

Safety and security research in tourism: A bibliometric mapping

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Abstract

Safety and security are among the most basic needs in life and are essential in tourism as in other research areas; thus, researchers need to focus on the topic. Since the 1970s, when the first scientific paper on tourism safety was published, the number of research in this field has significantly increased. This study aims to carry out a bibliometric analysis on tourism safety and security research conducted over the past forty-five years. The literature on the subject includes 597 studies obtained from the Scopus database. VOSviewer scientific mapping software programme was used to perform the analysis. The software covers keywords of tourism safety and security topics, influential authors, publications, journals, and countries and identifies several techniques such as co-citation, concept association, and bibliographic coupling. The rapid increase in the number of research and citations shows that the topic of tourism safety and security has drawn the attention of researchers in the last 12 years. The analysis results revealed that the study with the strongest link with other publications is "Tourist's perceptions of safety and security while visiting Cape Town". The researcher who contributed the most to the field with the author citation is Michael C. Hall; the journal making the most substantial impact is Tourism Management. Finally, the most productive country is United States of America. The current study contributes to expanding the literature on tourism safety and security and offers an overview for further research in this field.

Keywords: Tourism safety and security, bibliometric mapping, VOSviewer

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1. Introduction

Safety and security are among the basic needs of people and critical for the tourism sector, considering the mobility of tens of millions of people every year. People want to know that they are safe, and a crisis is highly likely to emerge if they feel their safety is threatened in a destination they prefer for vacation. Tourists are vulnerable because they are exposed to crime due to their distinct behaviours, the large amounts of money they carry with them, being unfamiliar with their environment, and being noticed in the crowd (Brunt *et al.*, 2000; Pizam and Mansfeld, 1996). Direct or indirect human-related security issues such as terrorist attacks, local wars, natural disasters, and health concerns can lead potential tourists to reconsider their destination preferences, change their destination, or cancel their travel plans (Hamarneh and Jeřábek, 2018).

Safety and security issues in tourism have become especially important with the evolution of mass tourism after the 1950s. The reasons that accelerate this evolution are the fact that tourism is not confined to a narrow social group or class activity but spread to the general population with the increase in personal income and leisure time, which affects a growing number of countries in the world, and that the advancements in transportation technologies increase geographical mobility. This has not only heralded a critical development but also brought up safety and security issues in tourism, one of the largest global industries in the world (Kovari and Zimanyi, 2011).

Although the relationship between tourism and safety and security had existed since the period when tourism emerged as an industry, academic interest in the subject started only in the 1970s. However, it is only in the last few decades that tourism safety and security research has gained momentum. Since it is a developing field, qualitative, quantitative, or mixed studies on this subject should be carried out. One reason for the limitation of empirical research is the reluctance to raise tourism safety and security issues and the difficulty of accessing data. The current study, which presents a panoramic view of the existing research, will contribute to a deeper understanding of the concept of tourism safety and security and fill the gap in the literature. However, while comparative literature reviews on tourism safety and security have been conducted in English and Chinese languages (Wang, Liu-Lastres, Shi & Li, 2019), articles in English (N=96) were limited to only three leading journals: *Tourism Management*, *Journal of Travel Research*, *Annals of Travel*. In addition, a literature review on the relevant topic conducted by Yang and Nair (2014) takes into consideration only some specific studies (N=46) by searching “risk”, “safety”, and “security” concepts in the title. Given that some researchers use different concepts in the title, the terms tourism, tourist, safety, and security were searched in the abstract, title, and keywords, in this current study, and no limitations were applied during searching.

Since the current literature on safety and security covers various fields of studies such as social sciences, business and management, environment, engineering, and computer sciences, making a comprehensive assessment of tourism safety and security is very difficult. However, the bibliometric research method (Cobo, López-Herrera, Herrera-Viedma, & Herrera, 2011) offers various techniques to overcome the difficulties involved in large-scale literature analysis. It also analyses the outputs of a great deal of studies in a particular field and has been frequently used in recent years. Thus, the main purpose of the current study is to present an overview of the tourism safety and security research conducted in the past forty-five years (N=597) using bibliometric techniques. In this context, the research questions developed in line with this main purpose are as follows:

- What is the type of distribution of the studies, e.g., book, article?
- What is the spread of the annual productivity of the studies?
- What are the top ten most influential studies?

- Which authors, documents, journals, and countries have the greatest contribution?
- What are the key concepts that the researchers mostly focused?

The results of the current study provide a resource for researchers interested in tourism safety and security to evaluate the current form. Moreover, the results present basic knowledge about reference sources, journals, and researchers for a better understanding of the subject and key concepts that can be focused on in future research.

2. Literature review

2.1. Previous studies on safety and security

Safety and security concepts have recently been studied in a variety of research fields, such as engineering, social sciences, computer sciences, medicine, and mathematics, within the context of bibliometric analysis or review (Gou *et al.*, 2022; Pirbhulal & Katsikas, 2021; Khan *et al.*, 2021; Boustras & Waring, 2020; Shvindina, 2019; Lisova, Šljivo & Čaušević, 2018; Xaba, 2014). In their study, Boustras & Waring (2020) have evaluated principal components linking the concepts of safety and security and considered their impacts on various environments. The results concluded that more integration of safety and security is necessary for theoretical, empirical, policy, and practitioner evaluations and programs at both the governmental and business levels. In order to map the literature-based research landscape and determine the essential features, Khalid *et al.* (2020) conducted a systematic literature review on the safety and security of industrial cyber-physical systems. As a result, the researchers presented extensive recommendations for researchers, designers, developers, and industries. Khan *et al.* (2021) conducted a systematic review on safety and security risks in smart homes to identify areas of concern or risk in the field of technology. The analysis showed that researchers and practitioners make more informed decisions when coping with smart home safety and security risks, particularly in an emergency. Shvindina (2019) created a bibliometric mapping of the topic using co-occurrence and citation analyses in a strategic management study on perspectives of coopetition in safety and security. The research found the most influential authors and studies and research trends in the field in the annual research trends. In engineering, Lisova, Šljivo, and Aida Causevic (2019) used a systematic literature review to reveal the status of safety and security co-analyses in system engineering. Based on 33 articles, the results of the study demonstrated that safety and security co-analysis is still a developing domain. Another systematic literature review study was conducted by Sandeep, Gkioulos, and Katsikas (2021) on co-engineering safety and security using Bayesian networks and graph theory. The results of the study revealed that Bayesian networks and graph theory are generally used for risk and failure management. In safety and security research based on the dynamic system context of an engineering study, Gou *et al.* (2022) applied a bibliometric mapping approach. Researchers adopted countries, journals, author citation analysis, and word co-occurrence analysis techniques in their research. Researchers underlined that energy security, safety management, and resource utilization are some of the most remarkable ones in the field. In the field of education, Xaba (2014) conducted a literature review on school safety and security and made suggestions for South Africa. Based on the evaluations, he underlined that the maintenance of facilities and school environment surveillance is critical for safety and security.

2.2. Previous research on tourism safety and security

Tourism/tourist safety and security are not only the premises of general tourism activities (Ding and Wu, 2022) but critical factors in tourism development and for the basic physiological needs of people. Participation of tens of millions of people from all over the world in various tourism activities also shows safety and security are integral parts of tourism that must be kept on the agenda. In the last twenty years, safety and security have become prominent issues due to natural disasters, epidemics, and social

violence occurring around the world. The severe harm to tourism in Japan due to the fear and anxiety after the Tōhoku earthquake and tsunami in 2011; the incidents, such as theft, fraud, harassment in India (Shu-Pin and Shih-Yen, 2011); sexual assault and murder of tourists in Thailand (Mydans, 2008); pickpocketing, mugging, and theft, which are common in Bangkok (Batra, 2008); robbery, rape, and murder of tourists who are considered easy prey in Malaysia (Amir, Ismail & See, 2014); 11/9 terrorist attacks in the United States (King, 2010); the great earthquake in Taiwan in 1999 (Chen, 2011), numerous food safety incidents in China (Lee and Boccalatteb, 2019); the dramatic decrease in tourism activities and tourist arrivals the coup attempt in Turkey in 2016 (Yıldız and Işıldar, 2020; Republic of Turkey Ministry of Interior, 2017); and the COVID-19 outbreak brought tourism activities to a standstill in 2019 and demonstrated the eminent position of safety and security issues in tourism. Furthermore, Russian aggression toward Ukraine in the first weeks of 2022 will negatively affect tourism both in Russia and Ukraine for safety and security reasons and in countries such as Turkey, which hosts millions of tourists from both countries. In addition to disasters, attacks, and epidemics, food significantly impacts the issue of safety and security. Given that dining is one of the main services provided in the tourism industry, numerous food-based incidents in China (Lee & Boccalatteb, 2019) publicly witnessed by the global community in recent years have also raised serious concerns about destination safety and security.

