CUDES JOURNAL CURRENT DEBATES IN SOCIAL SCIENCES

Arık, M. & Azazi, H. & Akcan, M.B. (2023). A Review Of "Earthquake" Based on Bibliometric Mapping. *Journal of Current Debates in Social Sciences*, 6(2), 119-130.

Research Article

A Review Of "Earthquake" Based on Bibliometric Mapping

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DOI: http://dx.doi.org/10.29228/cudes.73029

Article Info

Received: 14.10.2023
Accepted: 13.11.2023

Keywords: Earthquake, Bibliometric Mapping Analysis, Disaster Management, Disaster

Abstract

Disasters are characterized as unanticipated events that, if no action is taken may have severe consequences, including disruptions to the political, social, and economic systems. To lessen the negative consequences of unforeseen disaster events, it is deemed vital to establish disaster management systems. The most common problem in Turkey, "earthquake" management, is mentioned in the literature as another problem that has to be controlled with disaster management. In light of this, a bibliometric mapping analysis of 590 economics-based papers containing the word "earthquake" in the abstract, title, or keywords, published after 09.11.2022 and indexed in Web of Science, will be conducted. The economy will benefit if the damaging effects of the earthquake are kept to a minimum. Because of this, it is anticipated that research on the topic will be assessed, throw light on further research, and also contribute by offering market-based recommendations. As a consequence of the study, it is evident from a conceptual perspective that the focus is on risk management and catastrophe management related to earthquakes. One of the areas that have received attention recently is disaster management, which is crucial in reducing the devastation caused by earthquakes. According to the summary and key concept analysis, it can be concluded that policymakers should make political arrangements in terms of risk analysis, earthquake resistance, and disaster management. As a result of the study, guidance information is provided to those who will conduct academic research.

Makale Bilgisi

Geliş: 14.10.2023
Onay: 13.11.2023

Anahtar sözcükler: Deprem, Bibiyometrik Haritalama Analizi, Deprem Yönetimi, Afet

