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## Bibliometric mapping of the studies on noise related to tourism

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### ABSTRACT

This study aims to provide an overview of the development of tourism-related "noise" studies in the academic process. Thus, the most current research stream on the subject is clarified. First, a systematic literature review was conducted, and then bibliometric analysis was applied to the data obtained via VOSviewer. This article examines 102 studies published in the Elsevier SCOPUS database until January 2024. The journals in which the studies on the related topic were mainly published were identified, and it was found that in most of the tourism journals with a high impact factor, there were no related studies. The thematic evolution of the topic was determined in the framework of the network relationship drawn for the common keywords used. It was found that the Covid-19 pandemic shaped the field of study. In addition, a link map was drawn for all relevant researchers and studies. This paper provides a research agenda for future researchers.

### KEYWORDS

Tourism, noise, sound pollution, sustainability, bibliometric analysis, VOSviewer

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## INTRODUCTION

Tourism has emerged as a leading global industry, providing significant economic benefits and facilitating cultural exchange and preservation. However, alongside its positive outcomes, it also has negative impacts that need to be considered (Frent, 2016). Tourism can create additional employment opportunities and improve infrastructure, although it may increase the overall cost of living (Brankov et al., 2019). It also has the potential to cause changes in social and family frameworks and cultural traditions that are modified according to visitors' preferences. When looking at the negative environmental effects attributed to tourism, noise comes to the fore. In the dynamic environment of the tourism sector, it is important to evaluate the effects of noise pollution, or in other words, noise, on tourists and surrounding communities (Frent, 2016). The noise problem has become an important and urgent issue that needs to be solved, especially in tourist centers with large groups, busy transport networks, and entertainment facilities that operate until late at night (Brankov et al., 2019). As various sources show, noise in tourist destinations is caused by factors such as emissions and noise from aircraft, noise, and pollution from tour boats, water consumption and waste produced by hotels, litter produced by tourists, and pollution of beaches (Tsaligopoulos et al., 2023; Wadle & Martin, 2021).

Noise is a complex topic that has attracted considerable attention from a variety of scientific disciplines, including environmental engineering (Sharma & Bhattacharya, 2014; Vogiatzis et al., 2009), psychogeography (Long, 2014), sound science (Brown et al., 2011), architecture (Merchan et al., 2014) and psychology (Stansfeld & Matheson, 2003). As travelers seek new and exciting destinations, the impact of noise on the overall experience has become a growing concern, and this concept has begun to be addressed in tourism studies. As noise negatively affects the health and well-being of tourists, it also affects tourist satisfaction (Ma et al., 2021; Oquendo & Santos, 2020). Whether it is the bustling streets of a popular city, loud music at a beach resort, or the constant drone of aircraft flying near an airport, noise has the potential to negatively impact the tourism experience and cause discomfort for both visitors and residents (Gursoy et al., 2011; Liu et al., 2018).

As the tourism industry continues to develop, managing the impact of noise on tourist destinations is important for the sustainability of the sector. For this reason, "noise" is a topic that has been addressed in academic studies over the last decades. This article aims to present a bibliometric map by analyzing the evolution of the focus of tourism-related "noise" studies in the academic process. The reason for this is the contribution to academic knowledge by creating a future research agenda for researchers.

Bibliometric analysis is an important tool for assessing scientific productivity and research quality. This analysis involves studying scientific publications using mathematical and statistical methods and is widely used in various fields. Bibliometric parameters are important for measuring the productivity and impact of authors and journals and for mapping the intellectual structure and development of a given field of research (Choudhri et al., 2015; Durieux & Gevenois, 2010; Gutiérrez-Salcedo et al., 2018).

In this study, bibliometric analysis was used to identify the leading studies, researchers, and journals on the subject and to identify the main keywords through which the subject has developed.

The bibliometric analysis was used to identify the leading studies, researchers, and journals on the subject and to reveal the keywords through which the subject has developed. At the end of the research, recommendations are listed for both researchers working in the field and tourism stakeholders in the position of practitioners.

## LITERATURE REVIEW

### *The Concept of Noise*

In academic studies, interest in the acoustic environment is increasing daily. Studies generally focus on a single aspect of sound. This aspect of sound is the concept of noise or, in other words, "unwanted sound" (Yang, 2005). In general, the importance of definitions for thought has been discussed since the early days of philosophy. Words have connotations, ideas, or meanings

besides their primary meaning. Fink (2019) Fink (2009) defines noise as "unwanted and/or harmful sound." Dodd (2001) proposed a different definition of noise: "Noise is the subjective sound that we prefer not to listen to." A sound is transformed into noise according to a subjective interpretation. In some cases, mixing different sounds creates a white noise effect that makes it impossible to distinguish the individual sounds. For example, many birds singing very loudly simultaneously in spring makes it impossible to distinguish individual species, but the resulting sound is generally "pleasant." On the other hand, some types of music may be perceived as annoying by some people and considered as noise (Farina, 2014).