Although the concept of safety and security became a research agenda in the field of tourism in the 1970s, this interest only intensified 40 years later (Irene *et al.*, 2010; Fuchs & Pizam, 2011; Williamson *et al.*, 2012; Ojeda, 2013). The literature on tourism safety and security has increased remarkably in various research fields, reaching up to 597 studies. So far, the studies have been conducted in the areas of social sciences (Agarwal, Page, and Mawby, 2021; Malleka, Booyens, and Hoogendoorn, 2022), business and management (Zou & Meng, 2020; Tarulevicz and Ooi, 2021), and environmental sciences (Tang, Wu, Zheng, & Lyu, 2018). In addition to the general issues of tourism safety and security, a significant part of the research focuses particularly on recreation safety (Wu, 2015; Karvunis & Kapilevich, 2017; Cheng, Chen, Hong & Chen, 2022), managing tourism safety and risk (Coxon, Dimmock & Wilks, 2007; Kasum, Žanić Mikuličić & Kolić, 2018; Hamm & Su, 2021), food security (Pirani & Arafat, 2016; Addinsall, Weiler, Scherrer & Glencross, 2017; Huang & Tsai, 2021), environmental security (Irene, *aet al.*, 2010; Hall, 2013; Casares Blanco, Fernández-Aracil & Ortuño-Padilla, 2019), tourism ecological security (Xu, Liu, Li & Zhong, 2017; Tang, Wu, Zheng, Lyu, 2018; Yang, Jia, Wang & Zhang, 2021), tourists' safety perception (Wang, 2014; Peters & Papathanassis, 2019; Zou & Meng, 2020; Wang, Tarin, Liu, & Zhengf, 2022), impact of terrorism on safety (Chen & Noriega, 2004; Korstanje, 2017; Asongu & Nwachukwu, 2019; Agarwal, Page & Mawby, 2021), corporate security in tourism (Repnik & Antošová, 2021), and community safety (Cheng, Fang & Yin, 2022; Yamada, Heo, King & Fu, 2011).

Analysing the trends and correlations in tourism safety research longitudinally with new analytical techniques, such as citation analysis, co-citation analysis, and bibliometric coupling, is essential to reveal how far the research in the field has progressed. In this sense, the current quantitative study evaluates the existing tourism safety and security literature from various perspectives and contributes to its development and expansion. The links among the studies contributing to the construction of the intellectual structure of the tourism security issue will be explained. Social network analysis techniques such as joint citation, bibliometric matching, concept association, bibliometric coupling, and citation linking will be used to create information maps.

2.3. Bibliometric analysis in tourism research

Bibliometric analysis is a quantitative methodology used to determine the volume and development patterns and forms of literature developing in a particular field. It presents a retrospective literature

analysis by evaluating academic contributions to a focused area (Guleria & Kaur, 2021: 1004). Bibliometric analysis, which is a method used for the evaluation of books, journals, and other academic publications, is the calculation and visualisation of the most active authors, journals, countries, institutions, and even international research collaborations in the field (Sweileh, 2019: 10; Toker, 2021).

Bibliometric analysis is a widely used method to evaluate the content and performance of studies in different research fields and disciplines, such as tourism (Turan, 2014; Niñerola, Sánchez-Rebull, & Hernández-Lara, 2019; Toker, 2021), economy (Bonilla, Merigó, & Torres-Abad, 2015), communication (Lee & Sohn, 2016) social entrepreneurship (Rey-Martí, Ribeiro-Soriano, & Palacios-Marqués, 2016), computer and industrial engineering (Cancino *et al.*, 2017), knowledge management (Gaviria-Marin, Merigó, and Baier-Fuentes, 2019), human resources (Danvila-del-Valle, Estévez-Mendoza, & Lara, 2019), medical-health (Sweileh, 2019), education (Shen & Ho, 2020), and marketing (Saleem, Khattak, Ur Rehman & Ashiq, 2021). The fact that it is difficult to follow up and objectively evaluate the rapidly-increasing scientific resources in almost every field has led to the common use of this method. Another factor for the widespread use of this method is that it provides a holistic picture by making the hidden network structures regarding the research subject observable. Therefore, being called bibliometric mapping, these approaches are categorized as co-word, co-authorship, co-citation, bibliographic coupling, and direct citation (Avila-Robinson & Wakabayashi, 2018). Moreover, their principles are categorized as keywords, authors, cited references, citing papers, sources, countries, and organizations, as well as citing and cited papers.

In line with the tremendous increase in tourism studies, bibliometric methods have begun to be applied for several decades (Weaver & McCleary, 1989); however, bibliometric mapping studies are relatively new (Van Eck & Waltman, 2010). Bibliometric mapping techniques applied in tourism studies have been used to analyse a variety of themes, such as corporate social responsibility (Jiddi & Ibenrissoul, 2020), destination management and marketing (Ávila-Robinson & Wakabayashi, 2018), duration of stay (Atsız, Öğretmenoğlu & Akova, 2022), co-creation (Tregua, D'Auria & Costin, 2020), international dark tourism (Xie, Wang & Lu, 2019), smart experiences (Soliman *et al.*, 2021), world heritage (Zhang, Xiong, Liu & He, 2022), sustainable and responsible tourism paradigm (Mihalic, Mohamadi, Abbasi & Dávid, 2021), and information and communication technology (Molina-Collado *et al.*, 2022). The techniques have also been used to review scientific trends and the output of journals (Bashir & Singh, 2022; Bashir, Singh & Sibi, 2022; Soliman *et al.*, 2021a). In these bibliometric studies, the most common analysis techniques used to map the research topics were bibliographic coupling, co-citation, citation, keywords and abstract co-occurrence, and co-authorship analysis (Xie, Wang & Lu, 2019; Jiddi & Ibenrissoul, 2020; Tregua, D'Auria & Costin, 2020; Shekhar, Gupta & Valeri, 2021; Soliman *et al.*, 2021; Mihalic, Mohamadi, Abbasi & Dávid, 2021; Zhang, Xiong, Liu & He, 2022; Atsız, Öğretmenoğlu & Akova, 2022).

As stated in the previous sections, safety and security concepts have been studied by many authors in a variety of contexts, including literature reviews. Wang *et al.* (2019) conducted a comparative literature review on thirty years of tourism safety and security studies. They applied content analysis to 160 articles published between 1990 and 2018 in English and Chinese languages. In order to determine related articles, 'safety' and 'security' terms were searched in the titles, keywords, or abstracts of the articles in five leading tourism journals, such as *Tourism Management*, *Journal of Travel Research*, and *Annals of Travel Research*. Researchers concluded that the literature in Chinese and English languages concentrates on the different aspects of tourism safety and security. In other words, the focus of western literature is more comprehensive and considers the industry's supply and demand aspects. In a different perspective from the current research, Yang & Nair (2014), inspired by global crises, such as the 9/11 attack in 2001 and the SARS outbreak, conducted a review study on the perceived risk in tourism. By

applying content analysis to 46 articles, the researchers grouped the study's results into four themes: risk, security, and safety; research trends of risk; definitions and antecedents; and finally, risk as a positive element.

3. Methodology

The data were obtained from the Scopus database on June 22, 2022. With 84 million products, 17.6 million author profiles, and seven thousand publishers (Elsevier, 2022), Scopus is one of the largest citation index databases in the world, and it provides remarkable bibliometric research opportunities for researchers with its various metrics. The data were obtained from the database using Boolean logic by searching titles, keywords, and abstracts of all published studies. The search terms and accessed publication details are given below in Table 1.

