Citespace

Introduction

The outbreak of COVID-19 in early 2020 has swept the world, the economic condition and social life of most countries and regions in the world. To curb the spread of the epidemic, most economies have adopted strict social distancing and restrictions on the movement of people, and the highly mobile and highly interactive tourism industry has been hit intensely (Ndou et al., 2022). The World Tourism Organization (UNWTO) report shows that COVID-19 is the worst crisis event for the international tourism industry since records began in 1950

(UNWTO, 2021). On March 2, 2022, the World Tourism Cities Federation (WTCF) and the Tourism Research Center of the Chinese Academy of Social Sciences released the "Report on World Tourism Economy Trends (2022)" online. The data shows that in 2021, the total number of global tourists (including domestic tourists and international tourists) reach 6.60 billion, and the total global tourism revenue (including international tourism revenue and domestic tourism revenue) reach 3.3 trillion dollars, only 53.7 percent and 55.9 percent compared to 2019, respectively.

Since the 21st century, the world has experienced several large-scale disaster events, such as the "Attack of September 11", Severe Acute Respiratory Syndrome, Financial crisis of 2007–2008, to a certain extent, all of them have been regarded as typical cases of impact on tourism and become hot issues in the tourism research field (Higgins-Desbiolles et al., 2021). However, existing studies on security crises, natural disasters and economic and financial crisis events account for the largest proportion of the tourism crisis research literature, and the research topics mainly focus on the types of tourism crisis, crisis impact, crisis assessment, crisis response and other aspects. There are few research results on tourism related to public health emergencies such as an epidemic, and the scope and depth of research are limited (Duan et al., 2022). Unlike previous tourism crises, COVID-19 has brought an unprecedented impact on the tourism industry from the time scale and spatial scale. Therefore, based on the Web of Science Core Collection (from 2020 to 2022), using Citespace visual bibliometric software, this study conducts a quantitative and content analysis of the literature related to COVID-19 in tourism research and discusses the cooperation network and research hotspots of tourism-related research under the impact of the COVID-19. Specifically, this study hopes to answer the following questions:

Q1: What is the status of the collaborative network in the field of tourism research in the context of COVID-19?

Q2: What are the research hotspots in this field?

Q3: What are the major clusters of article keywords in the existing literature？

Q4: Which are the most frequently cited authors and articles in this field, and what content do they focus on?

Research Design

Research Method

This study used the visual bibliometric software CiteSpace (version 6.1.R2) designed by Chen Chaomei. Citespace is a multivariate, time-sharing and dynamic visual analysis software gradually developed under the background of bibliometrics, data and information visualization (Chen, 2016). It is mainly based on the idea of "co-occurrence clustering". First, the information units in the scientific literature (including references at the literature level, keywords, subject headings at the topic level, authors, institutions, and countries at the subject level) are extracted. Then, it reconstructs according to the type and strength of the connection between the information units to form a network structure with different meanings (such as keyword co-occurrence, author cooperation, and literature co-citation). Forming a "scientific knowledge map" through text data to show the structure, laws and distribution of scientific knowledge, and explore research hotspots, research fronts and research trends in a certain field (Li & Chen, 2016). Because it can accommodate the literature of authors from different perspectives, schools of thought, and different disciplines, it greatly reduces the subjective preference of scholars' references in traditional literature reviews, so it is more objective and reliable (Chen, 2016). Bibliometric analysis obtaine

secondary data from digital databases in a quantitative and objective way (Albort-Morant & Ribeiro-Soriano, 2016). Therefore, it can introduce a systematic, transparent and repeatable review process to improve the reliability and quality of review (De Bellis, 2009). Citespace has a wide range of applications in academic research, from medicine (Liao et al., 2018) to information science (Yu et al., 2017), from agriculture (Ouyang et al., 2018) to tourism (Fang et al., 2018), from enterprise social responsibility (Ye et al., 2020) to sustainable development (Zhu & Hua, 2017).

Data Source and Processing
In the Web of Science Core Collection, the researcher set Topics to "COVID-19" AND "tourism". The retrieval period from Jan 1, 2020 to June 30, 2022, and a total of 2322 articles in English language were retrieved, and the database was updated to July 4, 2022. The researcher had chosen Document Types as "Articles", "Early Access" and Review Articles. Based on the researcher's research area, four research areas were selected： Hospitality Leisure Sport Tourism, Management, Business and Business Finance. Thus, a total of 1,079 articles were retrieved. After artificial precise deduplication, irrelevant documents (including impacts on wildlife, social media, public opinion, and climate.) were removed to obtain the most complete and scientific data, finally, 832 articles were screened for use in subsequent analysis.

Data Analysis and Discussions
This section presents data analysis and discussions. First, the number of articles published in the study period is presented. Second, the collaborative network of the selected literature was analyzed at three levels: Author, institution, and country. Then the frequency statistics and cluster analysis are carried out to further explore the research focus and hotspot. Finally, the author and articles of the highest counts are screened to explore the most authoritative and influential scholars and articles contained in this research field.

Annual Publications Quantity
The 832 records of the literature were imported into *Citespace*, after the duplicates process, and eventually, 828 documents were available. Figure 1 presents the Publications Quantity from 2020 to 2022. The publications in the exploratory stage began in 2020, and there is a significantly increased in 2021, but the 2022 only statistics the publications in the first half year. The COVID-19 erupted in early 2020, and the widespread and strict personnel flow restrictions in various countries and regions obstacle the academic research speed. So the study result for 2020 has a large gap compared with 2021.
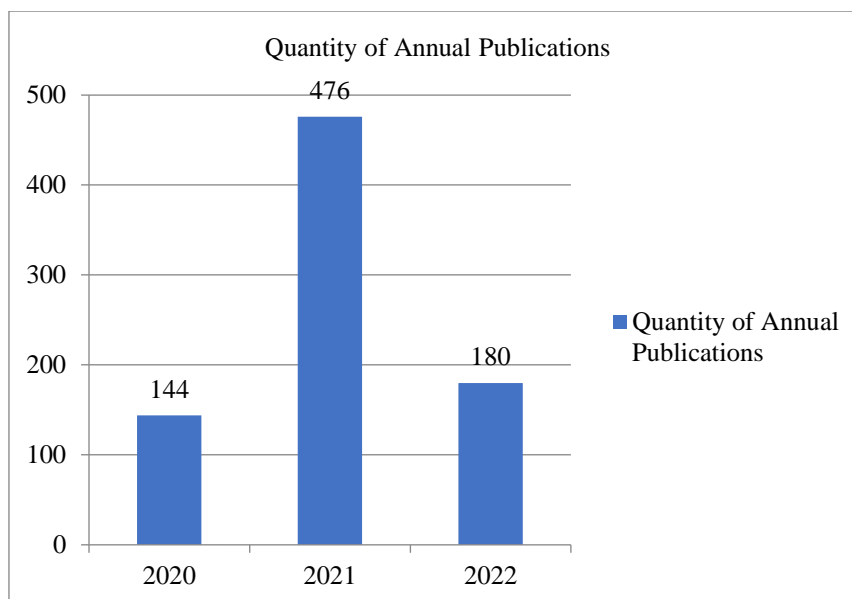
Figure 1: Annual Numbers of Publications of the Tourism Research under the Context of COVID-19

Cooperative Network Analysis

The cooperation network analysis mainly shows the importance and relevance of the research in a certain field from the author (micro), the organization (meso) and the state (macro), and to display the research ability distribution of the global network (Feng et al., 2021).

Core Author Analysis

The core author reflects that the author has a certain influence in a certain field and has a leading role in the development of a field. Analyzing the works of the core author is conducive to understanding the development process of the field (Li et al., 2022). Figure 2 is the visual map generated by "Author" as the Node Type, larger nodes mean more articles published. According to the data provided by *Citespace*, sort out the below table 1 to show the top ten most fruitful authors in this field.

