

PROFILING DISASTER RISK MANAGEMENT IN DEVELOPING COUNTRIES RESEARCH: A BIBLIOMETRIC ANALYSIS

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Abstract

Along with climate change and other natural and social phenomenon, there are rampant disasters both natural, social and health, especially in developing countries. These conditions encourage on disaster studies, especially governance, to be more carried out by scholars. Developing countries are identical to reactive and simultaneous disaster management patterns, in order they do not have a clear conceptual framework related to disaster risk management. This study aims to profile the study of current disaster risk management and future opportunities, through bibliometric analysis. Data collected were Scopus database from 110 documents analyzed using VOSViewer application. The findings of this study show that there are 7 topic clusters. Although the study was in developing countries, many of the researchers and institutions from developed countries conducted the study of Disaster Risk Management both of practical and theoretical studies in developing countries developed variously. In addition, this study is important for policymakers and scholars as a form of conceptual mitigation considering that disasters cannot be predicted comprehensively.

Keywords: Disaster Management; Governance; Bibliometric Analysis; Scholar Analysis' and Developing countries

I. INTRODUCTION

Disaster risk management was an action taken to reduce the adverse effects of a disaster (Fan & Shahani, 2016). Regarding to the impact of disasters that able to disrupt progress and nation-building efforts by observing at the main causes of related disasters. Regarding support for this orientation, efforts to find, collecting, organizing, searching, and disseminating disaster information in real time and optimally are becoming the basis of national and international priorities to overcome the task of crisis management and maximum disaster recovery (Zhou et al., 2020). Although it has not completely prevented all disasters, it can be recognized that the use of information and communication technology able to largely reduce the magnitude of losses in life and property. Innovations in emerging information and communication technologies, such as location-based systems, radio frequency identification, and big data analytics are considered powerful tools that able to assist various stakeholders during the disaster management cycle (Dodd & Collins, 2017).

The presence conditions stimulated disaster risk management become a priority in disaster risk reduction strategies in various developing countries (Golan et al., 2019). This condition is

mainly due to the significant frequency of events in related areas of potentially catastrophic natural phenomenon, such as earthquakes, volcanoes, and floods along with increased vulnerability caused by urban populations developing without careful planning. Disaster prevention and mitigation is the first step needed to achieve sustainable development (Giachanou & Crestani, 2016). The initial planning of disaster risk management preparedness should aim to develop a culture of safety, where people should be aware of the hazards they will face and provide knowledge as the first aid kit to protect themselves. Disasters often required response teams that are well planned and prepared before they occur (Goodfellow et al., 2017).

Climate change occurred towards adaptation integration was likely to be more than coherent and improved procedure of addressing climate-related disaster risk management that have authority to review every policy in different countries (Melo et al., 2017). Climate change mitigation is part of research conducted by the Administrative Policy and Decision Agency which aims to minimize the occurrence of disaster management risks that occur in various countries. Based on the data related to disaster vulnerability released by United Nations agency that dominates in 2019 has increased by 2,558 natural disasters that occurred in various countries with an estimate to be 65% of all natural disasters in the world and almost 80% of the total losses due to disasters caused, and the impact is estimated to reach economic losses of around USD 780 billion (Trencher & Karvonen, 2019). Disaster vulnerability are effected by the most of the erratic climate change annually (Wilson & Chakraborty, 2019). Therefore, mitigation strategy should be applied and its process should involve community along in decision making (Araque et al., 2013).

Climate change is taking place quick that the process of integrating disaster risk management into community planning has to be carried out as quickly as possible in various countries. Considering that disasters become an unavoidable reality in people's live around in countries with a high range of disaster vulnerability (Aghimien et al., 2019). Through a structured response, at least able to minimize the level of disaster risk management by looking at the efforts made to reduce the impact of any disaster damage occurs. The necessity to expand the system that each community group relies on resources for a while have to gradually return to the way it was (Benchimol et al., 2017). This condition provides provisions applicable to the process of reconstruction, alteration, addition, and generally pays little attention to the "disaster risk management" carried out in various countries (Bibri, 2018).

The impact of implementing a comprehensive disaster risk management strategy and trying to explain various suggestions for incident management is based on social constructs, such as grief, ecological public health perspectives on loss and grief, as well as research on educational change. Disaster risk management in many countries gives rise to working policies demonstrated by coherence between practices and philosophies that show any proactive approach to loss, grief, and critical incident management and legally responsible organizations have to be prioritized (Ahmed, 2019). Climate change occurs has an impact on sustainable mitigation of hazardous. This kind of synthesis is one of the reasons why awareness of disaster vulnerability hazardous has not been present in the decision-making process (Jiang et al., 2018). Disaster vulnerability has a global scope that was strongly related to disaster risk management which has a broad influence on climate change occurs in various countries (Anshori, 2014).

