

Health-Related Crises in Tourism Destination Management: A Systematic Review

Celeste Vong , Paulo Rita  and Nuno António 

NOVA Information Management School (NOVA IMS), Universidade Nova de Lisboa, Campus de Campolide, 1070-312 Lisboa, Portugal; prita@novaims.unl.pt (P.R.); nantonio@novaims.unl.pt (N.A.)

* Correspondence: d20200456@novaims.unl.pt

Abstract: Over the past two decades, the tourism industry has witnessed a range of health-related crises, with the recent outbreak of COVID-19 bringing the industry to a standstill. This systematic literature review serves to understand previous health crises, impacts, and consequences in the tourism industry and identify the current status, intellectual structure, and trends in this research field. A bibliometric analysis using VOSviewer and Gephi was performed over 63 journal articles from 2003 to 2021 indexed in Scopus. Results reveal a research focus shift towards sustainable tourism development. Moreover, the status quo indicates a need for closer research collaboration across continents and more interdisciplinary research in health science and tourism to better understand the broad impacts of pandemic outbreaks and generate new insights into this complex issue.

Keywords: tourism destination; health crises; crisis management; bibliometric analysis; VOSviewer; network theory



Citation: Vong, C.; Rita, P.; António, N. Health-Related Crises in Tourism Destination Management: A Systematic Review. *Sustainability* **2021**, *13*, 13738. <https://doi.org/10.3390/su132413738>

Academic Editor: J. Andres Coca-Stefaniak

Received: 9 November 2021

Accepted: 7 December 2021

Published: 13 December 2021

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2021 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Tourism is one of the world's largest and most revenue-generating industries [1], being an essential tool for economic growth in most developing countries [2], yet highly vulnerable to disruptive events such as crises and disasters [3]. 'Safety, security, and peace' are the basic conditions for the normal operation of tourism businesses [4] (p. 1). Recent global crises and disasters, both natural and human-induced, such as terrorism, wars, epidemic diseases, natural disasters, political and economic issues, have indeed posed major challenges to the tourism industry worldwide [5]. Specifically, the recent COVID-19 pandemic has led to devastating social and economic consequences, including mobility restrictions, business closures, pay cuts and massive job losses in the global travel and tourism industry [6,7]. Although sustainable development has been a long-discussed issue in tourism, the unprecedented socio-economic impacts brought by the pandemic have led scholars and practitioners alike to question the sustainability of the industry [8,9].

To date, a great deal of research has been done on tourism crises and disasters [10], such as how destinations should respond proactively to crises and how to develop strategies to avoid or cope with the crisis in order to mitigate its impacts on destinations [11–13]. In terms of the types of crises, much research during the last two decades is concerned with terrorist attacks, natural disasters like tsunamis and earthquakes or various crises and disasters in general [14]. Until recently, the outbreak of COVID-19 has drawn significant attention from tourism scholars across the world to understand the disastrous impacts on tourism [15,16]. This attention is probably due to the fact that the research on tourism crises is event-driven, which means the studies were often conducted promptly following the incidence of a particular crisis or disaster [17].

Several researchers have conducted reviews of the extant literature in the field to ensure the impacts of tourism crises and disasters are studied systematically. For example, Aliperti et al. [18] and Ritchie & Jiang [10] presented the current research focus, identified research gaps, and outlined a future research agenda. Estevão and Costa [19] looked at

the types of natural disasters and their impacts, and outlined strategies developed and implemented by destination management organisations (DMOs). Duan et al. [17] analysed different types of crises and provided a structural understanding of their impacts. Despite these research efforts, a systematic review that synthesises health-related crises in the tourism context is deemed necessary, since it may serve as a starting point for future research developments in the field, especially amid a global pandemic that has drastically changed the tourism landscape as we once knew it.

Meanwhile, the closest work answering this need is the review of 115 articles addressing tourism-related diseases by Chen et al. [20]. However, it generally focuses on the classification of research on tourism diseases and the relationship between disease and tourism, instead of infectious disease crises and their impacts on tourism. Therefore, the present systematic literature review aims to identify how DMOs can respond to health crises more effectively in the future by providing a comprehensive understanding of contemporary health crises and their impacts. Research gaps are also identified for future investigation.

In particular, the following research questions are addressed:

- RQ1: What types of health crises are covered in the reviewed studies, and what is their geographical scope?
- RQ2: How has tourism research evolved on health-related crises?
- RQ3: What are the keywords associated with health-related crises in tourism? And what are their implications?
- RQ4: What are the most influential publications, journals and authors in this research domain?
- RQ5: What are the impacts and consequences of health-related crises on tourism?
- RQ6: What are the strategies for tourism crisis management put forward in the reviewed studies?

A systematic literature review methodology was performed to review and analyse articles focused on health-related tourism crises to answer the above questions. The contribution of this paper is threefold. First, it identifies the impacts of health crises and strategies for tourism crisis management by systematising and synthesising findings from selected articles. Second, it presents the evolution, current status, trends, and future directions in this field. Third, identifying influential papers, journals and authors will facilitate the literature search in the area.

This paper, following this brief introduction, is organised as follows: Section 2 describes the systematic review methodology. Section 3 presents the results. Section 4 discusses the research questions. Section 5 concludes and identifies limitations and directions for future research.

2. Materials and Methods

A systematic literature review (SLR) is ‘a means of evaluating and interpreting all available research relevant to a particular research question or topic area or phenomenon of interest’ [21] (p. 1). This review paper applies the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) protocol to identify, screen and determine the eligibility of articles to be included in this review [22]. A PRISMA four-phase flow diagram outlining the selection process for the inclusion of articles in the SLR is shown in Figure 1.

2.1. Keyword Identification

A health crisis is defined by the World Health Organisation [23] as ‘any event that exceeds the coping capacity of an affected community’, and in this case, it is referred to as the outbreak of an infectious disease. Based on the research questions, the following keywords were identified: ‘crisis’, ‘disease’, ‘tourism’ and ‘destination’, for their relevance, and the article focuses on publications on the destination rather than a particular segment of the tourism industry.

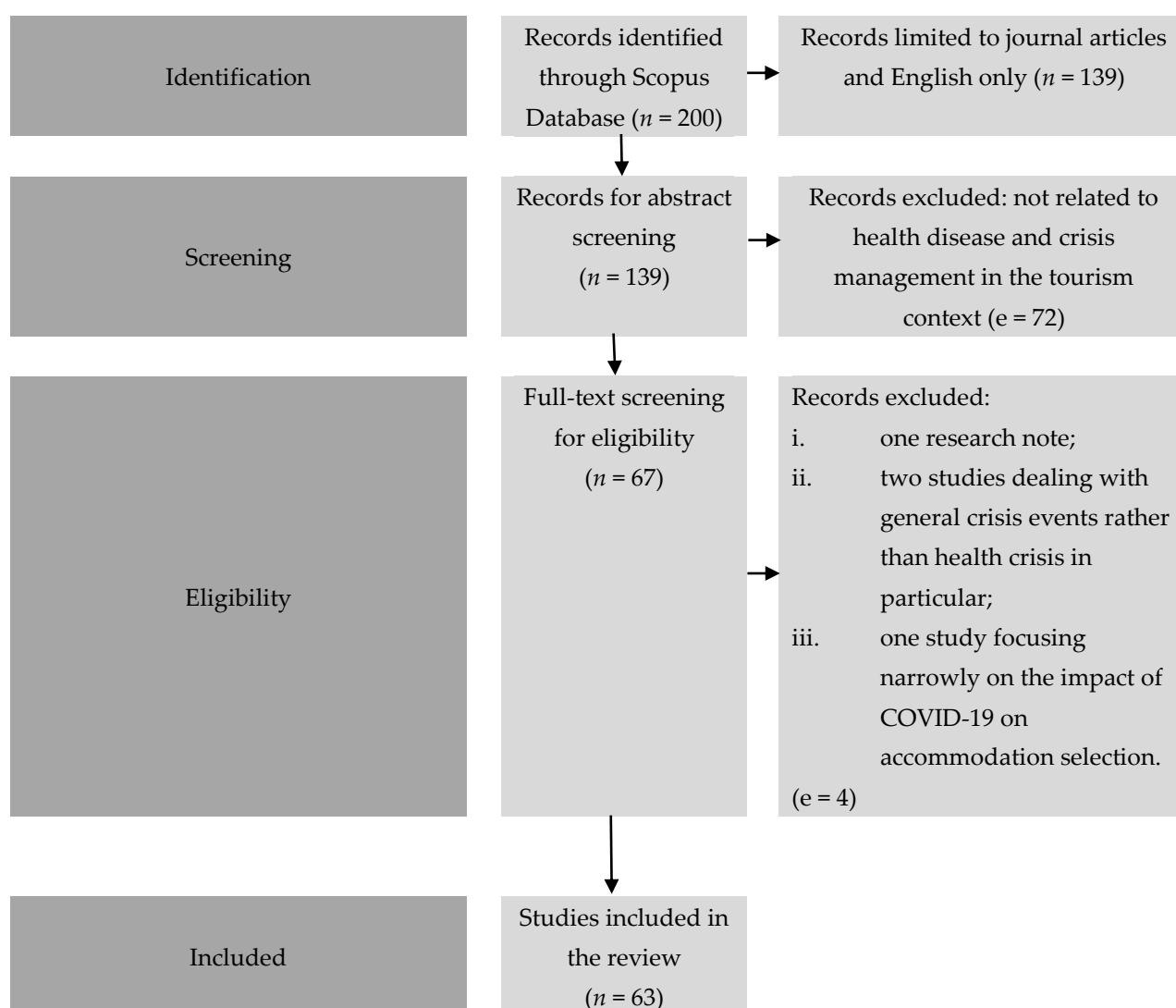


Figure 1. PRISMA four-phase flow diagram (n = included; e = excluded). Source: Adapted from Moher et al. [15].

2.2. Electronic Database Identification and Search

Web of Science (WOS) (<https://www.webofscience.com/wos/woscc/basic-search>; accessed on 3 May 2021) and Scopus (<https://www.scopus.com/search/form.uri?display=basic#basic>; accessed on 3 May 2021) were at the outset the chosen databases for literature search because they are most commonly used for bibliometric analysis and provide a broad interdisciplinary coverage [24]. Nevertheless, after an initial search, WOS was not considered for the present study due to the limited number of obtained results. The same search query yielded 139 and 14 articles on Scopus and WOS, respectively, in which 9 were duplicates. In the search strings, the keywords identified were searched within the article title, abstract and keywords in the Scopus database for publications from 2003 to April 2021: (TITLE-ABS-KEY (crisis) AND TITLE-ABS-KEY (disease) AND TITLE-ABS-KEY (tourism) OR TITLE-ABS-KEY (destination)) AND PUBYEAR > 2002. This timeframe was defined based on the occurrence of major disease outbreaks: (i) 2003 was the year when the SARS outbreak began in China and soon caused global concern for the tourism industry [25]; and (ii) The search was performed on 3 May 2021, so April 2021 was selected as the end of the timeframe for capturing the latest studies on tourism crisis management in the times of COVID-19.

2.3. Eligibility Criteria

The eligibility criteria are concerned with the inclusion and exclusion of studies for systematic review [26]. To ensure the quality of the current review, only articles published in peer-reviewed journals were considered for inclusion. Therefore, conference papers, review papers, books, book chapters, research notes and letters to editors were not included. In addition, as full-text evaluation is necessary and the bibliometric analysis tool used in the study can only process English-language texts, articles written in languages other than English were excluded.

2.4. Screening

Based on the inclusion criteria, a total of 139 records were identified using the Scopus database search. After abstract screening, studies unrelated to health disease and crisis management in the tourism context were excluded, leaving 67 articles for further full-text review. Although the results were limited to journal articles, a research note was found at the full-text screening stage and removed. In addition, of the remaining full-text articles, three were removed for the following reasons: i. two studies dealt with general crisis events rather than a health crisis in particular; ii. one study mainly focused on the impact of COVID-19 on selecting accommodation. Since the articles were collected from a single database—Scopus—no duplicates were found. As a result, 63 articles met the eligibility criteria and were included in the final analysis.

2.5. Bibliometric Analysis

Bibliometric analysis is the quantitative study of scholarly publications within a certain field using statistical methods [27]. A bibliometric analysis was performed to describe and analyse the current state of research on health-related crisis management in the tourism industry. A descriptive analysis was performed directly using Scopus' results analysis tool. Regarding metadata, the following information retrieved from Scopus was exported into CSV format for further analyses using VOSviewer (version 1.6.16.0, Centre for Science and Technology Studies, Leiden University: BN Leiden, The Netherlands) [28]: citation information, bibliographical information, abstract and keywords, and references.

2.6. The Application of VOSviewer for Bibliometric Analysis

VOSviewer is an open-source data visualisation software used to construct bibliometric maps based on bibliometric datasets. VOSviewer's distinctive viewing capabilities to handle a large number of items (usually more than 100 items) offers easy-to-interpret graphical representations of bibliometric maps [28]. In the present study, VOSviewer was applied to create distance-based maps to identify and analyse clusters of related items, including co-authorship analysis, co-occurrence of keywords analysis, citation analysis and co-citation analysis. Furthermore, the distance-based maps can illustrate the strength of the relations between each item, in which a shorter distance represents a higher strength and vice versa.

2.7. The Application of Network Theory Measures: EigenCentrality and PageRank

As a complementary method to the analysis and visualisation of bibliometric networks [29], in the current study network theory was applied to quantitatively analyse the underlying network structure and the patterns of interactions among the nodes within a network [30]. In network theory, the centrality of a node can be measured in a number of ways [31]. In particular, Eigenvector centrality and PageRank were used to identify prominent authors and important keywords in the field under study. We computed these data using Gephi 0.9.2 (<https://gephi.org/users/download/>; accessed on 4 July 2021), an open-source software for network exploration and analysis [32].

EigenCentrality [33] measures the influence of a node by considering not only the number of connections a node has, but also the importance of its adjacent connections. In other words, EigenCentrality reveals a node's networking ability, in which nodes that

are connected to high-scoring nodes are assigned higher scores than nodes with equal connections to low-scoring nodes. Here, an author with high EigenCentrality has close contact with other influential authors within the network. Similarly, keywords with high EigenCentrality indicate high co-occurrence frequency with other important keywords.

PageRank Algorithm is a variant of EigenCentrality formulated by Brin & Page [34]. It assigns weights not only to a node's connections but also to the connections of its connections. Therefore, PageRank particularly serves as a key indicator in co-authorship network analysis because higher weights are assigned to authors who work with multiple authors as well as authors who work with few authors who are highly co-authored [35]. Likewise, keywords with a high PageRank score represent their strong co-occurrence with keywords that frequently co-occur with other important keywords in the network.

Both EigenCentrality and PageRank have been used as a prestige measure in existing studies to identify influential authors (e.g., refs. [36–38]) as well as to measure the importance of keywords to identify key themes in a particular field (e.g., refs. [39,40]).