Noise research mainly focuses on developing statistical methods to analyze measurable physical and psychological effects. As a result of noise studies, many indices have been developed to indicate acceptable or desirable sound levels in the home. However, sound is one of the fundamental means by which individuals make sense of and communicate with the world, and this aspect of sound is often overlooked (Yang, 2005). Noise is very subjective. A noise perceived as loud and unpleasant for one person may be pretty acceptable for another (Spon, 1991). The sound itself is ecologically neutral, and the desirability of such a sound depends on the physiological and psychological parameters of the receiver. It is important to consider the context of a sound as well as where and when it occurs (Yang, 2005).

The use of pleasant sounds for therapeutic purposes is a method that has been used since ancient societies. In addition to music, psychotherapists use sounds such as streams, waterfalls, wind, waves, and birdsong in nature. Such sounds effectively reduce depression and stress (Ay & Günay, 2023). Sound is measured using a sound level meter, also called a noise level meter or decibel meter, in units of Decibels (dB) or Pascal. Sound becomes noise when it causes discomfort to the ear. The pressure change representing the human ear pain threshold is about 140 dB, equivalent to a jet aircraft's sound (Wawa & Mulaku, 2015). Humans are susceptible to noise in the 20-200 Hz frequency range, and this level must be considered for health reasons (Murphy & King, 2014). Noise has become a significant problem in the modern world and is constantly growing with each passing year. The soundscape intensity of a modern city can be as high as 90 dB. This figure is generally above 80 dB and is getting higher every year. It is estimated that the soundscape growth rate of cities is around half a decibel per year. Thus, it is possible to say that cities are twice as noisy as they were twenty years ago (Treasure, 2011).

Physiological experiments on humans have shown that moderate noise levels affect people indirectly but cause similar health problems to those caused by high levels of direct noise. Therefore, acute noise effects can occur not only at high sound levels but also at relatively low ambient sound levels (Hurtley, 2009). Noise has many physiological and psychological negative consequences. Sociologically, it affects the quality of life of the individual. Noise disturbs sleep, increases stress, and causes distraction. Prolonged noise exposure can cause hearing loss. High noise levels can cause cardiovascular effects by increasing blood pressure (Wawa & Mulaku, 2015). Sleep disturbance due to noise may cause people to become angry at the noise source. It can make it difficult for people to communicate through speech. Several experimental studies have shown that high noise levels can seriously affect productivity and efficiency and that fewer mistakes are made when noise levels are reduced. Noise also weakens the individual mentally. It can, therefore, be said that noise can cause hearing loss, mental illness, reduced productivity, and even loss of life (Spon, 1991).

### ***The Noise in Tourism***

Before explaining the concept of noise in the field of sustainable tourism, it is necessary to mention the effects of tourism. Because one of the significant environmental impacts of tourism is noise (Çakır et al., 2018). The impacts of tourism can be categorized as economic, socio-cultural, and environmental (Us Saqib et al., 2019). In addition to its positive economic effects, such as employment and income generation, it can also have negative effects, such as local inflation and opportunity costs (Li et al., 2017). From a social and cultural perspective, it has positive and negative effects on the quality of life, values, norms, habits, community models, and cultural structure (Pramanik & Ingkadijaya, 2018). Tourism also has both positive and negative impacts on the environment. However, the negative effects are ignored because of the predominance of

the economic return aspect (Bertan, 2009). Positive environmental impacts such as the protection of natural habitats (Andereck et al., 2005), the protection of archaeological and historical sites (Yoon et al., 2001), the landscaping of cities (Perdue et al., 1987), the enhancement of people's environmental awareness (Guerreiro et al., 2016) and the improvement of infrastructure and superstructure facilities (Kolupaev et al., 2018) can be listed. When analyzing the negative environmental impacts, the first thing that comes to mind is the negative impact on water. Sewage, garbage, fuel waste from facilities and water transport vehicles, garbage left by tourists, chemical waste such as sunscreen, etc., cause water pollution (Zhong et al., 2011). Studies have shown that fuels used in facilities and transport vehicles and tourist mobility cause air pollution (Sunlu, 2003). Minimizing all these negative impacts and protecting the natural and social environment are among the objectives of sustainable tourism (Battaglia, 2017).