The vulnerability of disasters continuity initiate the government to make efforts to minimize the level of disasters that occur through disaster risk management (Khan et al., 2014). These efforts

to overcome disasters were about to take place require the integration of disaster management into community planning (Macnamara, 2011). The need to organize resources and prioritize time-efficient actions along with an understanding of the possible consequences of climate change (Vercic et al., 2015). The assigned disaster response team has to coordinate in different phases before, during, and after the disaster with defined roles and responsibilities (A. Smith & Matthews, 2015). Through government agencies, however, they have adopted technology as a means of corporate communication, strategic organization, as well as public relations activities to hear people's voices, member participation, discussion group, and community development in following up on emerging disaster risks (B. G. Smith, 2015). According to the various studies on disaster risk management previously executed, there is still limited research that explains the scientific structure and trends related to this topic. This study aims to profile and evaluate the scientific structure of disaster risk management topics in developing countries with a bibliometric analysis approach.

II. LITERATURE REVIEW

- Disaster Risk Management

Disaster risk management was an action taken to reduce the adverse effects of its disaster (Matsuoka et al., 2013). Basically, the impact of disasters was able to disrupt the progress and efforts of nation development by observing at the main causes of its disaster (A. Smith & Matthews, 2015). Techniques for finding, collecting, organizing, observing, and disseminating disaster information in real-time efficiently which are the cornerstone of national priorities to address the tasks of crisis management and maximum disaster recovery (Saldana-Zorrilla, 2015). Although it had not completely prevented all disasters, it able to be well recognized that the use of information and communication technology able to largely reduce the magnitude of losses both of life and property (Zheng et al., 2013). Innovations to emerging information and communication technologies including location-based systems, radio frequency identification, and big data analytics (BDA) were considered as powerful tools that able to assist stakeholders during the disaster management cycle (Leiras et al., 2014).

The larger achievement, coherent integration of climate change adaptation (CCA) and improve the way climate-related risks were addressed, urban authorities need to systematically review policies and regulations to assess applicable synergies and gaps (Rivera & Wamsler, 2014). Disaster management had been defined as a part of policies and administrative decisions, operational activities, actors, and technologies directly related to the various stages of a disaster at all levels (Baytiyeh, 2017). For instance, in the past decade the Asian domain has experienced 1,730 natural disasters which account for 39% of all natural disasters in the world and almost 50% of total losses due to disasters, and the impact is estimated to be economic losses of around USD 752 billion (Zhou et al., 2020). Most of the existing buildings in seismic areas do not fulfill the requirements of modern design codes and need to be upgraded according to optimal levels (Dodd & Collins, 2017). The available methods for seismic structure assessment involving detailed analysis and design of structures (Ittefaq, 2019).

This Conditions effect to make information management as a priority in disaster risk reduction strategies (Mavragani & Gkillas, 2020). This is mainly due to the significant frequency of events in areas related to potentially catastrophic natural phenomenon in the form of earthquakes, volcanoes, and floods along with increased vulnerability given that urban populations

develop with improper planning (Kristjanpoller et al., 2021). Disaster prevention and mitigation became the first step needed to achieve sustainable development (Liu et al., 2018). Planning towards disaster risk management preparedness should aim to develop a culture of safety, where the general public is aware hazardous they will face and provides knowledge of safety first aid kit to protect themselves (Wimberly, 2021). Disasters often require a well-planned and prepared response team before a disaster occurs (Lyo et al., 2020).

This work provided only provisions applicable to reconstruction, alteration, addition, and generally lacks regard for effective "disaster risk management" (Greyling et al., 2021). This condition potentially widespread impact necessitates implementing a comprehensive management strategy and attempting to explain suggestions for incident management based on social constructs of grief, ecological public health perspectives on loss and grief, as well as research on educational transformation (Manor, 2017). Suggested work policies demonstrate coherence between practices and philosophies that demonstrate a proactive approach to loss, grief, as well as critical incident management and legally responsible organizations (Splendiani & Capriello, 2022). Referring to the study from (Pearce, 2003) In a paper on "Disaster Management, Community Planning, and Public Participation" discusses ways to achieve sustainable hazard mitigation (Orimoloye et al., 2021). (Pearce, 2003) stated that the current practice rarely reflects such a synthesis and this is one reason why awareness of the hazardous doesn't exist in local decision-making processes (Araujo et al., 2020).

Mitigation strategies would be more successful while implemented along with disaster management processes that has to involve public participation at the local decision-making level (Gillespie, 2020). It was necessary to integrate disaster management into community planning (Sonderby, 2020). Disasters become a reality in the lives of people staying in disaster-prone countries (Hung et al., 2022). Well-coordinated response would effect on saving multiple lives and reducing disaster damage (Dany & Lebel, 2020). Hence, the necessity in expanding system for each community group and organization able to rely on their own resources and ingenuity for a while before gradually returning to normal (Joseph et al., 2020).