3. Results

3.1. Descriptive Analysis

Tourism literature on health-related crises showed a sharp increase in 2020 and 2021, and papers produced during this period account for more than half of the total search results (see Figure 2). Although the tourism industry worldwide has experienced several health-related crisis events, such as SARS in 2003, Swine flu (H1N1) in 2009, Ebola in 2014, and MERS in 2012 [41–43], the outbreak of COVID-19 in December 2019 has attracted relatively more attention from scholars in the tourism field. This attention may be explained by the consequences and devastating impacts it has on global tourism.

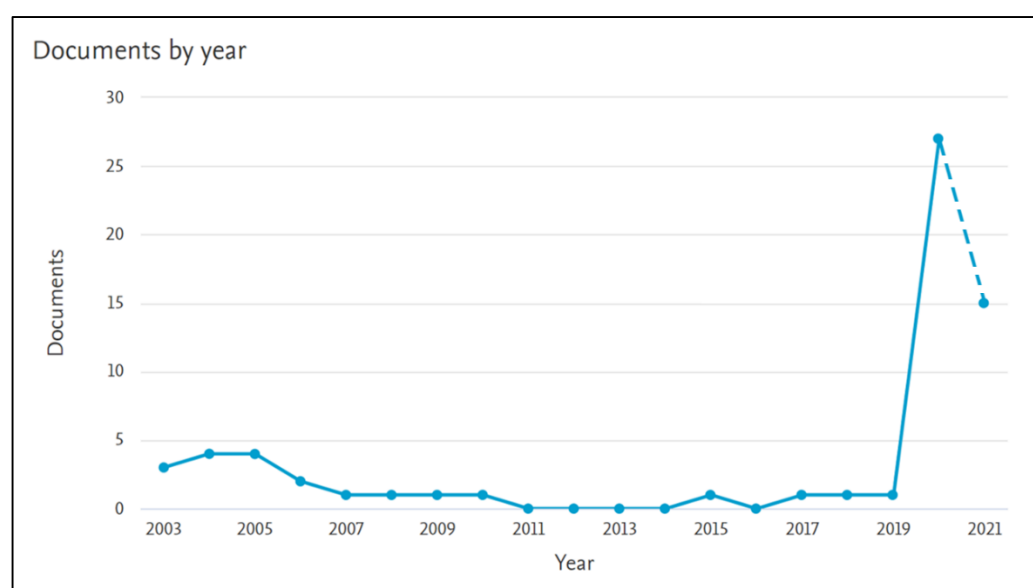


Figure 2. Number of documents by year. Source: Scopus Analyse search results.

According to Scopus's search results analysis, research on health-related crises in tourism primarily fell into the subject areas of Business, Management and Accounting (39%), Social Sciences (35.6%) and Environmental Science (11.9%). Other areas, including Medicine, Energy, Earth and Planetary Sciences, and Psychology, made up the remaining 13.5% (see Figure 3).

The journals publishing most articles on health-related tourism crises were Tourism Geographies followed by Current Issues in Tourism, Sustainability, International Journal of Environmental Research and Journal of Travel and Tourism Marketing, spanning diverse fields of tourism, marketing, environment, sustainability and public health (see Figure 4).

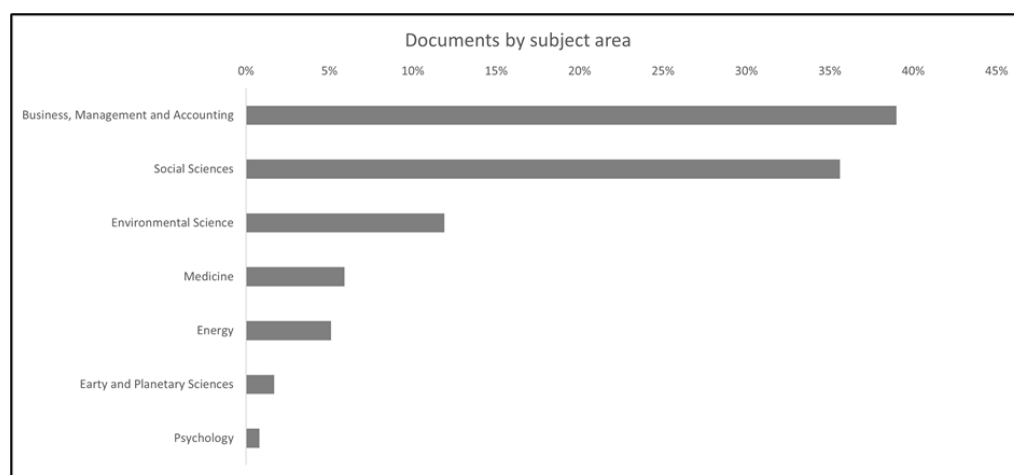


Figure 3. Documents by subject area. Source: Scopus Analyse search results.

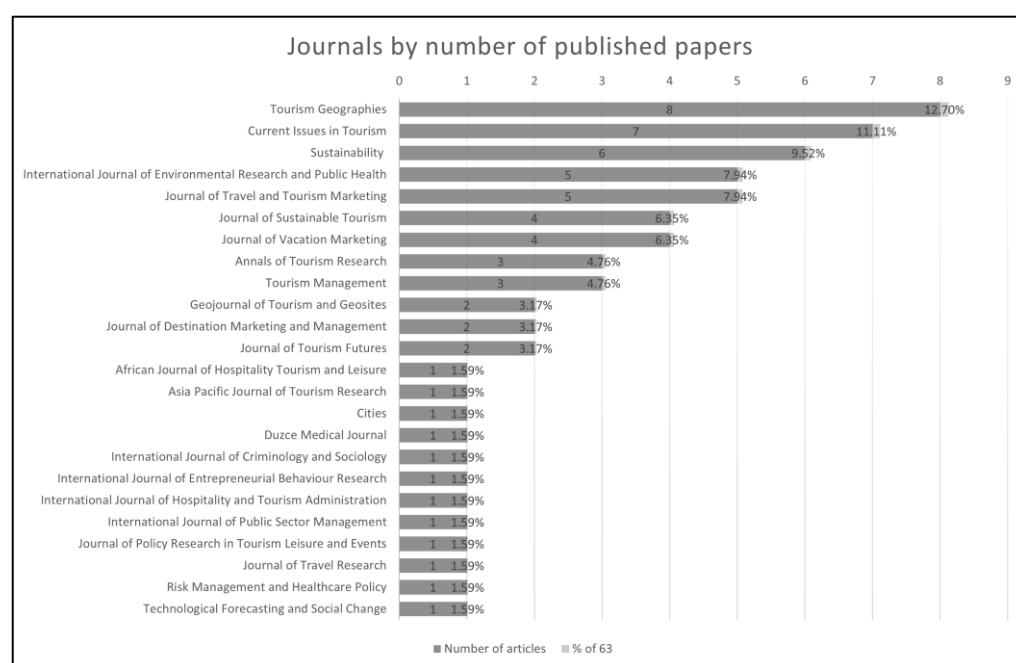


Figure 4. Journals by number of published papers. Source: Scopus Analyse search results.

In addition, the ten most cited papers from Scopus were primarily published in Tourism Management and Tourism Geographies. Papers in the former journal were published between 2008 and 2010, focusing on the impacts of disease crises on a destination as well as tourists' risk perception and behavioural changes, while papers in the latter journal were published in 2020, focusing on how the COVID-19 pandemic provided the opportunity for a sustainable transformation of the tourism industry. This transformation reflects a shift of focus from how the tourism industry can respond to health-related crises effectively to how tourism can recover sustainably over time. Table A1 presents the ten most cited papers from Scopus during the period 2003–2021 (April) and their key findings. In terms of citations, papers on COVID-19 received the most citations among the ten most cited papers, followed by SARS and Ebola (see Table 1), exhibiting a pattern consistent with the degree of impact of the disease.

Table 1. Total citations per year of the ten most cited papers since publication by type of disease.

Crisis (Disease)	Number of Papers	Total Citations	Total Citations per Year Since Publication
COVID-19	4	678	678
SARS	3 *	269	34
Ebola	1	97	32
Avian flu	2 *	353	29
General health diseases	1	89	5
Foot-and-Mouth Disease	1	61	3

Notes: * Two of the papers cover both Avian flu and SARS.

3.2. Content Analysis

In general, there are three major research streams in health-related crisis management in tourism, specifically focusing on impacts on the industry, tourism demand and tourist behaviour [44]. Accordingly, the content analysis of the selected articles was based on these three streams for classification. Table A2 lists the articles in each of these streams.

3.2.1. Impact on Tourism Industry

Prior to the outbreak of COVID-19, the research on the impact of health crises on the tourism industry largely focused on crisis communications [45–54]. Yet, the tremendous impact of COVID-19 has led scholars to question the sustainability of the current tourism practices and development, giving rise to a growing body of literature on crisis and disaster management for sustainable tourism [9,55–64]. It is evident that the future of tourism requires a fundamental transformation towards a more sustainable system. Most of the literature emphasizes the importance of sustainable transformation, yet little attention has been paid to which can be the mechanisms for transformation and how the tourism industry can truly exercise sustainable practices in the future.

3.2.2. Impact on Tourism Demand

Overall, the impact of health crises on tourism demand received less attention in the extant literature, with only 6 out of the 63 articles falling into this research stream. By studying the impact of disease outbreak on tourism demand, these papers intended to put forward appropriate strategies and policies to respond to the reoccurrence of any future crises. Meanwhile, the research conducted in recent years appeared to highlight the importance of sustainable practices in tourism businesses [8,65]. Once again, how it can be achieved in practice is yet to be examined.

3.2.3. Impact on Tourist Behaviour

About half of the studies grouped under this stream focused on risk perception and its impact on travel behaviour [59,66–69], while the others investigated the impact of health crises on tourist behaviour through the lens of sustainable tourism [70–77]. The use of online social media has been accelerated during the pandemic [78], yet there is little research on how the application of online social media by tourism businesses and destinations influences one's travel behaviour in the post-pandemic context.

3.3. Bibliometric Analysis via VOSviewer

A bibliometric analysis on existing studies was conducted based on the visualisation of the bibliometric networks generated by VOSviewer:

3.3.1. Co-Authorship Analysis

Co-authorship analysis is a tool for understanding collaborative ties between authors, affiliated institutions and countries. There were 158 authors involved in writing the 63 papers in the dataset. A visual map of co-authorship was produced using the fractional counting method, in which the minimum number of papers of an author was set to two,

and eighteen authors met the threshold. As shown in Figure 5, there are five networks of authors who have published papers on the topic together. At the same time, in overlay visualisation, the two major clusters in yellow represent stronger collaborations among authors in 2020, indicating that significant collaborative efforts were made to study health-related crises in the tourism context since the outbreak of COVID-19. In terms of the importance and influence of the authors, as shown in Table 2, the EigenCentrality and PageRank values indicate that Castanho R. A., Couto G., Carvalho C. and Pimentel P., who held prominent positions, had close collaborations with influential authors in the network. Meanwhile, Song H., Ritchie B.W. and Han H. had the highest PageRank scores but low EigenCentrality, indicating their strong collaborations with highly co-authored authors.

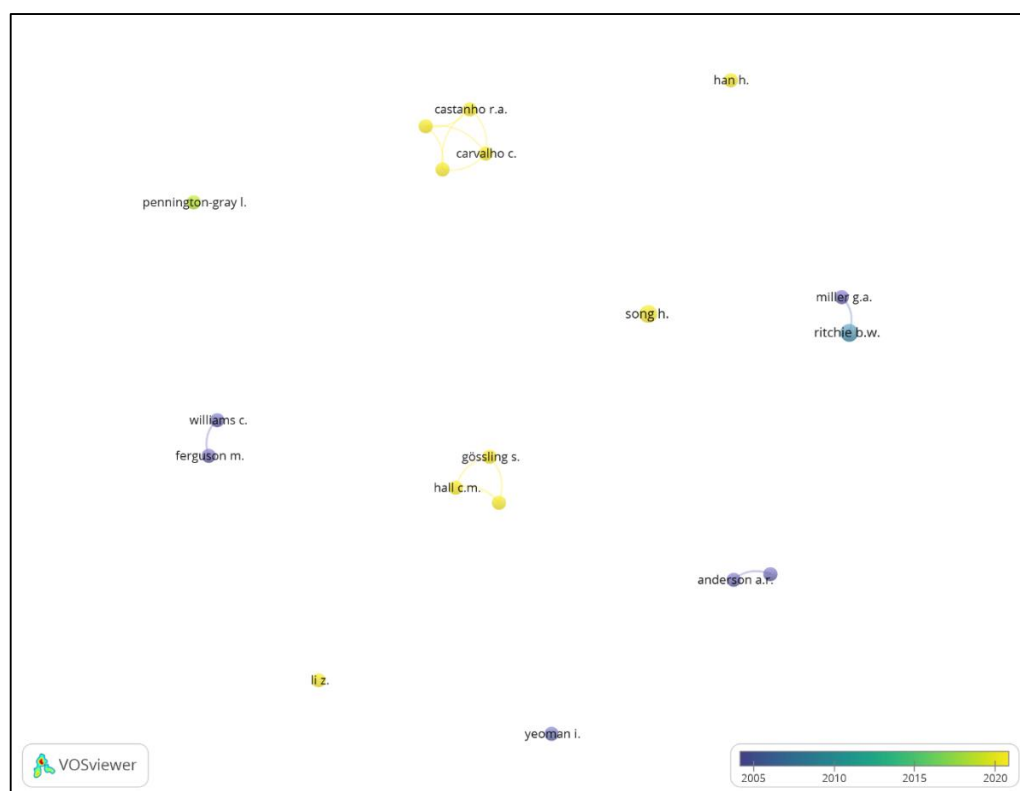


Figure 5. Overlay visualisation of co-authorship.

Table 2. Top ten authors based on EigenCentrality and PageRank measures.

Rank	Authors	EigenCentrality	Authors	PageRank
1	<i>Castanho R. A.</i>	1	Song H.	0.015329
2	<i>Couto G.</i>	1	Ritchie B. W.	0.011308
3	<i>Carvalho C.</i>	1	Han H.	0.011254
4	<i>Pimentel P.</i>	1	Yeoman I.	0.010860
5	Chen T.	0.81482	Li Z.	0.010736
6	Cong G.	0.81482	<i>Pennington-Gray L.</i>	0.009982
7	Jing B.	0.81482	<i>Castanho R. A.</i>	0.007807
8	Li G.	0.81482	<i>Couto G.</i>	0.007807
9	Peng L.	0.81482	<i>Carvalho C.</i>	0.007807
10	Yang J.	0.81482	<i>Pimentel P.</i>	0.007807

Notes: Authors in italic appear in both measures.