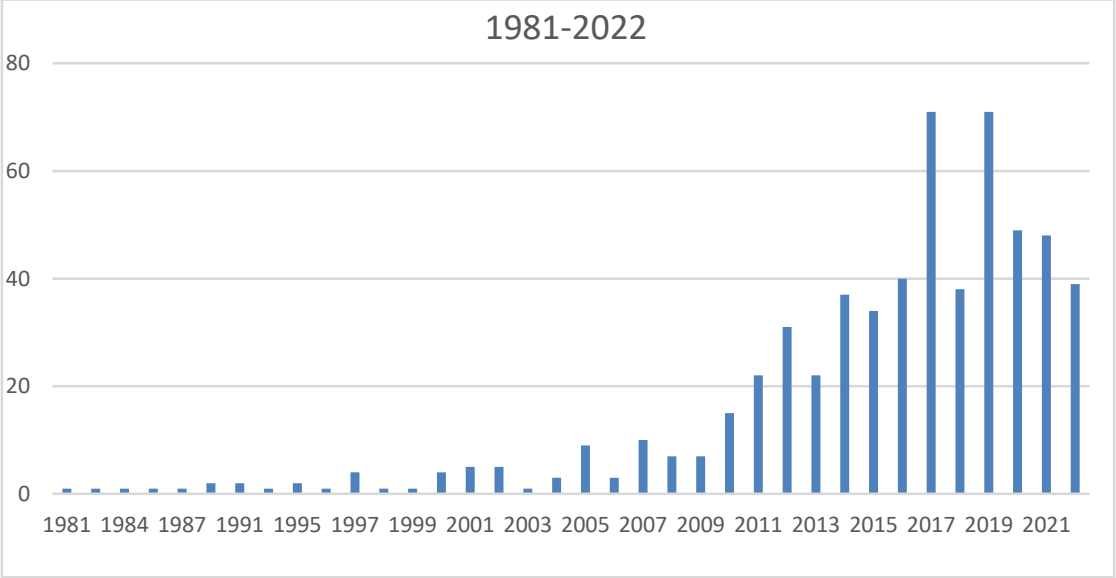
Öz

Afet, beklenti dışında ortaya çıkan ve tedbir alınmadığı taktirde olumsuz etkilere ve buna ek olarak siyasi, sosyal ve ekonomik kesintilere yol açabilen olaylar olarak ifade edilmektedir. Ani olarak karşı karşıya kalınan afet olaylarının negatif etkisinin minimize edilmesi için afet yönetimi tekniklerinin geliştirilmesi gerekli görülmektedir. Türkiye özelinde en sık karşı karşıya kalınan "deprem" yönetimi de afet yönetimi ile kontrol altına alınması gereken bir diğer konu olarak literatürde yer almaktadır. Buradan hareketle çalışma dahilinde 09.11.2022'den sonra yayımlanmış ve Web of Science'da indekslenmiş olan; özet, başlık veya anahtar kelimelerinde "deprem" kavramı geçen ekonomi temelinde inşa edilmiş 590 makalenin bibliyometrik haritalama analizi gerçekleştirilecektir. Depremin ekonomi üzerindeki yıkıcı etkisinin minimize edilmesi ekonomi üzerinde olumlu etki uyandıracaktır. Bu nedenle konu üzerine gerçekleştirilmiş çalışmaların değerlendirilerek gelecekteki çalışmalara ışık tutulacağı buna ek olarak piyasa bazlı önerilerde bulunulması suretiyle katkı sağlanacağı düşünülmektedir. Çalışma sonucunda alanda yer alan eserlerin incelenmesi akabinde kavramsal bazda deprem nedeniyle risk yönetimi ve afet yönetimi konularına odaklanıldığı gözlemlenmektedir. Çalışma sonucunda alanda araştırma yapacak kişilere anahtar kelime, kaynakça, yazar ve kurum analizi bilgileri verilmekle birlikte özet ve anahtar kavram analizi sonucunda politika yapıcıların risk analizi, depreme dayanıklılık ve afet yönetimi noktasında politik düzenlemelere gitmesi gerekliliği ifade edilebilecektir.

1. INTRODUCTION

Disasters may be defined as a series of unanticipated occurrences that, if nothing is done, have disastrous impacts on the political, social, and economic spheres. Disaster management needs to be prioritized in order to lessen these negative impacts. The "earthquake," which has a terrible economic impact, might be characterized as the natural catastrophe that Turkey experiences most frequently. (Erkal ve Değerliyurt, 2009). The devastation caused by the earthquake and its aftermath may be used to explain why the notion of "earthquake" is the subject of more than one study in the literature, particularly when it comes to disaster management. By identifying the areas of emphasis on the economic foundation of earthquakes and assessing the proposals made in this regard, the analysis of academic research published in the field will enable these studies to serve as a guide for future studies. Table 1 displays the distribution by years of 590 academic disaster management publications with a "earthquake" focus that were created under the "economy" constraint and indexed in Web of Science after 09.11.2022.

Table 1. Article Distribution by Years



Source: Web of Science Database

It is seen that the articles focusing on the concept of "earthquake" in the field of economy were published between 1981 and 2022. Although the frequency of research in the area did not grow much between 1981 and 2007, it did show a progressive increase following that year, and as 2022 draws closer, the number of publications in the subject has been rising rapidly. In this case, it is seen that the economic effect of the "earthquake" among disasters is frequently investigated in the literature. The importance of the subject as history progresses can be explained by the high economic impact of the earthquake. The frequency seen in the studies in the literature on the subject necessitates a comprehensive evaluation of the studies carried out by examining them within the scope of bibliometric mapping.

When the studies in the literature are examined, It is seen in the study of Takeuchi (2014) that he made a special examination of the 2011 March earthquake in Japan. In addition to the lives lost, the disaster's status as the most expensive earthquake in terms of economic cost prompted an examination of the topic from an insurance standpoint. The goal of Wu and Zhou's (2010) study, which assesses the evolution of risk insurance and improves its functionality by accounting for the earthquakes that occurred in China between 1966 and 2008, is to use insurance to economically control disaster destruction. Boehm et al. (2019) added a new research to its knowledge base. Based on the North Tokyo earthquake of 2011, the research looks at how the earthquake affected different countries economically and how shocks were transmitted from one to the other. It is anticipated that the impact assessment conducted as part of the research would reflect the rules based on policy. On the other hand, Sakai, Vd. (2019), focusing on the economic contribution of trash management as well as offering efficiency in health, sought a response to the topic of how to act in waste management

following the Kumanoto earthquake that happened in 2016. If the economic effects of the earthquake are used as the foundation, it is clear from studying academic research in the literature that they seek to offer efficiency in disaster management.