Table 1. Boolean logic search results

Searched terms		Papers	Numbers
Title	Tourism AND safety OR tourism AND security OR tourist AND safety OR tourist AND security	Article	371
OR		Conference	107
Keywords	"Tourist security" OR "Tourist safety" OR "Tourism security" OR "Tourism safety"	paper	70
OR		Book chapter	22
Abstract	"Tourist security" OR "Tourist safety" OR "Tourism security" OR "Tourism safety"	Review	14
OR		Book	3
		Erratum	2
	"Tourism AND crime" OR "Tourist AND crime" OR "Tourism AND war" OR "Tourist AND war" OR "Tourism AND terror*" OR "Tourist AND terror*" OR "Tourism AND natural disaster*" OR "Tourist AND natural disaster*" OR "Tourist AND natural disaster*" OR "Tourism AND epidemic*" OR "Tourist AND epidemic*" OR "Tourism AND epidemic*" OR "Tourist AND epidemic*"	Editorial	2
Title-Abstract-Keywords		Letter	5
		Note	1
		Short survey	597*
		Total	

* Remaining data after further screening

All documents were exported without any modifications, including the citation information (e.g., author(s), year, citation count, document title), bibliographical information (affiliations, language of original document), abstract & keywords, funding details (e.g., number, acronym, sponsor), and other information (e.g., Tradenames & manufacturers, accession numbers & chemicals). The successfully exported data in the appropriate format were then used for visual bibliometric evaluations and visualizations. Researchers applied further screening of the obtained data to ensure there were no duplicate data, irrelevant studies were removed, and some irregular data, such as journal names, were organised.

Visualization of Similarities application is a software developed by Van Eck and Waltman (2010) to determine the network structures of the data and perform mapping, which was made available to researchers for free. This software provided to create and display bibliometric maps has frequently been employed in many studies in various disciplines in recent years. (Johnson & Samakovlis, 2019; Agapito, 2020; Wong, Köseoğlu & Kim, 2021). Four types of analysis techniques by the VOSviewer software were used on the Scopus database. Some of these techniques are citation links (Van Eck & Waltman 2022), showing the connection between two items where one item refers to the other; bibliographic coupling, showing the links between two items citing the same work (Kessler, 1963); and co-citation analyses (Small, 1973) showing the networks between two items cited by the same study. Finally, there are publication trends related to the subject of the publications using some descriptive statistics provided by the database.

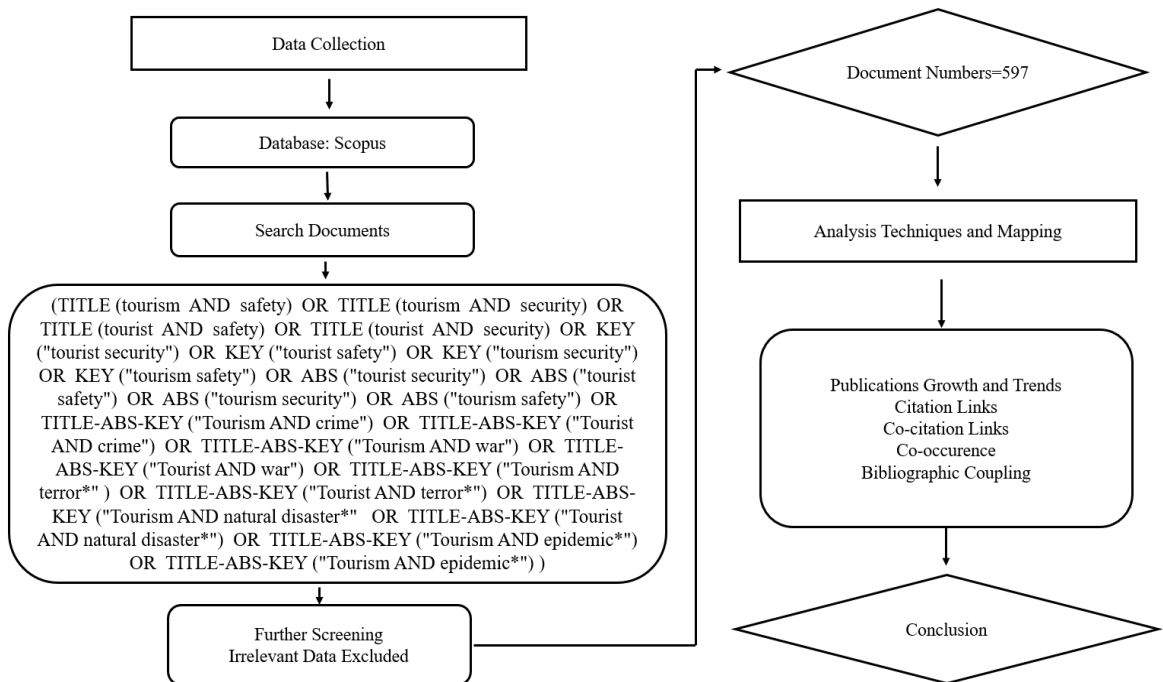


Figure 1. *Methodology flow chart*

In line with the statements above, this study analyses the development of research on tourism safety between 1976 and 2022 from various perspectives. Specifically, the objectives formulated below form the framework for the following parts of the study:

1. To obtain an overview of scientific research on tourism safety and security by evaluating:
 - 2.a. annual productivity
 - 2.b. annual citation
 - 2.c. top ten influential papers
2. To analyse contributions based on:
 - 2.a. authorship
 - 2.b. citations
 - 2.c. journals
 - 2.d. geographical locations
3. To create a knowledge map, analysing the co-occurrence based on:
 - 3.a. keyword
 - 3.b. Abstract

4. Findings

The following sections present development trend and the bibliometric mapping techniques adopted in this research to make an overall assessment of research on tourism safety-security.

4.1. Development trend

The first scientific research published on tourism safety was carried out in 1976. From 1976 to 1998, one study on tourism safety was published in each of the following years: 1976-1977-1980 and 1992, and two

studies were carried out in 1933-1986-1989-1990-1993-1994-1995 and 1998. Although the research on the subject fluctuated between 1998 and 2010, it increased remarkably afterward (Fig. 2). During the data collection period (10.06.2022) in the last quarter of 2022, a considerable number of studies ($f=597$) were published. Furthermore, a significant increase in the number of studies was observed between 2019 and 2021. The topics frequently emphasised in the tourism sector were tourists' perception of safety, health safety, tourism safety, risk management, tourists' recreation safety, ecological security, food security, data security, agro-safety tourism, psychological safety, and economic safety of the tourism sector. It can also be argued that the Covid-19 pandemic, which brought tourism activities to a standstill on a global scale, had an impact on the study of the issues mentioned above on these dates regarding tourism safety.

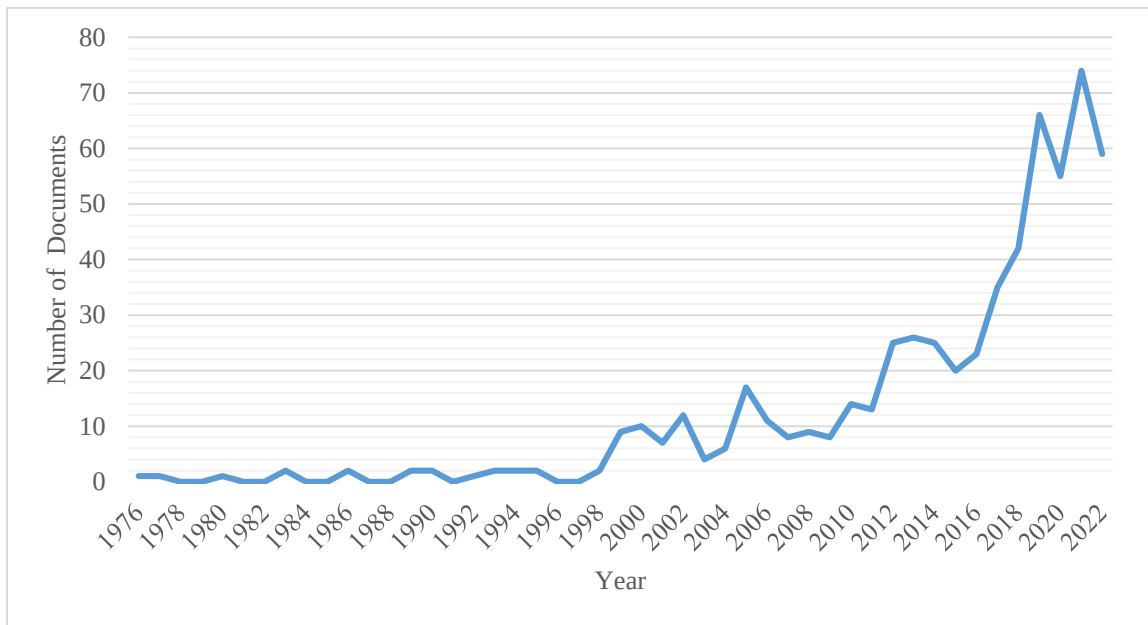


Figure 2. Annual productivity (1976-2022)