This condition requires efficient organization of resources, staff, and prioritization of actions with time as well as understanding of possible catastrophic consequences (Mokkenstorm et al., 2021). Operational teams should be assigned to work in coordination together in different phases before, during, and after a disaster with predefined roles as well as responsibilities (Endo et al., 2021). Statistically it shows a significant correlation with information networks to the use of information and communication technology in observing disaster risk management that will occur and continue to suppress the pace of conventional media (Valentini, 2015). Government agencies, including Small and Medium-Sized Enterprises, however, have adopted information and communication technology as a means of corporate communication, strategic organization, and public relations activities to accommodate people's voices, member participation, group dialogue, as well as community development in following up disaster risk (Lovari et al., 2012). Therefore, the advantages of information and communication technology able to convey information to the public, to reach of information to target audiences globally, to become the potential for two-way communication between diplomats and the public related to disaster risk management in various countries (Šimunjak & Caliandro, 2019).

III. RESEACH METHOD

To response this research questions, Bibliometric analysis was employed to incorporate both of quantitative and qualitative insights into the specific location studied, in line with the growth trends in measurement research (Miraj et al., 2020; Osei-Kyei et al., 2020; Viana-Lora & Nel-lo-Andreu, 2022). Bibliometric analysis was classified as a branch of science since it provides a comprehensive map of the structure, assessment, and measurement of knowledge using scientific papers collected in databases (Donthu et al., 2021). This research applies the Scopus database as the main database, because it covers a wide range of research in the world that is recognized for its credibility internationally (Aziz et al., 2023). Many researchers apply bibliography for a variety of reasons, including observing collaboration patterns, research elements, exploring the intellectual structure of a certain topic in the current literature, and, as discussed in this article, identifying trends in journal articles. The data at the focus of bibliometric analysis are typically vast. By rigorously analyzing vast amounts of unstructured data, bibliometric analysis can help comprehend and map the cumulative scientific knowledge and evolutionary nuances of well-established subjects.

In conducting bibliometric analysis, we have several stages which can be seen in figure 1 below:

Figure 1: The Stage of Research

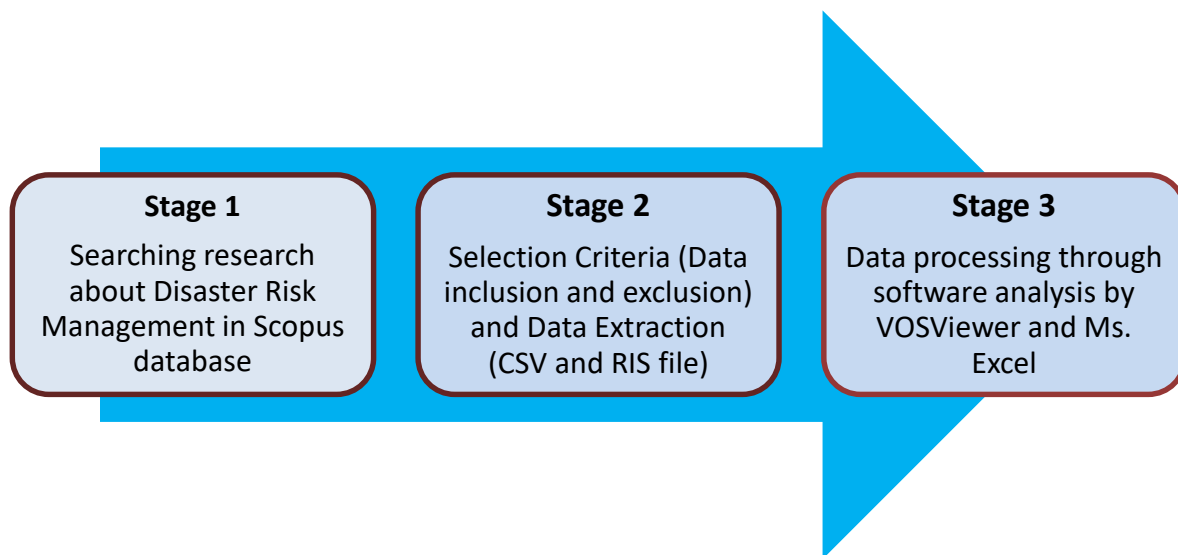
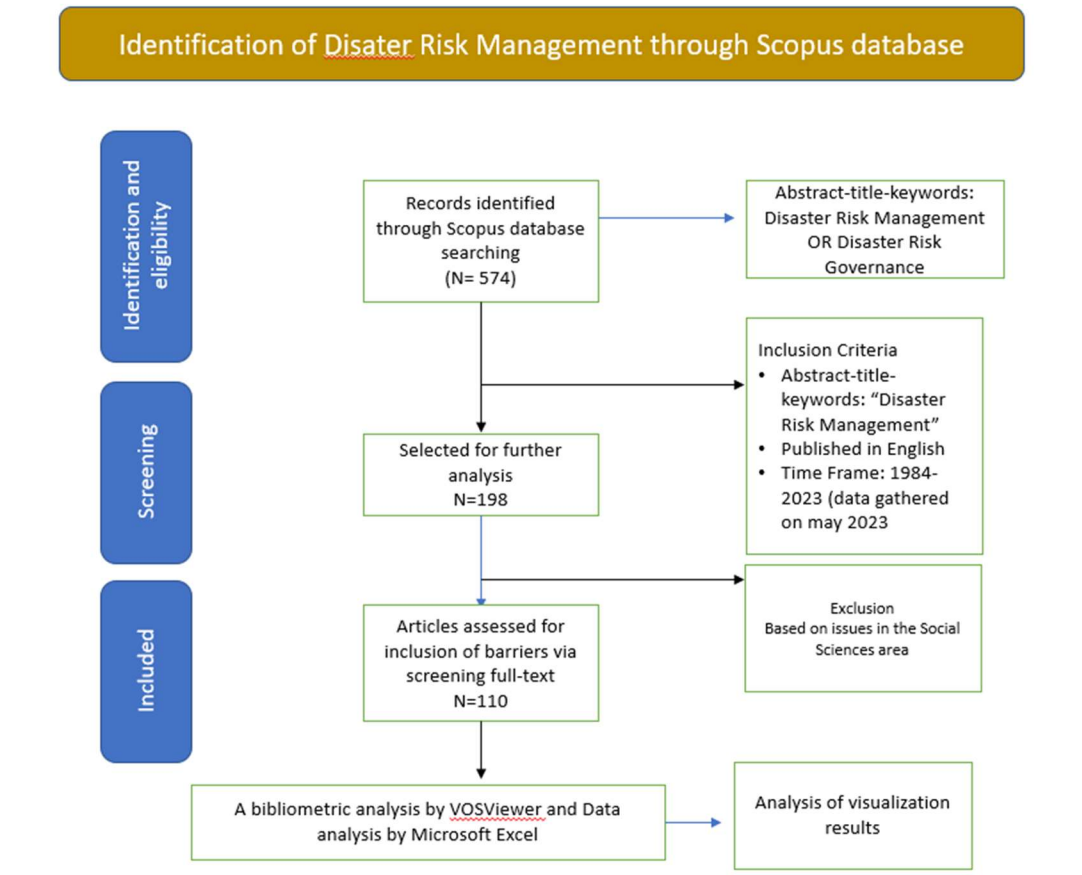