Table 1: The Top Ten Authors in terms of Publication Numbers and Their Research Field

Authors	Publication Numbers	Research field
Han, Heesup	9	Corporate Social Responsibility; Business Model Innovation; Management; International Business; Organization Theory; Human Resource Management
Li, Zhiyong	9	Tourism Behavior; Rural Tourism; Tourism Planning; Tourism Destination (Scenic Spot) Management
Kim, Jinkyung Jenny	8	Hospitality & Tourism; Hotel Management; Services Marketing; Service Quality; Tourism Development; Customer Service; Marketing

Yang, Yang	7	Tourism development; Tourism management; Regional Economics; Strategic Management; Foreign Direct Investment
Kim, Seongseop (Sam)	7	Convention and Events Management; Tourism Management
Zhang, Jiangchi	7	Hotel Management; Corporate Social Responsibility; Crisis Management
Liu, Xinyi	7	Consumer Behavior; Tourism Management; Tourism Marketing; Travel; Hospitality & Tourism
Boto-García, David	6	Tourism Behavior; Applied Econometrics; Econometric Modeling; Microeconometrics
Kozak, Metin	5	Tourism Marketing; Marketing; Consumer Behavior; Business Ethics; Marketing Strategy
Seraphin, Hugues	5	Sustainable Tourism; Tourism; Tourism Development; Corporate Social Responsibility; Sustainable Development
Law, Rob	5	Hotel and Tourism Technology Management
Wen, Jun	5	Special Interest Tourism; Suboptimal Health Status; Interdisciplinary Research; Tourism Marketing; Travel Medicine
Woosnam, Kyle Maurice	5	Research Methodology; Quantitative Analysis; Quantitative Methodology; Survey Methodology and Data Analysis; Academic Writing

According to the famous Price's law of Derek John de Solla Price, the father of scientometrics, based on the analysis and the same topic, half of the papers were written by a group of highly productive authors, approximately equal to the square root of the total number of authors. The specific formula is shown as the following Equ (1):

$$M = 0.749 \times \sqrt{N_{max}} \quad (1)$$

where M represents the minimum number of publications by core authors in a field, N_{max} represents the largest number of publications in its field (in this study is nine). The M value in this study was calculated as 2.247 according to the above formula, The minimum number of publications for core authors in this research field is three. A total of 66 authors have published more than three articles, and the total number is 260, accounting for 31.4 percent of the total publications in this field, which indicate a big gap with the standard that the proportion of the core author group should reach 50 percent. Reflecting that as an emerging research field, the current research has not yet formed a stable core author group.
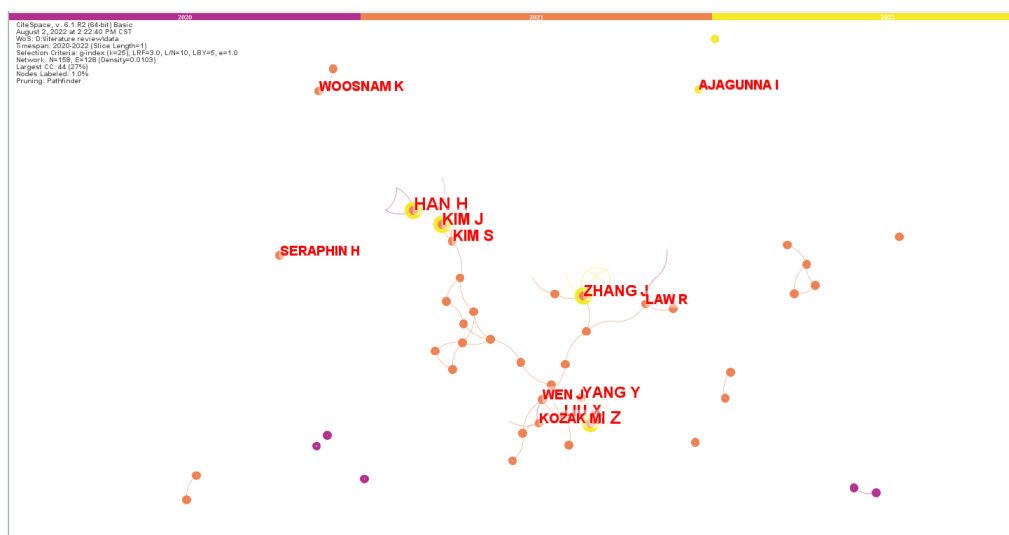
Figure 2: Authors' Cooperation Map in the Tourism Research under the Context of COVID-19

The author's cooperative network can reveal the research interest and link relationship of different authors in this area. From the link in Figure 2, the core authors are less connected, which shows that most researchers are in the state of independent research. Decentralized research among scholars is not conducive to reaching a consensus at the level of research issues. Therefore, there is still considerable potential and space for cooperation between scholars. Meanwhile, the research fields of the core authors are broad and rich, proving that within the context of COVID-19, tourism research is very diverse and comprehensive: There are rich research objects, such as airlines (Moon et al., 2021), hotels (Kim & Han, 2022), tourism industry practitioners (Zhang et al., 2020), destinations (Li et al., 2022) and children (Seraphin, 2020); Further, multi-dimensional research perspectives exist, such as tourism behavior (Banos-Pino et al., 2021; Park et al., 2021; Radic et al., 2021), corporate social responsibility (Zhang et al., 2021), food safety and consumption (Kartari et al., 2021) , sustainable development and environmental protection (Calder et al., 2022), innovative tourism (Liu et al., 2022) and others.

Publications Institutions and Countries
The top five institutions and top ten countries in this research field are shown in the below two tables:

Table 2
The Top Five Publication Institutions of the Tourism Research under the Context of COVID-19

Institution	Publication numbers	Betweenness centrality	Countries
University Johannesburg	29	0.37	South Africa
Hong Kong Polytechnic University	26	0.22	Hong Kong, China
University Surrey	19	0.11	The United Kingdom
Sichuan University	15	0.05	China
Griffith University	13	0.06	Australia

Table 3
The Top Ten Publication Countries of the Tourism Research under the Context of COVID-19

Countries	Publication numbers	Betweenness centrality
CHIAN	140	0.17
USA	117	0.23
ENGLAND	99	0.43
AUSTRALIA	89	0.18
SPAIN	68	0.10
INDIA	60	0.04
ITALY	49	0.08
TURKEY	49	0.07
PORTUGAL	39	0.02
SOUTH AFRICA	36	0.07
SOUTH KOREA	36	0.01