In the relationship between noise and tourism, it is seen that both affect each other, especially with the development of mass tourism. While mentioning the existence of noise from touristic activities, it is necessary to emphasize the impact of noise from other sources on tourism (Ay & Günay Aktaş, 2019). The presence of a favorable soundscape is important for the sustainable development of tourist destinations (Qiu, Zhang, & Zheng, 2018). Tourism-related crowding of people and vehicles has a negative impact on tourist destinations, natural areas/parks, and oceans (Guerra et al., 2014; Kavallinis & Pizam, 1994; Kimbrough et al., 2013; Lobo Soares & Bento Coelho, 2016; Sharma & Bhattacharya, 2014; Yuen, 2014; Zannin et al., 2002). Noise caused by tourism negatively affects tourists as well as local people. In addition to its negative environmental impact, noise also has a negative economic impact on these areas. It may negatively impact tourist satisfaction in destinations and cause tourists to dislike these areas. This situation negatively affects all stakeholders in the industry (Merchan et al., 2014; Montazerolhodjah et al., 2019). Tourists who come to have fun, get away from the daily routine, relax, and have a good time are adversely affected physiologically and psychologically as a result of exposure to disturbing noise levels (Belsoy & Korir, 2012; Hasan & Siddique, 2016; Kimbrough et al., 2013; Nejati et al., 2014; Pramanik & Ingkadijaya, 2018; Wawa & Mulaku, 2015).

## **METHODOLOGY**

Within the scope of this study, a systematic literature review on the concept of "noise" has been carried out with a holistic approach within the tourism literature. The bibliometric mapping method was used in this study to examine the status of the concept in tourism studies. Bibliometric mapping is a widely used research method in various scientific fields (Ahmad & Slots, 2021; Aria & Cuccurullo, 2017; Merigó, J. M. & Yang; J. B., 2017). It provides researchers with a comprehensive perspective on the flow and development of knowledge in a particular field by visualizing the links and relationships in the scientific literature (Arslan, 2022). Figure 1 presents the flowchart of the analysis.

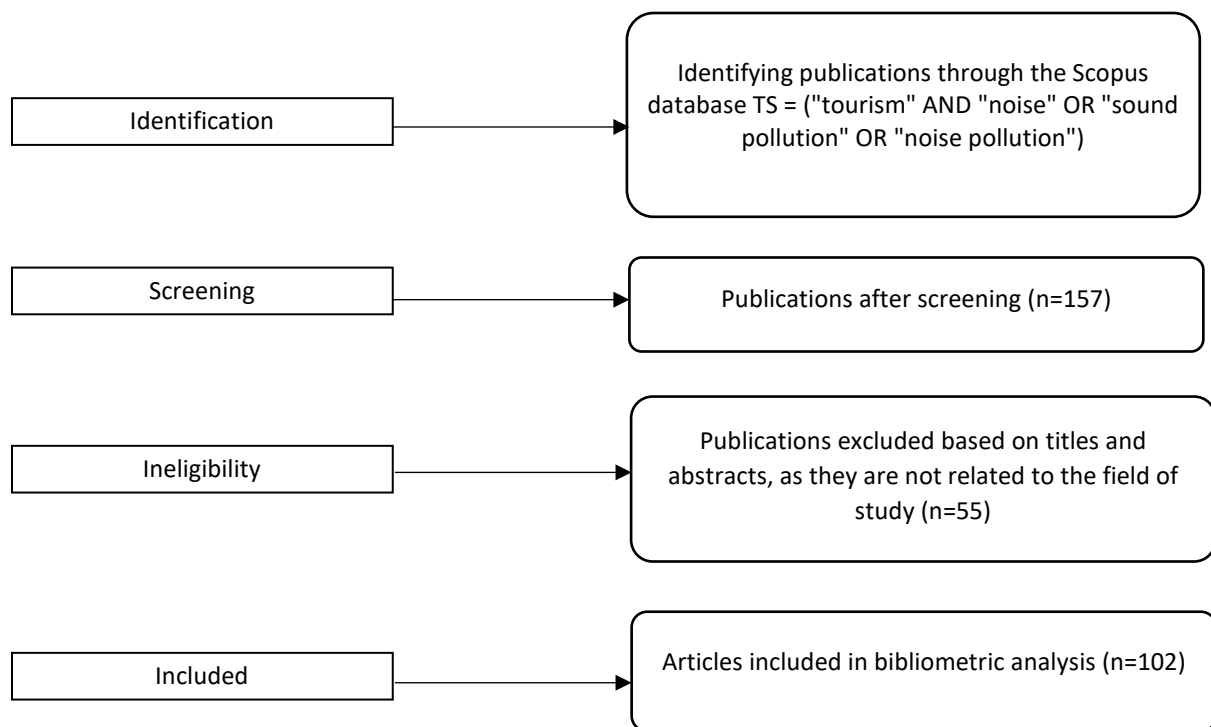


Figure 1. Flowchart for Bibliometric Analysis (Source: Own research)