In terms of international collaboration, a visual map of co-authorship networks of countries was constructed to identify the collaboration patterns and countries with most publications on the topic. The analysis was performed using fractional counting methods, in which the minimum number of papers of a country was set to three in order to produce

a more meaningful map. Out of the 31 countries in the sample, eleven met the threshold. As shown in Figure 6, United Kingdom is the largest node, representing a country with the greatest number of publications. Moreover, the map consists of three clusters of countries from which scholars worked together on publications—namely, (i) blue cluster: United Kingdom, Canada and Sweden; (ii) green cluster: United States, Australia, China and South Korea; and (iii) red cluster: Spain, Poland, Portugal and Croatia. These clusters indicate stronger collaborations within continents and a relatively weak collaboration across geographical boundaries. Table 3 provides the number of publications by these eleven countries and the number of citations per paper by these countries as received in the Scopus journals. United Kingdom, United States and Australia were the countries with the most publications concerning health-related tourism crises, while most influential publications were from Sweden, Canada and United Kingdom.

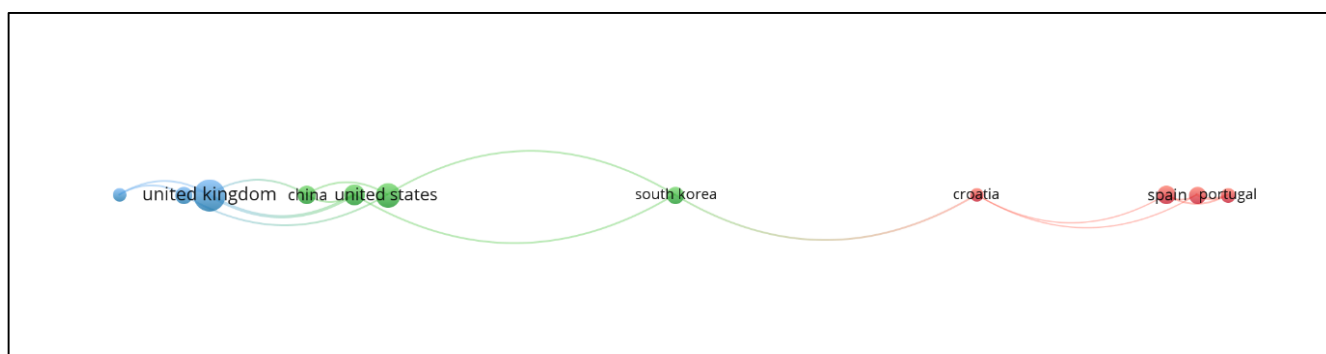


Figure 6. Network map of the co-authorship analysis on countries.

Table 3. Top countries by number of papers and number of citations as of May 2021.

Country	Documents	Citations	Citations per Paper
United Kingdom	17	1080	63.53 *
United States	10	356	35.60
Australia	7	364	52.00
China	6	87	14.50
Spain	6	11	1.83
Canada	5	594	118.80 *
Poland	5	34	6.80
South Korea	5	30	6.00
Portugal	4	10	2.50
Croatia	3	32	10.67
Sweden	3	577	192.33 *

Notes: * Three countries with the most influential papers.

3.3.2. Occurrence of Author Keyword Analysis

Author keywords are keywords provided by the authors that can best present the main idea of an article [79]. Therefore, an analysis of author keywords' occurrence was conducted to understand the focus of the studies and issues covered in the research on health-related crises over time. The full counting method was used, and the occurrence of each keyword was set to one. Of the 247 author keywords, 205 were selected for the analysis.

In overlay visualisation (see Figure 7), the health-crisis events studied in the tourism literature, by chronological order, were Foot-and-Mouth Disease (FMD), SARS, Avian Flu, Ebola and COVID-19, and were closely related to the topic of the pandemic. COVID-19 received the most scholarly attention. Meanwhile, sustainable tourism was found to be an emerging focus in recent pandemic studies.

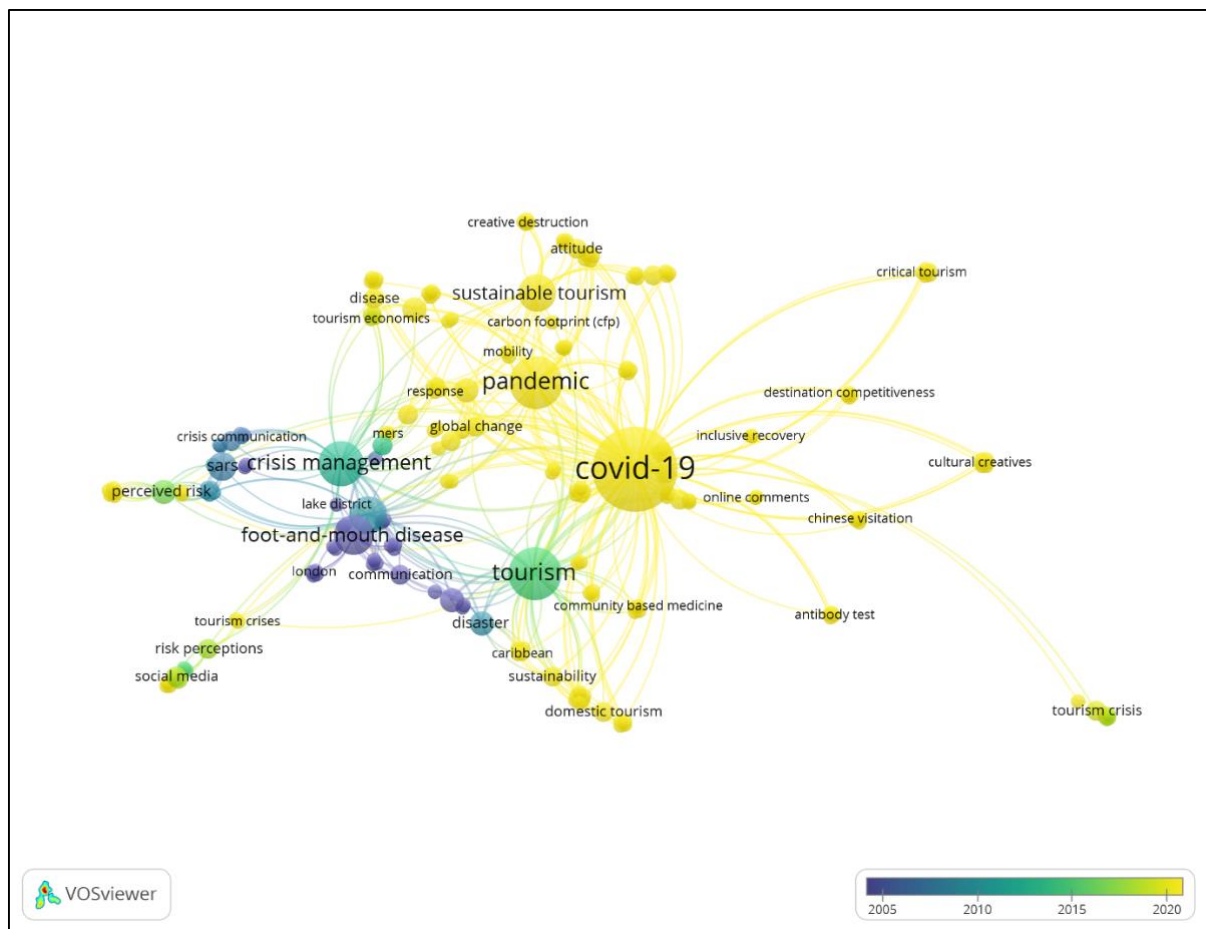


Figure 7. Overlay visualisation of the occurrence of author keywords.

The visual map in Figure 8 shows that the impact of health crises is primarily manifested in international tourism demand. In terms of crisis management, the issues addressed in the literature were planning, British Tourist Authority (i.e., DMO), communication, risk perceptions and resilience.

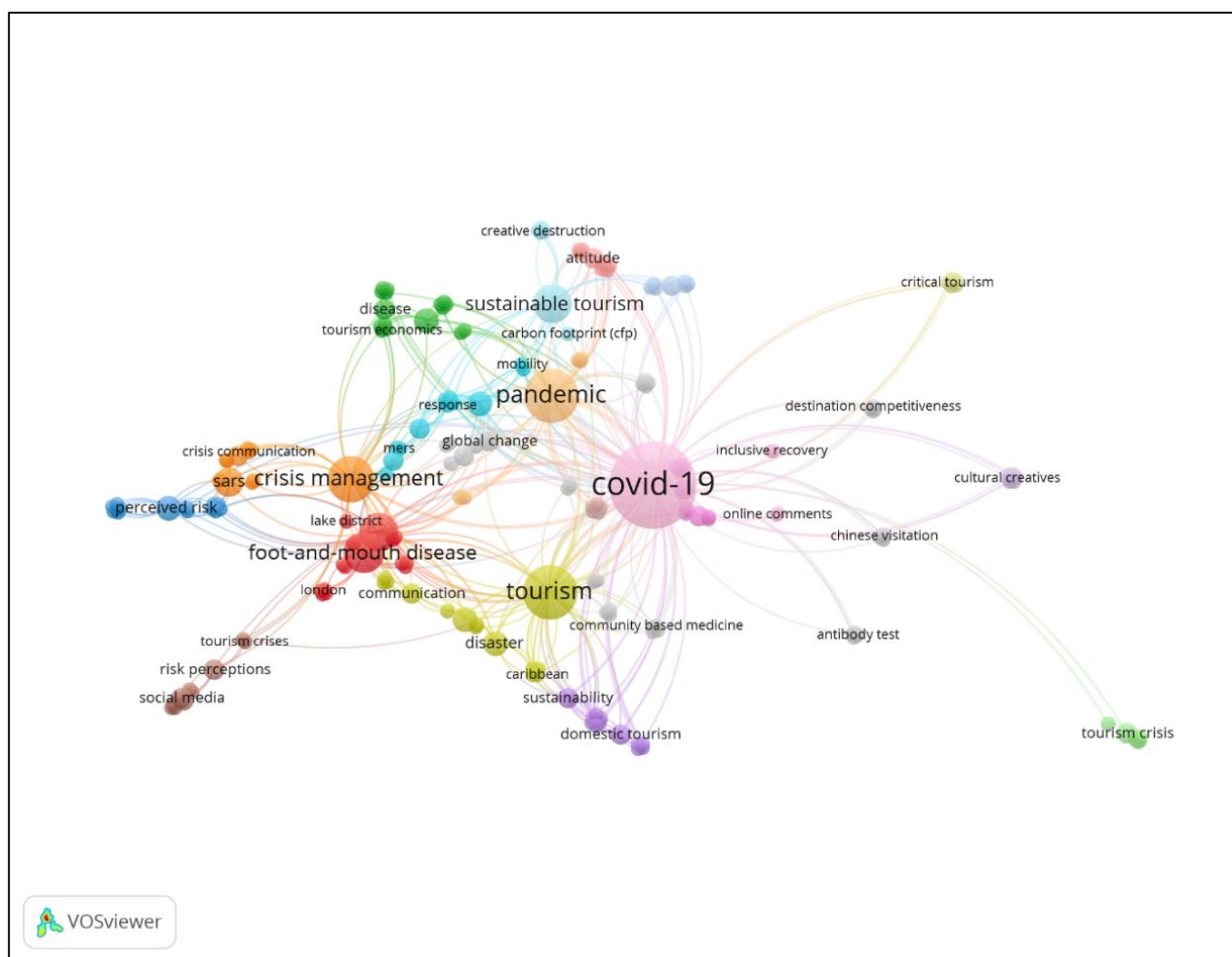


Figure 8. Network map of the occurrence of keywords.

3.3.3. Co-Occurrence of Keyword Analysis

The co-occurrence of keyword analysis can be used to understand a particular field's research status and trends by identifying the connections between keywords and the frequency of two or more keywords that appear together in the same literature. The co-occurrence of keyword (including both author and index keywords) analysis was performed using the full counting method with a minimum number of three occurrences of each keyword, resulting in 62 keywords. The five most common keywords ranked by total link strength were COVID-19 (occurrences: 36; total link strength: 243), tourism (25; 188), viral disease (22; 176), epidemic (15; 130) and pandemic (12; 124), all of which fit within the research context (see Figure 9).

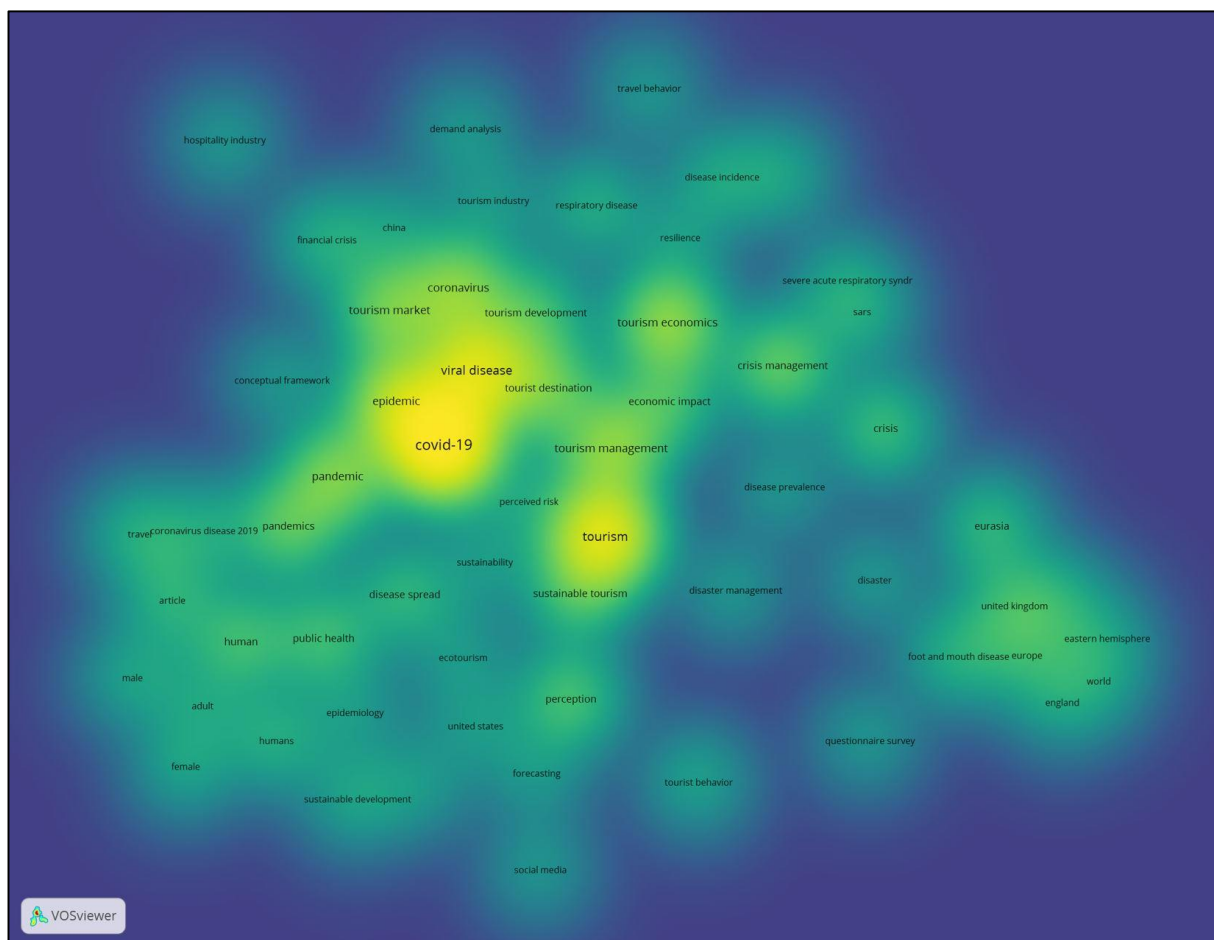


Figure 9. Density visualisation of the co-occurrence of keywords.

