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RESEARCH ARTICLE

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Bibliometric Analysis of Tourism Development Based on Disaster Mitigation Through the Scopus Database

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ABSTRACT

The development of the world tourism industry in daily life still focuses on the beauty of tourist attractions and the economic income of a country. Still, it ignores crisis conditions, such as disasters in tourist areas. Therefore, disaster mitigation is expected to educate the public and tourists to prepare them for a disaster. The research objective is to universally analyze the development of tourism research topics based on disaster mitigation. The research method used was bibliometric analysis. Bibliometric analysis helps identify the distribution of articles published in Scopus-indexed journals, authors, institutions, citations, countries, topic trends, keywords, and networks between authors. The research results show that the disaster mitigation process refers to structural and non-structural mitigation actions, such as infrastructure development, increasing public knowledge about disaster mitigation, creating disaster evacuation routes, and strengthening regulations. Meanwhile, the results of the bibliometric analysis show that the country that produces the most scientific writing on tourism and disaster mitigation is Indonesia, with 49 articles, followed by China with 16 articles, the United States with 12 articles, Japan with 5 articles, India and the UK with 4 articles. These results indicate that Indonesian writers have contributed globally to tourism and disaster mitigation.

Introduction

Tourism activities have developed into a tourism industry that significantly contributes to the local, regional, and national economies. Tourism can generate foreign exchange incomes, increase economic growth, and create new jobs. Tourism has become an aspect of national development, owing to its multiple effects on a country's economy [1]. Tourism can contribute to regional economic growth and generate income for local communities and businesses, and developing tourism in both developing and developed countries is highly suitable [2]. Tourism also influences the economy of the West Manggarai Regency, the longer tourists stay, the higher their local income and employment opportunities [3]. Generally, the tourism industry plays four roles in the economy. First, it is a component of Gross Domestic Product (GDP). Second, it contributes to the foreign trade in a country. Third is opening up job opportunities. Fourth, the tourism industry can be used to develop nations and regions with poor natural resources [4].

The relationship between tourism and the economy can be described using two theories. The first is the Keynesian multiplier approach, which considers international tourism as an exogenous component. Aggregate demand positively affects income and employment through the multiplier processes. In addition, there is a two-sector Lucas endogenous growth model for the tourism sector [5]. Economic impact is divided into three parts: direct, indirect, and induced [6]. The direct economic impact occurs because of the circulation of the money tourists spend to enjoy the facilities, rides, attractions, and accommodations

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available in tourist areas. Indirect impacts are local economic activities that originate from directly affected business unit (BU) expenditures. This impact is caused by business units that receive direct impacts and require input (raw materials and labor) from other sectors. Another impact is the continuation of regional economic activities from additional regional income (direct and indirect impacts). The advanced economic impact is the economic impact obtained based on labor expenditure [7].

The development of the world of tourism, in general, still pays attention to the beauty of tourist destinations and the economic contribution of a country. However, it still does not focus on emergency conditions, such as disasters in tourism areas. Tourism and the public sector must pay more attention to the policies and strategies required for mitigation and adaptation [8]. Tourism focuses on beauty and pleasures. However, the tourism industry is also vulnerable to economic drivers. The occurrence of natural disasters is a vulnerability of the tourism industry. For example, the Lombok earthquake disaster of 2018, which impacted the tourism industry, resulted in the loss of life for 4,636 tourists, a reduction of 100,000 tourists, and losses to the tourism industry reaching 1.4 trillion [9]. According to Suprapto et al. [10], Tourism is relatively vulnerable to the dangers of natural disasters because of the following: 1) locations attached to disaster-prone areas, such as beaches [11]; 2) lack of tourism preparedness and knowledge; 3) inadequate vulnerability assessment; and 4) limited integration of tourism with a national disaster management system [12].

According to Hallegatte et al. [13], citing the World Bank's opinion, investment in disaster risk reduction has significant economic and social benefits. However, investment in disaster risk reduction is still low globally, especially in disaster risk mitigation and preparedness. Robust infrastructure investments can generate $4 for every dollar invested. When a country rebuilds its infrastructure after experiencing a disaster, it can reduce the adverse impact of future disasters on welfare by as much as 31% [14]. The introduction of early warning systems (EWS) can reduce the loss of government resources and assistance due to disasters by approximately $35 billion annually. EWS may also contribute to reduced mortality rates [15]. However, only 4.1% of all disaster aid between 2010 and 2019 was aimed at disaster prevention and preparedness [16].

Paying attention to the development of tourism, which is vulnerable to disasters, research is needed to reduce risks and to develop strategies based on disaster mitigation for local communities, tourists, business actors, and the government. However, thus far, few studies have been conducted on disaster mitigation-based tourism and no research has used bibliometric methods to help identify the distribution of articles published in Scopus-indexed journals, the most relevant authors, the most relevant institutions, the most citations, and the most relevant countries. Widely cited and produced scientific writing, research topic trends, keyword networks, and networks among authors. Bibliometrics also helps identify research gaps and limitations [17]. Thus, this research aims to universally analyze the development of tourism research topics based on disaster mitigation.