Figure 2 outlines the steps of the article selection process, which adhered to the principles of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). The bibliometric data in this study were collected in time period 1993- mid of 2023. After doing various inclusions and exclusions, there are a total of 110 documents. As explained in figure 2.

Figure 2: PRISMA Scheme in this Research

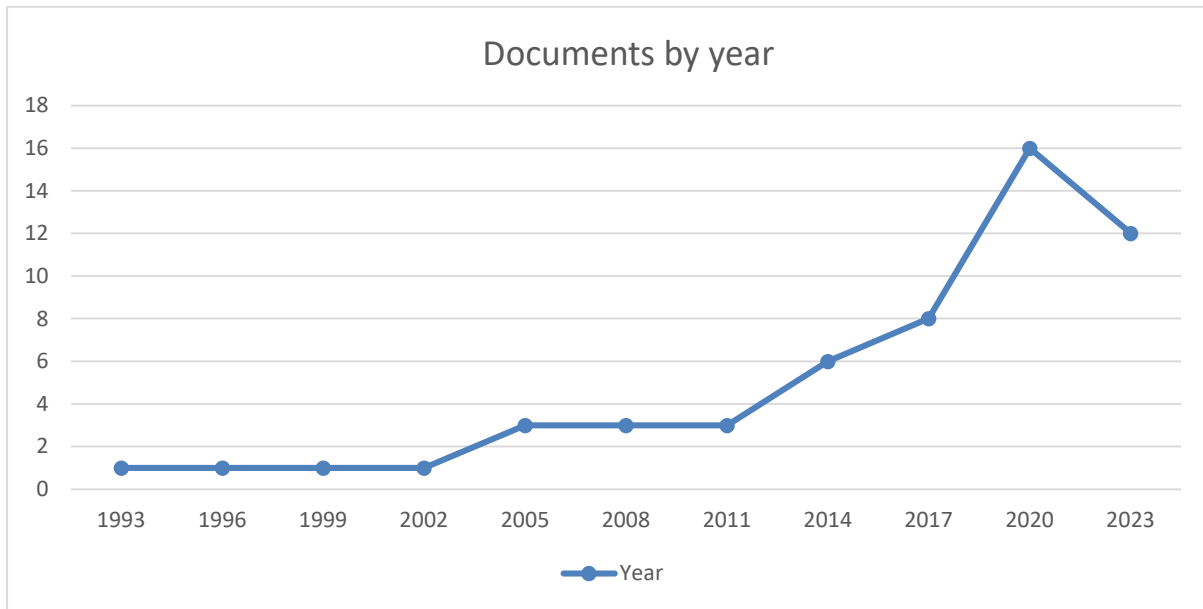


In the bibliometric analysis by VOS viewer software, the researcher used features. co-occurrence features in VOS viewer are the relationships between keywords of the paper collections (Nees Jan van Eck & Ludo Waltman, 2014). The stronger the relationship between words, the closer and larger the distance between the items. Co-occurrence features are also used for mapping the cluster of concepts that are indicated by a certain color for a group (Widuri et al., 2022). In addition, we also use Ms. Excel to tabulate data and process data to be presented in the form of charts or graphics through descriptive images.