### **Data Collection**

Firstly, the terms to be used in the search were determined in line with the purpose of the research. The terms "tourism" AND "noise" OR "sound pollution" OR "noise pollution" were searched in titles, abstracts, and keywords in The Elsevier SCOPUS database collection. SCOPUS database was preferred due to its broader scope and resources than other databases (Salisbury, 2009). No date range was selected in the query. Thus, all studies conducted on the subject were accessed. The query ended on January 10, 2024. The search results were refined as open-access studies written in English. 157 English-accessible studies were found. The researcher then reviewed each study individually to eliminate duplicates and publications that did not meet the relevant criteria. A total of 102 studies were finally included in the review, including 95 articles, 5 conference proceedings, 1 review, and 1 book chapter.

### **Data Analysis**

Bibliometric studies allow researchers to access the information distilled from the articles on the subject and to understand the subject in more detail (Palmer et al., 2005). Bibliographic matching was used to combine scientific articles with similar intellectual content that addressed the concept of "noise" in tourism studies (Kessler, 1963).

VOSviewer is a bibliometric analysis software that is freely available to researchers. Developed by Van Eck and Waltman (2010), VOSviewer allows researchers to construct and display bibliometric maps. VOSviewer provides a viewer that allows you to examine bibliometric maps in detail. It has scrolling, zooming, and searching functions that make it easy to examine a map in detail. Most computer programs (Bibliometrix, R Package, Bibexcel, etc.) used to construct bibliometric maps cannot produce such maps at this level.

The VOSviewer software uses several analysis techniques. One is citation link analysis, which shows the connection between two studies when they cite another. The VOSviewer software uses several analysis techniques. One of the analyses used in this study is the co-citation analysis. Co-citation analysis was used to identify and link groups of publications with a similar consensus, forming an intellectual basis through common references. This analysis helps identify and link publication groups on the same topic (Braam et al., 1991). Co-citation refers to the presence of two studies in the same sources or citing them together. The country bibliographic

coupling analysis was used to determine which countries have productivity related to the research topic (Toker & Emir, 2023).

In order to identify the most important concepts of the studies, a co-occurrence analysis was carried out by evaluating the keywords of the studies. This analysis scans the entire literature and categorizes it into clusters representing different research foci, thus organizing the body of knowledge in the field in a systematic way (Arslan, 2022).

## FINDINGS

### *Findings on the Development Trend*

The studies examining the concepts of tourism and noise together are shown in Figure 2.