The visual map of the co-occurrence of keywords shows four clusters (see Figure 10). The size of the nodes represents the weight of the keywords: the connections between nodes indicate the co-occurrence of the keywords, and the thickness of the links and the distance between two nodes represent the frequency of the co-occurrence of keywords. According to the results shown in Figure 10, the largest nodes of keywords from the four clusters identified were COVID-19 (red), tourism (blue), pandemic (green) and sustainable tourism (yellow), which is further confirmed by the EigenCentrality measure that shows consistent results (See Table 4). The analysis reveals that tourism scholars have given the pandemic far more attention since the outbreak of COVID-19.

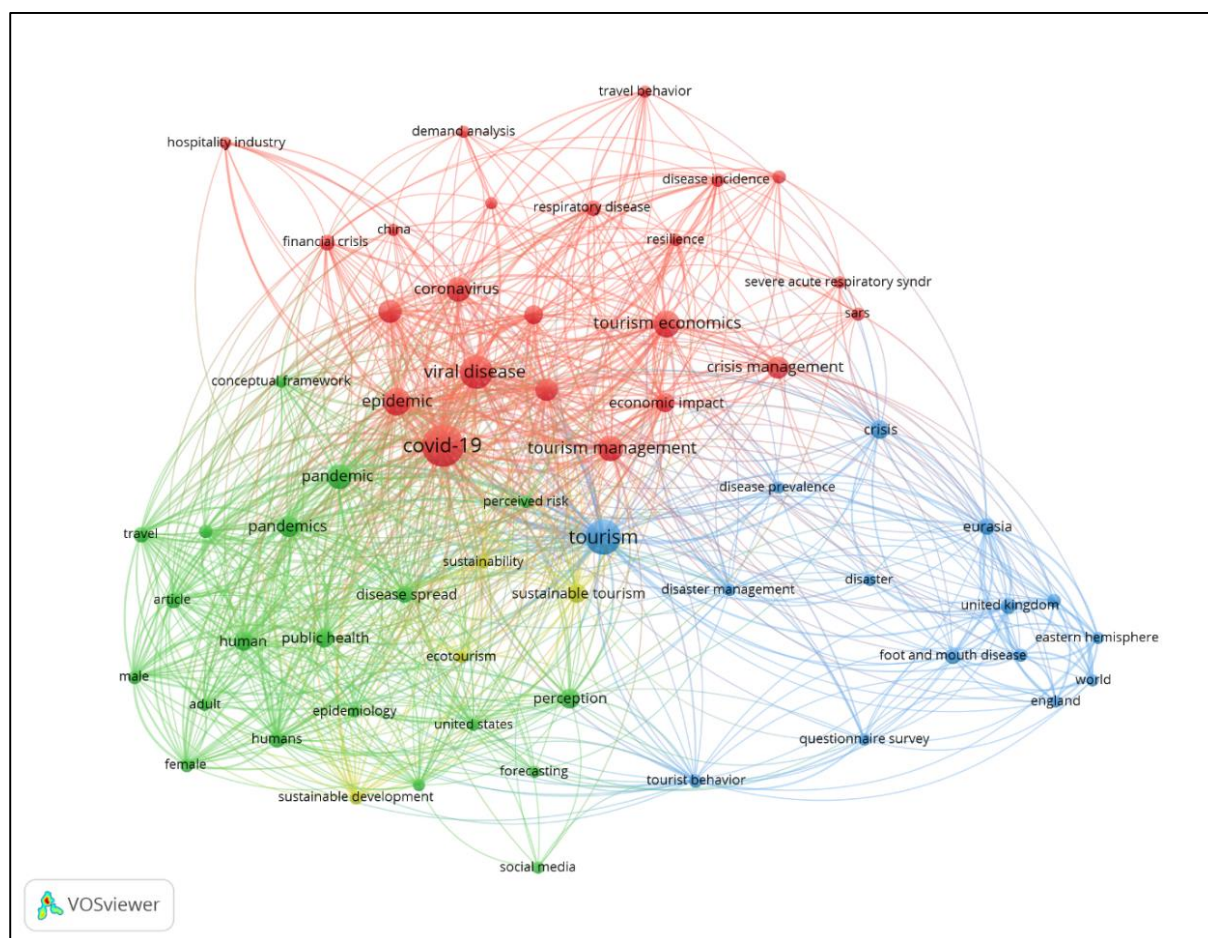


Figure 10. Network map of the co-occurrence of keywords.

Table 4. Top ten keywords based on EigenCentrality and PageRank measures.

Rank	Keywords	EigenCentrality	Keywords	PageRank
1	COVID-19	1	COVID-19	0.070836
2	Tourism	0.445909	Pandemic	0.025553
3	Pandemic	0.440224	Tourism	0.025537
4	Crisis management	0.318418	Crisis management	0.020377
5	Sustainable tourism	0.280801	Foot-and-mouth disease	0.015369
6	Crisis	0.247390	Sustainable tourism	0.014768
7	Resilience	0.219670	Crisis	0.013895
8	Sustainability	0.176509	SARS	0.009927
9	Transformation	0.167250	Perceived risk	0.009071
10	Domestic tourism	0.166604	Tourism industry	0.007572

To further analyse the evolution of research topics in health-related tourism crises, the co-occurrence of keywords is displayed in overlay visualisation (see Figure 11). The results show that although the tourism industry has gone through a number of public health crisis events and their associated impacts over the past two decades, not much has been written on the topic except for the particular attention paid to the FMD outbreak in England and SARS. Consistently, both FMD and SARS also appear in the top ten keywords based on the PageRank measure (See Table 4), indicating their relatively high occurrence in studies of health-related tourism crises. In addition, in line with the earlier analyses, COVID-19, in particular, has received significantly more interest in the tourism field. The core position of the keywords ‘sustainability’ and ‘sustainable tourism’ and their distances to COVID-19

reflect a research focus shift towards sustainable tourism development due to the outbreak of COVID-19.

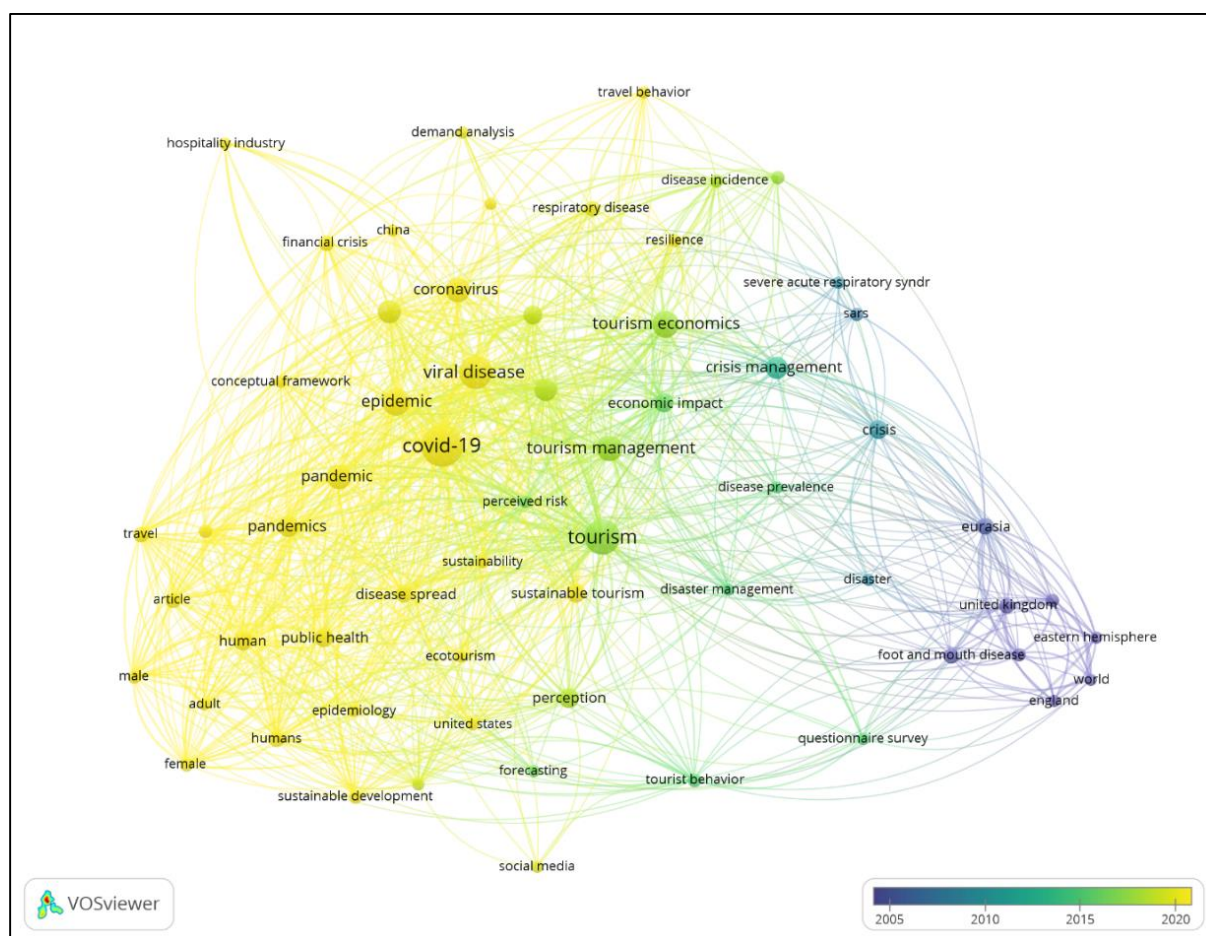


Figure 11. Overlay visualisation of the co-occurrence of keywords.

3.3.4. Citation Analysis

Citation analysis explores the impact of articles, journals and authors in a specific research field, in which impact is concerned with the frequency of being cited [80]. In VOSviewer's citation analysis, a citation link between two items indicates that one item cites the other item.

First, to find out the citation status of papers related to health-related tourism crises, a citation analysis of papers was performed with the minimum number of paper citations set to fifteen. As a result, 30 papers met the threshold. However, as shown in Figure 12, papers with the most citations were mainly scattered across the map, with almost no relatedness between items. The only prominent cluster found on the map was the one dominated by Gössling et al.'s [8] paper on COVID-19, which was also the paper that received most citations (430) in the dataset. Figure 13 provides a closer look at the relatedness of the articles grouped into this cluster. It shows that Maphanga & Henama's [42] paper on the tourism impact of Ebola in Africa, albeit with fewer citations (19), was the key paper that linked to the highly cited papers in the dataset. These include, apart from Gössling et al.'s [8] paper, papers on COVID-19 by Hall et al. [81] and Jamal & Budke [82].

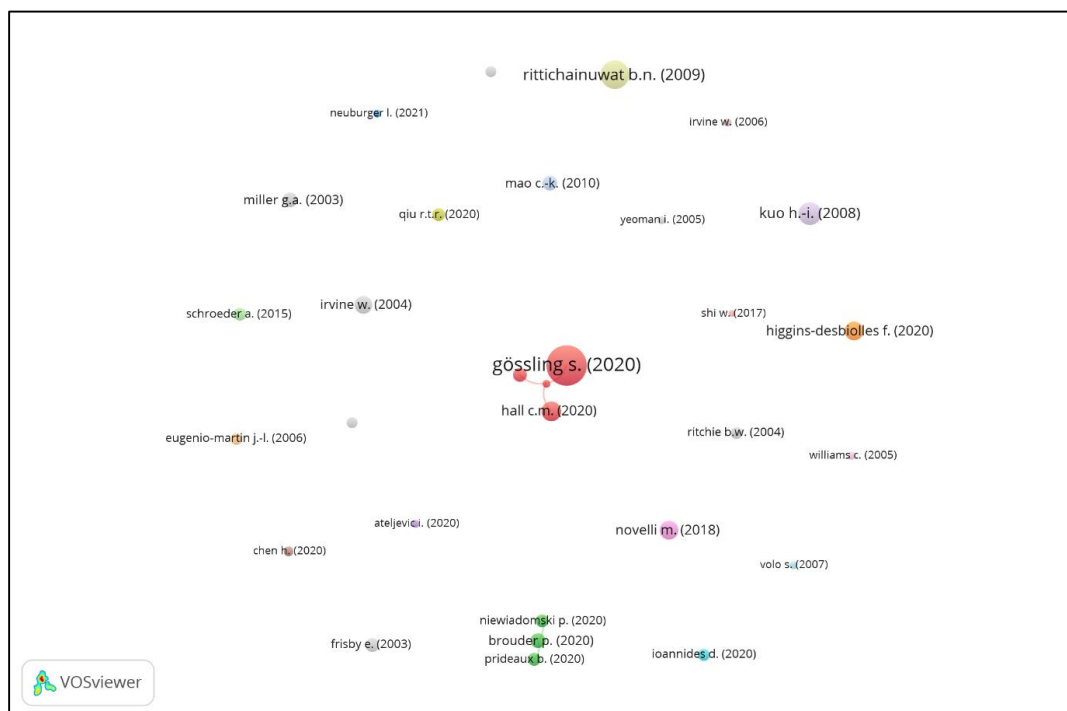


Figure 12. Network map of the citation analysis on papers.