The comparative analysis of country（the macro-level）and institution（the meso-level）shows that the results are consistent. The top ten countries in terms of publishing numbers are also the locations of the top five institutions. In the Report on World Tourism Economy Trends (2019), the top 20 countries in the world in terms of total tourism revenue are called T20 countries, and 80 percent of the global tourism economy is contributed by T20 countries. Except for South Africa and Portugal in Table 3, other countries (or regions) perennial rank at the top of the T20. Although South Africa is not in the T20 ranks, tourism brings huge economic benefits to South Africa and is regarded as the vital catalyst for the government's hope to realize economic gain and meet development requirements (Jiang et al., 2019). According to data released by the World Travel and Tourism Council (WTTC; 2018), the direct economic contribution of the tourism industry in South Africa in 2017 was 136.1 billion South Africa Rand, accounts for 2.9 percent of GDP, directly providing 726,500 jobs, accounting for the total 4.5 percent of employment (World Travel and Tourism Council, 2018). South Africa's emphasis on tourism has led to rich research results on the impact of COVID-19 on tourism and its recovery and development.
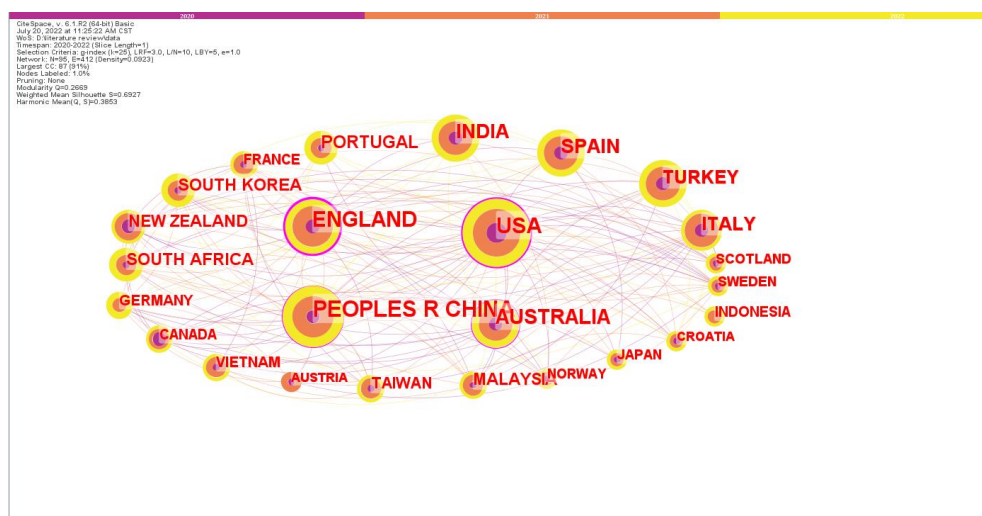

Figure 3: Countries with High Publication Volume and Their Centrality

Figure 3 shows the countries with many publications and their centrality. Combining the contents of Table 3, it is not difficult to find that although China ranks first in the number of publications, its centrality is lower than the United States of America, the United Kingdom and Australia. The number of articles published by a country (or region) does not determine its dominance in research in a certain field. China is the first country in the world to have a concentrated outbreak of the epidemic, and it is also the first country to bring the epidemic under control and implement regular epidemic prevention and control with the high cooperation of the whole people. The recovery of the domestic tourism industry was relatively early, and the resumption of work and production in various industries also provided more data and cases for research in the tourism field, which are the reasons for the high volume of publications in China. However, China's influence on network nodes needs to be improved, and high-quality research can lead the direction of this field. This also provides warning and motivation for Chinese scholars to conduct more in-depth, interdisciplinary, and comprehensive research in the future.

Co-occurrence Analysis

The co-occurrence analysis method is an analysis method that quantifies the co-occurrence information in the carrier of various information (this article mainly analyzes keywords) in the literature, to reveal the implied meaning between the information   (Sun & Zhang, 2017). The basis of its analysis comes from the principle of adjacent connection in psychology and the principle of knowledge structure and mapping   (Zhang, 2017).

Keywords are the core summary of a journal document, often representing the focus of its discussion, and reflecting the disciplinary structure of the literature to a certain extent. If a keyword appears frequently in the literature of a certain subject area, it means that the topic represented by the keyword is a research hotspot   (Zhang et al., 2022) and a vital theme   (Chen, 2016) in this field. This article analyzes the frequency of keywords (301 in total) in tourism-related research after the occurrence of COVID-19. The specific statistical results are shown in the following Table 4.

Table 4
The Top Ten High Count Keywords of the Tourism Research under the Context of COVID-19

NO.	Keywords	Counts
1	Tourism	142
2	Impact	141
3	Model	74
4	Crisis management	74
5	Perception	65
6	Management	56
7	Satisfaction	56
8	Risk	53
9	COVID-19 pandemic	51
10	Crisis	50
11	Industry	50

Keywords with high centrality and high count represent the common concerns of researchers in a certain period, that is, research hotspots   (Chen et al., 2015). The keywords are sorted according to the betweenness centrality, and the top ten from high to low are shown in the following Table 5.

Table 5
The Top Ten High Centrality Keywords of the Tourism Research under the Context of COVID-19

No.	Keywords	Betweenness centrality
1	Satisfaction	0.07
2	Sustainable tourism	0.07
3	Hotel industry	0.07
4	Social media	0.06
5	Motivation	0.06
6	Loyalty	0.06
7	Disaster management	0.06
8	Perception	0.05
9	Performance	0.05
10	Perceived risk	0.05
11	Travel	0.05
12	Innovation	0.05
13	Online	0.05

　　Compare the contents of Tables 4 and Table 5, it is not difficult to find that keywords such as "satisfaction" and "perception" belong to words with high count and betweenness centrality, indicating that they are the focus of researchers and have a high role of mediation nodes, which are the current research hotspots. However, keywords such as "sustainable tourism" (count 30), "innovation" (count 24), "loyalty" (count 9), and "online "(count 7), although the centrality is relatively high, the count is relatively low, which means that although they play the role of intermediary nodes, they have not yet attracted the attention of researchers, and should be paid more attention in the future.

Keywords Cluster Analysis

Cluster analysis refers to dividing the analysis objects into different classes or clusters according to the similarity of the analysis objects so that the similarity of the analysis objects in the same cluster is as large as possible, and the difference between the analysis objects not in the same cluster is also as big as possible (Li & Shao, 2016). That is, after clustering, the topics of the same category will be clustered together as much as possible, and the topics of different categories will be separated as much as possible.

　　According to the network structure and the clarity of clustering, *Citespace* provides two indicators: Modularity (*Q value*) and Silhouette (*S value*) as the basis for judging the map drawing effect. The *Q value* represents the significance of the cluster map and measures the similarity of members within the cluster. The larger the value, the higher the homogeneity of the cluster members. Generally, it is in the interval of [0,1], if the *Q value* is greater than 0.3, it indicates that the partitioned clustering structure is significant. The *S value* represents the homogeneity of the clustering map. Mostly, if S is greater than 0.7, it indicates that the clustering is highly efficient and convincing (Chen et al., 2015), if S is above 0.5, clustering is generally considered reasonable. In this study, "Pathfinder" and "Pruning sliced networks" are selected under the "Pruning" item, and "Likelihood Rate (LLR)" pairs are selected for keyword clustering. Q=0.5918, S=0.805, which proves that the clustering community structure is significant, efficient, and convincing.
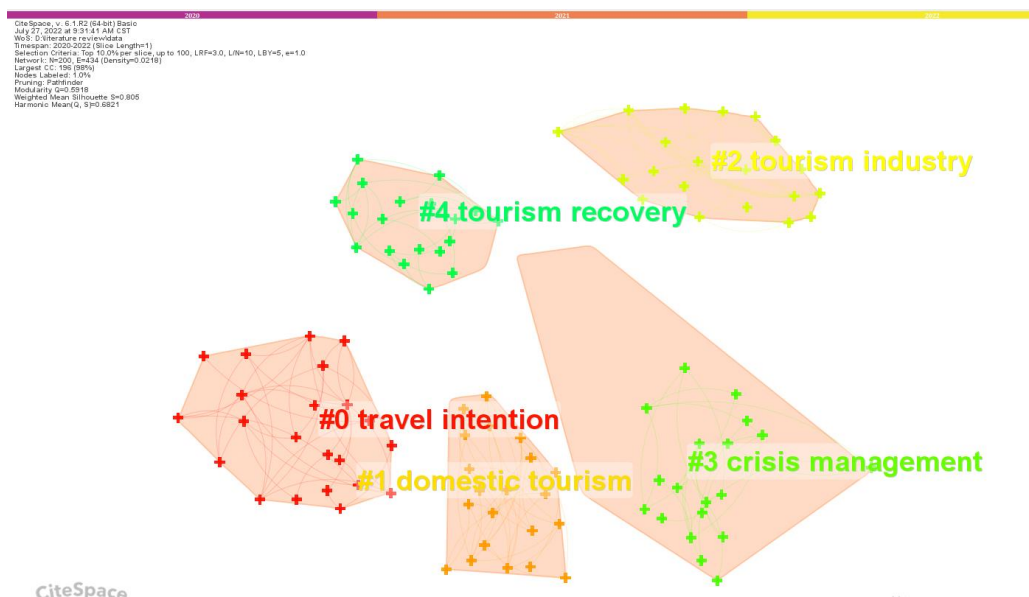
Figure 4: Keywords Cluster View of the Tourism Research under the Context of COVID-19

After keyword clustering, a total of 16 clusters were formed. The smaller the cluster number, the more keywords the cluster covers. This research selects the top five largest clusters for detailed analysis, which are shown in Figure 4.