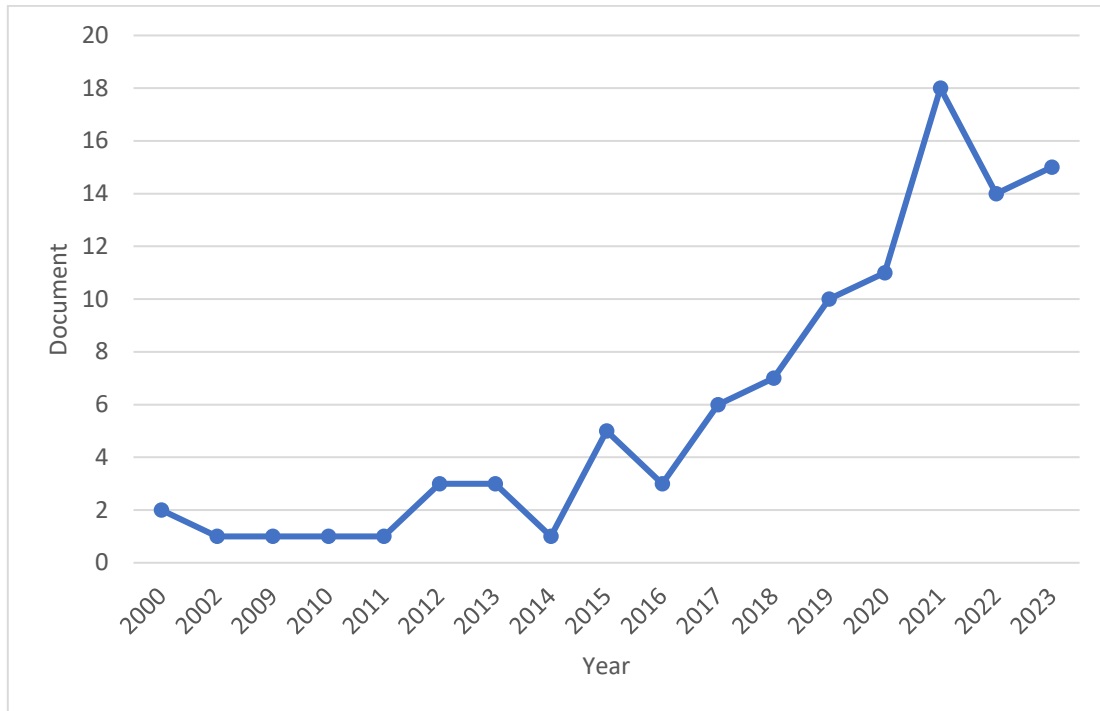
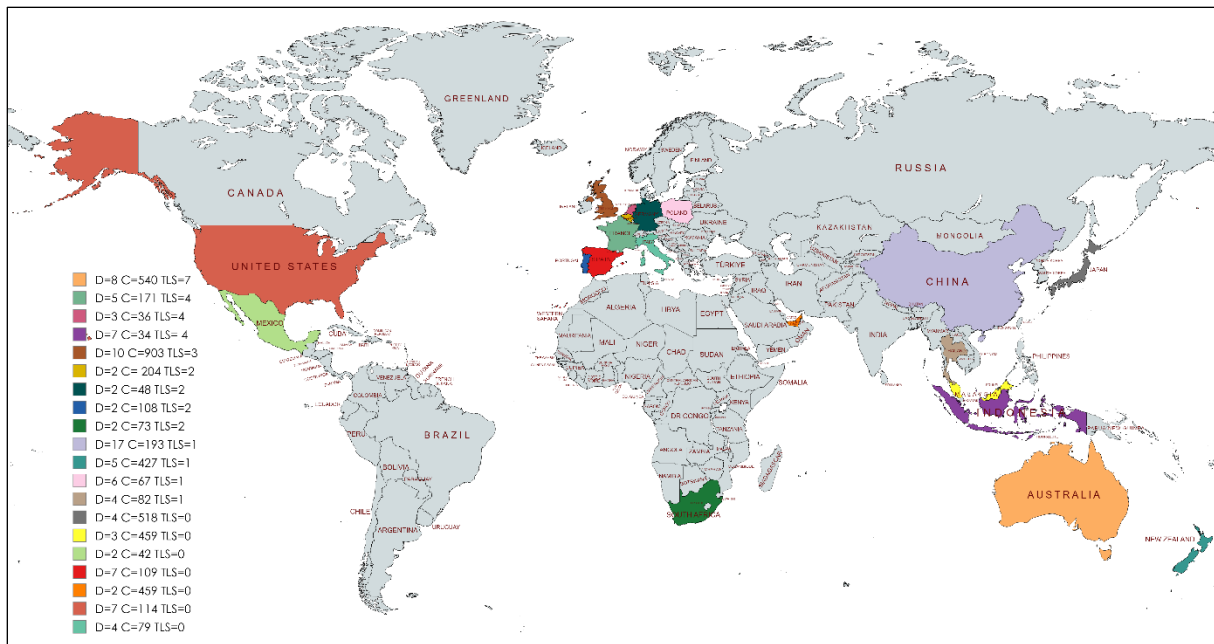


Figure 2. Annual Scientific Production in Sound Pollution Research in Tourism

The annual scientific output is presented from 2000 to 2023. Although there was a slight increase in the number of publications in 2012 and 2013, there was no significant increase until 2014. A significant increase can be seen from 2017 onwards. In 2021, the number of publications on this topic reaches its peak. A decline can be expected after this date.

### *Distribution of Publications by Countries*

It was found that the studies included in the analysis were published in 51 different countries. A threshold of two for the number of studies published from a country and a threshold of 30 for the number of citations received was set and analyzed. It was determined that 20 countries met the threshold (Figure 3).



(D=documents, C=citations, TLS=Total link strength)

Figure 3. Distribution of Publications by Countries

China (17 studies) and the United Kingdom (10 studies) are the countries with the highest academic production. The United Kingdom, which ranks second in terms of the number of studies, is the country that contributes the most to the field regarding the number of citations. When we look at the bibliographic matching of China, although it is the country with the highest number of studies, the number of citations it receives is relatively low. Although Malaysia and the United Arab Emirates have produced few studies, it is understood that their contributions to the field are high according to the number of citations they have received. Australia ranks first in terms of total number of links. France, the Netherlands, and Indonesia rank behind Australia.

#### ***Sources Co-citation Analysis***

It was found that there were a total of 2913 references in the studies considered in this study. Depending on the intensity of the number of studies, a lower limit can be set to identify the most related studies (McCain, 1990). To perform the source co-citation analysis, studies that met the criteria of a minimum number of citations to a source 20 were included in the analysis, and the source co-citation network map was created with 11 studies that met these conditions (Figure 4).