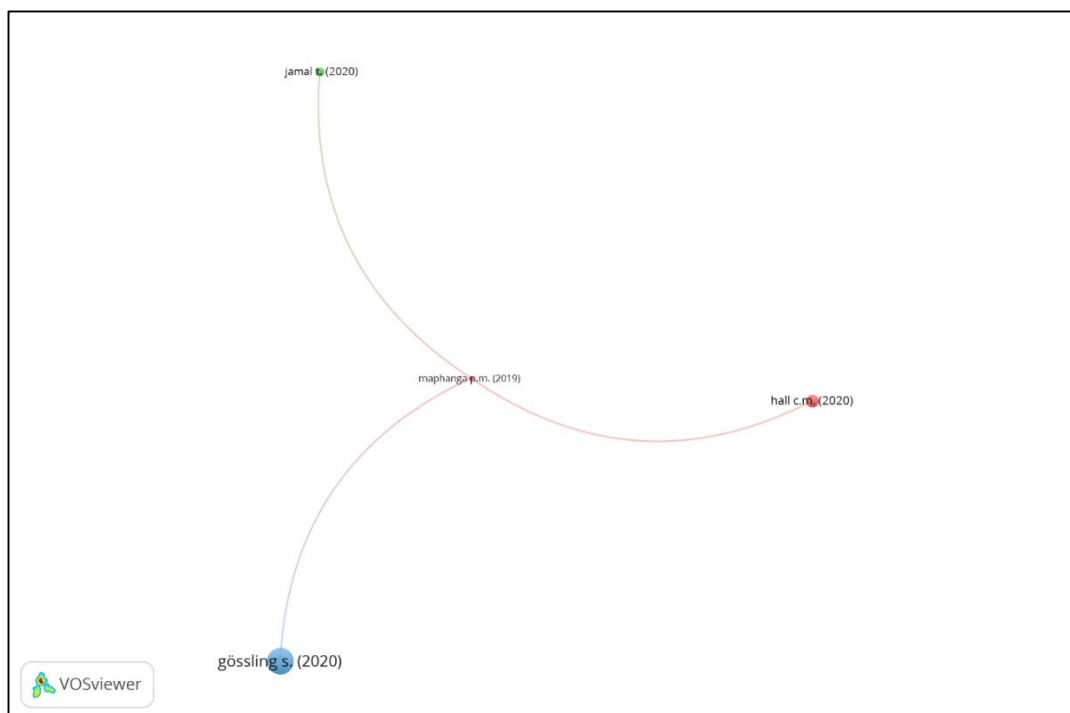


Figure 13. Network map of a further citation analysis on papers.

Second, a citation analysis was conducted on journals. To be included in the analysis, each journal had to be cited at least five times. Of the 24 journals, 17 met the threshold. Yet, only six items formed the network of journals, consisting of two major clusters of journals that cited each other, as shown in Figure 14. Tourism Geographies was the journal that linked all items in the network.

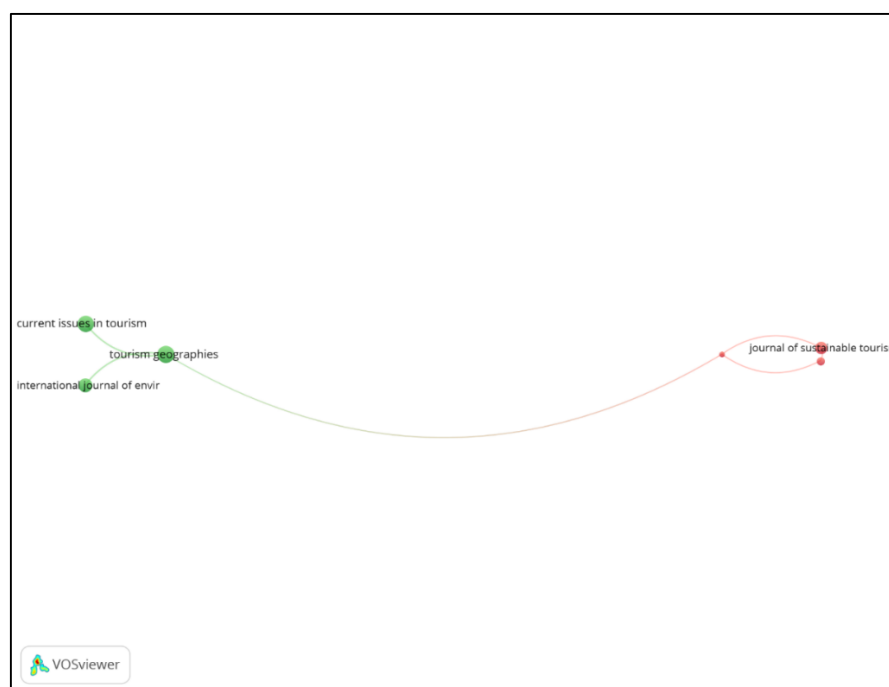


Figure 14. Network map of the citation analysis on journals.

Finally, a citation analysis on authors was conducted to understand how often they cited each other as well as to identify the influential authors in the field. For this analysis, the minimum number of citations of an author was set to 15, leading to 59 authors meeting the threshold. As a result, a citation network of two significant clusters was formed by eight authors, as shown in Figure 15. Consistent with an earlier analysis on papers, both Maphanga, P. M. and Henama, U. S., who co-authored a paper titled ‘The Tourism Impact of Ebola in Africa: Lessons on Crisis Management’, were the key authors linking influential authors in the dataset.

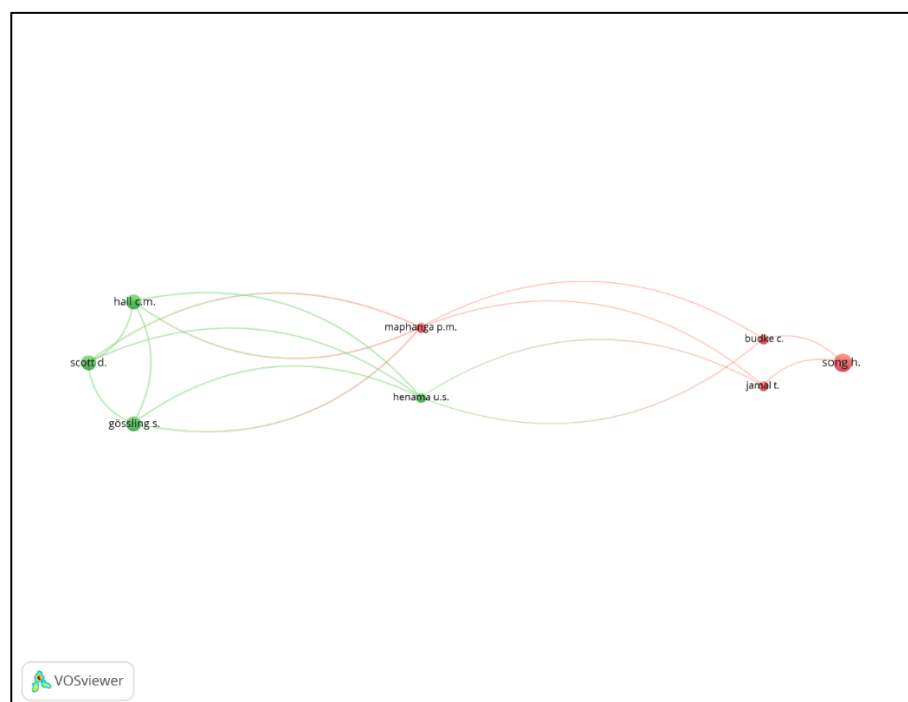


Figure 15. Network map of the citation analysis on authors.

3.3.5. Co-Citation Analysis

A co-citation analysis maps the intellectual structure of a particular research field based on the relatedness of items such as cited authors, cited sources and cited references. It is worth noting that the citation analysis also considers the references cited in the sample of 63 papers. Thus, a co-citation link between two items indicates that both items are cited by the same document.

Given the small sample size of the present study, a co-citation analysis is instrumental in identifying the influential papers, journals and authors in the research domain. Using the full counting method with the minimum number of citations of a cited reference set to three, the analysis on cited references resulted in 16 meeting the threshold (see Figure 16). The three most cited references were: Lepp & Gibson [83] (total link strength: 16); Faulkner [11] (15) and McKercher & Chon [84] (12).

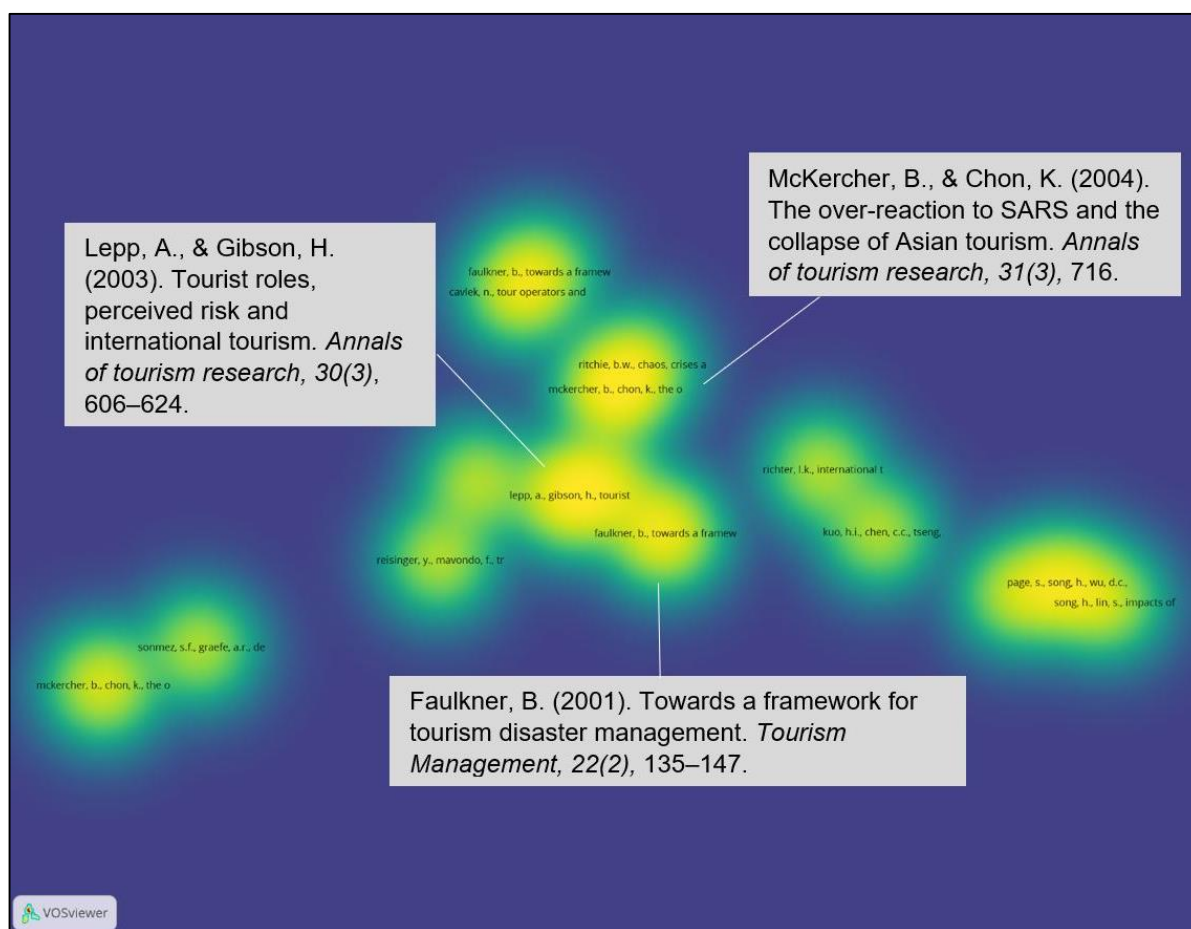


Figure 16. Density visualisation of the co-citation analysis on cited papers.

In terms of cited journals, a co-citation analysis was performed with a full counting method. To achieve a more meaningful network analysis on the cited journals, the minimum number of citations of a journal was set to 25, resulting in seven cited journals. The results in Figure 17 reveal that the most cited journals were *Tourism Management* (citations: 193), *Annals of Tourism Research* (134) and *Journal of Travel Research* (89).

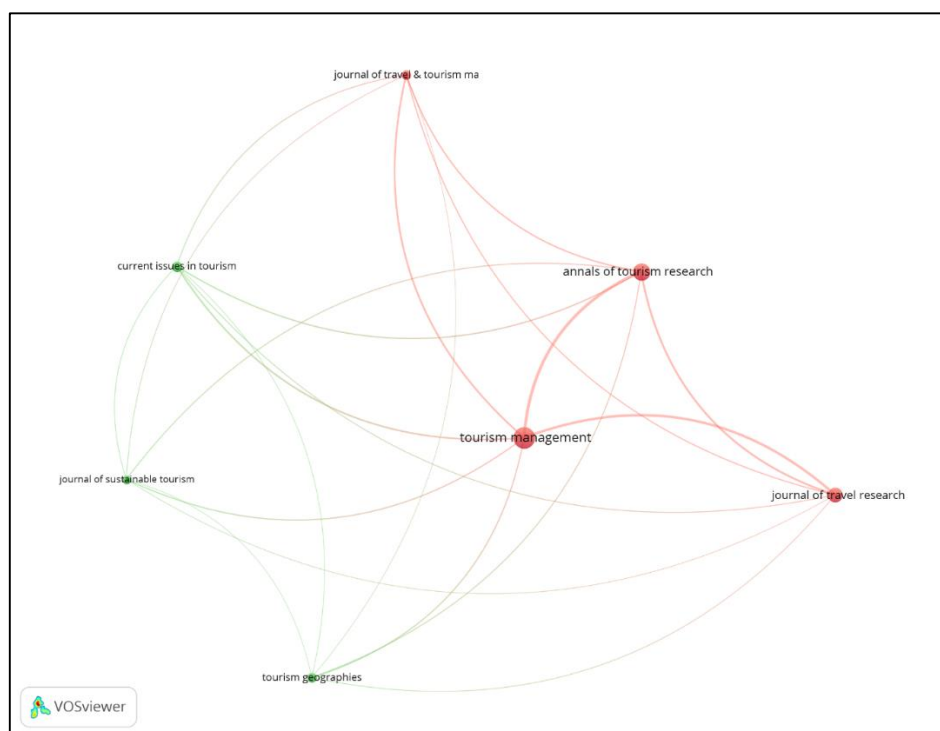


Figure 17. Network map of the co-citation analysis on cited journals.

Regarding the co-cited authors, a co-citation analysis was performed to analyse all the authors cited in the sample of 63 papers. The minimum number of citations of an author was set to 20, resulting in 10 authors forming the co-citation network (see Figure 18). The five most-cited authors were Hall, C. M. (citations: 54), Song, H. (41), Gossling, S. (37), Ritchie, B. W. (36) and Pennington-Gray, I. (31). Nevertheless, the relatedness of these authors was relatively low, except for a rather strong co-citation link between Hall, C. M., and Gossling, S.