IV. RESULT AND DISCUSSION

- Annual outputs

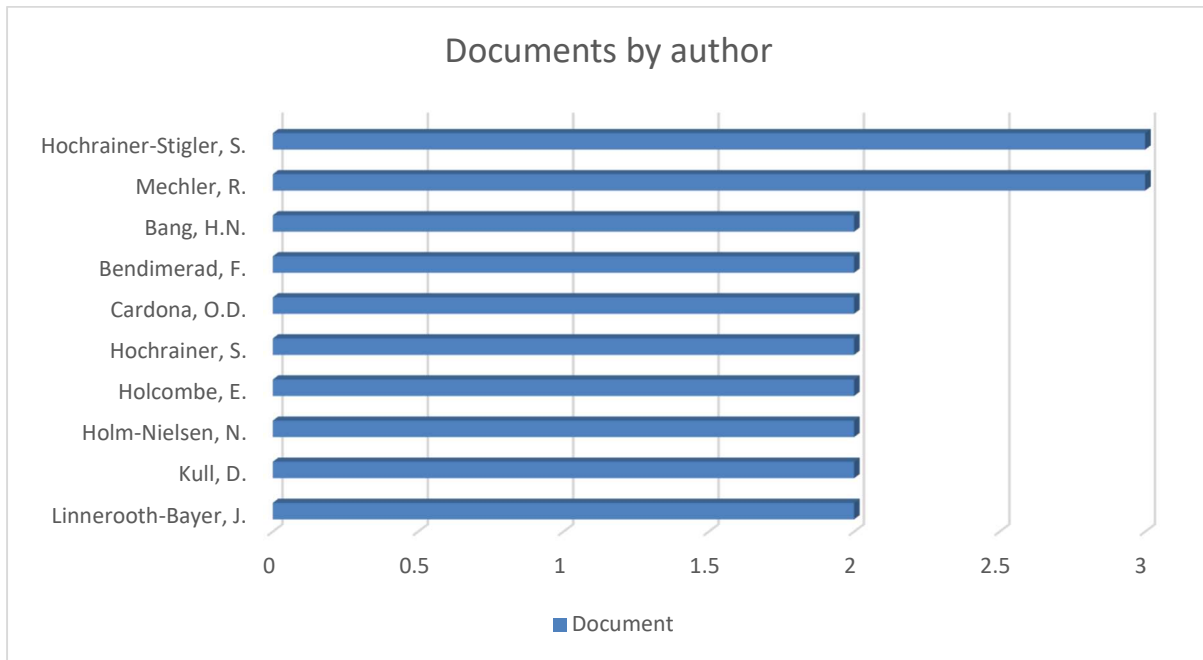
Figure 3: Number of Publications Annually



According to the data above, as many as 110 articles were extracted, of which 50 are conference articles and 56 journal articles. All extracted articles come directly from the Scopus database. Figure 1 shows that publications on DRM as a whole increased in the period 1993-2023. However, there was consistency in article publishing between 2017 and 2020, resulting in 56 journal articles being published. It is important to note that 2020-2023 had the highest number of publications with 16 and 12 articles, followed by 2014 and 2017 with 6 and 8 articles, respectively. Considering from the research article on this matter, it reveals that since the concept of disaster risk management was introduced, followed by the presence of community elements, as well as research on information systems in relation to social media and so on, it can be said to have reached the point of perfection.