According to the results of the analyses, *Tourism Management* (f=133) is one of the journals with the highest number of citations for tourism-related studies dealing with the concept of noise. This journal is also the journal with the highest total link strength. Other journals are as follows: *Annals of Tourism Research* (f=90), *Sustainability* (f=65), *Journal of Travel Research* (f=44), *Journal of Acoustical Society of America* (f=39), *Journal of Sustainable Tourism* (f=39), *Tourism Management* (f=35), *Plos One* (f=31), *Science of The Total Environment* (f=27), *Marine Mammal Science* (f=24) and *Marine Pollution Bulletin* (f=22).

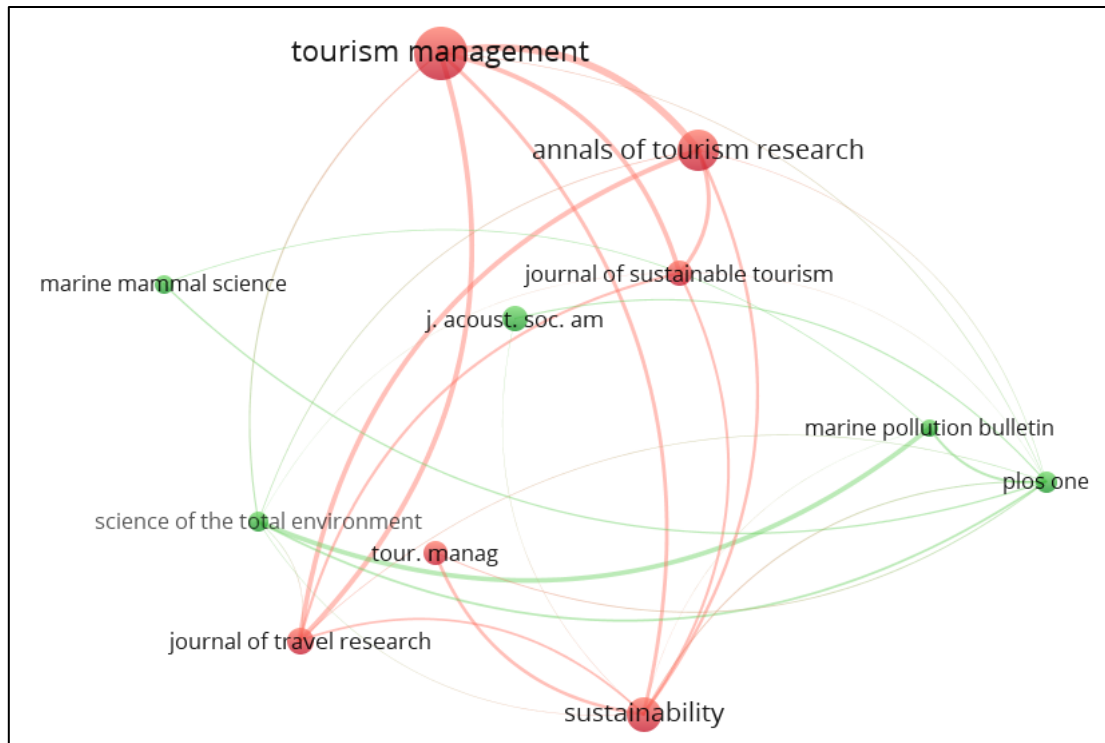


Figure 4. Bibliographic Network Map of Sources Co-citation Analysis

**Co-occurrence-keywords Analysis**

Out of 1142 keywords, those with at least 2 co-occurrences were analyzed. It was found that 175 keywords meet the given criteria. The density map in Figure 5 shows the most frequently used keywords in this field.