Cluster #0 is the largest in terms of size, which is labeled as travel intention. Due to the pandemic, compulsory state measures and travel bans worldwide, when considering vacation travel, tourists prefer greater proximity (Lebrun et al., 2021) when considering destination safety and security (Lu & Atadil, 2021). Some factors have a positive effect on travel intention, such as empathy (Xie et al., 2021), solidarity, trust and healthcare system (Rasoolimanesh et al., 2021), compensatory consumption (Zhang et al., 2021), nostalgia (Wang & Xia, 2021), destination image (Ahmad et al., 2021), mental well-being (Colakoglu et al., 2021) uncertainty and inadequate knowledge (Rahmafitria et al., 2021), while others have a negative effect, containing risk aversion attitudes (Shekari & Azizi, 2022). travel constraints (Pan et al., 2021), and perceived risk (Shekari & Azizi, 2022; Teeroovengadum et al., 2021). Some influencing factors have indirect effects on tourism intention through mediating variables, including the positive effects of trust and solidarity on willingness to support a destination (Rastegar et al., 2021), trust in government (Quintal et al., 2022), and health risk perception (Su et al., 2022). The vaccination intention and travel intention are also mutually influenced (Ekinci et al., 2022; Gursoy et al., 2021; Kesgin et al., 2022). People who were more severely influenced by the pandemic show a relatively higher willingness to travel (Boto-Garcia & Leoni, 2021).

Cluster #1 is labeled as domestic tourism. Since the outbreak of COVID-19, many scholars have focused their research on domestic tourism. Scholars have conducted quantitative or qualitative researches on new trends such as short-distance travel (Park et al., 2022; Wang et al., 2022), non-contact travel (Bae et al., 2022), self-driving travel (Butler et al., 2021), family travel (Moya Calderon et al., 2022), and rural travel (Li et al., 2022; Marques et al., 2022; Vaishar & Stastna, 2022) in domestic tourism, as well as the status of recovery (Arbulu et al., 2021; Provenzano & Volo, 2022), and the way of recovery and effective measures (Quang et al., 2022; Volgger et al., 2021). However, some scholars have also proposed that domestic tourism is possibly a factor in the virus spread especially during

the early periods of Covid-19, which means that government policies should restrict residents' non-essential domestic travels to reduce the spreading of the virus   (Nunkoo et al., 2022).

Cluster #3 is labeled as crisis management. In tourism crisis management, high-frequency keywords involve crisis, management, risk, and innovation. From the perspective of time stages, the key tasks of each stage of the tourism crisis during COVID-19 are different. Before a crisis occurs, focus on crisis prevention and the improvement of emergency management systems, regular safety and health inspections, and raising tourists' awareness of health risks   (Duan et al., 2022). During the crisis, it should be focused on the mobilization and actions to deal with the crisis, and the research on how tourism government departments and enterprises responded to the epidemic crisis accounted for the vast majority of the content (Huertas et al., 2020; Shao et al., 2021; Shapoval et al., 2021; Yeh, 2021). After the epidemic has entered a stage of normalization, the management strategy should turn to the recovery of the tourism market. From the perspective of spatial structure, domestic tourism and regional tourism are more likely to recover in the short term than international tourism (Foo et al., 2021). Restoring tourists' confidence in the tourism market and reducing concerns about risks are also important parts of the recovery of the tourism market   (Rogerson & Baum, 2020). In addition, it is also necessary to strengthen tourism market recovery marketing, including tourism destination image marketing, using new technologies to provide innovative tourism products and others (Barna & Semak, 2020).

Cluster #2 and Cluster #4 can be discussed together. The impact of the COVID-19 has brought huge losses to the tourism industry, involving all tourism related industries, such as the hotel industry (Wen et al., 2021; Zhong et al., 2021)，aviation industry, cruise industry (Lee & Leung, 2022)，sports tourism (Mirehie & Cho, 2022)，travel agencies   (Huang et al., 2021)，and high-frequency keywords involve industry, hospitality, experience. In general, there is an imbalance in the research topics among scholars, and most of them focused on the hotel industry   (Breier et al., 2021; Liu et al., 2021; Quang et al., 2022; Zhang & Lu, 2022). The way the virus spreads has spawned new formats in the tourism field, the digitalization of tourism (Vu & Hartley, 2022)，intelligent (Srivastava et al., 2022)，automation (Ivanov et al., 2022)，and virtual travel (El-Said & Aziz, 2022; Lu et al., 2022) have become new research focus and new opportunities for the recovery and development of tourism. As Lu et al.(2022) argue that virtual tourism can strengthen stay-at-home order and help containment of COVID-19, meanwhile it can bring immersed experience to tourists without being in the destinations, which help promote sustainable tourism. Zeng et al (2020) discover the application of service robots in the tourism industry reduces the risk perception of tourists and enhances people's willingness to travel. The research conducted by Srivastava et al (2022) promote the tourism industry by using information management solutions,for example, biosensors, robotic room services and contactless hosting, to get a disruptive paradigm shift.

Co-citation Analysis
The co-citation analysis of this study mainly includes two parts: the co-citation of the literature and the co-citation of the author. The citation frequency determines the influence and is a direct reflection of the scientific research level and academic influence of the literature or author. Taking "Reference" as Node Types, the top five most frequently cited documents are counted, as shown in the following Table 6. The visual map drawn by "Cited Author" as Node Types counts authors who have been cited more than 100 times in this research field, as shown in the following Figure 5.

Table 6

The Top Five Most Cited Articles of the Tourism Research under the Context of COVID-19

| No.	Count	Title	Year	Journal
1	311	Pandemics, tourism and global change: A rapid assessment of COVID-19	2021	Journal of Sustainable Tourism
2	141	Tourism and COVID-19: Impacts and implications for advancing and resetting industry and research	2020	Journal of Business Research
3	116	*Pandemics, transformations and tourism: Be careful what you wish for*	2020	Tourism Geographies
4	98	The coronavirus pandemic - A critical discussion of a tourism research agenda	2020	Tourism Management
5	78	*Socializing tourism for social and ecological justice after COVID-19*	2020	Tourism Geographies
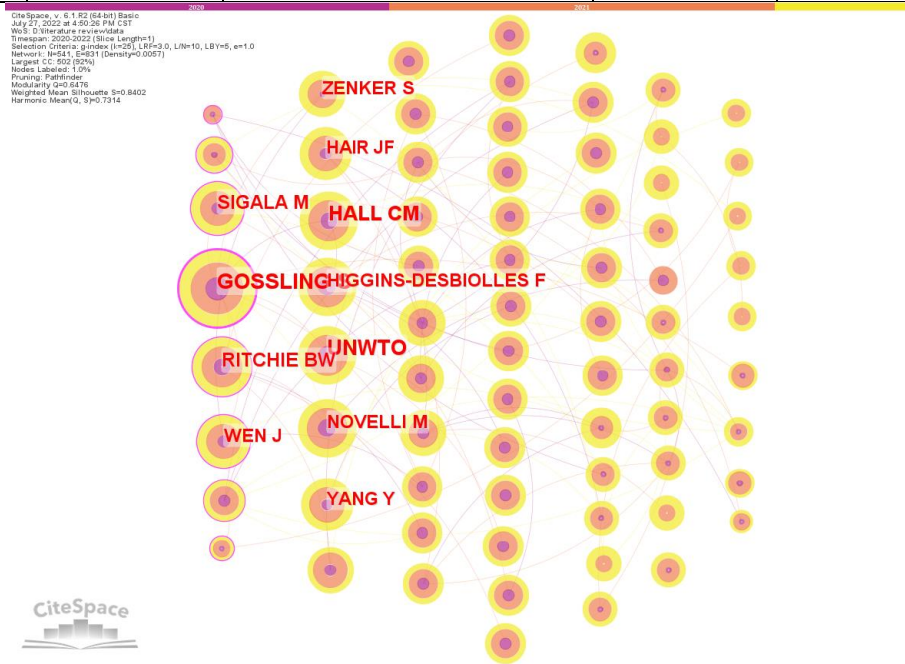
Figure 5: Authors Cited More than 100 Times of the Tourism Research under the Context of COVID-19