Examining the research in the literature reveals that none of them carry out "bibliometric mapping analysis." This circumstance demonstrates the lack of a study that assesses the field's study scope, identifies the present issues being addressed, and evaluates upcoming research from this perspective. Because of this, it is believed that this study will add to the literature by offering a broad examination

A broad analysis of the studies in the literature will be conducted based on the study's relevant goal, and this will be followed by a bibliometric mapping analysis. With the use of bibliometric mapping analysis, 590 academic publications produced on the topic of "earthquake" and from an economic perspective will be subjected to summary, key idea, and thorough bibliography analysis. The range of the studies that have been published in the subject will be assessed in light of the results, and recommendations will be made that will further current academic research and literature.

2. LITERATURE REVIEW

If a disaster is not averted, it may have several adverse effects, including severe economic downturns and potential humanitarian risks. It is required to conduct "earthquake"-based investigations in more than one study within the literature due to the extensive influence that earthquakes have. Table 2 includes information from the literature publications being evaluated on the main topic of the investigation, authors, time period, study variables, and study results.

Table 2. "Earthquake" Themed Studies in the Literature

Research Topic	Author(s) (Date)	Investigation Period	Researched Country/ Country Group	Method	Results
It examines how risk attitudes affect people's decisions to start their own businesses while taking earthquake survivors into account.	De-Blasio, Et al. (2020)	2004-2014	Italy	Emprical Analysis	It demonstrates that aversion to risk has a significant detrimental impact on one's likelihood of starting their own business.
It aims to create an earthquake-based corporate social responsibility (CSR) Simulation.	Evert, Et al. (2019)	-	Studies	Qualitative Analysis	The study revealed a deeper comprehension of CSR and better levels of moral effectiveness across all four categories.
This study explores how non-adopter groups might be distinguished by public policy makers.	Adıgüzel, (2019)	-	Turkey	Emprical Analysis	The study highlights important differences between non-adoptive groups that insurers and policy makers should consider when formulating their marketing plans.

It seeks to evaluate the efficiency of computation applications at the time of an earthquake's emergency reaction.	Sargiacomo (2015)	2009	Italy	Qualitative Analysis	Following the study, recommendations for applications were provided to reduce the adverse impacts of seismic applications.
It aims to look at disaster management strategies based on the devastation caused by earthquakes.	Wu, and Zhou (2010)	1966-2008	China	Emprical Analysis	According to the findings, the double exponential jump-diffusion model adequately describes the data.
This article reviews earthquake risk reduction and the growth of earthquake insurance in China.	Tao, Et al. (2010)	2008	China	Emprical Analysis	It is argued that it is dangerous for the insurance industry to insure such a major disaster, and a solution is proposed in this direction.
Through the use of multivariate statistical analysis, the categorization and grading of seismic catastrophes have been explored.	Mao, Et al. (2007)	1954-2005	China	Qualitative Analysis	The outcome demonstrates that the occurrence of seismic catastrophes that have already happened has a plausible explanation.

When the studies are analyzed, it is clear that academic studies with a focus on the qualitative have a greater prevalence than field research with a focus on the quantitative. While the studies' main focus is on the words of risk management and catastrophe management, a common goal of the research is to articulate preventative steps in this area and identify any gaps in risk management that may already exist. The bibliometric mapping analysis in the next section of the study is significant since it provides a thorough examination of studies with an earthquake subject.

3. BIBLIOMETRIC MAPPING ANALYSIS

The study's scope includes bibliometric mapping analysis of scholarly works on the topic of "earthquake" that are constructed with an economic foundation. The overall patterns of the research may be identified using the titles, abstracts, key terms, and bibliographies of the papers using the qualitative analysis approach known as "bibliometric mapping analysis." To give information that will serve as a guide for future investigations, the analysis will conceptually assess the scope and substance of all studies. A thorough idea analysis with the themes of summary, keywords, and bibliography will be conducted in this direction, in this section of the study.