Materials and Methods

This qualitative research method refers to literature studies using bibliometric methods with the help of the RStudio Software to analyze the development of research topics globally from the Scopus database. Bibliometric methods in literature studies are a way of analyzing the development of research topics and emerging topics. In scientific and applied fields, bibliometric methods are considered fundamental components of research evaluation methodologies [18]. A bibliometric analysis of the available literature offers an invaluable and innovative resource for academics and practitioners [19]. This method is used to explore and study various science fields and determine the ranking of institutions and universities worldwide [20].

In this research, literature was carefully collected using the Scopus database on August 22, 2023, with special search strategies such as searching for keywords tourism and disaster mitigation, time range 1995 to 2023, articles in English, document types, articles, conference papers, article titles, abstracts, and keywords, as well as source types for journals and conference proceedings. Based on the search results, approximately 48 articles were found, indicating that very little research on disaster mitigation-based tourism is available in the Scopus database. Subsequently, open-access articles were limited and an in-depth search was conducted to produce 15 journal articles that could be presented to support this research.

Results and Discussion

Journal Distribution

Based on 48 articles spread across Scopus, the results show that articles about disaster mitigation-based tourism are generally published most frequently in the IOP Conference Series: Earth and Environmental SCI with 11 articles, followed by AIP Conference Proceedings and Geojournal of Tourism and Geosites with four articles each, and Heritage, Cultural, and Society: Research Agenda and Best Practices in the Hospitality and Tourism Industry, Proceedings of the 3rd International Hospitality and Tourism Conference, IHTC 2016 and 2nd International Seminar on Tourism, ISOT 2016, and Journal of Disaster Research, with two articles each (Figure 1). The articles in Scopus are mostly sourced from international conferences, so it can be explained that the theme of tourism and disaster mitigation still requires many journals to accept relevant theme publications.

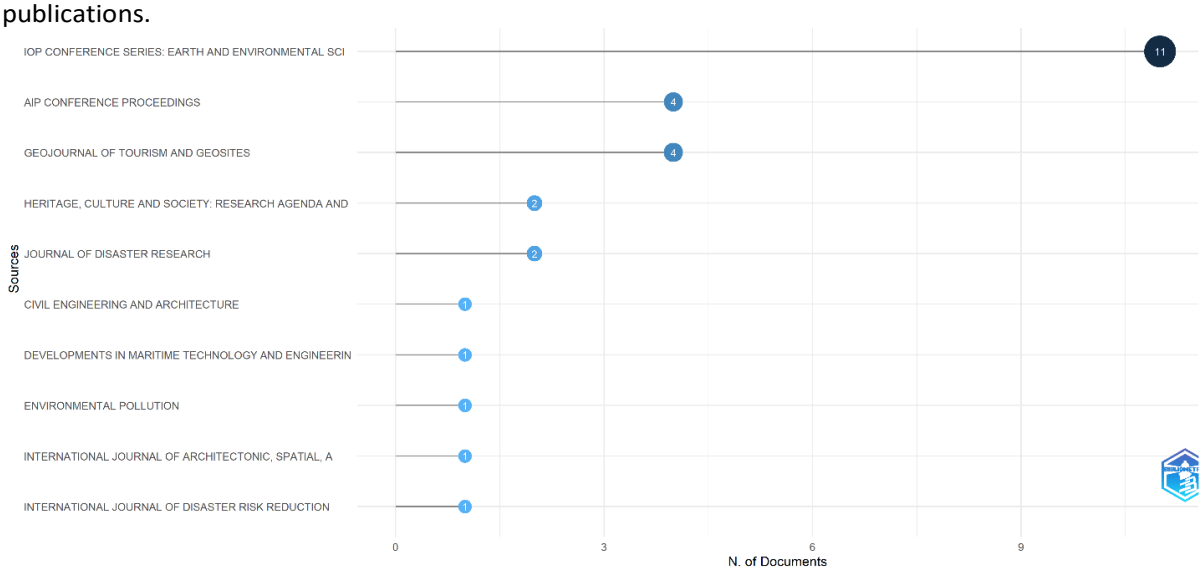

Figure 1. Most relevant journal distribution.

The Most Relevant Authors

The results showed that the most relevant author on the theme of tourism and disaster mitigation, namely Wahyuningtyas N, occupied the first position with 4 articles, followed by Dewi K, Idris I, Kodir A, and Kuri M with 2 articles each (Figure 2). Interestingly, based on the results of the most relevant authors, all the top four authors came from Indonesia, the first year of publishing journal articles in 2019, and the fifth place came from Japan. These results indicate that Indonesian writers could contribute to global tourism and disaster mitigation.