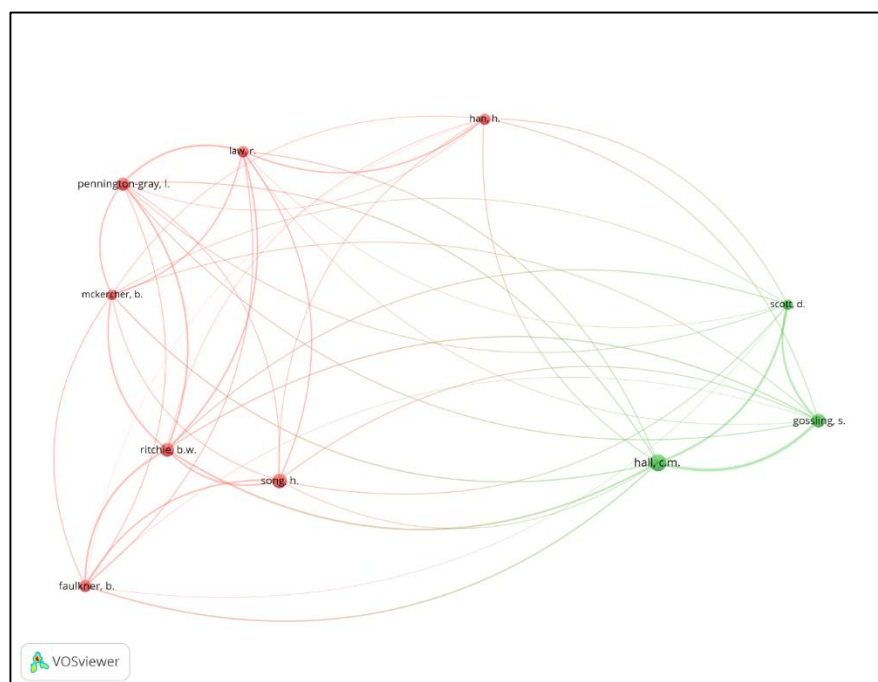


Figure 18. Network map of the co-citation analysis on authors.

4. Discussion

This SLR explores and maps the existing studies on health-related tourism crises using a bibliometric analysis. This section answers the posed research questions:

4.1. RQ1: What Types of Health Crises Are Covered in the Reviewed Studies, and What Is Their Geographical Scope?

The health crisis events covered in the tourism literature were, by chronological order, Foot-and-Mouth Disease, SARS, Avian Flu, Ebola and COVID-19, and were closely related to the topic of the pandemic. COVID-19 received the most scholarly attention. This attention may be attributed to the fact that articles on tourism crises are event-driven [17] and to the consequences and unprecedented impacts of COVID-19 on global tourism. In terms of geographical scope, the United Kingdom was the country with the most significant number of publications. Although the papers in the present review span different continents, stronger collaborations were only seen within continents with relatively weak collaborations across geographical boundaries. Given that pandemics are a global issue, the collaboration among scholars from different countries is particularly important for generating new scientific knowledge and solutions.

Furthermore, different countries have different crisis recovery patterns [85], and international research collaborations may benefit from different environmental conditions across the world [86]. In addition, the impact of health crises on the tourism industry in developing countries can be more devastating than in developed ones due to their heavy reliance on tourism, and the recovery is even more challenging due to the limited financial resources [87]. Despite this, few studies have been conducted on tourism crisis management in developing countries. Therefore, more research collaborations between developed and developing countries are needed.

4.2. RQ2: How Has Tourism Research on Health-Related Crises Evolved over Time?

In tourism research on health-related crises, the findings reflect a shift of focus from how the tourism industry can respond to health-related crises effectively to how tourism can recover sustainably over time. Undoubtedly, sustainable tourism is the development trend of global tourism [88]. However, although issues related to sustainable tourism development have long been discussed in the extant literature, they are rarely attended to—for instance, climate change. Despite the increasing attention to climate change issues in tourism literature, the tourism industry has not sufficiently responded to the danger because its impact may not seem immediate, albeit posing a more significant threat to human life than disease crises [63]. Therefore, COVID-19 has provided opportunities for the tourism industry to rethink how they should recover and operate in the future and for tourism scholars to explore how the tourism industry may be transformed from the current model, that is driven by the ‘business-as-usual’ mindset [81], to a more sustainable tourism industry in which the public good and socio-ecological justice are concerned [60].

4.3. RQ3: What Are the Keywords Associated with Health-Related Crises in Tourism? And What Is the Implication?

The five most common keywords associated with health-related crises in tourism ranked by total link strength were COVID-19, tourism, viral disease, epidemic and pandemic. However, the findings reveal tourism scholars have devoted far more attention to the pandemic since the outbreak of COVID-19. Furthermore, the core position of the keywords ‘sustainability’ and ‘sustainable tourism’ and their distances to COVID-19 imply a research focus shift towards sustainable tourism development. Indeed, this is not surprising, as the COVID-19 pandemic has brought the tourism industry worldwide to a standstill, leading several scholars to call for a transformation of the global tourism system to adopt a more sustainable path [9,55,57,58,60,61,63].

4.4. RQ4: What Are the Most Influential Publications, Journals and Authors in the Research Domain?

4.4.1. Influential Publications

Gössling et al.'s [8] paper titled 'Pandemics, tourism and global change: a rapid assessment of COVID-19' was the most influential paper in the research domain. In addition, Maphanga & Henama's [42] paper titled 'The tourism impact of Ebola in Africa: Lessons on crisis management' was the paper cited by the highly cited papers, including Gössling et al.'s [8], Hall et al.'s [81] and Jamal & Budke's [82] papers on COVID-19. This fact suggests that the paper by Maphanga & Henama [42] may serve as a key reference for future work on the pandemic in the tourism field. Furthermore, given the paper's focus on disease outbreaks in developing countries, the current citation status may suggest the trend towards sustainability will be more pronounced in this research context.

In terms of cited references, the three most influential papers were also identified: i. research on the perceived risk associated with international tourism by Lepp & Gibson [83]; ii. research on tourism disaster management by Faulkner [11]; and iii. the research note on SARS by McKercher & Chon [84]. Although the first two papers identified are not particularly concerned with health-related tourism crises, topics such as risk perception and disaster management are highly related to health crises in tourism management that cannot be neglected [89].

4.4.2. Influential Journals

The ten most cited papers from Scopus are mostly published in *Tourism Management* and *Tourism Geographies*. Given the research trend towards sustainability, *Tourism Geographies*, which focuses on sustainable tourism development, may serve as a critical source for research on health-related tourism crises. In addition, the most cited journals were *Tourism Management*, *Annals of Tourism Research* and *Journal of Travel Research*, all of which are ranked as first decile journals in the field of tourism, leisure and hospitality management [90].

4.4.3. Influential Authors

The five most-cited authors were Hall, C. M., Song, H., Gössling, S., Ritchie, B. W. and Pennington-Gray, I. Although they are some of the leading tourism scholars in the field of crisis management, scholars from both the public health and tourism domains argued that interdisciplinary research in medical/health science and tourism is crucial because such collaborative efforts will enable researchers to better understand the broad impacts of pandemic outbreaks, and therefore identify more meaningful research questions that address the complex issues and knowledge gaps. Medical knowledge, in turn, can be delivered to the public effectively, but appropriate strategies and policies for disease prevention and control can also be developed [91]. In addition, Castanho R. A., Couto G., Carvalho C. and Pimentel P. were the authors with the ability to exert influence on scientific collaborations.

4.5. RQ5: What Are the Impacts and Consequences of Health-Related Crises on Tourism?

The expected impact of health crises on tourism is primarily manifested in the international tourism demand. This impact is mainly a result of different levels of nonpharmaceutical interventions imposed by governments across the world to contain the spread of infectious disease during a pandemic, including social distancing, crowd control, mobility and travel restrictions and quarantine requirements [8,92]. Moreover, disease outbreaks often adversely affect a destination's image and competitiveness, and, accordingly, tourism demand [93], and such problem may be even amplified by the effect of media reporting on tourists' risk perception [87]. In addition, disease outbreaks can cause changes in tourists' behaviours and travel patterns [72,75]—for instance, the preference for domestic travel, short-distance travel and less populated destinations [73,76,77].

Comparing the impact of previous health crisis events and COVID-19 on tourism, this study suggests that the tourism industry is generally impacted by a decrease in international tourism demand during a disease outbreak. At the same time, the difference concerns the extent to which destinations are affected by this impact. This difference is particularly true—scholars Zenker & Kock [94] have recently noted that not all impacts of COVID-19 are worth researching, as existing theories pertinent to crises and disasters can often be used to explain and understand the current tourism phenomena.

4.6. RQ6: What Are the Strategies for Tourism Crisis Management Put Forward in the Reviewed Studies?

Taken together, the findings from previous studies suggest that tourism crisis management are preparedness, proactive planning, contingency plans and response strategies in place essential to effective, because the primary goal is to prevent or mitigate the negative impacts on the destinations [87,93,95–97]. Meanwhile, the involvement of various stakeholders in decision-making and public-private collaboration is essential for pandemic response strategies and resilience-building [42,70,98,99].

During a disease outbreak, DMO should play a leading role in crisis communications due to the presence of negative media coverage and the rapid dissemination of misinformation enabled by online social media [13,49,52,82]. Particularly at the early stage, accurate and up-to-date information should be delivered to visitors. In the medium term, marketing campaigns such as advertising and promotion may effectively generate positive media coverage. Finally, at the recovery stage, it is important to restore the destination's image and provide information on the implementation of health and safety travel measures to reassure tourists, mitigate risk perceptions and rebuild their confidence in travelling [46,52,54,66,82,99,100].

Given tourists' preference shift for closer and less populated destinations during a disease outbreak, DMO may consider a recovery strategy by reviving domestic tourism and promoting lesser-known places [57,73].

Last but not least, instead of returning to the past, the global tourism industry should rethink how post-pandemic tourism should operate as well as what changes should be made in practices and policies for a more resilient, equitable and sustainable system [57,101].

5. Conclusions, Limitations, and Future Research

This study performs a bibliometric analysis on articles related to health-related crises in the tourism industry, which provides a picture of the current research status and intellectual structure in the research field. By synthesising the findings from the selected papers, this SLR highlights the impacts of health crises on tourism and strategies for DMO to respond effectively to future health crisis events. However, it is not without limitations. First, the analysis was based on data generated from a relatively small sample size of 63 articles. Second, the search was limited to articles in English published in peer-reviewed journals for analysis purposes. Third, Scopus was chosen as the only data source in this study. Nevertheless, Scopus is recognised as the largest abstract and citation database of multidisciplinary peer-reviewed literature [102]. Fourth, the bibliometric analysis was conducted using a single tool—VOSviewer. Although the use of VOSviewer alongside a descriptive analysis of data from Scopus as well as the network statistics generated by Gephi aptly answered the research questions, the application of other bibliometrics tools such as CiteSpace 5.8.R3 (Drexel University, Philadelphia, United States) and CitNetExplorer 1.0.0 (Centre for Science and Technology Studies, Leiden University, Leiden, the Netherlands) may have yielded additional findings [103,104]. A further replication of this study with a larger sample size and a longer timeframe is recommended in the future. Notwithstanding the above limitations, the co-citation analyses on the cited authors, papers and journals performed in this paper also considered references of the selected 63 articles, which could slightly compensate the limitations of the small sample size and the single data source.

Overall, the existing research is limited in several aspects, and future work is required. First, what seems to be lacking is cross-continent research to evaluate previous health crises, impacts and consequences on the tourism industry worldwide. Moreover, research collaborations among scholars from different countries, particularly from developing and developed countries, is encouraged to offer different perspectives on such global issues. Second, the research focus shifted towards sustainable tourism warrants future research to explore how the tourism industry may transform towards a more sustainable path. Third, although a sharp increase is seen in the number of research on tourism health crises since the outbreak of COVID-19, there is still a lack of empirical studies to investigate the underlying effects of a health crisis on tourists' decision-making and behaviour as well as the role of online social media, given its accelerated use during the COVID-19 pandemic. Finally, the influential papers identified are all authored by tourism scholars. A more interdisciplinary research, collaboratively conducted by scholars from health science and tourism fields, is required for understanding the complex issues of health crises in the tourism context.

Author Contributions: C.V.: conceptualisation, methodology, software, formal analysis, data curation, writing—original draft, visualisation. P.R.: conceptualization, methodology, validation, writing—review & editing, supervision. N.A.: conceptualization, methodology, validation, writing—review & editing, supervision. All authors have read and agreed to the published version of the manuscript.

Funding: The work by Paulo Rita and Nuno António was supported by Fundação para a Ciência e Tecnologia (FCT) within the Project: UIDB/04152/2020—Centro de Investigação em Gestão de Informação (MagIC).

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Ten most cited papers from Scopus during the period from 2003 to 2021 (April), as of May 2021.

References	Year	Citations	Key Findings	Crisis
[17]	2020	419	The authors compared the impacts of COVID-19 and previous infectious disease outbreaks on global tourism regarding the number of international tourists, including Spanish flu, SARS, swine flu, MERS and Ebola. Impacts on tourism including airlines, accommodation, MICE and sports events, restaurants and cruises. Given the vulnerability of tourism, key players in the sector such as DMOs, tourism organisations, industry representatives and large corporations should reconsider and transform the global tourism system towards sustainable development.	COVID-19
[18]	2009	211	In times of crisis, travellers tend to seek travel alternatives instead of discontinuing traveling. First-time and repeat travellers showed differences in terms of perceived risks associated with disease, increase of travel costs and travel inconvenience. Repeat travellers are more knowledgeable, so they have a lower perception of disease risks than first-time travellers, yet higher perceived risks on costs and inconvenience because their past travel experience enables them to compare.	SARS and Avian (Bird) Flu

Table A1. Cont.

References	Year	Citations	Key Findings	Crisis
[19]	2008	142	It focuses on the relationship between tourism and crisis management. Outbreaks adversely affects a destination's competitiveness, and, accordingly, tourism demand. By comparing the post-crisis analysis of SARS with the pre-crisis analysis of Avian Flu, the findings suggest that preparedness, pre-crisis planning and response strategies in place will lead to effective management during a crisis.	SARS and Avian Flu
[20]	2020	106	Nonpharmaceutical interventions (NPIs) are measures to contain the spread of infectious disease during a pandemic, including social distancing, crowd control, travel restrictions and quarantine requirements, which have a significant impact on tourism. A pandemic may offer transformative opportunities. Yet, government interventions such as economic stimulation schemes often focus on rebuilding the business and generating jobs without considering sustainability and climate change mitigation. Resilience research suggests that the future of tourism requires a comprehensive and fundamental transformation of the global tourism system. Still, tourism recovery is often bound by the 'business-as-usual' mindset instead of a sustainability-oriented mindset.	COVID-19
[21]	2018	97	A longitudinal study used [10]'s Rapid Situation Analysis to understand the impact of the health-related crisis on developing countries and how destinations react to the planning, response and resolution phases during a health crisis. Crisis preparation and planning enables destinations to respond to a crisis more effectively. The effect of media reporting on tourist risk perception could influence tourism demand, and the recovery strategy should consider the destination's image and communication management.	Ebola
[22]	2020	96	The COVID-19 pandemic has offered a transformative opportunity to reset the tourism sector and reorient it to the public good and social and ecological justice.	COVID-19
[23]	2004	89	The effect of disease outbreaks may be amplified by media coverage, images in particular. In addition, crisis planning enables destinations to respond and mitigate their impacts effectively.	General
[24]	2003	61	Preparation and proactive planning are essential to an effective crisis management, while the essence of crisis management is to prevent or mitigate the 'ripple effect' and the impacts on destinations.	Foot-and-Mouth Disease
[25]	2010	58	Different countries have different crisis/disaster recovery patterns in terms of tourist arrivals. The recovery process depends on two factors: the normal factor and the splitting factor. The former is concerned with the restoration to the original state (e.g., from with SARS to without SARS); the latter can generate a hysteresis effect which will affect the recovery time. The splitting factor addressed in the study is travellers' fear and perceived risk. The recovery strategy at the macro level may consider building traveller confidence and reducing public fear through mass media campaigns; individualised marketing should be employed to reduce individual travellers' risk perception at the micro level.	SARS

Table A1. Cont.