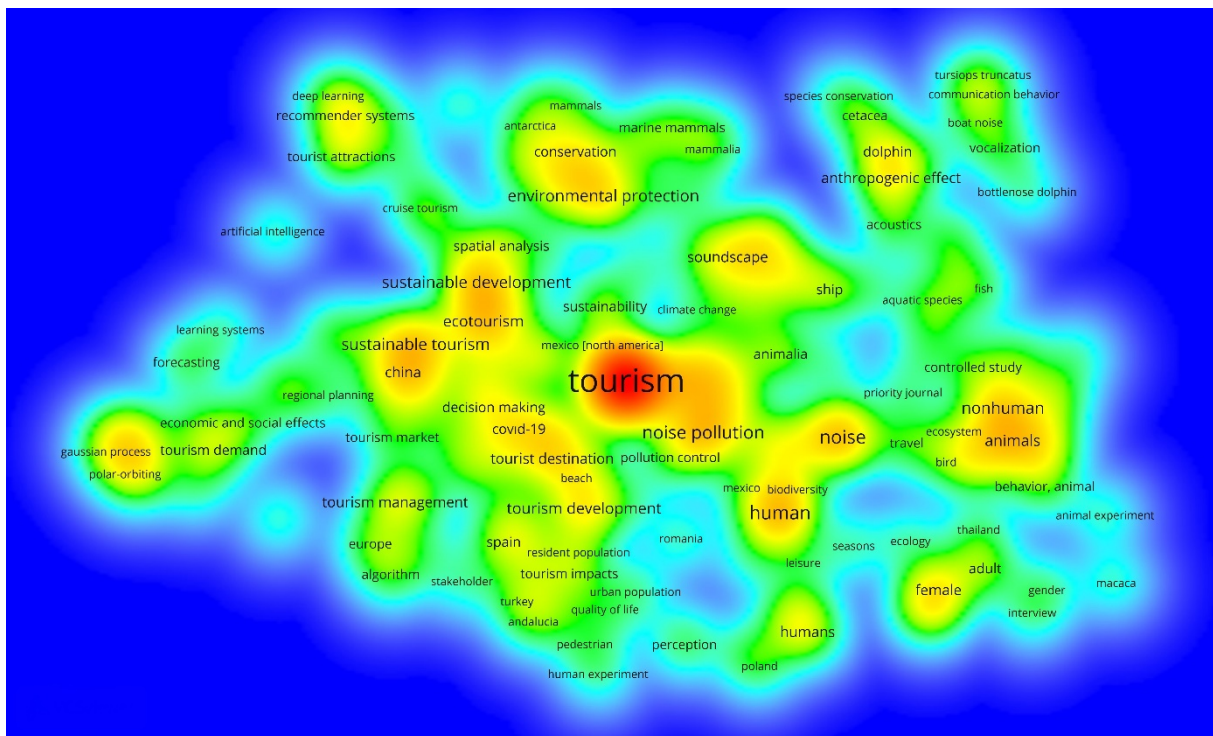


Figure 5. Density Map of Co-occurrence-keywords Analysis

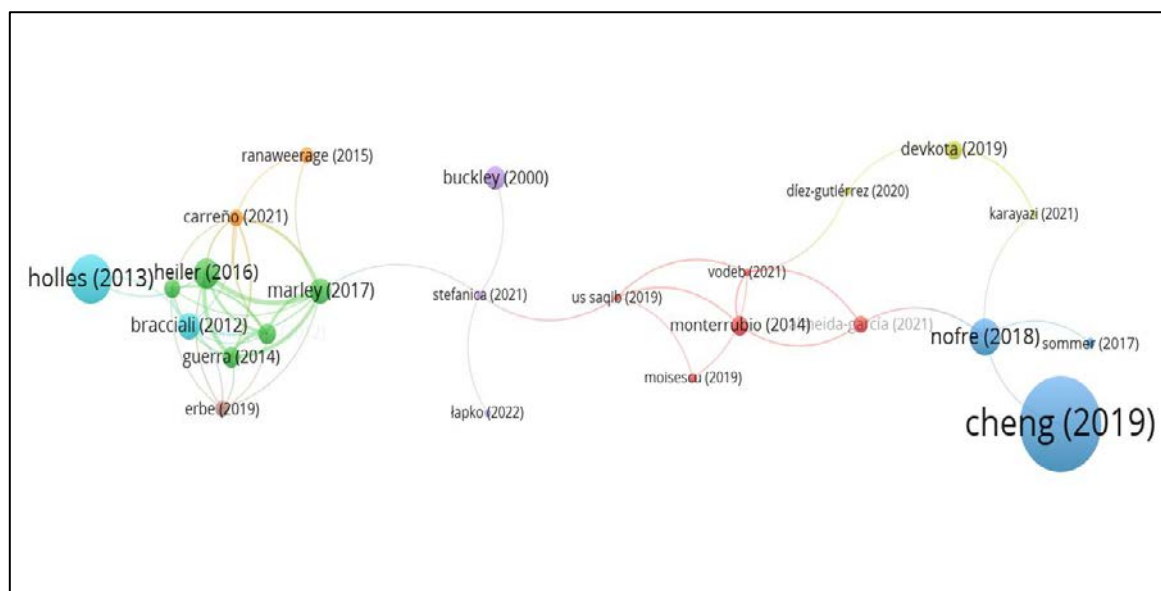
Accordingly, there are nine clusters formed by 174 keywords. It was found that 174 related keywords formed 1785 links, and the total link strength was 2213. The most common



keywords in the field are "tourism," "human," "noise," "noise pollution," "nonhuman," "sustainable development," "environmental protection," and "sustainable tourism."

### ***Bibliographic Coupling Analysis***

A bibliographic coupling analysis was performed to determine the bibliographic consistency of the studies. The lower limit for the number of citations of a study was 10 citations, and a total of 41 studies were analyzed (Figure 6).