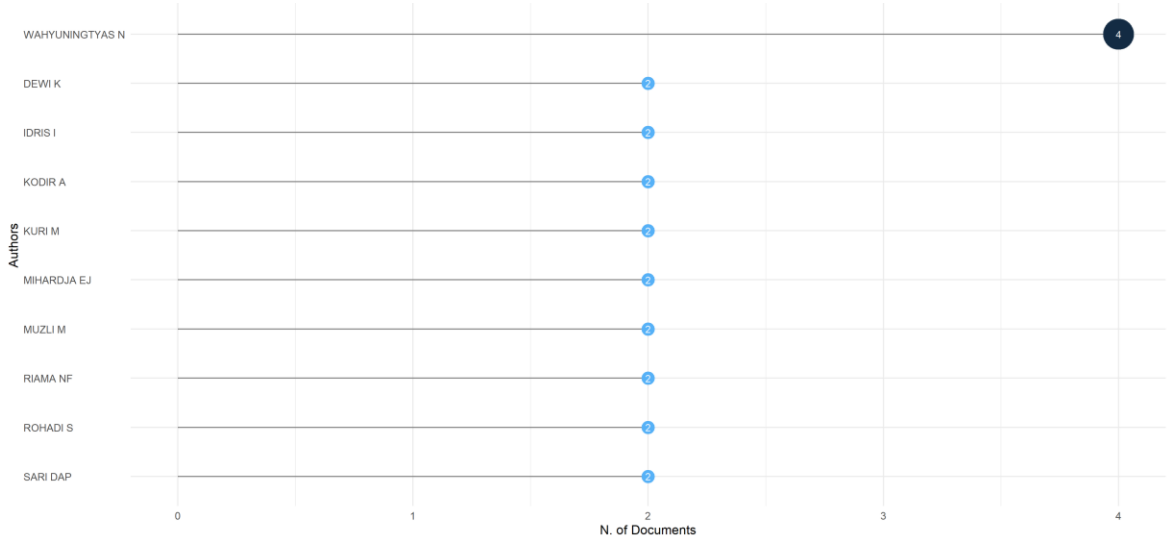

Figure 2. Most relevant authors.

Most Relevant Affiliation

The results for the most relevant affiliates showed that four of the five were from Indonesia. The State University of Malang contributed the most with 11 published articles. Hasanuddin University, Sebelas Maret University, and Bakrie University had three articles each. Fifth, Brigham Young University has published two articles. However, based on (Figure 3) Universitas Gadjah Mada ranked second with four published articles. Nonuniform writing of institutional origin causes the database to be read differently. Therefore, it can be concluded that the top five most relevant affiliations related to disaster mitigation-based tourism are all in Indonesia.

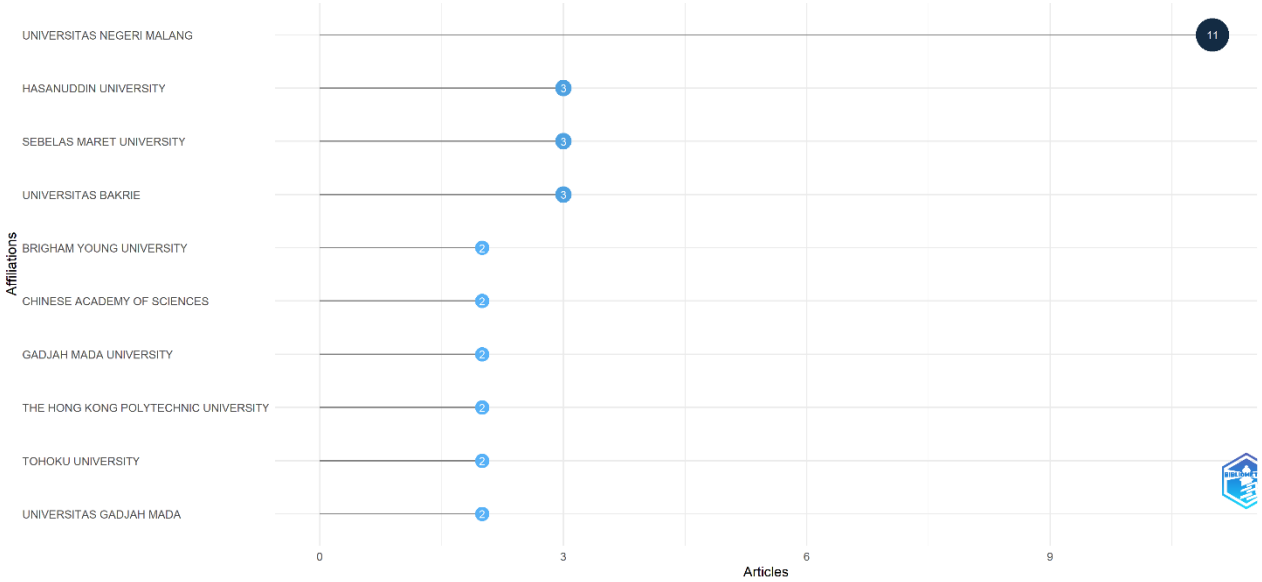

Figure 3. Most relevant affiliates.