The highest number of citations per document by year is the study titled "Tourism and water use: supply, demand, and security. An international review". This study by Stefan Gössling and his colleagues received 48 citations before 2015 and an average of 40,25 citations each year after that, making it the most cited study on the subject (Table 2). According to the Field-Weighted Citation Impact, an important metric in demonstrating the contribution of a study to the field that shows how often it is cited compared to other similar studies, the study with the highest impact (FCWI= 13,56) also belongs to Gössling and his colleagues. (Table 2). A value for the metric greater than 1.00 indicates that the study has more citations than expected compared to the average. Between 1976 and 2022, the most cited works per year on average were carried out in 2012 ($\bar{X}=40,3$), 2003 ($\bar{X}=15,8$), and 2000 ($\bar{X}=10,9$). Considering the above explanations and the values given in the table; the most cited studies in the field of tourism safety, the studies with the highest numerical values, and FCWI were carried out in the last two decades, indicating research on this subject has gained momentum. However, this can also be interpreted as an indication that the tourism science community is late in paying attention to the issues of safety and security, two of the most basic needs and fundamental concepts for tourism. The findings above are

important in showing the studies that contribute most to tourism safety and security literature and their distribution over the years.

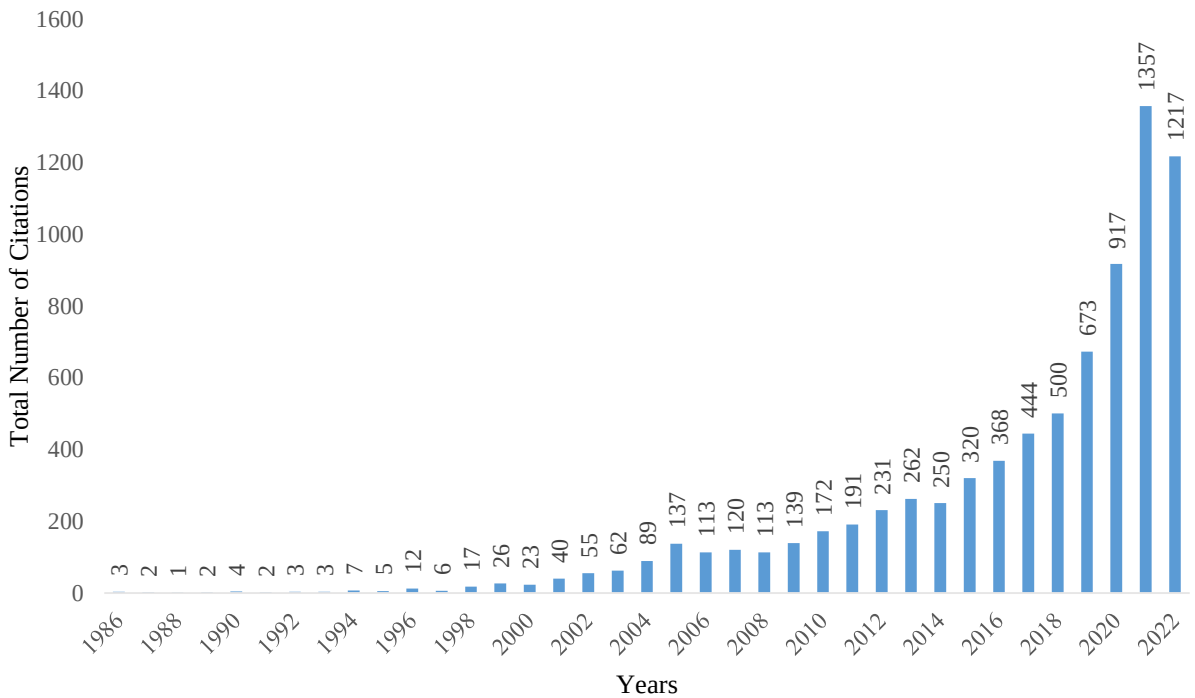


Figure 3. Total number of citations by year (1976-2022)

4.2. Citation link analysis

Citation link analysis shows the link between two studies based on a citation from one study to another. Citation links are considered undirected in VOSviewer. Therefore, no distinction is made between citations from one study (A) to another study (B) and citations in the opposite direction (Van Eck & Waltman, 2022: 27). In the citation analysis, which helps to identify the influential studies in the field with the citation patterns between publications (Hosseini *et al.*, 2018), the citation links of the studies included in the analysis are calculated, and the studies with the most connections are included in the analysis unit. In the citation analysis of 597 studies on tourism safety and security, the analysis type was chosen as *citation*, the analysis unit as “documents,” and the *threshold* for the minimum number of citations received by a study as 30. It was determined that 78 studies exceeded this threshold. Some of the studies in which the highest number of links were selected by calculating the citation links of each of the 78 studies were not connected in the network, and as can be seen in Figure 4, the largest number of study clusters with a link was 44. Accordingly, the most cited studies in tourism safety and security research are Pizam, A. (2005), George R. (2003), Chesney-Lind, M. (1986), Brunt, P. (2000), Hall, D. (2006); the number of citations and links received by these studies are 47-14, 199-13, 128-13, 133-12 and 101-10 respectively. The lack of distinction between citations from one study to another and vice versa can be seen as a limitation of the VOSviewer citation analysis. Although the number of citations is high in the programme analysis, if the number of links of a study is low or if there is no link, the relevant study is not included in the analysis unit. Although Gössling S. (2012) was the most cited ($f=371$; $L=0$)

study in the current study, the programme did not include this study in the analysis unit because there was no citation link with other studies included in the study.

Table 2. *Most cited study and its impact (1976-2022)*

Documents		Citations	<2015	2015	2016	2017	2018	2019	2020	2021	2022	$\bar{X}$	Sub-total	Total	FWCI
			2090	320	368	444	500	673	917	1357	1217	724,5	6539	7894	29,77
1	Tourism and water use: Supply, demand, and security. An international review	2012	48	43	37	37	37	40	49	45	34	40,25	370	371	13,56
2	Tourist's perceptions of safety and security while visiting Cape Town	2003	73	11	8	13	15	15	27	21	16	15,75	153	199	4,45
3	Crime, violence, terrorism and tourism. An accidental or intrinsic relationship?	1993	92	4	10	11	12	16	14	11	8	10,75	107	178	-
4	Terrorism and tourism as logical companions	1986	100	2	3	9	6	8	10	13	6	7,13	80	157	-
5	Tourism and terrorism: A quantitative analysis of major terrorist acts and their impact on tourism destinations	2000	57	1	4	8	12	12	8	27	15	10,88	102	144	2,38
6	Heterogeneity in risk and safety perceptions of international tourists	2013	4	2	4	8	13	12	30	39	30	17,3	142	142	1,59
7	Missing bodies: The politics of visibility	2009	53	14	14	16	11	7	8	6	8	10,5	124	137	2,21
8	Tourist victimisation and the fear of crime on holiday	2000	57	9	11	7	4	10	10	12	13	9,5	97	133	2,7
9	Visitors as victims crimes against tourists in Hawaii	1986	85	3	5	4	3	8	8	6	6	5,38	64	128	-
10	Tourism and crime in the Caribbean	1999	61	7	3	7	3	8	8	12	9	7,13	71	118	2,88