*Figure 6.* Bibliographic Network Map of Bibliographic Coupling Analysis

In bibliometric maps, arrows indicate link networks, while dots indicate the peaks where link networks intersect. The size of the dots indicates the citation frequency of the article. The articles in a similar cluster are assumed to have a strong relationship based on a common idea. Here, the articles were textually analyzed individually, and their research bases were analyzed.

In the same cluster, Carreño and Lloret (2021), Erbe et al. (2019), Marley et al. (2017), Heiler et al. (2016), Ranaweera et al. (2015), and Guerra et al. (2014) examined the impacts of tourism in the sea. In particular, it was concluded that noise from tour boats negatively affects aquatic mammalian organisms. In another cluster, Holles et al. (2013) and Bracciali et al. (2012) examined the effects of tourism on other marine organisms. In another cluster, Karayazi et al. (2021), Cheng and Jin (2019), Nofre et al. (2018), and Sommer and Helbrecht (2017) analyzed the effects of tourism in urban areas and historical tourist sites. Again, these studies revealed the effects of tourism-related noise on both residents and tourists.

Almeida-García et al. (2021), Monterrubio and Andriotis (2014); Us Saqib et al. (2019) and Vodeb et al. (2021), Almeida-García et al. (2021), Monterrubio and Andriotis (2014), Us Saqib et al. (2019) and Vodeb et al. (2021) constitute another cluster that examines the environmental, social and economic impacts of tourism. In these studies, attention was drawn to the negative effects of tourism-related noise on people. These studies draw attention to the negative effects of tourism-related noise on people.

### **CONCLUSIONS, DISCUSSION, AND IMPLICATIONS**

This article aims to highlight the stages of development of noise research in the field of tourism. At the same time, it presents a future research agenda for researchers working on this topic using a bibliometric analysis approach. The journals in which most studies on the subject are published, the network relationship of the keywords used, and the change of the subject in the process is defined, and a link map between all studies and researchers is drawn.

It was found that the relevant studies were published in journals with a high impact factor, except in tourism. In other words, it was found that there were no noise studies in other social science journals on tourism with a high impact factor. It was assumed that the studies on the subject intensified from 2000 onwards and were effective in the field. Looking at the number of studies, an increase was observed after the Covid-19 pandemic in 2020. Based on this information, it is clear that tourism studies focus on the environment. In order to talk about the existence of tourism, positive environmental conditions must exist. From this point of view, it can be said that the importance of sustainability has increased even more and that academic researchers are turning to these issues. When evaluating the thematic development of the studies, it was observed that the focus of the keywords changed from 2021 onwards. Based on this data, it can be said that the Covid-19 pandemic has also influenced the focus of academic studies.

Due to several resource demands, tourism negatively impacts the social, cultural, and physical environment (McKercher, 1993). The concept of noise is addressed in studies of tourism impacts. However, it is recognized that studies in this area are limited. The negative effects of tourism should be reduced to ensure the sustainability of tourism in a world with increasing environmental problems. Therefore, academic initiatives in this area are important. In this way, practitioners can be educated and encouraged.

People generally travel to get away from their daily routine and relieve all the fatigue of the working season. However, being in an environment with disturbing sounds can adversely affect them physically and mentally (Ay & Günay Aktaş, 2019). Scientific studies have shown that sound-related factors can also affect tourist satisfaction and perceptions of service quality (He et al., 2019; Jiang et al., 2020; Lu et al., 2022; Qiu, Zhang, & Zheng, 2018). The impact of tourism-related noise on animals and plants is an issue that has been studied extensively (Bracciali et al., 2012; Carreño & Lloret, 2021; Erbe et al., 2019; Guerra et al., 2014; Heiler et al., 2016; Holles et al., 2013; Marley et al., 2017; Ranaweerage et al., 2015). If we look at the classification of scientific journals already published, we see aquatic science, environmental science, ocean engineering, water science, global and planetary change, and animal science. However, studies on the relationship between tourists' psychological well-being and noise (He et al., 2019; Qiu, Zhang, Zhang et al., 2018; Wadle & Martin, 2021) are limited. This situation can also be observed as a deficiency in practice. The common contributions of academic publications in the field of tourism to practice are improving tourism activities, improving service quality, ensuring tourist satisfaction, and increasing the economic benefits of tourism. As the focus of tourism is on people, it is recommended that more studies be carried out on the effects of noise on the mental and physical well-being of tourists. In parallel with this, it is a practical suggestion that stakeholders control the soundscape of touristic areas and take necessary measures to prevent noise, if any, to ensure service quality and touristic satisfaction. However, this study has limitations. The scope of the research data is only the studies written in English in the Scopus database. It may be possible for future researchers to expand the knowledge network of the subject by working on studies written in different languages in different databases.

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