Article Citation Analysis

Cited articles were obtained by running the citation space. Based on the operational results, out of the 48 articles in Scopus, the top 10 were most frequently cited, with more than 10 citation frequencies. First, Kunte PD et al. (2014), Journal of Ocean & Coastal Management, titled multi-hazard coastal vulnerability assessment of Goa, India, using geospatial techniques, as many as 74 citations. Second, Sam Cole (1995), Journal of Contingencies and Crisis Management, titled Lifelines and Livelihood: A Social Accounting Matrix Approach to Calamity Preparedness, has as many as 44 citations (Figure 4).

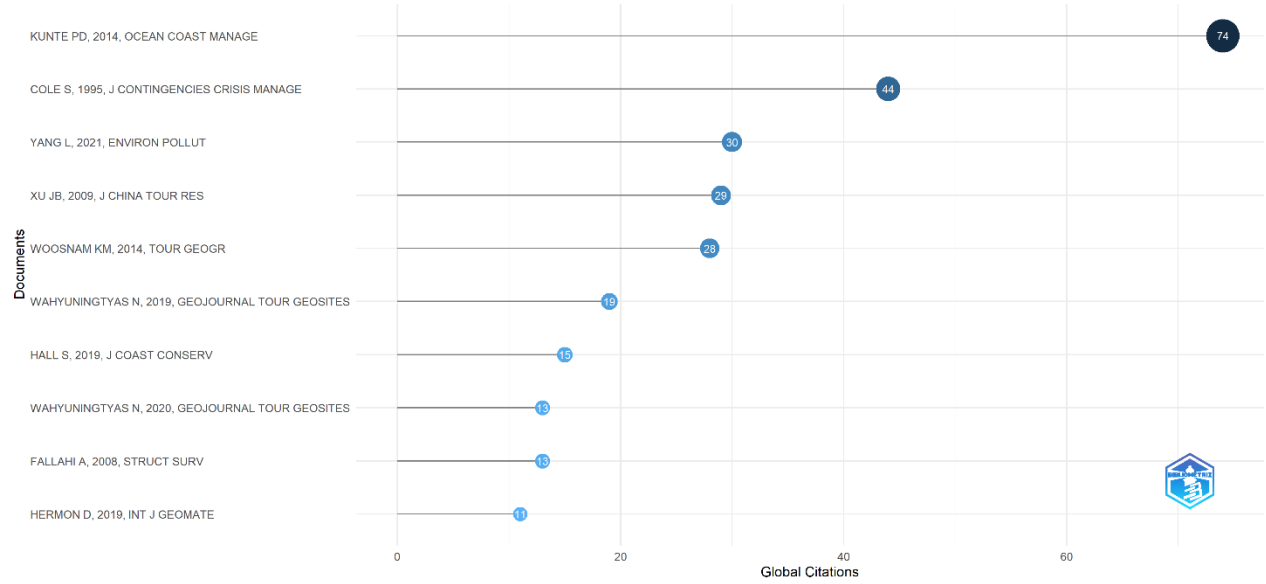

Figure 4. Most cited articles.

Most Cited Countries

The list of most-cited countries is a compilation of countries that have received the highest number of citations in scientific articles and academic publications over a given period of time. The significance of this ranking lies in its ability to demonstrate the scientific impact and involvement of countries worldwide in tourism and disaster mitigation. This list shows that most of the countries mentioned were in Asia. India tops the list nationally with the highest number of citations (74), followed by Indonesia (49), the United States (48), China (36), Hong Kong (29), and Japan (23) (Figure 5).