Table 7

The Top Ten Most Cited Authors of the Tourism Research under the Context of COVID-19

No.	Authors	Count	Betweenness centrality
1	Gossling, Stefan	331	0.20
2	UNWTO	209	0.07
3	Hall, Colin Michael	203	0.03
4	Sigala, Marianna	159	0.11
5	Ritchie, Brent W.	151	0.13
6	Wen, Jun	119	0.13
7	Higgins-Desbiolles, Freya	114	0.05
8	Novelli, Marina	113	0.00
9	Zenker, Sebastian	111	0.03
10	Hair, Joseph F	105	0.04

Figure 7 shows the top ten most cited authors in this research field. Combining the above information, it is obviously clear that Stefan Gossling is the author with the highest frequency of citations and the strongest betweenness centrality, which shows that he has considerable influence in this field. A total of 195 of his articles are included in the Web of Science Core Collection, most of which are related to tourism. The article he published in 2021 "*Pandemics, tourism and global change: A rapid assessment of COVID-19*" is the most cited article in the field. The paper compares the impact of COVID-19 with previous epidemics/pandemics and other types of global crises and explores how COVID-19 is changing society, the economy, and tourism. Neither the Attack of September 11 in 2001, the global economic crisis in 2008, nor Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) in public health contributed to the long-term decline in global tourism, but the impact and recovery of COVID-19 will be unprecedented. COVID-19 has provided us with an opportunity to critically reconsider the growth trajectory of tourism, which historically has been defined by almost every tourism organization (UNWTO, ICAO, CLIA or WTTC) as a one-sided measure of tourism prosperity as growth in tourist numbers. But the logic of "more people visiting means greater interests" has been subverted under COVID-19. COVID-19 offers deep lessons for the travel industry, policymakers and tourism researchers about the impact of global change. The challenge now is to collectively learn from this global tragedy to accelerate the transformation of sustainable tourism (Gossling et al., 2020).

Since Citespace's co-citation analysis of *Web of Science* authors is only for the first author. For the article *Pandemics, tourism and global change: A rapid assessment of COVID-19*, its third author Colin Michael Hall ranked third in the table, excluding the institutional status of UNWTO, Colin Michael Hall ranked second among individual scholars. According to a *Google Schola*r analysis for the category of tourism, he is currently the most cited scholar in the subject area and is also highly cited in geography, regional development, sustainability and global environmental change. In addition to the one mentioned above, his second most cited article in the *Web of Science Core Collection* is *Pandemics, transformations and tourism: Be careful what you wish for*, which is also a paper co-authored with Stefan Gossling. The article draws on existing literature to identify factors that influence tourism and destination recovery, and in some cases, selectivity, and containment measures for the impact of COVID-19 may lead to a repositioning of tourism. Tackling

planetary limits and sustainable tourism requires a global approach, and without a fundamental transformation of the entire planet, the possibilities for a full transformation of the tourism system remain extremely limited (Hall et al., 2020).

Conclusions and Limitations
To sum up, the impact and mechanism of different dimensions of COVID-19 in the tourism industry have received continuous attention from scholars, with diverse research objects and prolific research results. However, at this stage, the core author group has not yet been formed, and the in-depth cooperation between authors with a high number of publications is relatively limited. Countries and institutions with a relatively high volume of publications are also countries and regions that hold an important weight in the global tourism market. The current research focuses on the impact of COVID-19 on the tourism industry, crisis management, satisfaction, and perception. In the future, research in sustainable tourism, innovation of tourism models or business forms, as well as online tourism, cloud tourism and other fields that are more suitable for tourism behaviors and models in the epidemic situation need to increase in depth. Authors and articles with greater influence in the field are emphasizing the necessity and importance of the transition to sustainable tourism. China is a country with earlier research and more achievements in this field, but it needs to be improved in terms of authority and influence.

This study also has some limitations. First, the *Web of Science Core Collection* does not contain all the literature in this field. Secondly, due to the relatively limited research period of this paper, no keywords burst analysis was carried out. In addition, due to the limitations of the researcher's language ability, this paper only analyzed journal articles written in English. In 2022, only the data for the first half of the year are collected. The author will continue to pay attention to the research trends and achievements in this field and strive to further dig into the research status in this field in a longer time frame.

Reference
Ahmad, A., Jamaludin, A., Zuraimi, N. S. M., & Valeri, M. (2021). Visit intention and destination image in post-Covid-19 crisis recovery. *Current Issues in Tourism*, *24*(17), 2392–2397. https://doi.org/10.1080/13683500.2020.1842342

Albort-Morant, G., & Ribeiro-Soriano, D. (2016). A bibliometric analysis of international impact of business incubators. *Journal of Business Research*, *69*(5), 1775–1779. https://doi.org/10.1016/j.jbusres.2015.10.054

Arbulu, I., Razumova, M., Rey-Maquieira, J., & Sastre, F. (2021). Can domestic tourism relieve the COVID-19 tourist industry crisis? The case of Spain. *Journal of Destination Marketing & Management*, *20*, 100568. https://doi.org/10.1016/j.jdmm.2021.100568

Bae, S. Y., Chang, P.-J., & Lee, H. (2022). Examining untact tourism behaviour in South Korea during the COVID-19 pandemic: A two-wave longitudinal study (March and September 2020). *Asia Pacific Journal of Tourism Research*, *27*(1), 15–29. https://doi.org/10.1080/10941665.2021.1998157

Banos-Pino, J. F., Boto-Garcia, D., Del Valle, E., & Sustacha, I. (2021). The impact of COVID-19 on tourists' length of stay and daily expenditures. *Tourism Economics*, 13548166211053420. https://doi.org/10.1177/13548166211053419

Barna, M., & Semak, B. (2020). Main trends of marketing innovations development of international tour operating. *Baltic Journal of Economic Studies*, *6*(5), 33–41. https://doi.org/10.30525/2256-0742/2020-6-5-33-41

Boto-Garcia, D., & Leoni, V. (2021). Exposure to COVID-19 and travel intentions: Evidence from Spain. *Tourism Economics*, 1354816621996554. https://doi.org/10.1177/1354816621996554

Breier, M., Kallmuenzer, A., Clauss, T., Gast, J., Kraus, S., & Tiberius, V. (2021). The role of business model innovation in the hospitality industry during the COVID-19 crisis. *International Journal of Hospitality Management*, *92*, 102723. https://doi.org/10.1016/j.ijhm.2020.102723

Butler, G., Szili, G., Cutler, C., Hay, I., & Saikia, U. (2021). Changing Australian leisure mobilities in the COVID-19 pandemic: Exploring the role of automobilities. *Leisure Studies*, *40*(5), 698–713. https://doi.org/10.1080/02614367.2021.1916833

Calder, G., Radic, A., Ryu, H.-S., Ariza-Montes, A., & Han, H. (2022). COVID-19 and pro-environmental behaviour at destinations amongst international travellers. *Frontiers in Psychology*, *13*, 879300. https://doi.org/10.3389/fpsyg.2022.879300

Chen, C. (2016). *CiteSpace: A practical guide for mapping scientific literature*. Nova Science Publishers Hauppauge, NY, USA.