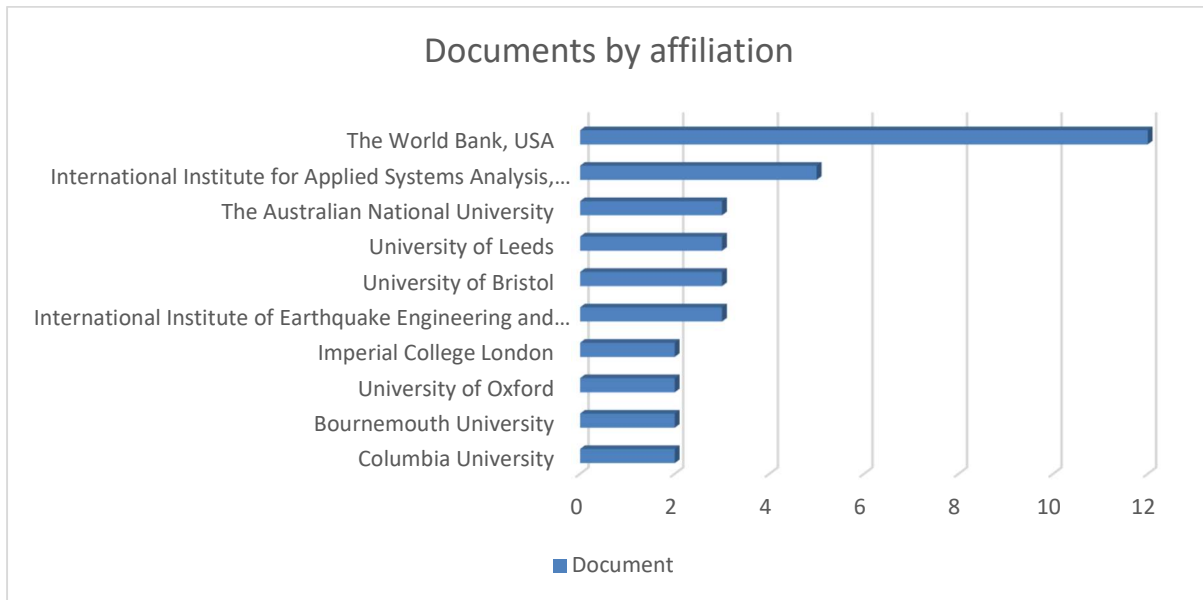
- The Most Contribution Regarding to Authors, Affiliations, And Countries

Figure 4: Number of Documents by Authors



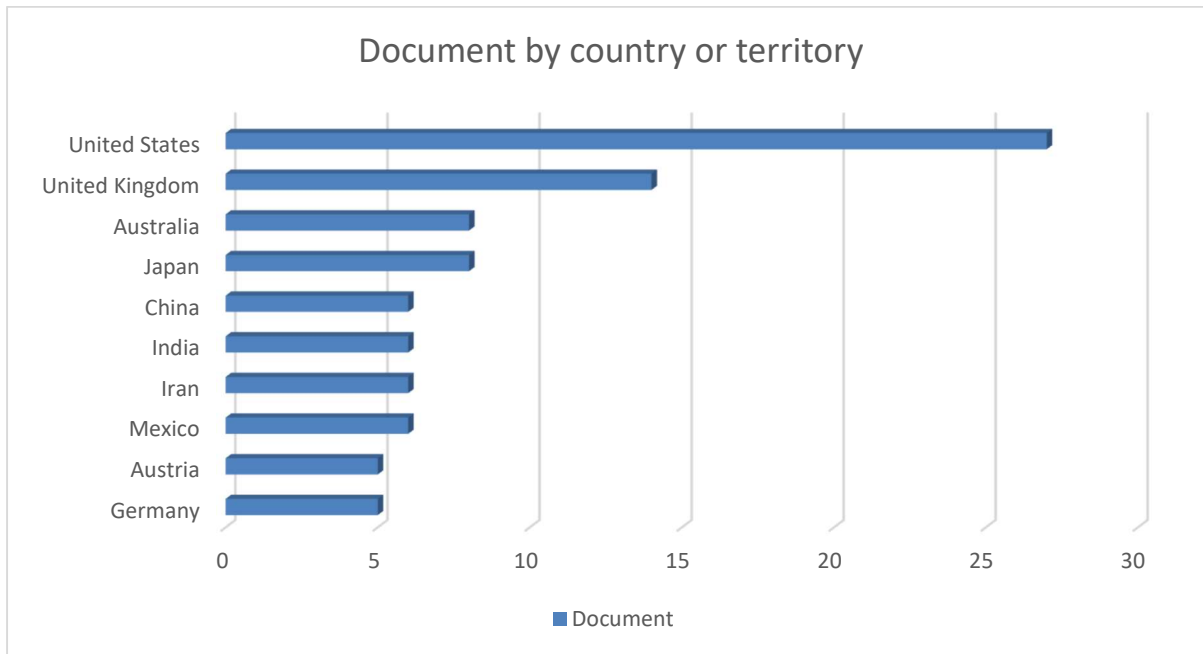
Based on the data above, you can see as many as 10 articles found with each author. Authors by name Hochrainer-Sigler, S.; Mechler, R each has 3 articles. In addition, other names include Bang, H.N.; Bendimerad, F.; Cardona, O.D.; Hochrainer, S.; Holcomber, E.; Holm-Nielsen, N.; Kull, D.; Linnerooth-Bayer, J each have 1 article. A quick search reveals this journal publishes on relevant articles related to disaster risk management generally, considering that this case doesn't confound that disasters are the main foundation for the creation of disaster risk management. Frequently cited sources relate directly to disasters that have a link to disaster risk management. This case doesn't confound by considering that the topic aims to promote disaster risk management in the development of competent government, and it provides space for the government to carry out its duties maximally.