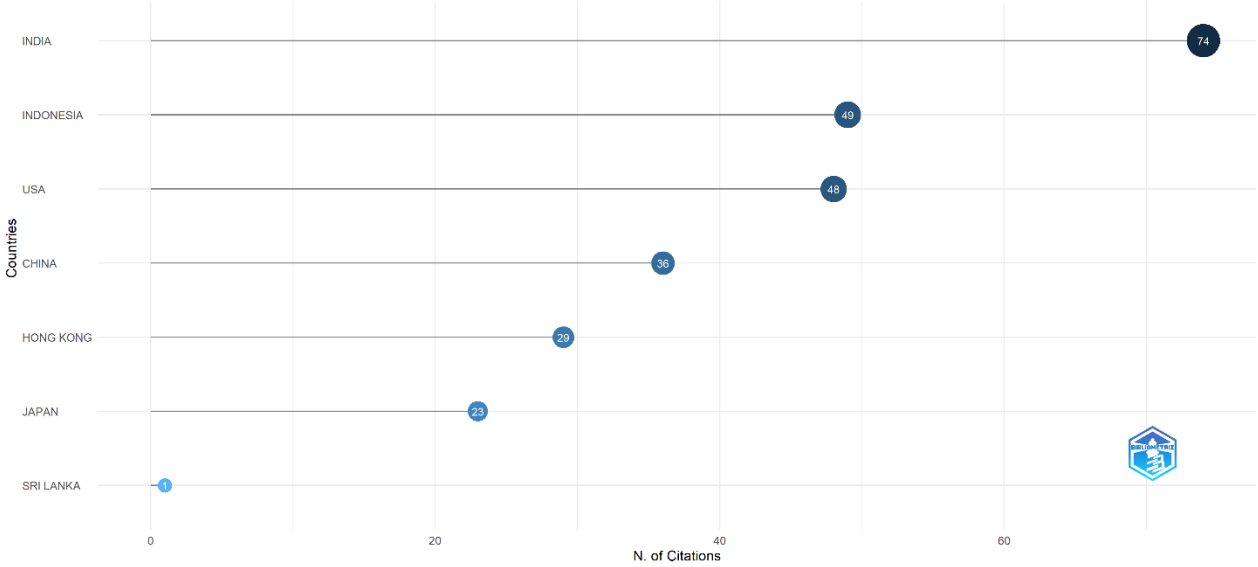

Figure 5. Most cited countries.

Country Scientific Production

Country Scientific Production is a quantitative and qualitative assessment of the scientific output produced by a country, taking into account Scopus data. A country's scientific output is a direct indicator of its ability and excellence in conducting research worldwide. The world map shows that Indonesia is the leading country in scientific research on tourism and disaster mitigation with a frequency of 49 articles. China has 16 articles, the United States has 12 articles, Japan has five articles, India and the United Kingdom have four articles each, and Bulgaria, Canada, Iran, Malaysia, Panama, Sri Lanka, and Thailand have one article each (Figure 6).

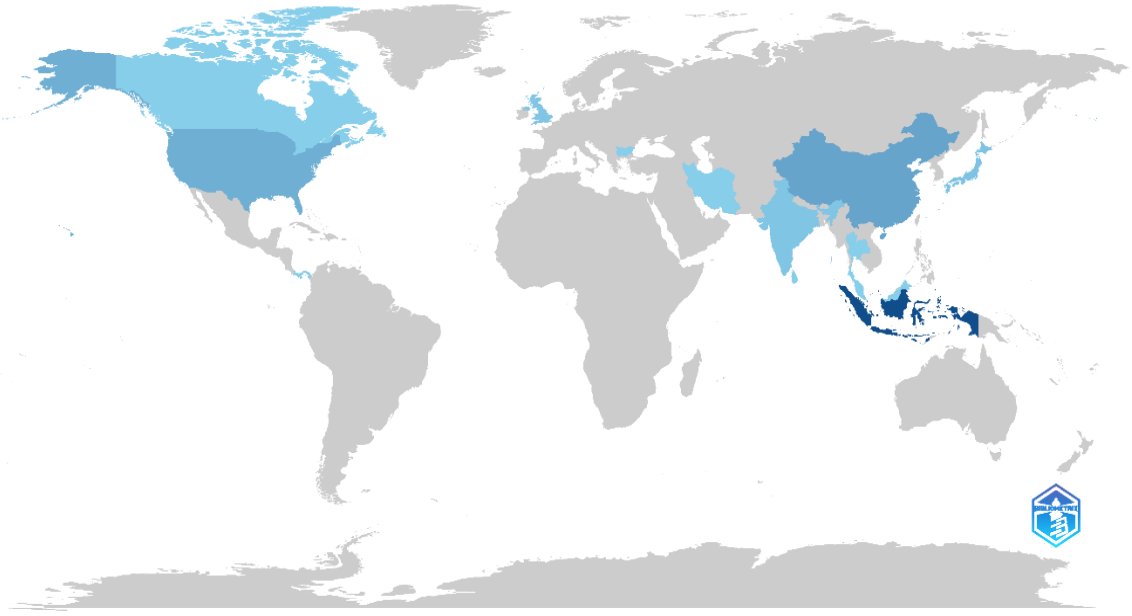

Figure 6. Distribution country scientific production.

Word Cloud

Word Cloud is the frequency of words often appearing in the data collection of articles studied with the theme of tourism and disaster mitigation. The word cloud shows a summary with an outline that uses words of different sizes, according to the number of frequently occurring words. Word Clouds are usually random; however, the most prominent words are always in the center and are more visible because of their large size. Based on the results of the analysis, the words with the highest frequency of appearance were disaster (18 words), disaster mitigation (17 words), disaster management (11 words), disaster prevention (9 words), Indonesia (8 words), China (7 words), tourism (7 words), climate change, and Sustainable Development and Tourism Development (6 words) (Figure 7).