Chen, Y., Chen, C. M., Liu, Z. Y., Hu, Z. G., & Wang, X. W. (2015). The methodology function of Citespace mapping knowledge domains. *Studies in Science of Science*, *33*(02), 242–253. https://doi.org/10.16192/j.cnki.1003-2053.2015.02.009

Colakoglu, U., Yurcu, G., & Avsar, M. (2021). Social isolation, anxiety, mental well-being and push travel motivation: The case of COVID-19 in Turkey. *Asia Pacific Journal of Tourism Research*, *26*(11), 1173–1188. https://doi.org/10.1080/10941665.2021.1981415

De Bellis, N. (2009). *Bibliometrics and citation analysis: From the science citation index to cybermetrics*. scarecrow press.

Duan, J., Xie, C., & Morrison, A. M. (2022). Tourism crises and impacts on destinations: A systematic review of the tourism and hospitality literature. *Journal of Hospitality & Tourism Research*, *46*(4), 667–695. https://doi.org/10.1177/1096348021994194

Ekinci, Y., Gursoy, D., Can, A. S., & Williams, N. L. (2022). Does travel desire influence COVID-19 vaccination intentions? *Journal of Hospitality Marketing & Management*, *31*(4), 413–430. https://doi.org/10.1080/19368623.2022.2020701

El-Said, O., & Aziz, H. (2022). Virtual tours a means to an end: An analysis of virtual tours' role in tourism recovery post COVID-19. *Journal of Travel Research*, *61*(3), 528–548. https://doi.org/10.1177/0047287521997567

Fang, Y., Yin, J., & Wu, B. (2018). Climate change and tourism: A scientometric analysis using CiteSpace. *Journal of Sustainable Tourism*, *26*(1), 108–126. https://doi.org/10.1080/09669582.2017.1329310

Feng, L., Wang, S. B., Tang, H. Y., Yu, X., Li, S. J., Yuan, J. X., & Huang, G. Q. (2021). Knowledge map of rural ecological civilization research based on Citespace visualization analysis. *Journal of Ecology and Rural Environment*, *37*(02), 137–144. https://doi.org/10.19741/j.issn.1673-4831.2020.0442

Foo, L.-P., Chin, M.-Y., Tan, K.-L., & Phuah, K.-T. (2021). The impact of COVID-19 on tourism industry in Malaysia. *Current Issues in Tourism*, *24*(19), 2735–2739. https://doi.org/10.1080/13683500.2020.1777951

Gössling, S., Scott, D., & Hall, C. M. (2020). Pandemics, tourism and global change: A rapid assessment of COVID-19. *Journal of sustainable Tourism*, 1–20. https://doi.org/10.1080/09669582.2020.1758708

Gursoy, D., Can, A. S., Williams, N., & Ekinci, Y. (2021). Evolving impacts of COVID-19 vaccination intentions on travel intentions. *Service Industries Journal*, *41*(11–12), 719–733. https://doi.org/10.1080/02642069.2021.1938555

Hall, C. M., Scott, D., & Gössling, S. (2020). Pandemics, transformations and tourism: Be careful what you wish for. *Tourism Geographies*, *22*(3), 577–598. https://doi.org/10.1080/14616688.2020.1759131

Huang, G., Zhong, S., & Wong, I. A. (2021). Evolutionary selection for travel agencies under COVID-19 adversity through the lens of life history theory. *Journal of Travel & Tourism Marketing*, *38*(9), 917–934. https://doi.org/10.1080/10548408.2021.2006857

Huertas, A., Oliveira, A., & Girotto, M. (2020). Crisis communication management by the national tourist organizations of Spain and Italy in the face of Covid-19. *Profesional De La Informacion*, *29*(4), e290410. https://doi.org/10.3145/epi.2020.jul.10

Ivanov, S. H., Webster, C., Stoilova, E., & Slobodskoy, D. (2022). Biosecurity, crisis management, automation technologies and economic performance of travel, tourism and hospitality companies—A conceptual framework. *Tourism Economics*, *28*(1), 3–26. https://doi.org/10.1177/1354816620946541

Jiang, S., LIU, B., & Zhang, Z. (2019). Spatial-temporal evolution of tourism income level and tourism competitiveness in African countries. *Journal of Subtropical resources and Environment*, *14*(2), 65–73.

Kartari, A., Ozen, A. E., Correia, A., Wen, J., & Kozak, M. (2021). Impacts of COVID-19 on changing patterns of household food consumption: An intercultural study of three countries. *International Journal of Gastronomy and Food Science*, *26*, 100420. https://doi.org/10.1016/j.ijgfs.2021.100420

Kesgin, M., Can, A. S., Gursoy, D., Ekinci, Y., & Aldawodi, K. (2022). Effects of religiosity and travel desire on COVID-19 vaccination intentions. *Current Issues in Tourism*. https://doi.org/10.1080/13683500.2022.2026302

Kim, J. J., & Han, H. (2022). Saving the hotel industry: Strategic response to the COVID-19 pandemic, hotel selection analysis, and customer retention. *International Journal of Hospitality Management*, *102*, 103163. https://doi.org/10.1016/j.ijhm.2022.103163

Kim, J., Park, J., Kim, S. (Sam), Gonzalez-Jimenez, H., Kim, J.-E., De Villiers, R., Lee, J. C., & Giroux, M. (2022). The impact of the threat of COVID-19 on visiting intentions as influenced by different destination logos. *European Journal of Marketing*, *56*(3), 738–767. https://doi.org/10.1108/EJM-04-2020-0308

Kim, S. (Sam), Kim, J., Badu-Baiden, F., Giroux, M., & Choi, Y. (2021). Preference for robot service or human service in hotels? Impacts of the COVID-19 pandemic. *International Journal of Hospitality Management*, *93*, 102795. https://doi.org/10.1016/j.ijhm.2020.102795

Lebrun, A.-M., Corbel, R., & Bouchet, P. (2021). Impacts of Covid-19 on travel intention for summer 2020: A trend in proximity tourism mediated by an attitude towards Covid-19. *Service Business*. https://doi.org/10.1007/s11628-021-00450-z

Lee, H. Y., & Leung, K. Y. K. (2022). Island ferry travel during COVID-19: Charting the recovery of local tourism in Hong Kong. *Current Issues in Tourism*, *25*(1), 76–93. https://doi.org/10.1080/13683500.2021.1911964

Li, J., & Chen, C. M. (2016). *Citespace:Text mining and visualization in scientific literature* (2nd 本). Capital University of Economics and Business Press.

Li, L., Tao, Z., Lu, L., Liu, H., Zhang, J., & Zhang, M. (2022). The impact of COVID-19 on the regional tourism flow network: An empirical study in Hubei Province. *Current Issues in Tourism*, *25*(2), 287–302. https://doi.org/10.1080/13683500.2021.1937075

Li, X. X., & Shao, Z. Y. (2016). The fast search clustering algorithm based on density-distance and its application in the co-word clustering analysis. *Journal of the China Society for Scientific and Technical Information*, *35*(04), 380–388.