Figure 5: Number of Document by Affiliations



Referring to the data above, it shows that the level of higher education in terms of publishing scientific articles is quite significant. Considering from "The World Bank, USA" the highest up to 12 articles. Followed by "International Institute for Applied System Analysis" has 5 articles, and "The Australian National University", "University of Leeds", "University of Bristol", "International Institute of Earthquake Engineering" each has 3 articles. Continued by "Imperial College London", "University of Oxford", "Bournemouth University", and Columbia University each have 2 articles. The literature based on each of these colleges able to influence other research streams in the audit discipline, as well as largely contribute to auditor tenure and auditor-client negotiation flows. Regarding to disasters that has citations globally because of its strong association with disaster risk management which has had a broad influence on other research and become one of the most influential articles in literature studies.

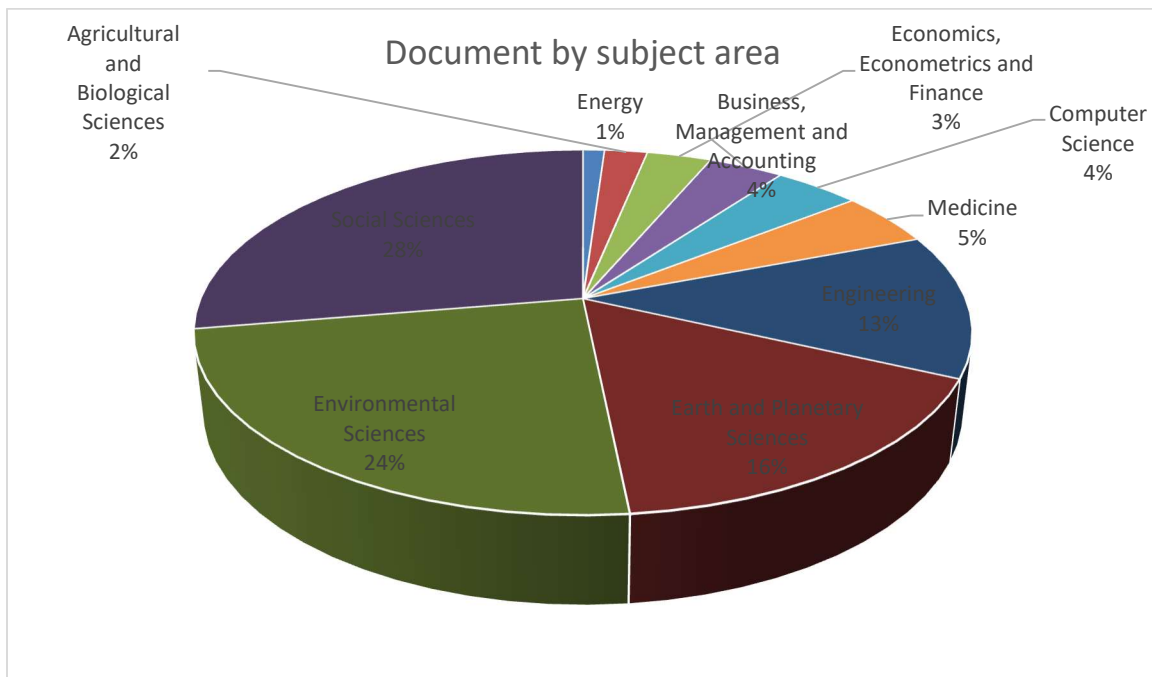
Figure 6: Number of Documents by Countries



Bases on the data above, it can be seen the number of article publications has more than one country. According to figure 4, United State tops the list of countries with 27 articles, followed by United Kingdom with 14 articles, then Australia and Japan with 8 articles each. Followed by China, India, Iran, and Mexico have 6 articles each country. Other listed countries such as Austria and Germany have 5 articles each. It is important to know Australia and India are developing countries that have articles related to disaster risk management. Related to the countries concerned have optimal equity.

- *Subject Areas of Disaster Risk Management*

Figure 7: Number of Documents by Subject Area



Based on the above data related to the subject area shows the level of college in the case with publishing scientific articles is quite significant. It can be observed from the subject areas of "Social Sciences" as much as 28%, "Environmental Sciences" as much as 24%, "Earth and Planetary Sciences" as much as 16%, and "Engineering" as much as 13%. Followed by "Medicine" as much as 5%, "Computer Science" as much as 4%, and "Business, Management and Accounting" as much as 4%. Furthermore, there are "Economics, Econometrics and Finance" as much as 3%, "Agricultural and Biological Sciences" as much as 2%, and "Energy" as much as 1%. The literature bases on each of these colleges able to influence other research streams in the audit discipline, as well as largely contribute to auditor tenure and auditor-client negotiation flows. Regarding to disasters that has citations globally because of its strong association with disaster risk management which has had a broad influence on other research and is one of the most influential articles in literature studies.