Figure 7. Frequency word cloud.

Trend Topic

Topic trends are a picture of a topic's progress over the long term, with divisions occurring annually. Based on the topic trend image, one can see which subjects have been used for a long time, and which themes are the most recent. Subject development was also adjusted for the recurring use of words in tourism and disaster mitigation research. The higher it is used and the more to the right, the newer the word used. Based on the results of the trend topics, tourism topics increased in 2021 and disaster mitigation topics increased in 2018 (Figure 8).

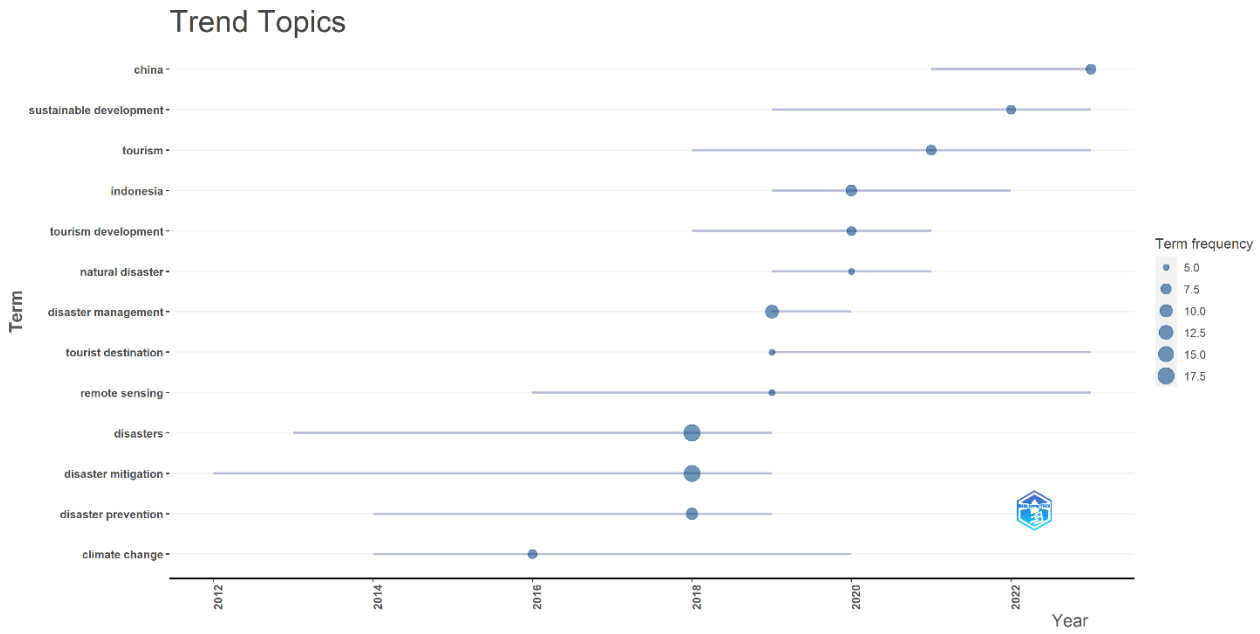

Figure 8. Trend topic.

Co-occurrence Network

A co-occurrence network is an aggregate connectedness of terms given their harmonious presence in each text unit [21]. Networks are generated by linking keywords using a set of criteria that together define events. The network of shared events found as many as six networks, with both large and small numbers of words. The network of events in the first cluster in red consists of the keywords disaster, disaster mitigation, disaster prevention, tourism, climate change, sustainable development, hazards, remote sensing, economics, tsunamis, beaches, earthquakes, volcanoes, water pollution, conservation, earthquakes, and tsunamis. The network of events with the second cluster in blue consists of the keywords disaster management, Indonesia, natural disaster, tourist destination, risk assessment, ecotourism, fewer Sunda Islands, mitigation, and Bali. The third cluster of green shared event networks consisted of the keywords land use, landslides, geographic information systems, and mapping. The network of events with the fourth cluster in purple consists of the keywords China, Environmental Monitoring, and Articles. The network of events with cluster 5 in Orange consists of keyword decision-making and heritage tourism. Finally, the event network with Cluster 6 in brown consists of the keywords Beach and Hazard Assessment (Figure 9).