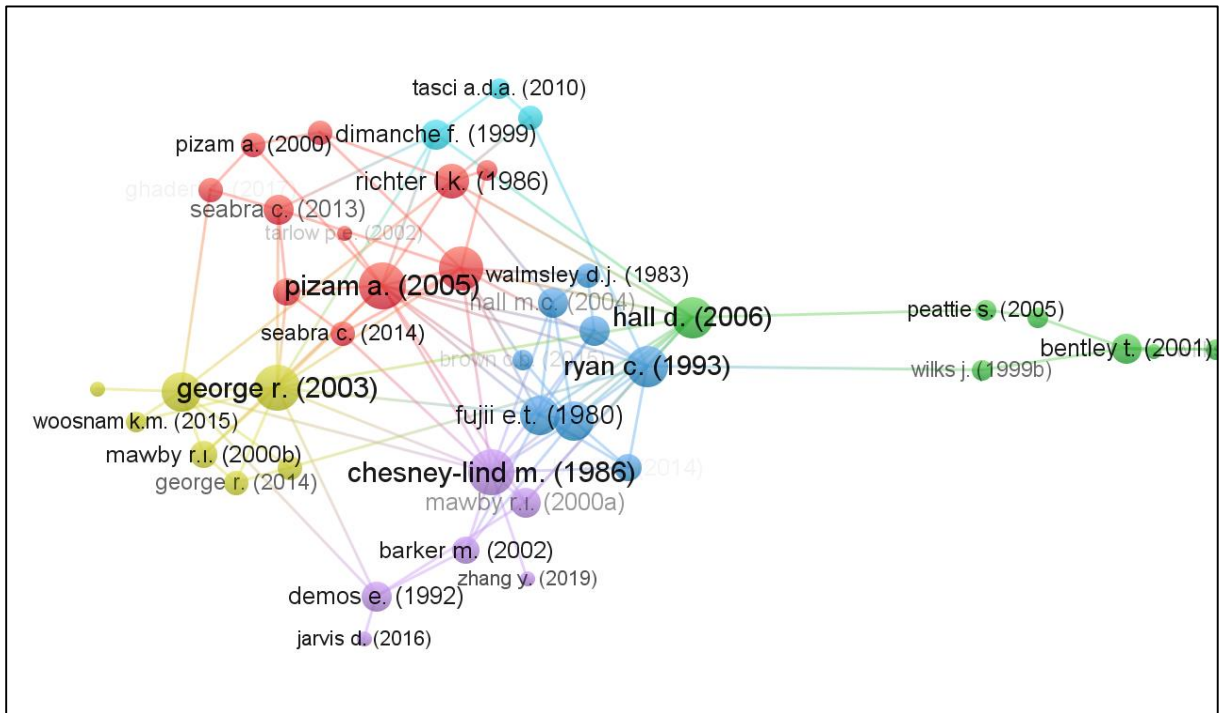


Figure 4. Documents citation link analysis

4.3. Co-citation

Co-citation occurs when two documents receive a citation from the same third document (Van Eck & Waltman, 2022). Citation analysis shows the relative importance or influence of the author, article, or publication source by counting how many times others have cited an author, article, or a publication source (Vermaa *et al.*, 2021; Cobo, López-Herrera, Herrera-Viedma, & Herrera, 2011; Small, 1973). The higher the number of citations of two publications from a common third publication, the higher the common citation power of these publications and the higher the probability of being related to each other. Co-citation is an accepted technique that researchers in bibliometric studies have been widely using in recent years (Leung, Sun, & Bai, 2017; Mulet-Forteza *et al.*, 2018; Diéguez-Castrillón, Gueimonde-Canto, & Rodríguez-López, 2021; Mukhopadhyay Pandey and Rishi, 2022). This technique was used to identify the most influential researchers who contributed to the improvement of tourism safety and security literature.

During the implementation of the techniques to be applied in social network research where co-citation will be applied, a lower limit can be determined depending on the intensity of the frequencies (McCain, 1990). Due to the presence of 28390 co-citations in 597 studies in total, the lower limit for co-citations was set as 30 by the author. As can be seen in the figure below, 76 researchers were selected according to these criteria. The co-citation analysis output below, consisting of five clusters, 2613 links, and 59353 total link strength, shows that closely clustered author studies have a higher level of strong correlation than distant ones. The researchers most contributed to the field with the number of co-citations received are Pizam, A. ($f=259$), Hall, C. M. ($f=231$), Wilks J. ($f=174$), Page S. J. ($f=170$), and Mansfeld, Y. ($f=148$) respectively. With his interest in environmental issues and innovative work in the field of tourism, Michael C. Hall; with his work on health, safety, risk, and crisis management in tourism, Jeff

Wilks; with his work on the effects and costs of tourism, Abraham Pizam; with his work on health, safety, accidents, and injuries in travel and tourism, Stephen J. Page; and with his studies on crime, conflict, and terrorism in tourism, Yoel Mansfeld, are well-known and respected researchers in the tourism literature.

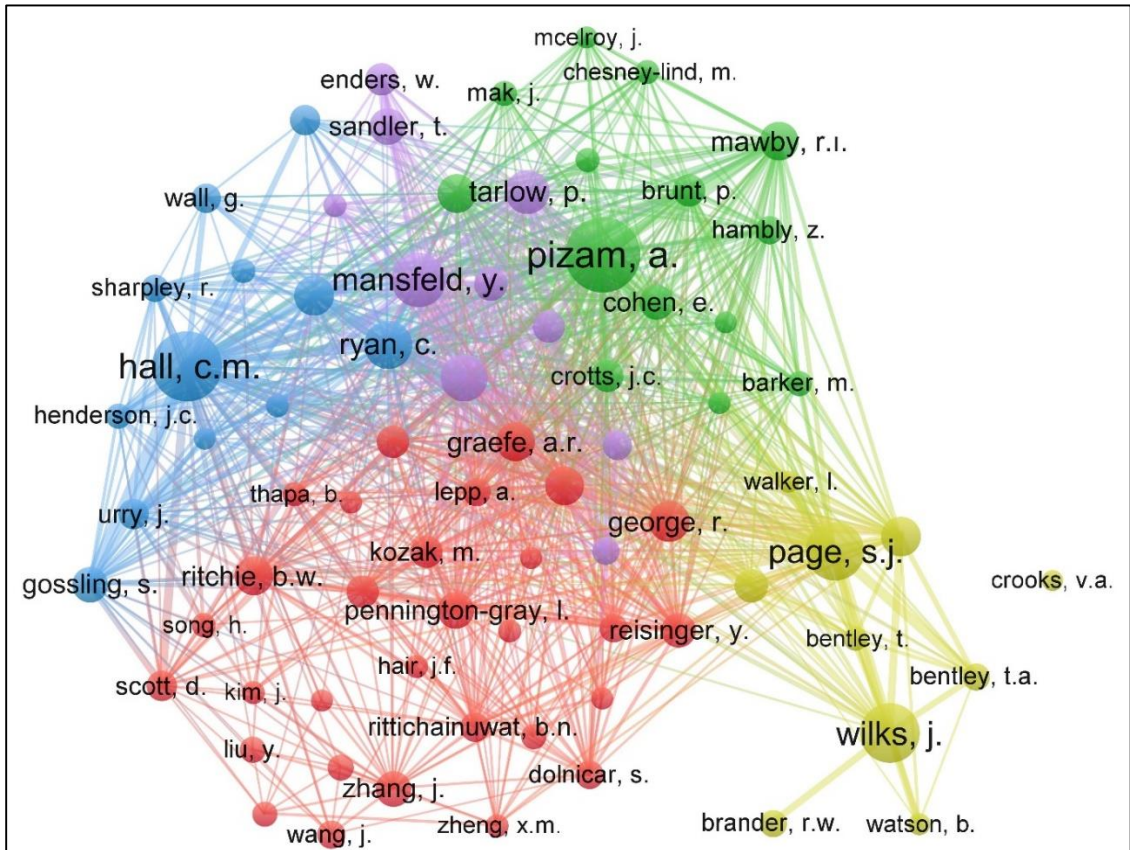


Figure 4. Authors co-citation analysis

Journal/source co-citation is a technique that reflects the distribution and relevance of the knowledge base, which indicates the simultaneous citation of two journals in a study. The strength of association between two journals in journal co-citation is determined by the degree to which journals are cited together in the same study. A minimum of 30 citation criteria was applied to one source among 13180 references, and a co-citation network map was created with 46 journals meeting this criterion. According to the journal/source co-citation analysis results, the leading journals in the development of tourism safety and security are *Tourism Management* ($f=1463$; $TLS=47219$), *Annals of Tourism Research* ($f=1039$; $TLS=39141$), *Journal of Travel Research* ($f=750$; $TLS=26549$), *Journal of Travel and Tourism Marketing* ($f=293$; 11565), and *Current Issues in Tourism* ($f=285$; $TLS=10362$). These journals, which have the highest number of co-citations on tourism safety and security studies are also among the leading journals in the field of tourism. Well-known by tourism researchers, these journals are among the top ten journals in the *Tourism, Leisure, and Hospitality Management* in the Scimago Journal & Country Rank (SJR). *Tourism Management* (3.383), *Annals of Tourism Research* (3.145), *Journal of Travel Research*

(3.291), *Current Issues in Tourism* (1.838), and *Journal of Travel and Tourism Marketing* (2.054) are all published in the Q1 quarter, and they spearhead tourism research.