Li, Z., Xiang, Y., & Lu, Q. (2022). Research progress, hot spots and prospects in the field of high-quality development of agricultural economy: Visual analysis based on CiteSpace. *Journal of Chinese Agricultural Mechanization*, *43*(07), 106–115. https://doi.org/10.13733/j.jcam.issn.2095-5553.2022.07.016

Li, Z., Zhao, Q., Huo, T., Shao, Y., & Hu, Z. (2022). COVID-19: Management focus of reopened tourist destinations. *Current Issues in Tourism*, *25*(1), 14–20. https://doi.org/10.1080/13683500.2020.1863926

Liao, H., Tang, M., Luo, L., Li, C., Chiclana, F., & Zeng, X.-J. (2018). A bibliometric analysis and visualization of medical big data research. *Sustainability*, *10*(1), 166. https://doi.org/10.3390/su10010166

Liu, M. T., Wang, S., McCartney, G., & Wong, I. A. (2021). Taking a break is for accomplishing a longer journey: Hospitality industry in Macao under the COVID-19 pandemic. *International Journal of Contemporary Hospitality Management*, *33*(4), 1249–1275. https://doi.org/10.1108/IJCHM-07-2020-0678

Liu, X., Wen, J., Kozak, M., Jiang, Y., & Li, Z. (2022). Negotiating interdisciplinary practice under the COVID-19 crisis: Opportunities and challenges for tourism research. *Tourism Review*, *77*(2), 484–502. https://doi.org/10.1108/TR-01-2021-0034

Liu, X., Yuan, Y., He, J., & Li, Z. (2022). Framing the travel livestreaming in China: A new star rising under the COVID-19. *Current Issues in Tourism*. https://doi.org/10.1080/13683500.2021.2023115

Lu, J., Xiao, X., Xu, Z., Wang, C., Zhang, M., & Zhou, Y. (2022). The potential of virtual tourism in the recovery of tourism industry during the COVID-19 pandemic. *Current Issues in Tourism*, *25*(3), 441–457. https://doi.org/10.1080/13683500.2021.1959526

Lu, Q., & Atadil, H. A. (2021). Do you dare to travel to China? An examination of China's destination image amid the COVID-19. *Tourism Management Perspectives*, *40*, 100881. https://doi.org/10.1016/j.tmp.2021.100881

Marques, C. P., Guedes, A., & Bento, R. (2022). Rural tourism recovery between two COVID-19 waves: The case of Portugal. *Current Issues in Tourism*, *25*(6), 857–863. https://doi.org/10.1080/13683500.2021.1910216

Mirehie, M., & Cho, I. (2022). Exploring the effects of the COVID-19 pandemic on sport tourism. *International Journal of Sports Marketing & Sponsorship*, *23*(3), 527–546. https://doi.org/10.1108/IJSMS-04-2021-0081

Moon, H., Lho, L., & Han, H. (2021). Self-check-in kiosk quality and airline non-contact service maximization: How to win air traveler satisfaction and loyalty in the post-pandemic world? *Journal of Travel & Tourism Marketing*, *38*, 383–398. https://doi.org/10.1080/10548408.2021.1921096

Moya Calderon, M., Chavarria Esquivel, K., Arrieta Garcia, M. M., & Barriocanal Lozano, C. (2022). Tourist behaviour and dynamics of domestic tourism in times of COVID-19. *Current Issues in Tourism*, *25*(14), 2207–2211. https://doi.org/10.1080/13683500.2021.1947993

Ndou, V., Mele, G., Hysa, E., & Manta, O. (2022). Exploiting technology to deal with the COVID-19 challenges in travel & tourism: A bibliometric analysis. *Sustainability*, *14*(10), Art. 10. https://doi.org/10.3390/su14105917

Nunkoo, R., Daronkola, H. K., & Gholipour, H. F. (2022). Does domestic tourism influence COVID-19 cases and deaths? *Current Issues in Tourism*, *25*(3), 338–351. https://doi.org/10.1080/13683500.2021.1960283

Ouyang, W., Wang, Y., Lin, C., He, M., Hao, F., Liu, H., & Zhu, W. (2018). Heavy metal loss from agricultural watershed to aquatic system: A scientometrics review. *Science of the Total Environment*, *637*, 208–220. https://doi.org/10.1016/j.scitotenv.2018.04.434

Pan, T., Shu, F., Kitterlin-Lynch, M., & Beckman, E. (2021). Perceptions of cruise travel during the COVID-19 pandemic: Market recovery strategies for cruise businesses in North America. *Tourism Management*, *85*, 104275. https://doi.org/10.1016/j.tourman.2020.104275

Park, I.-J., Kim, J., Kim, S. (Sam), Lee, J. C., & Giroux, M. (2021). Impact of the COVID-19 pandemic on travelers' preference for crowded versus non-crowded options. *Tourism Management*, *87*, 104398. https://doi.org/10.1016/j.tourman.2021.104398

Park, S., Kim, Y. R., & Ho, C. S. T. (2022). Analysis of travel mobility under Covid-19: Application of network science. *Journal of Travel & Tourism Marketing*, *39*(3), 335–352. https://doi.org/10.1080/10548408.2022.2089954

Provenzano, D., & Volo, S. (2022). Tourism recovery amid COVID-19: The case of Lombardy, Italy. *Tourism Economics*, *28*(1), 110–130. https://doi.org/10.1177/13548166211039702

Quang, T. D., Tran, T. C., Tran, V. H., Nguyen, T. T., & Nguyen, T. T. (2022). Is Vietnam ready to welcome tourists back? Assessing COVID-19's economic impact and the Vietnamese tourism industry's response to the pandemic. *Current Issues in Tourism*, *25*(1), 115–133. https://doi.org/10.1080/13683500.2020.1860916

Quintal, V., Sung, B., & Lee, S. (2022). Is the coast clear? Trust, risk-reducing behaviours and anxiety toward cruise travel in the wake of COVID-19. *Current Issues in Tourism*, *25*(2), 206–218. https://doi.org/10.1080/13683500.2021.1880377

Radic, A., Luck, M., Al-Ansi, A., Chua, B.-L., Seeler, S., Raposo, A., Kim, J. J., & Han, H. (2021). To dine, or not to dine on a cruise ship in the time of the COVID-19 pandemic: The tripartite approach towards an understanding of behavioral intentions among female passengers. *Sustainability*, *13*(5), 2516. https://doi.org/10.3390/su13052516

Rahmafitria, F., Suryadi, K., Oktadiana, H., Putro, H. P. H., & Rosyidie, A. (2021). Applying knowledge, social concern and perceived risk in planned behavior theory for tourism in the Covid-19 pandemic. *Tourism Review*, *76*(4), 809–828. https://doi.org/10.1108/TR-11-2020-0542

Rasoolimanesh, S. M., Seyfi, S., Rastegar, R., & Hall, C. M. (2021). Destination image during the COVID-19 pandemic and future travel behavior: The moderating role of past experience. *Journal of Destination Marketing & Management*, *21*, 100620. https://doi.org/10.1016/j.jdmm.2021.100620

Rastegar, R., Higgins-Desbiolles, F., & Ruhanen, L. (2021). COVID-19 and a justice framework to guide tourism recovery. *Annals of Tourism Research*, *91*, 103161. https://doi.org/10.1016/j.annals.2021.103161

Rastegar, R., Seyfi, S., & Rasoolimanesh, S. M. (2021). How COVID-19 case fatality rates have shaped perceptions and travel intention? *Journal of Hospitality and Tourism Management*, *47*, 353–364. https://doi.org/10.1016/j.jhtm.2021.04.006

Rogerson, C. M., & Baum, T. (2020). COVID-19 and African tourism research agendas. *Development Southern Africa*, *37*(5), 727–741. https://doi.org/10.1080/0376835X.2020.1818551