3.1. Most Frequently Used Words in the Summary Section

With their aim, subject, technique, data set, outcome, and suggestion, abstract study components can be described as the most crucial study components. Because of this, the word frequency in the abstracts plays a crucial role in highlighting the main themes of the investigations. The most commonly used term in the abstract of the 590 publications that will be the subject of the study, according to the bibliometric mapping analysis, has 735 usages. And this word is "earthquake". The fact that it forms the main point of the subject explains the frequency of use of the concept. Following this concept, among the concepts used (number of use), respectively, it is seen that effect(409), model(343), impact(293), disaster(280), risk(261) are included. When the ideas are taken into account, it is clear that the earthquake's effects and the possibility of disaster are the key

problems. The focus of the research on risk- and impact-oriented ideas demonstrates that the studies may be constructed within the "management" framework. The map in Figure 1 in particular makes the words employed more obvious.

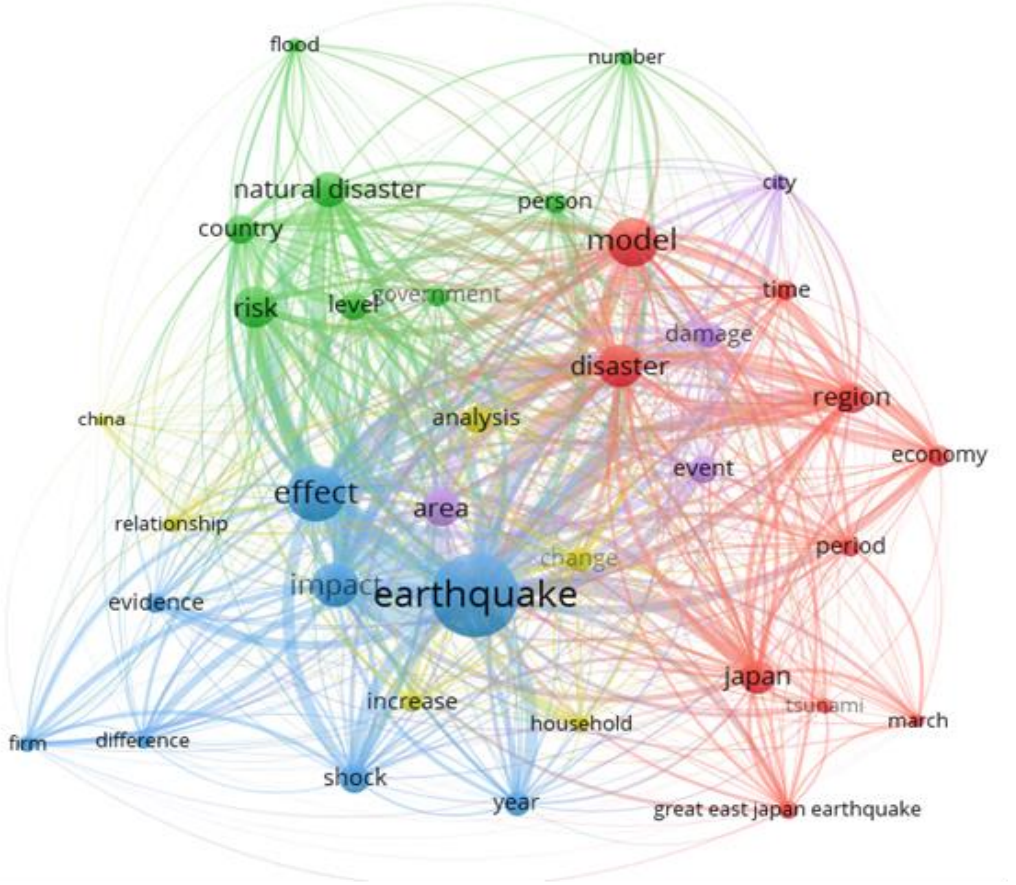


Figure 1. Most Frequently Used Words in the Summary

All of the words that are substantially presented in the summary section may be observed when the figure is inspected. The concepts with the largest font size among these are those that are utilized the most frequently. The words of "effect," "impact," and "risk" are particularly highlighted on the map, as can be seen. Despite the fact that it is believed that this circumstance will be useful in assessing the concentration in the management area, it can be argued that the key concept analysis will allow for a clearer observation of the situation.

3.2. Most Frequently Used Keywords

As "keywords," the notions that are most important at the time the investigations are stated. The characteristic that enables the reader to get information about that work is displayed by the keywords. The words that best characterize studies on the topic of "earthquake" in this manner demonstrate the aspect that has to be examined in order to provide information about the studies' contents. As a consequence of bibliometric mapping, the most commonly used terms may be noticed when Figure 2 is studied.