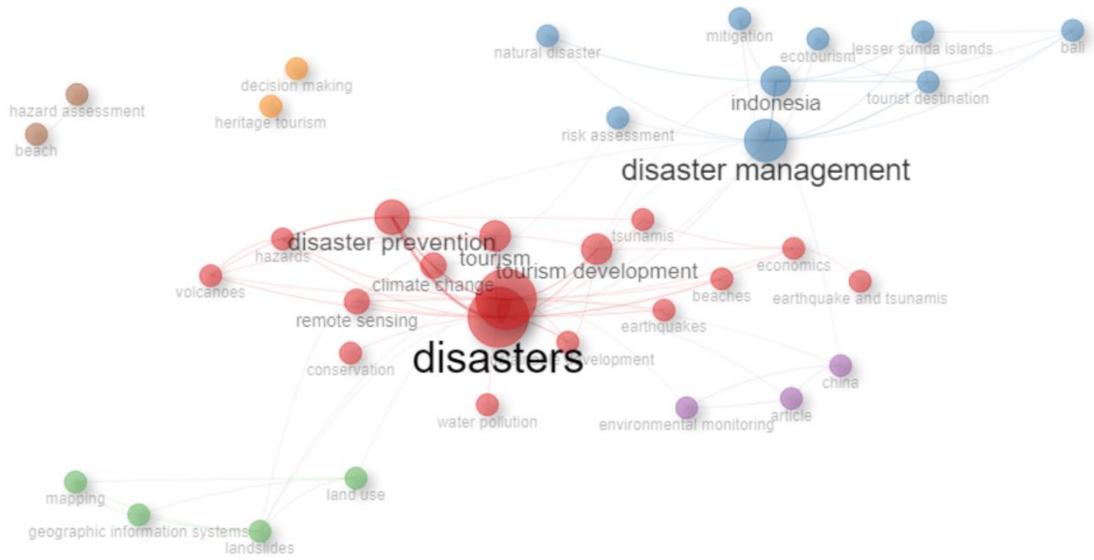

Figure 9. Network Co-occurrence.

Collaboration Network

The cooperation network or cooperation of the authors of articles on tourism and disaster mitigation features several authors with connectivity. The similarity of colors and lines between names indicates a relationship between authors. The size of each circle indicates the number of articles on a topic. The Cooperation Network in this theme has 12 clusters consisting of two to five authors per cluster. The first cluster in red was a collaboration between Wahyuningtyas N, Dewi K, Idris I, Kodir A, and Tanjung A. The second cluster in blue represents the collaboration between Kuri, Suppasri, and Donovan. The third cluster in green was a collaboration between Mihardja EJ, Sari Dap, Agustini PM and Alisjahbana S. The fourth cluster in purple is the cooperation between Muzli M, Riama NF, Rohadi S, and Yuliatmoko RS. The fifth orange cluster represents the collaboration between Chen, Chen, and Han. The sixth brown cluster was a collaboration between Anderson E, Cherrington E, and Cordova AF. The seventh cluster is light purple, and cooperation exists between the Afandi NAA and Caisarina I. The eighth cluster is smelly gray, and cooperation exists between As'ari R and Fadjarajani S. The ninth cluster is a colored tosca, and cooperation exists between Efriyeld E and Hamidy R. The orange cluster is a collaboration between Dowdeswell E and Fuavo VA. The eleventh cluster of the Blue Air Force occurred in cooperation with Ardhiati Y, Begin DT, and Hariprasetyo T. The twelfth cluster of light purple occurred in Cooperation between Cui Y and Gao H. Finally, the thirteenth cluster of light colors occurred in collaboration with Berrett B, Cope A, Emmett C, Hall S, and Harris R (Figure 10).

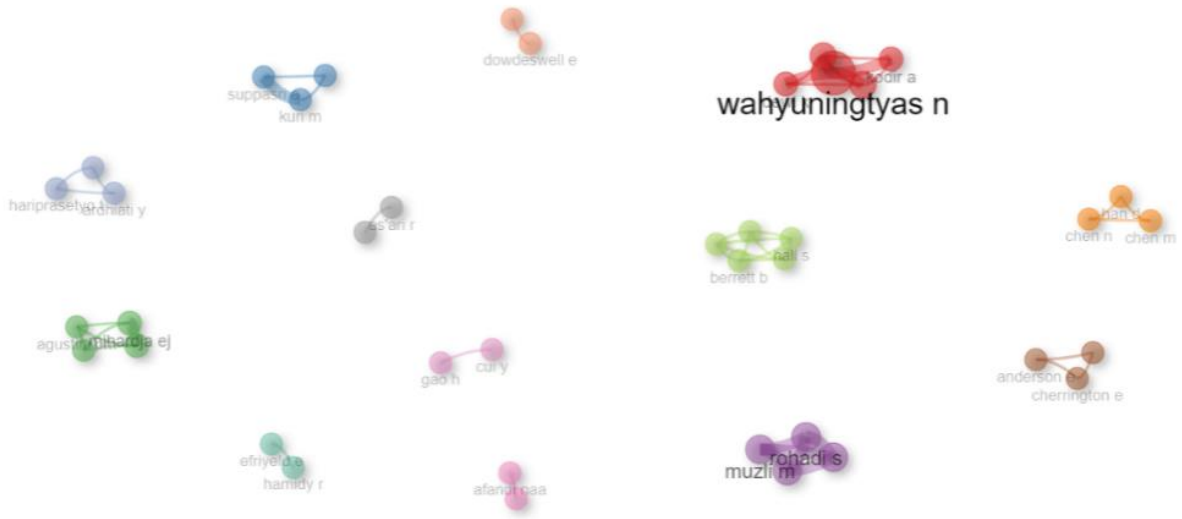

Figure 10. Collaboration network.