References	Year	Citations	Key Findings	Crisis
[26]	2020	57	The COVID-19 health crisis provides a transformative opportunity for tourism to reset and rethink how it should recover and operate. The transformation of tourism is possible, but it requires institutional innovation on tourism's supply and demand side.	COVID-19

Table A2. Research streams and publications on health-related tourism crises.

Research Streams	Publications	Number of Publications
Impact on tourism industry	[9,55–58,60–64,81,82,85,87,92,95–101,105–114] Focusing on crisis communications (12 publications): [45–54,115,116]	44
Impact on tourism demand	[8,42,65,93,117,118]	6
Impact on tourist behaviours	[70–77] Focusing on risk perception (5 publications): [59,66–69]	13
Total publications		63

References

- Woo, E.; Uysal, M.; Sirgy, M.J. Tourism impact and stakeholders' quality of life. *J. Hosp. Tour. Res.* **2018**, *42*, 260–286. [\[CrossRef\]](#)
- Samimi, A.J.; Sadeghi, S.; Sadeghi, S. Tourism and economic growth in developing countries: P-VAR approach. *Middle-East J. Sci. Res.* **2011**, *10*, 28–32.
- Pforr, C.; Hosie, P.J. Crisis management in tourism: Preparing for recovery. *J. Travel Tour. Mark.* **2008**, *23*, 249–264. [\[CrossRef\]](#)
- Shin, Y.-S. Safety, security and peace tourism: The case of the DMZ area. *Asia Pac. J. Tour. Res.* **2005**, *10*, 411–426. [\[CrossRef\]](#)
- Hall, C.M. Crisis events in tourism: Subjects of crisis in tourism. *Curr. Issues Tour.* **2010**, *13*, 401–417. [\[CrossRef\]](#)
- UNWTO. Tourism and COVID-19—Unprecedented Economic Impacts | UNWTO. 2020. Available online: <https://www.unwto.org/tourism-and-covid-19-unprecedented-economic-impacts> (accessed on 19 May 2021).
- António, N.; Rita, P.; Saraiva, P. COVID-19: Worldwide Profiles during the First 250 Days. *Appl. Sci.* **2021**, *11*, 3400. [\[CrossRef\]](#)
- Gössling, S.; Scott, D.; Hall, C.M.M. Pandemics, tourism and global change: A rapid assessment of COVID-19. *J. Sustain. Tour.* **2020**, *29*, 1–20. [\[CrossRef\]](#)
- Niewiadomski, P. COVID-19: From temporary de-globalisation to a re-discovery of tourism? *Tour. Geogr.* **2020**, *22*, 651–656. [\[CrossRef\]](#)
- Ritchie, B.W.; Jiang, Y. A review of research on tourism risk, crisis and disaster management: Launching the annals of tourism research curated collection on tourism risk, crisis and disaster management. *Ann. Tour. Res.* **2019**, *79*, 102812. [\[CrossRef\]](#)
- Faulkner, B. Towards a framework for tourism disaster management. *Tour. Manag.* **2001**, *22*, 135–147. [\[CrossRef\]](#)
- Paraskevas, A.; Arendell, B. A strategic framework for terrorism prevention and mitigation in tourism destinations. *Tour. Manag.* **2007**, *28*, 1560–1573. [\[CrossRef\]](#)
- Ritchie, B.W. Chaos, crises and disasters: A strategic approach to crisis management in the tourism industry. *Tour. Manag.* **2004**, *25*, 669–683. [\[CrossRef\]](#)
- Gani, A.; Singh, R. Managing Disaster and Crisis in Tourism: A Critique of Research and a fresh Research Agenda. *Afr. J. Hosp. Tour. Leis.* **2019**, *8*, 1–25.
- António, N.; Rita, P. COVID 19: The catalyst for digital transformation in the hospitality industry? COVID-19: O catalisador para a transformação digital no sector hoteleiro? *Tour. Manag. Stud.* **2021**, *17*, 41–46. [\[CrossRef\]](#)
- Piccinelli, S.; Moro, S.; Rita, P. Air-travelers' concerns emerging from online comments during the COVID-19 outbreak. *Tour. Manag.* **2021**, *85*, 104313. [\[CrossRef\]](#)
- Duan, J.; Xie, C.; Morrison, A.M. Tourism Crises and Impacts on Destinations: A Systematic Review of the Tourism and Hospitality Literature. *J. Hosp. Tour. Res.* **2021**. [\[CrossRef\]](#)
- Aliperti, G.; Sandholz, S.; Hagenlocher, M.; Rizzi, F.; Frey, M.; Garschagen, M. Tourism, Crisis, Disaster: An Interdisciplinary Approach. *Ann. Tour. Res.* **2019**, *79*, 102808. [\[CrossRef\]](#)
- Estevão, C.; Costa, C. Natural disaster management in tourist destinations: A systematic literature review. *Eur. J. Tour. Res.* **2020**, *25*, 2502.
- Chen, S.; Law, R.; Zhang, M. Review of research on tourism-related diseases. *Asia Pac. J. Tour. Res.* **2021**, *26*, 44–58. [\[CrossRef\]](#)
- Kitchenham, B. Procedures for performing systematic reviews. *Keele UK Keele Univ.* **2004**, *33*, 1–26.

22. Moher, D.; Liberati, A.; Tetzlaff, J.; Altman, D.G.; Altman, D.; Antes, G.; Atkins, D.; Barbour, V.; Barrowman, N.; Berlin, J.A.; et al. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med.* **2009**, *6*, e1000097. [\[CrossRef\]](#)
23. World Health Organization. *Scaling Up the Capacity of Nursing and Midwifery Services to Contribute to the Achievement of the MDGs: Report of the 11th Meeting, Geneva, 17–18 March 2008*; World Health Organization: Geneva, Switzerland, 2008.
24. Mongeon, P.; Paul-Hus, A. The journal coverage of Web of Science and Scopus: A comparative analysis. *Scientometrics* **2016**, *106*, 213–228. [\[CrossRef\]](#)
25. Wilder-Smith, A. The severe acute respiratory syndrome: Impact on travel and tourism. *Travel Med. Infect. Dis.* **2006**, *4*, 53–60. [\[CrossRef\]](#) [\[PubMed\]](#)
26. Meline, T. Selecting studies for systemic review: Inclusion and exclusion criteria. *Contemp. Issues Commun. Sci. Disord.* **2006**, *33*, 21–27. [\[CrossRef\]](#)
27. Chen, X.; Wang, S.; Tang, Y.; Hao, T. A bibliometric analysis of event detection in social media. *Online Inf. Rev.* **2019**, *43*, 29–52. [\[CrossRef\]](#)
28. van Eck, N.J.; Waltman, L. Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics* **2010**, *84*, 523–538. [\[CrossRef\]](#) [\[PubMed\]](#)
29. Leydesdorff, L.; Rafols, I. Interactive overlays: A new method for generating global journal maps from Web-of-Science data. *J. Informetr.* **2012**, *6*, 318–332. [\[CrossRef\]](#)
30. Scott, J.; Tallia, A.; Crosson, J.C.; Orzano, A.J.; Stroebel, C.; DiCicco-Bloom, B.; O'Malley, D.; Shaw, E.; Crabtree, B. Social network analysis as an analytic tool for interaction patterns in primary care practices. *Ann. Fam. Med.* **2005**, *3*, 443–448. [\[CrossRef\]](#)
31. Freeman, L.C. Centrality in social networks conceptual clarification. *Soc. Netw.* **1978**, *1*, 215–239. [\[CrossRef\]](#)
32. Bastian, M.; Heymann, S.; Jacomy, M. Gephi: An open source software for exploring and manipulating networks. In Proceedings of the Third International AAAI Conference on Weblogs and Social Media, San Jose, CA, USA, 17–20 May 2009.
33. Bonacich, P. Factoring and weighting approaches to status scores and clique identification. *J. Math. Sociol.* **1972**, *2*, 113–120. [\[CrossRef\]](#)
34. Brin, S.; Page, L. The anatomy of a large-scale hypertextual web search engine. *Comput. Netw. ISDN Syst.* **1998**, *30*, 107–117. [\[CrossRef\]](#)
35. Yan, E.; Ding, Y. Discovering author impact: A PageRank perspective. *Inf. Process. Manag.* **2011**, *47*, 125–134. [\[CrossRef\]](#)
36. Bibi, F.; Khan, H.U.; Iqbal, T.; Farooq, M.; Mehmood, I.; Nam, Y. Ranking authors in an academic network using social network measures. *Appl. Sci.* **2018**, *8*, 1824. [\[CrossRef\]](#)
37. Ding, Y.; Yan, E.; Frazho, A.; Caverlee, J. PageRank for ranking authors in co-citation networks. *J. Am. Soc. Inf. Sci. Technol.* **2009**, *60*, 2229–2243. [\[CrossRef\]](#)
38. Yan, E.; Ding, Y. Applying centrality measures to impact analysis: A coauthorship network analysis. *J. Am. Soc. Inf. Sci. Technol.* **2009**, *60*, 2107–2118. [\[CrossRef\]](#)
39. Khan, G.F.; Wood, J. Information technology management domain: Emerging themes and keyword analysis. *Scientometrics* **2015**, *105*, 959–972. [\[CrossRef\]](#)
40. Zhao, W.; Mao, J.; Lu, K. Ranking themes on co-word networks: Exploring the relationships among different metrics. *Inf. Process. Manag.* **2018**, *54*, 203–218. [\[CrossRef\]](#)
41. Hung, K.K.C.; Mark, C.K.M.; Yeung, M.P.S.; Chan, E.Y.Y.; Graham, C.A. The role of the hotel industry in the response to emerging epidemics: A case study of SARS in 2003 and H1N1 swine flu in 2009 in Hong Kong. *Global. Health* **2018**, *14*, 1–7. [\[CrossRef\]](#) [\[PubMed\]](#)
42. Maphanga, P.M.M.; Henama, U.S.S. The tourism impact of ebola in Africa: Lessons on crisis management. *Afr. J. Hosp. Tour. Leis.* **2019**, *8*, 1–13.
43. Memish, Z.A.; Cotten, M.; Meyer, B.; Watson, S.J.; Alsahafi, A.J.; Al Rabeeah, A.A.; Corman, V.M.; Sieberg, A.; Makhdoom, H.Q.; Assiri, A. Human infection with MERS coronavirus after exposure to infected camels, Saudi Arabia, 2013. *Emerg. Infect. Dis.* **2014**, *20*, 1012. [\[CrossRef\]](#) [\[PubMed\]](#)
44. Zheng, D.; Luo, Q.; Ritchie, B.W. Afraid to travel after COVID-19? Self-protection, coping and resilience against pandemic ‘travel fear’. *Tour. Manag.* **2021**, *83*, 104261. [\[CrossRef\]](#)
45. Eugenio-Martin, J.-L.; Sinclair, M.T.T.; Yeoman, I. Quantifying the effects of tourism crises: An application to Scotland. *J. Travel Tour. Mark.* **2006**, *19*, 21–34. [\[CrossRef\]](#)
46. Frisby, E. Communicating in a crisis: The British Tourist Authority’s responses to the foot-and-mouth outbreak and 11th September, 2001. *J. Vacat. Mark.* **2003**, *9*, 89–100. [\[CrossRef\]](#)
47. Henderson, J.C.C. Managing a health-related crisis: SARS in Singapore. *J. Vacat. Mark.* **2004**, *10*, 67–77. [\[CrossRef\]](#)
48. Hopper, P. Marketing London in a difficult climate. *J. Vacat. Mark.* **2003**, *9*, 81–88. [\[CrossRef\]](#)
49. Irvine, W.; Anderson, A.R.R. Small tourist firms in rural areas: Agility, vulnerability and survival in the face of crisis. *Int. J. Entrep. Behav. Res.* **2004**, *10*, 229–246. [\[CrossRef\]](#)
50. Irvine, W.; Anderson, A.R.R. The impacts of foot and mouth disease on a peripheral tourism area: The role and effect of crisis management. *J. Travel Tour. Mark.* **2006**, *19*, 47–60. [\[CrossRef\]](#)
51. Ritchie, B.W.W.; Dorrell, H.; Miller, D.; Miller, G.A.A. Crisis communication and recovery for the tourism industry: Lessons from the 2001 foot and mouth disease outbreak in the United Kingdom. *J. Travel Tour. Mark.* **2004**, *15*, 199–216. [\[CrossRef\]](#)