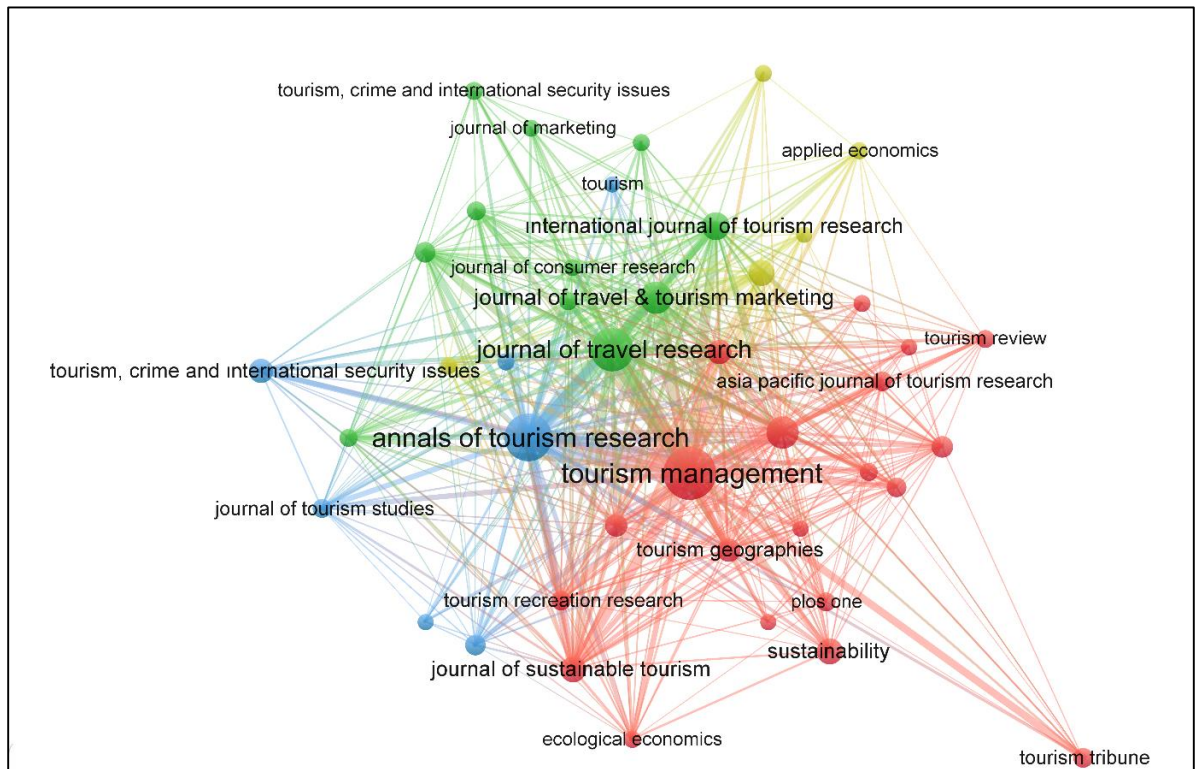


Figure 5. Sources co-citation analysis

4.4. Bibliographic coupling

Developed by Kessler (1963), the bibliographic coupling is the inclusion of an academic study that makes a connection between two studies. Including a work (document) in two other studies simultaneously provides bibliographic coupling. The bibliographic coupling strength of these studies is determined by the number of common sources they have (Egghe and Rousseau, 1990: 235). Country bibliographic coupling helps identify countries with high productivity on a particular topic. The map below (Figure 7) shows the 18 countries with the highest bibliographic match, as a result of selecting minimum number of documents of a country as ten and minimum number of citations as 30 for a country out of 82 countries where 597 studies on tourism safety and security were published. The USA is the most productive country on the subject, considering the fact that the total connectivity strength of one study shows the connection of other studies (Jaafar, Bodolica, & Spraggon, 2021). Although it ranks second in terms of the number of published studies, the country makes the most contribution to the field in terms of the number of citations. Another country that should be noted in Figure 7 is Australia. While the country ranked in low order by the number of studies conducted holds a higher place in received citations. However, it has a low correlation with other studies. The opposite is observed in the bibliographic coupling of China, where most academic production occurs. Although the studies are mostly from China, the number of citations it receives is relatively low. Still, it ranks second in total link strength, which shows that it is highly correlated with other studies on the subject.

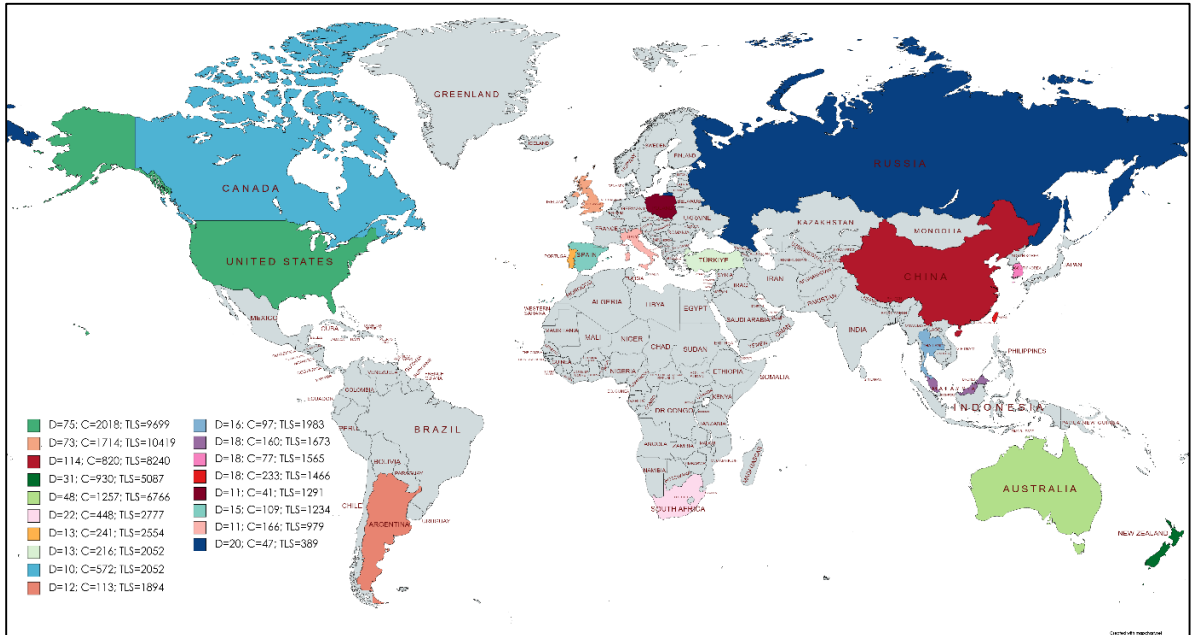


Figure 6. Country bibliographic coupling analysis

4.5. Co-occurrence

Keywords co-occurrence analysis is a tool that maps the research area (Lis, 2018: 50), creates a knowledge map based on words and their relationships, and draws attention to the connections between them (Abdallah, Fekete-Farkas, & Lakner, 2021: 9). Among the 1544 keywords used in the published studies on tourism safety and security, those co-occurred at least three times were evaluated. Accordingly, the association of 78 interrelated concepts, forming 206 links and 7 clusters with five to 20 keywords in each cluster, were identified, with a total link strength of 341.

Figure 8 and Table 3 show both the historical distribution and common keywords co-occurrence frequency in tourism safety and security papers. Accordingly, the concepts of tourism and crime, Australia, collective security, community tourism, adventure tourism, Thailand, perceptions, urban tourism, international tourism, tourism industry, crime, tourists, ecotourism, Caribbean, sustainability, security, water safety, ecological security, tourism ecological security, Turkey, tourism security, risk are the most common keywords co-occurred until 2014. National security, terrorism, safety and security, sustainable development, safety, Malaysia, natural disasters, risk management, Ghana, tourism, tourism safety, criminality, fear, perceived risk, perceived safety, safety management, tourist safety, violence, tourism development, and sustainable tourism are the most co-occurred keywords in tourism safety and security papers during the period between 2014 and 2018. Finally, dark tourism, management, Jordan, road safety, crisis management, medical tourism, food safety, risk perception, climate change, tourism destination, destination, food security, tourist destination, Nigeria, destination image, rural tourism, China, economic security, event tourism, safety perception, Egypt, covid-19 are the most co-occurred keywords following 2018 to date. When the keywords were examined, it was found that the epidemic, which had significant aftermaths on tourism, especially after 2018, impacted the studies carried out. The keywords were selected from the concepts that refer to the focal points of the research; thus, it can be concluded that there has been a change in the focus of tourism safety studies over time.