Discussion: Tourism Development Was Based on Disaster Mitigation

When a disaster is imminent, disaster risk reduction preparedness refers to the actions and steps taken in advance to foresee threats, warn of danger, evacuate people and property, and ensure an efficient response (e.g., monitoring food supplies) [22]. Several disaster mitigation strategies have been implemented, including installing cliffs (revetments), reforesting mangroves, building environmental adaptation facilities, coastal education, and community outreach, to preserve the Bandar Bakau ecotourism area. In addition, there is potential to create several mitigation strategies, such as beach feeding, building embankments or breakwaters, building tidal flood control channels, and strengthening regulations [23].

The construction of wave protection infrastructure such as embankments and the establishment of land and building use control zones are generally appropriate procedures for reducing waves and sea level rise in coastal areas. However, the implementation of this strategy in coastal tourism areas remains low because of concerns regarding the loss of access to and views on coastal areas [24]. Coastal management in the typology of marine sedimentation beaches can be carried out using a protective or accommodative approach; for example, by observing changes in natural conditions due to rising sea levels [25]. Coastal management frameworks require adaptive and collaborative cooperation [26].

Communities attempt to minimize the impact of disasters through structural and nonstructural mitigation measures. Communities strive for disaster preparedness through local knowledge and education as well as guidance from external stakeholders. Non-structural mitigation in the Segenter Community group includes elements of knowledge, local insight values, policy-making instruments, and community group solidarity. The application of structural mitigation includes volcanic disaster evacuation route boards and building earthquake-resistant houses [27]. Disaster vulnerability maps are used for (1) land use planning and zoning regulations to protect local resources and (2) developing natural disaster mitigation for flooding due to tropical storms [28].

Strategies that can be used to overcome barriers to structural and nonstructural risk-mitigation efforts include revising building regulations, strengthening planning guidelines, increasing professional training, clarifying roles and tasks, and enabling and demonstrating complementary bottom-up and top-down approaches [29]. The evacuation route for personal safety in the event of a tsunami at a gathering point at a height of 25 m above sea level. The gathering point/safe point area during a tsunami evacuation can be used as the main rescue location for tsunami victims by focusing on when the tsunami arrives [30]. The evacuation process took 15 to 20 minutes after the earthquake, but 42.1% of tourists believed that the evacuation process would take more than 30 min [31].

Most tourists who have visited Banda Aceh or are planning to visit the area are aware that if a tsunami or earthquake occurs, they must seek shelter on a higher ground or in a safe zone (green zone) [32]. Disaster survivors at Senggigi Beach had little information on disaster mitigation. Usually, many survivors feel anxious if they receive fake news because they do not understand the information regarding existing disaster mitigation strategies. Senggigi Beach needs to receive more attention in terms of disaster mitigation, for example the creation and introduction of disaster risk maps, the addition of disaster evacuation signs, evacuation route maps, shelters, beachside buildings as wave breakers, and watchtowers [33]. The Gandoriah beach tourist area (7.8 ha) has several temporary evacuation points 2 and 2 shelters, the Anas Malik and Cermin beach tourist area (16.11 ha) has several shelters 1, the beach tourist area Kata tourist area (19.68 ha) has several temporary evacuation site (TES) or three gathering points and no shelters, and tourism in the Naras beach area (7.54 ha) has several TES 1 and shelter 1. The more attention a tourist area receives regarding disaster mitigation, the greater its will provide a sense of security and comfort for tourists [34]. Therefore, it is recommended that special-interest tourist destinations implement disaster mitigation, which will be beneficial and provide a sense of security for tourists [35].

Conclusion

Based on the research results, it can be concluded that tourism development in general still pays attention to the beauty of tourist destinations and the economic contribution of a country but does not pay attention to emergency conditions such as disasters in tourism areas. Therefore, disaster mitigation is required to increase knowledge of disasters among communities and tourists to save themselves if a disaster occurs. The disaster mitigation process refers to structural and nonstructural mitigation efforts. These strategies include infrastructure development, increasing public knowledge on disaster mitigation, creating disaster evacuation routes, and strengthening regulations. From the results of a bibliometric search using the Scopus dataset with the keywords tourism and disaster mitigation, it is known that in 28 years, only 48 articles were found, which shows that little research has been conducted on tourism and disaster mitigation. Therefore, more research is needed on tourism and disaster mitigation to reduce disaster risk and ensure the security and safety of communities and tourists.

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