52. Schroeder, A.; Pennington-Gray, L. The Role of Social Media in International Tourist's Decision Making. *J. Travel Res.* **2015**, *54*, 584–595. [\[CrossRef\]](#)
53. Volo, S. Communicating tourism crises through destination websites. *J. Travel Tour. Mark.* **2007**, *23*, 83–93. [\[CrossRef\]](#)
54. Yeoman, I.; Lennon, J.J.J.; Black, L. Foot-and-mouth disease: A scenario of reoccurrence for Scotland's tourism industry. *J. Vacat. Mark.* **2005**, *11*, 179–190. [\[CrossRef\]](#)
55. Ateljevic, I. Transforming the (tourism) world for good and (re)generating the potential 'new normal'. *Tour. Geogr.* **2020**, *22*, 467–475. [\[CrossRef\]](#)
56. Sheller, M. Reconstructing tourism in the Caribbean: Connecting pandemic recovery, climate resilience and sustainable tourism through mobility justice. *J. Sustain. Tour.* **2020**, *29*, 14361–14449. [\[CrossRef\]](#)
57. Benjamin, S.; Dillette, A.; Alderman, D.H.H. "We can't return to normal": Committing to tourism equity in the post-pandemic age. *Tour. Geogr.* **2020**, *22*, 476–483. [\[CrossRef\]](#)
58. Brouder, P. Reset redux: Possible evolutionary pathways towards the transformation of tourism in a COVID-19 world. *Tour. Geogr.* **2020**, *22*, 484–490. [\[CrossRef\]](#)
59. Han, H.; Al-Ansi, A.; Chua, B.-L.; Tariq, B.; Radic, A.; Park, S.-H. The post-coronavirus world in the international tourism industry: Application of the theory of planned behavior to safer destination choices in the case of us outbound tourism. *Int. J. Environ. Res. Public Health* **2020**, *17*, 6485. [\[CrossRef\]](#) [\[PubMed\]](#)
60. Higgins-Desbiolles, F. Socialising tourism for social and ecological justice after COVID-19. *Tour. Geogr.* **2020**, *22*, 610–623. [\[CrossRef\]](#)
61. Ioannides, D.; Gyimóthy, S. The COVID-19 crisis as an opportunity for escaping the unsustainable global tourism path. *Tour. Geogr.* **2020**, *22*, 624–632. [\[CrossRef\]](#)
62. Kitamura, Y.; Karkour, S.; Ichisugi, Y.; Itsubo, N. Evaluation of the economic, environmental, and social impacts of the COVID-19 pandemic on the Japanese tourism industry. *Sustainability* **2020**, *12*, 10302. [\[CrossRef\]](#)
63. Prideaux, B.; Thompson, M.; Pabel, A. Lessons from COVID-19 can prepare global tourism for the economic transformation needed to combat climate change. *Tour. Geogr.* **2020**, *22*, 667–678. [\[CrossRef\]](#)
64. Santos-Roldán, L.; Canalejo, A.M.C.M.C.; Berbel-Pineda, J.M.M.; Palacios-Florencio, B. Sustainable tourism as a source of healthy tourism. *Int. J. Environ. Res. Public Health* **2020**, *17*, 5353. [\[CrossRef\]](#) [\[PubMed\]](#)
65. Choe, Y.; Wang, J.; Song, H. The impact of the Middle East Respiratory Syndrome coronavirus on inbound tourism in South Korea toward sustainable tourism. *J. Sustain. Tour.* **2021**, *29*, 1117–1133. [\[CrossRef\]](#)
66. Neuburger, L.; Egger, R. Travel risk perception and travel behaviour during the COVID-19 pandemic 2020: A case study of the DACH region. *Curr. Issues Tour.* **2021**, *24*, 1003–1016. [\[CrossRef\]](#)
67. Peluso, A.M.M.; Pichierri, M. Effects of socio-demographics, sense of control, and uncertainty avoidability on post-COVID-19 vacation intention. *Curr. Issues Tour.* **2020**, *24*, 2755–2767. [\[CrossRef\]](#)
68. Rittichainuwat, B.N.N.; Chakraborty, G. Perceived travel risks regarding terrorism and disease: The case of Thailand. *Tour. Manag.* **2009**, *30*, 410–418. [\[CrossRef\]](#)
69. Zhan, L.L.; Zeng, X.; Morrison, A.M.A.M.; Liang, H.; Coca-Stefaniak, J.A.A. A risk perception scale for travel to a crisis epicentre: Visiting Wuhan after COVID-19. *Curr. Issues Tour.* **2020**, 1–18. [\[CrossRef\]](#)
70. Castanho, R.A.; Couto, G.; Pimentel, P.; Sousa, A.; Carvalho, C.; Batista, M.D.G. How an infectious disease could influence the development of a region: The evidence of the SARS-CoV-2 outbreak over the tourism intentions in azores archipelago. *Duzce Med. J.* **2021**, *23*, 106–112. [\[CrossRef\]](#)
71. Couto, G.; Castanho, R.A.A.; Pimentel, P.; Carvalho, C.; Sousa, Á.; Santos, C. The impacts of COVID-19 crisis over the tourism expectations of the Azores Archipelago residents. *Sustainability* **2020**, *12*, 7612. [\[CrossRef\]](#)
72. Li, Z.; Zhang, S.; Liu, X.; Kozak, M.; Wen, J. Seeing the invisible hand: Underlying effects of COVID-19 on tourists' behavioral patterns. *J. Destin. Mark. Manag.* **2020**, *18*, 100502. [\[CrossRef\]](#)
73. Moreno-Luna, L.; Robina-Ramírez, R.; Sánchez, M.S.-O.; Castro-Serrano, J. Tourism and sustainability in times of covid-19: The case of Spain. *Int. J. Environ. Res. Public Health* **2021**, *18*, 1859. [\[CrossRef\]](#)
74. Qiu, R.T.R.; Park, J.; Li, S.; Song, H. Social costs of tourism during the COVID-19 pandemic. *Ann. Tour. Res.* **2020**, *84*, 102994. [\[CrossRef\]](#) [\[PubMed\]](#)
75. Rodway-Dyer, S.; Shaw, G. The effects of the foot-and-mouth outbreak on visitor behaviour: The case of Dartmoor national park, south-west England. *J. Sustain. Tour.* **2005**, *13*, 63–81. [\[CrossRef\]](#)
76. Roman, M.; Niedziółka, A.; Krasnodebski, A. Respondents' involvement in tourist activities at the time of the COVID-19 pandemic. *Sustainability* **2020**, *12*, 9610. [\[CrossRef\]](#)
77. Sung, Y.-A.; Kim, K.-W.; Kwon, H.-J. Big data analysis of Korean travelers' behavior in the post-COVID-19 era. *Sustainability* **2021**, *13*, 310. [\[CrossRef\]](#)
78. Saud, M.; Mashud, M.; Ida, R. Usage of social media during the pandemic: Seeking support and awareness about COVID-19 through social media platforms. *J. Public Aff.* **2020**, *20*, e2417. [\[CrossRef\]](#)
79. Chen, G.; Xiao, L. Selecting publication keywords for domain analysis in bibliometrics: A comparison of three methods. *J. Informetr.* **2016**, *10*, 212–223. [\[CrossRef\]](#)
80. Black, S. Practical applications of do-it-yourself citation analysis. *Ser. Libr.* **2013**, *64*, 285–298. [\[CrossRef\]](#)

81. Hall, C.M.; Scott, D.; Gössling, S. Pandemics, transformations and tourism: Be careful what you wish for. *Tour. Geogr.* **2020**, *22*, 577–598. [\[CrossRef\]](#)
82. Jamal, T.; Budke, C. Tourism in a world with pandemics: Local-global responsibility and action. *J. Tour. Futur.* **2020**, *6*, 181–188. [\[CrossRef\]](#)
83. Lepp, A.; Gibson, H. Tourist roles, perceived risk and international tourism. *Ann. Tour. Res.* **2003**, *30*, 606–624. [\[CrossRef\]](#)
84. McKercher, B.; Chon, K. The over-reaction to SARS and the collapse of Asian tourism. *Ann. Tour. Res.* **2004**, *31*, 716. [\[CrossRef\]](#) [\[PubMed\]](#)
85. Mao, C.-K.; Ding, C.G.G.; Lee, H.-Y. Post-SARS tourist arrival recovery patterns: An analysis based on a catastrophe theory. *Tour. Manag.* **2010**, *31*, 855–861. [\[CrossRef\]](#) [\[PubMed\]](#)
86. Katsouyanni, K. Collaborative research: Accomplishments & potential. *Environ. Health* **2008**, *7*, 1–7.
87. Novelli, M.; Gussing Burgess, L.; Jones, A.; Ritchie, B.W.W. 'No Ebola . . . still doomed'—The Ebola-induced tourism crisis. *Ann. Tour. Res.* **2018**, *70*, 76–87. [\[CrossRef\]](#)
88. Tran, A.H.; Xuan, H.N. INTERNATIONAL ECONOMIC INTEGRATION TO DEVELOP SUSTAINABLE TOURISM IN SAPA, Vietnam. *Psychol. Educ. J.* **2021**, *58*, 7160–7171.
89. Liu, B.; Pennington-Gray, L.; Krieger, J. Tourism crisis management: Can the Extended Parallel Process Model be used to understand crisis responses in the cruise industry? *Tour. Manag.* **2016**, *55*, 310–321. [\[CrossRef\]](#)
90. SCImago. Tourism, Leisure and Hospitality Management Journal Rankings. 2019. Available online: <https://www.scimagojr.com/journalrank.php?category=1409> (accessed on 18 May 2021).
91. Wen, J.; Wang, W.; Kozak, M.; Liu, X.; Hou, H. Many brains are better than one: The importance of interdisciplinary studies on COVID-19 in and beyond tourism. *Tour. Recreat. Res.* **2020**, *46*, 310–313. [\[CrossRef\]](#)
92. António, N.; Rita, P. March 2020: 31 days that will reshape tourism. *Curr. Issues Tour.* **2020**, *24*, 2768–2783. [\[CrossRef\]](#)
93. Kuo, H.-I.; Chen, C.-C.; Tseng, W.-C.; Ju, L.-F.; Huang, B.-W. Assessing impacts of SARS and Avian Flu on international tourism demand to Asia. *Tour. Manag.* **2008**, *29*, 917–928. [\[CrossRef\]](#)
94. Zenker, S.; Kock, F. The coronavirus pandemic—A critical discussion of a tourism research agenda. *Tour. Manag.* **2020**, *81*, 104164. [\[CrossRef\]](#)
95. Miller, G.A.A.; Ritchie, B.W.W. A farming crisis or a tourism disaster? An analysis of the foot and mouth disease in the UK. *Curr. Issues Tour.* **2003**, *6*, 150–171. [\[CrossRef\]](#)
96. Škare, M.; Soriano, D.R.R.; Porada-Rochoń, M. Impact of COVID-19 on the travel and tourism industry. *Technol. Forecast. Soc. Chang.* **2021**, *163*, 120469. [\[CrossRef\]](#)
97. Williams, C.; Ferguson, M. Biting the hand that feeds: The marginalisation of tourism and leisure industry providers in times of agricultural crisis. *Curr. Issues Tour.* **2005**, *8*, 155–164. [\[CrossRef\]](#)
98. Rodríguez-Antón, J.M.M.; Alonso-Almeida, M.M.M. COVID-19 impacts and recovery strategies: The case of the hospitality industry in Spain. *Sustainability* **2020**, *12*, 8599. [\[CrossRef\]](#)
99. Williams, C.; Ferguson, M. Recovering from crisis. Strategic alternatives for leisure and tourism providers based within a rural economy. *Int. J. Public Sect. Manag.* **2005**, *18*, 350–366. [\[CrossRef\]](#)
100. Dias, Á.; Patuleia, M.; Silva, R.; Estêvão, J.; González-Rodríguez, M.R. Post-pandemic recovery strategies: Revitalizing lifestyle entrepreneurship. *J. Policy Res. Tour. Leis. Events* **2021**, 1–18. [\[CrossRef\]](#)
101. Deb, S.K.K.; Nafi, S.M. Impact of COVID-19 pandemic on tourism: Recovery proposal for future tourism. *Geoj. Tour. Geosites* **2021**, *33*, 1486–1492. [\[CrossRef\]](#)
102. Chadegani, A.A.; Salehi, H.; Yunus, M.M.; Farhadi, H.; Fooladi, M.; Farhadi, M.; Ale Ebrahim, N. A Comparison between Two Main Academic Literature Collections: Web of Science and Scopus Databases. *Asian Soc. Sci.* **2013**, *9*, 18–26. [\[CrossRef\]](#)
103. Chen, C.; Song, M. Science mapping tools and applications. In *Representing Scientific Knowledge*; Springer: Berlin/Heidelberg, Germany, 2017; pp. 57–137.
104. Van Eck, N.J.; Waltman, L. CitNetExplorer: A new software tool for analyzing and visualizing citation networks. *J. Informetr.* **2014**, *8*, 802–823. [\[CrossRef\]](#)
105. Bautista, H.; Valeeva, G.; Danilevich, V.; Zinovyeva, A. A Development strategy for the revival of tourist hotspots following the covid-19 pandemic. *Int. J. Criminol. Sociol.* **2020**, *9*, 1047–1053. [\[CrossRef\]](#)
106. Chen, T.; Peng, L.; Yin, X.; Jing, B.; Yang, J.; Cong, G.; Li, G. A policy category analysis model for tourism promotion in china during the covid-19 pandemic based on data mining and binary regression. *Risk Manag. Healthc. Policy* **2020**, *13*, 3211–3233. [\[CrossRef\]](#) [\[PubMed\]](#)
107. Coles, T. A local reading of a global disaster: Some lessons on tourism management from an anus horribilis in South West England. *J. Travel Tour. Mark.* **2004**, *15*, 173–197. [\[CrossRef\]](#)
108. Han, H.; Lee, S.; Kim, J.J.J.; Ryu, H.B.B. Coronavirus disease (COVID-19), traveler behaviors, and international tourism businesses: Impact of the corporate social responsibility (csr), knowledge, psychological distress, attitude, and ascribed responsibility. *Sustainability* **2020**, *12*, 8639. [\[CrossRef\]](#)
109. Litvin, S.W.W.; Smith, W.W.W. International Travel and Coronavirus: A Very Early USA-based Study. *Int. J. Hosp. Tour. Adm.* **2021**, 1–7. [\[CrossRef\]](#)
110. Marome, W.; Shaw, R. COVID-19 response in Thailand and its implications on future preparedness. *Int. J. Environ. Res. Public Health* **2021**, *18*, 1089. [\[CrossRef\]](#)

-
111. McCartney, G.; Pinto, J.; Liu, M. City resilience and recovery from COVID-19: The case of Macao. *Cities* **2021**, *112*, 103130. [[CrossRef](#)] [[PubMed](#)]
 112. Rueda Lopez, R.; Lopez-Felipe, T.; Navajas-Romero, V.; Menor-Campos, A. Lessons from the First Wave of COVID-19. What Security Measures Do Women and Men Require from the Hotel Industry to Protect against the Pandemic? *Int. J. Environ. Res. Public Health* **2021**, *18*, 2232. [[CrossRef](#)]
 113. Wylie, L.L.L. Cuba's response to COVID-19: Lessons for the future. *J. Tour. Futur.* **2021**, *7*, 356–363. [[CrossRef](#)]
 114. Zhang, H.; Song, H.; Wen, L.; Liu, C. Forecasting tourism recovery amid COVID-19. *Ann. Tour. Res.* **2021**, *87*, 103149. [[CrossRef](#)]
 115. Chen, H.; Huang, X.; Li, Z. A content analysis of Chinese news coverage on COVID-19 and tourism. *Curr. Issues Tour.* **2020**, 1–8. [[CrossRef](#)]
 116. Yang, E.; Kim, J.; Pennington-Gray, L. Social media information and peer-to-peer accommodation during an infectious disease outbreak. *J. Destin. Mark. Manag.* **2021**, *19*, 100538. [[CrossRef](#)]
 117. Korinth, B.; Ranasinghe, R. Covid-19 pandemic's impact on tourism in poland in march 2020. *Geoj. Tour. Geosites* **2020**, *31*, 987–990. [[CrossRef](#)]
 118. Shi, W.; Li, K.X.X. Impact of unexpected events on inbound tourism demand modeling: Evidence of Middle East Respiratory Syndrome outbreak in South Korea. *Asia Pac. J. Tour. Res.* **2017**, *22*, 344–356. [[CrossRef](#)]