Table 3. *The most common keywords in tourism safety and security papers*

Keywords	Occurrences	TLS	Keyword	Occurrences	TLS
Tourism	84	117	Adventure tourism	5	8
Security	36	60	Destination	5	12
Terrorism	32	42	Tourism destination	5	4
Safety	30	37	Malaysia	5	3
Crime	19	34	Natural disasters	4	3
Tourism security	16	20	Violence	4	6
Covid-19	15	18	Crisis management	4	8
Tourists	14	12	Management	4	6
Tourist safety	14	12	Safety management	4	10
Tourism safety	13	18	Rural tourism	4	7
Perceptions	12	15	Medical tourism	4	1
Risk	10	12	Urban tourism	4	5
Sustainable development	10	13	Economic security	4	4
Tourism ecological security	10	4	National security	4	3
Tourism industry	9	8	Perceived safety	4	0
Food security	9	15	Safety perception	4	5
China	9	9	Egypt	4	5
Tourist destination	9	16	Nigeria	4	4
Risk perception	7	8	Thailand	4	4
Sustainability	7	10	Criminality	3	4
Dark tourism	7	9	Fear	3	5
Food safety	7	8	Community tourism	3	4
Safety and Security	7	7	Ecotourism	3	5
Tourism and Crime	6	6	Event tourism	3	2
Destination image	6	8	Collective security	3	3
Risk management	6	10	Road safety	3	1
Ecological security	6	7	Water safety	3	3
Climate change	5	8	Australia	3	6
Perceived risk	5	5	Caribbean	3	7
Tourism development	5	7	Jordan	3	4
International tourism	5	1	Turkey	3	2
Sustainable tourism	5	5	Ghana	3	7

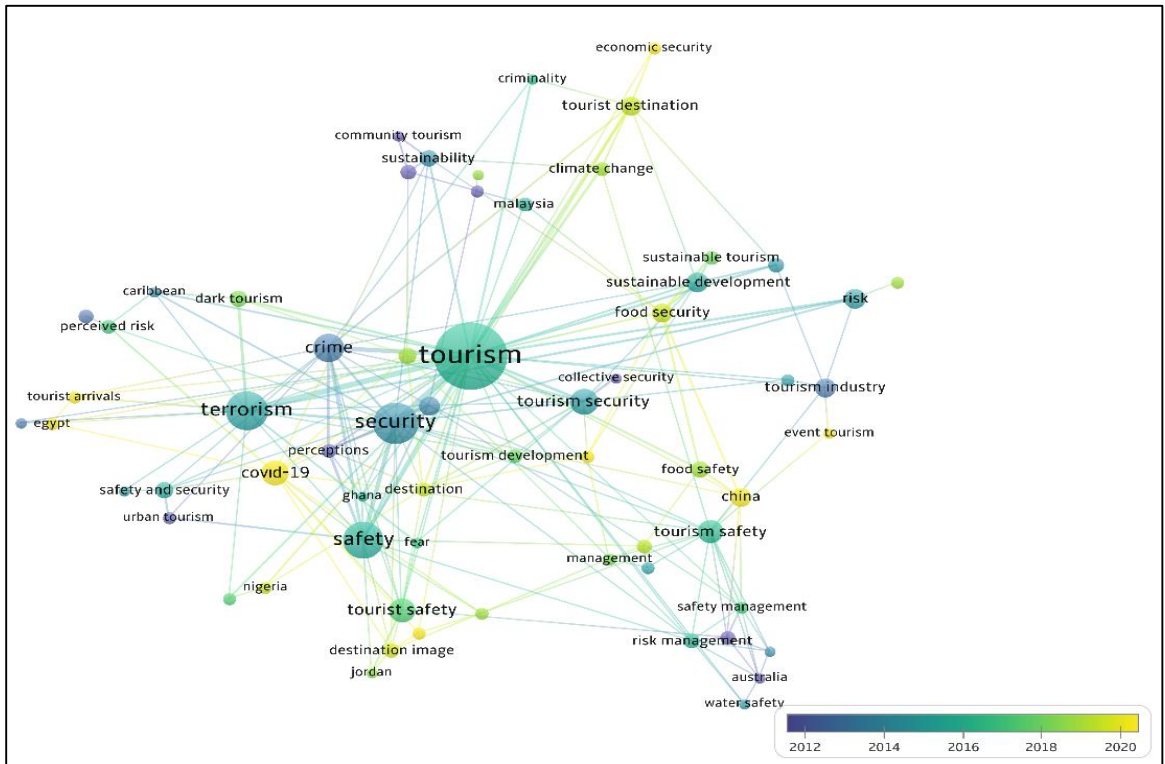


Figure 8. Keywords co-occurrence analysis

As noted earlier in this study, tourism safety and security are two research foci that have gained momentum in recent years; as such, it is important to emphasize the key elements in the studies focusing on relevant topic. To determine central concepts of co-occurrence emphasized by researchers interested in tourism safety and security and to reveal the main research clusters, a summary concept association network structure was created; the results are presented in Figure 9. The minimum number of occurrences of a term was selected as 30, and of the 11342 terms, 83 met the threshold. Six clusters consisting of 112 items and 2417 links in the network structure were acquired by recruiting this procedure. The most common concepts in the clusters are shown below. Accordingly, in the acceleration period (2010-2012) of the subject; death, fear, crime, injury, personal safety, health, peace, travel, violence, insecurity, crisis, ecological security, tourism ecological security, foreign tourists, accident, travel, safety measures, trust, tourism development, victim, incident, and tourism policies are the most attributed concepts in the studies. Following this period up to 2016 the concepts of vulnerability, travel, government, health, hospitality, Europe, Malaysia, Egypt, Thailand, United States, residents, international tourists, violence, responsibility, and foreign tourists have dominated the safety and security studies. Between 2017 and 2018, more attention was paid to technology, transportation, hazard, terrorist attack, terrorism, international tourism, trip, security measure, accident, natural disasters, insecurity, tourism activity, ecological security, medical tourist, trust, food, and natural environment. Finally, from 2019 to date researchers have focused heavily on food safety, safety perception, pandemic, COVID-19, intention, crisis, security issues, economic security, criminal activity, crime, natural disaster, and tourist safety. climate change, inbound tourism, disaster, earthquake, and tourism resources. Until 2016, the issues that researchers focused on were the negative impacts of tourism regarding tourism safety and security. However, after 2018, with the substantial effect of the

pandemic on the tourism industry, the direction of tourism safety and security studies seemingly concentrated on the agenda of related time.