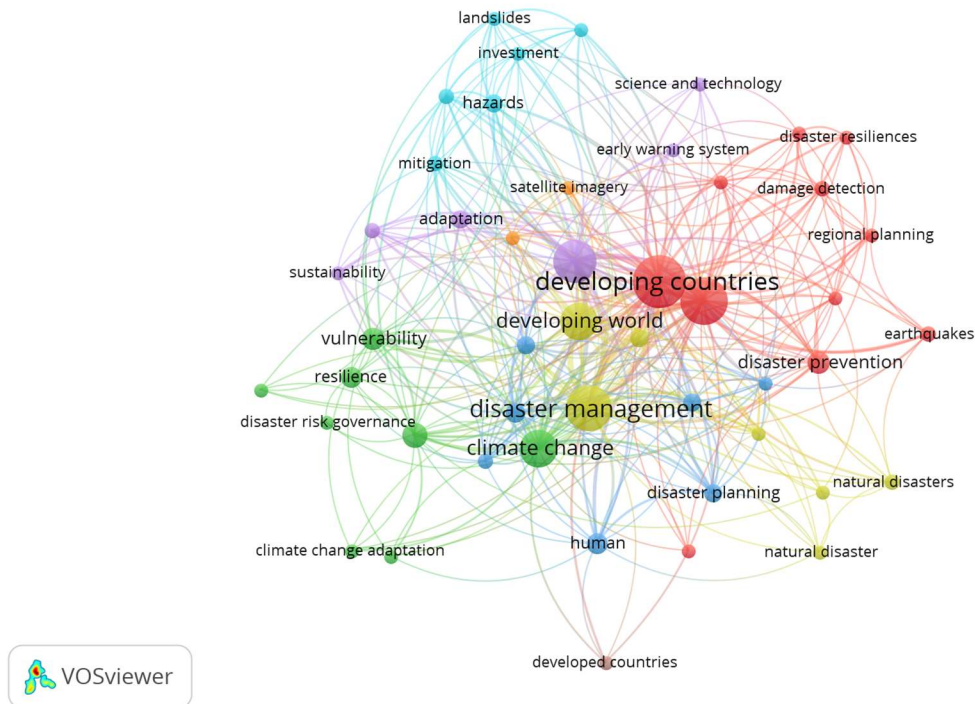
- Cluster and Network analysis

In cluster 1, the chosen keyword is disaster prevention. This is shown in outline the topic of disaster prevention has a frequency or often referred to quite high in cluster 1 and all concepts written by the author refer also to disaster prevention. Disaster prevention is carried out through maximum disaster risk management by identifying every hazard that comes, reducing vulnerability, and increasing or optimizing the capacity of affected cities. In cluster 2, the keyword taken is early warning system. This shows that, broadly discussing, the topic of early warning system has a concept written by the author with reference to the study of disaster risk management, therefore the author conducted research on this topic.

Early warning systems are carried out to prevent the frequency of natural phenomenon that come and have the potential for disasters, such as earthquakes, volcanoes, and floods along with increased vulnerability considering that urban populations development without careful planning.

In cluster 3, it has similarities with the dominant concept in the previous cluster. Cluster 3 broadly discusses mitigation. The chosen keywords are mitigation actions taken which means all authors refer to them on cluster 3. Therefore, mitigation is carried out to recognize disaster risk, awareness of disaster risk, and disaster management planning.

Figure 8: Cluster Analysis by VOSViewer



In cluster 4 taken are related to natural disasters. The dominant keyword is access with all authors focusing on cluster 4. Therefore, natural disasters become events or series of events caused by nature, such as earthquakes, tsunamis, floods, and so on. Cluster 5 has a dominant concept of climate change. The dominant keyword is climate change which is the author's main focus.

The focus of cluster 5 is to link climate change to disaster risk management. Therefore, climate change is caused by the emergence of large greenhouse gases from human activities that cover the earth's atmosphere, trap solar energy in the earth, and increase the earth's temperature. Finally, in cluster 6, the chosen keyword is disaster management. This is shown as general topic of disaster management that has a frequency or often referred to quite high in cluster 6 and all concepts written by the author refer also to disaster management. Disaster management able to be carried out through prevention and mitigation stages, preparedness stages, emergency response stages, and rehabilitation and reconstruction stages.

V. CONCLUSION

In conclusion, we found that the study of disaster risk management in developing countries is widely discussed by scholars varied today, there are five clusters, namely disaster prevention, early warning system, mitigation, natural disaster, climate change and disaster risk management.

This clustering aims to identify topics that have been developing, as well as provide future directions for other researchers who will conduct research on disaster risk management. By using the Scopus database, this research able to be interpreted as profiling and scientific structure of the topic of disaster risk management in recent years. This research in concept and practice contributes as a comprehensive framework on disaster management in order to mitigate the impact of risks arising from a disaster. This study has limitations including the review carried out is descriptive and only uses one international database, in order the results of the findings of this study are expected to be followed up specifically by other researchers.

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