Seraphin, H. (2020). COVID-19 and the acknowledgement of children as stakeholders of the tourism industry. *Anatolia*, *32*(10), 152–156. https://doi.org/10.1080/13032917.2020.1856690

Seraphin, H., & Dosquet, F. (2020). Mountain tourism and second home tourism as post COVID-19 lockdown placebo? *Worldwide Hospitality and Tourism Themes*, *12*(4), 485–500. https://doi.org/10.1108/WHATT-05-2020-0027

Shao, Y., Hu, Z., Luo, M., Huo, T., & Zhao, Q. (2021). What is the policy focus for tourism recovery after the outbreak of COVID-19? A co-word analysis. *Current Issues in Tourism*, *24*(7), 899–904. https://doi.org/10.1080/13683500.2020.1806798

Shapoval, V., Hagglund, P., Pizam, A., Abraham, V., Carlback, M., Nygren, T., & Smith, R. M. (2021). The COVID-19 pandemic effects on the hospitality industry using social systems theory: A multi-country comparison. *International Journal of Hospitality Management*, *94*, 102813. https://doi.org/10.1016/j.ijhm.2020.102813

Shekari, F., & Azizi, F. (2022). Exploring the factors affecting travel intention during the COVID-19 pandemic: A structural analysis. *Iranian Journal of Management Studies*, *15*(3), 613–632.

Srivastava, P. R., Sengupta, K., Kumar, A., Biswas, B., & Ishizaka, A. (2022). Post-epidemic factors influencing customer's booking intent for a hotel or leisure spot: An empirical study. *Journal of Enterprise Information Management*, *35*(1), 78–99. https://doi.org/10.1108/JEIM-03-2021-0137

Su, D. N., Tran, K. P. T., Nguyen, L. N. T., Thai, T. H. T., Doan, T. H. T., & Tran, V. T. (2022). Modeling behavioral intention toward traveling in times of a health-related crisis. *Journal of Vacation Marketing*, *28*(2), 135–151. https://doi.org/10.1177/13567667211024703

Sun, Z. B., & Zhang, H. J. (2017). Research on co-word analysis method based on semantic similarity. *Journal of Library Science*, *39*(01), 74–79. https://doi.org/10.14037/j.cnki.tsgxk.2017.01.018

Teeroovengadum, V., Seetanah, B., Bindah, E., Pooloo, A., & Veerasawmy, I. (2021). Minimising perceived travel risk in the aftermath of the COVID-19 pandemic to boost travel and tourism. *Tourism Review*, *76*(4), 910–928. https://doi.org/10.1108/TR-05-2020-0195

UNWTO. (2021). *Tourism barometer and statistical Annex*.

Vaishar, A., & Stastna, M. (2022). Impact of the COVID-19 pandemic on rural tourism in Czechia Preliminary considerations. *Current Issues in Tourism*, *25*(2), 187–191. https://doi.org/10.1080/13683500.2020.1839027

Volgger, M., Taplin, R., & Aebli, A. (2021). Recovery of domestic tourism during the COVID-19 pandemic: An experimental comparison of interventions. *Journal of Hospitality and Tourism Management*, *48*, 428–440. https://doi.org/10.1016/j.jhtm.2021.07.015

Vu, K., & Hartley, K. (2022). Drivers of growth and catch-up in the tourism sector of industrialized economies. *Journal of Travel Research*, *61*(5), 1156–1172. https://doi.org/10.1177/00472875211019478

Wang, D., Kotsi, F., Mathmann, F., Yao, J., & Pike, S. (2022). Short break drive holiday destination attractiveness during COVID-19 border closures. *Journal of Hospitality and Tourism Management*, *51*, 568–577. https://doi.org/10.1016/j.jhtm.2022.05.013

Wang, J., & Xia, L. (2021). Revenge travel: Nostalgia and desire for leisure travel post COVID-19. *Journal of Travel & Tourism Marketing*, *38*(9), 935–955. https://doi.org/10.1080/10548408.2021.2006858

Wen, J., Kozak, M., Yang, S., & Liu, F. (2021). COVID-19: Potential effects on Chinese citizens' lifestyle and travel. *Tourism Review*, *76*(1), 74–87. https://doi.org/10.1108/TR-03-2020-0110

World Travel and Tourism Council. (2018). *Travel&tourism economic impact 2018 South Africa*. World Travle and Tourism Council.

Xie, C., Zhang, J., Morrison, A. M., & Coca-Stefaniak, J. A. (2021). The effects of risk message frames on post-pandemic travel intentions: The moderation of empathy and perceived waiting time. *Current Issues in Tourism*, *24*(23), 3387–3406. https://doi.org/10.1080/13683500.2021.1881052

Ye, N., Kueh, T.-B., Hou, L., Liu, Y., & Yu, H. (2020). A bibliometric analysis of corporate social responsibility in sustainable development. *Journal of Cleaner Production*, *272*, 122679. https://doi.org/10.1016/j.jclepro.2020.122679

Yeh, S.-S. (2021). Tourism recovery strategy against COVID-19 pandemic. *Tourism Recreation Research*, *46*(2), 188–194. https://doi.org/10.1080/02508281.2020.1805933

Yu, D., Xu, Z., Pedrycz, W., & Wang, W. (2017). Information sciences 1968-2016: A retrospective analysis with text mining and bibliometric. *Information Sciences*, *418*, 619–634. https://doi.org/10.1016/j.ins.2017.08.031

Zeng, Z., Chen, P.-J., & Lew, A. A. (2020). From high-touch to high-tech: COVID-19 drives robotics adoption. *Tourism Geographies*, *22*(3), 724–734. https://doi.org/10.1080/14616688.2020.1762118

Zhang, H., & Lu, J. (2022). Forecasting hotel room demand amid COVID-19. *Tourism Economics*, *28*(1), 200–221. https://doi.org/10.1177/13548166211035569

Zhang, J., Xie, C., & Morrison, A. M. (2021). The effect of corporate social responsibility on hotel employee safety behavior during COVID-19: The moderation of belief restoration and negative emotions. *Journal of Hospitality and Tourism Management*, *46*, 233–243. https://doi.org/10.1016/j.jhtm.2020.12.011

Zhang, J., Xie, C., Wang, J., Morrison, A. M., & Coca-Stefaniak, J. A. (2020). Responding to a major global crisis: The effects of hotel safety leadership on employee safety behavior during COVID-19. *International Journal of Contemporary Hospitality Management*, *32*(11), 3365–3389. https://doi.org/10.1108/IJCHM-04-2020-0335

Zhang, L. B. (2017). *Information analysis methods and practice*. Northeast Normal University Press.

Zhang, X., Xie, Q., Song, C., & Song, M. (2022). Mining the evolutionary process of knowledge through multiple relationships between keywords. *Scientometrics*, *127*(4), 2023–2053. https://doi.org/10.1007/s11192-022-04272-2

Zhang, Y., Lingyi, M., Peixue, L., Lu, Y., & Zhang, J. (2021). COVID-19's impact on tourism: Will compensatory travel intention appear? *Asia Pacific Journal of Tourism Research*, *26*(7), 732–747. https://doi.org/10.1080/10941665.2021.1908383

Zhong, L., Sun, S., Law, R., & Li, X. (2021). Tourism crisis management: Evidence from COVID-19. *Current Issues in Tourism*, *24*(19), 2671–2682. https://doi.org/10.1080/13683500.2021.1901866

Zhu, J., & Hua, W. (2017). Visualizing the knowledge domain of sustainable development research between 1987 and 2015: A bibliometric analysis. *Scientometrics*, *110*(2), 893–914. https://doi.org/10.1007/s11192-016-2187-8