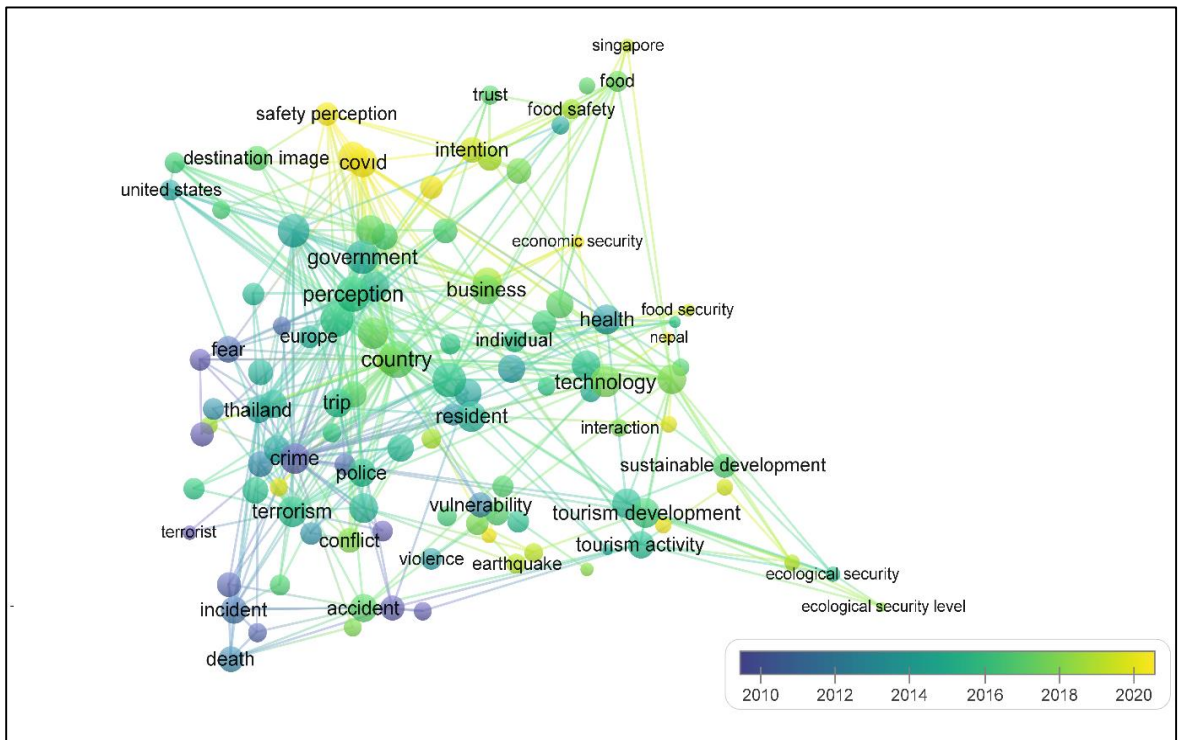


Figure 7. *Abstract co-occurrence analysis*

5. Conclusions, discussion, and implications

Tourism/tourist safety and security have long been studied in the past few decades. Since a growing body of literature exists, by applying the bibliometric method to tourism safety and security studies, current research is expected to improve the knowledge base on the topic and contribute to the relevant research field in various ways. The results contribute to the tourism literature and the development of the tourism safety field, the study and citation development of the tourism safety literature in the historical context, the leading researchers, resources, journals, and countries that contribute to the field with high efficiency and also the analysis and visualisation of relational network structures for the key concepts focused on research. The results are expected to encourage researchers to focus more on tourism safety and security issues and become catalysts for raising awareness in this context. In this context using a bibliometric mapping program VOSviewer, citation analysis, co-citation analysis, concept association, and bibliographic coupling were applied to 597 publications obtained from the Scopus database.

The current study provides several theoretical implications through analysing and mapping the tourism safety and security studies. The results of the study clearly demonstrated that the research on tourism security dates back to the late 1970s; however, there are only a few studies from these years to the millennium. Besides, the number of studies conducted from the 2000s to the present increased remarkably. With many incidents such as the September 11 attacks, the Iraq War, the South Ossetia

War, the Indian Ocean earthquake and tsunami, the Thai coup, and the London attacks, and pressing issues, such as climate change and ecological problems, various security concerns have emerged, and tourism safety and security research has become more critical. In line with the increase in annual publications, the results of the study revealed that about $\frac{3}{4}$ of the citations received by the studies took place after 2015. Two of the most cited studies were found as “Tourism and water use: supply, demand, and security” by Stefan Gössling, Paul Peeters, Michael Hall, Jean-Paul Cerone, Ghislain Dubois, La Vergne Lehmann, and Daniel Scotth, and “Tourist’s perceptions of safety and security while visiting Cape Town” by Richard George also have the highest Field-Weighted Citation effect.

Co-citation analysis occurs when two documents are cited from the same third document (Van Eck and Waltman 2022: 27) and refers to the relative importance of the author, article, or publication source (Vermaa *et al.*, 2021: 1182; Cobo, López-Herrera, Viedma & Herrera, 2011: 1384; Small, 1973: 265). Co-citation analysis research of the current research demonstrated that leading researchers in tourism safety and security studies are Michael C. Hall, who stands out with his interest in environmental issues; Abraham Pizam, who is known for his studies on the effects and costs of tourism; Jeff Wilks, who focuses on health, safety, risk, and crisis management; and Yoel Mansfeld, who draws attention to crime, conflict, and terrorism in tourism research.

According to co-citation analysis results, journals with leading publications in tourism safety and security are Tourism Management, Annals of Tourism Research, Journal of Travel Research, Current Issues in Tourism, and Journal of Travel and Tourism Marketing. Given the analysis results of journal co-citation, the journals in which tourism safety and security studies published in the top ten in the Tourism, Leisure, and Hospitality Management ranking of the Scimago Journal & Country Rank. Moreover, the studies were mainly published in Q1 category journals, which can be interpreted as an indicator of the high quality of the studies in the tourism safety and security field. The results of the bibliographic coupling analysis, in which the number of common sources increases the bibliographic coupling strength (Egghe & Rousseau, 1990: 235), showed that the most productive country in this field is the United States of America, followed by United Kingdom, China, Australia, and New Zealand respectively. The results of the abstract co-occurrence analysis, which was carried out to identify and map the concepts that make-up research trends in tourism safety and security over the years, demonstrate that the key concepts in focus were crime, death, fear, injury, health, violence, insecurity, foreign tourists, accidents, safety measures, trust, incident, and victim. Considering these terms were studied in the first years of the subject, one can conclude that the researchers approached the subject from a micro perspective in the early periods. Following this period up to 2018 researchers paid more attention on the concepts of vulnerability, transportation, travel, government, health, hospitality, residents, international tourists, hazard, terrorist attack, terrorism, international tourism, security measure, natural disasters, tourism activity, ecological security, medical tourists, technology. In addition, country scale studies were considered such as Europe, Malaysia, Egypt, Thailand, United States. One may conclude based on the terms used in the expanding years of safety and security studies in tourism, researchers carried out more extensive studies in the development phase of the literature. Finally, in the past three years, researchers have focused heavily on COVID-19, pandemic, natural disaster, intention, security issues, food safety, inbound tourism, safety perception, and tourism resources. Just like every other thing in life, COVID-19 outbreak had impacts on tourism studies and many researchers concentrated on the safety issues related to pandemic. When the concepts emphasized in the transition periods were analyzed, it was concluded that the evaluation approaches changed from the micro to the macro level. With a similar approach, in the expanding phase of the literature, most safety and security related concepts used in the study keywords were collective security, urban tourism, crime, tourism safety and security, ecological security and natural disaster, risk

management, criminality, fear, law enforcement, water safety, national security, and sustainability. In the following phase the concepts of risk and safety perception, food safety and security, tourism ecological safety, dark tourism, road safety, economic security, rural tourism, poverty alleviation, medical tourism concepts were heavily co-occurred. The issues that researchers focused on regarding tourism safety and security until 2016 were the impact or the costs of tourism, which is the subject of widespread discussion in tourism. After 2018, the pandemic dominated tourism safety and security research. In this sense, one may infer that popular or influential research topics have attracted scholars. Ultimately, based on the research concepts, as noted in various studies (Khalid *et al.*; Khan *et al.*, 2012), one may conclude researchers need to focus on more on the technological approaches in tourism safety and security studies.

6. Limitations and future research directions

Besides its contributions, the current study has some limitations and recommendations for future research. The results were obtained by searching for "tourism safety", "tourist safety", "tourism security", and "tourist security" concepts within the article title, abstract, and keywords and by using the services offered by the Scopus database. Although all languages and study types were included in the research, studies with incomplete information such as year, author, and title were excluded. The exclusion of Google Scholar and Web of Science data not covered by the Scopus database can also be considered a limitation. Even though this study offers detailed answers to which, who, what, and where questions about the tourism safety studies, the answers to the questions that can provide more in-depth information, such as why and how, are not as detailed, and this may be considered another limitation. However, it should be noted that these limitations are far beyond the scope of this study.

Studies on tourism safety and security have concentrated on terrorism, crime, Covid-19, and risk perception. However, it is striking that studies related to ecology, climate change, food and beverage safety, fear, violence, and accidents are relatively less emphasized. In addition, security issues concerning alternative tourism, including adventure tourism, activity tourism, medical tourism, and, dark tourism have been partially covered. In this regard, future research can investigate potential safety and security issues within the scope of emerging tourism types in order to contribute to the scientific development of the field. In addition, ecological security threats and natural disasters due to climate change may also be examined within the framework of tourism security. Considering the role of the tourism industry in climate change, the social costs of security problems are among the other vital subjects worth examining. Therefore, it is critical to address the issue of tourism security from the perspective of sustainability, marketing, management, and alternative tourism types. On the other hand, for tourism-specific incidents on tourism safety and security, further research may concentrate on comparative content analysis of the topic. Finally, the current study utilised the VOSviewer programme to map and analyse the data. In order to acquire different contents and apply an analysis approach, future research may use some other software, such as CiteSpace, Pajek, Gephi, R, or Phyton for data mapping.

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