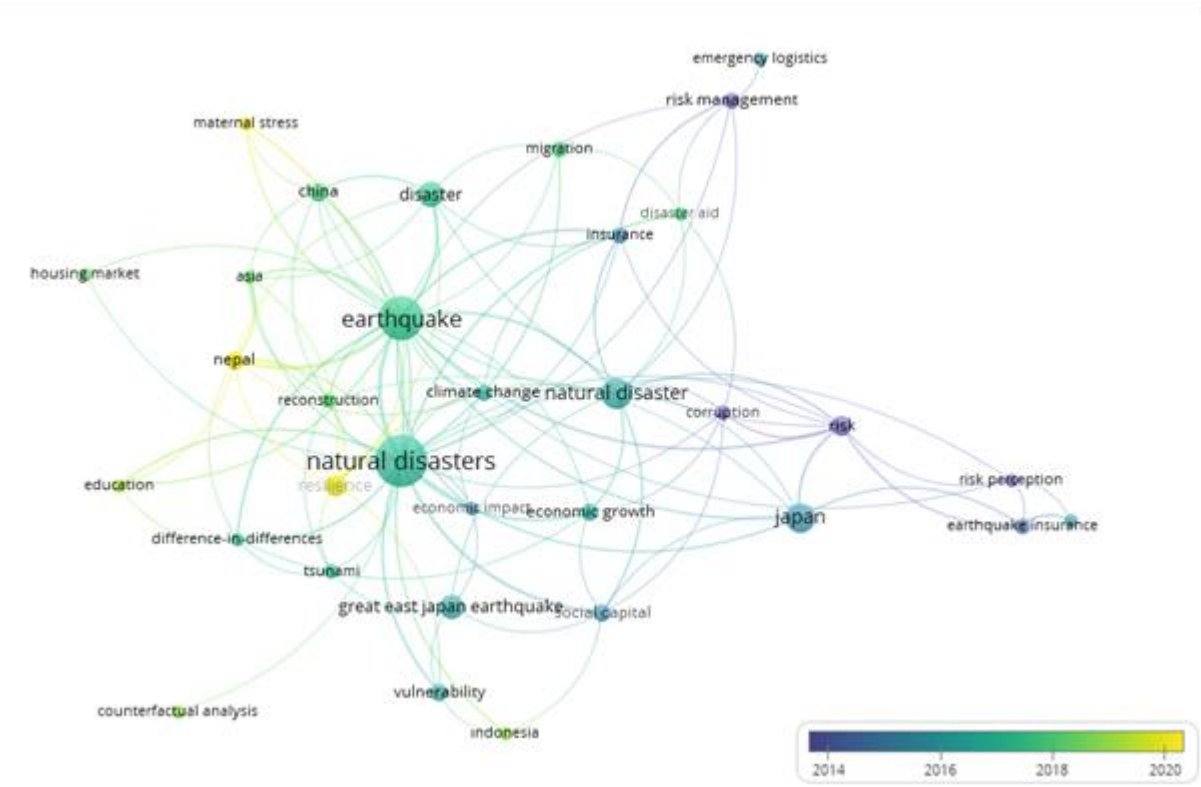


Figure 2: Most Frequently Used Keywords

The scale in the lower right corner of the picture displays the years in which the words are used more frequently than the colours, while the words in the figure display the most frequently occurring keywords in the abstracts of the research. In the first place among the words (number of use) when the analysis is carried out; natural disasters (102). The most common keywords in studies; It was included between the years 2016-2018. Following the word; earthquake (85), Japan (24), disaster (18), resilience (13) and risk (11). When the words are examined, the frequency in the use of natural disaster and earthquake, which is the main theme of the study, can be explained. The fact that "japan" comes after the words can be explained by the fact that natural disasters encountered as earthquake zones are among the topics that are frequently discussed in the academic literature. It may also be argued that research that will help in this direction are prioritized, and that the notions of "resilience" and "risk" are commonly incorporated in them in order to limit the potential disasters that may be faced following an earthquake. In fact, the yellow color representation of these two phrases within the map suggests that research concentrating on catastrophe management have been conducted in recent years in terms of scalability.

3.1. Co-Author Analysis

Since researchers working in the field provide the findings in the literature, the authors who specialize in that subject make the greatest impact. This is why co-authors are a factor to consider in bibliometric mapping analysis. The co-author map is shown in Figure 3.

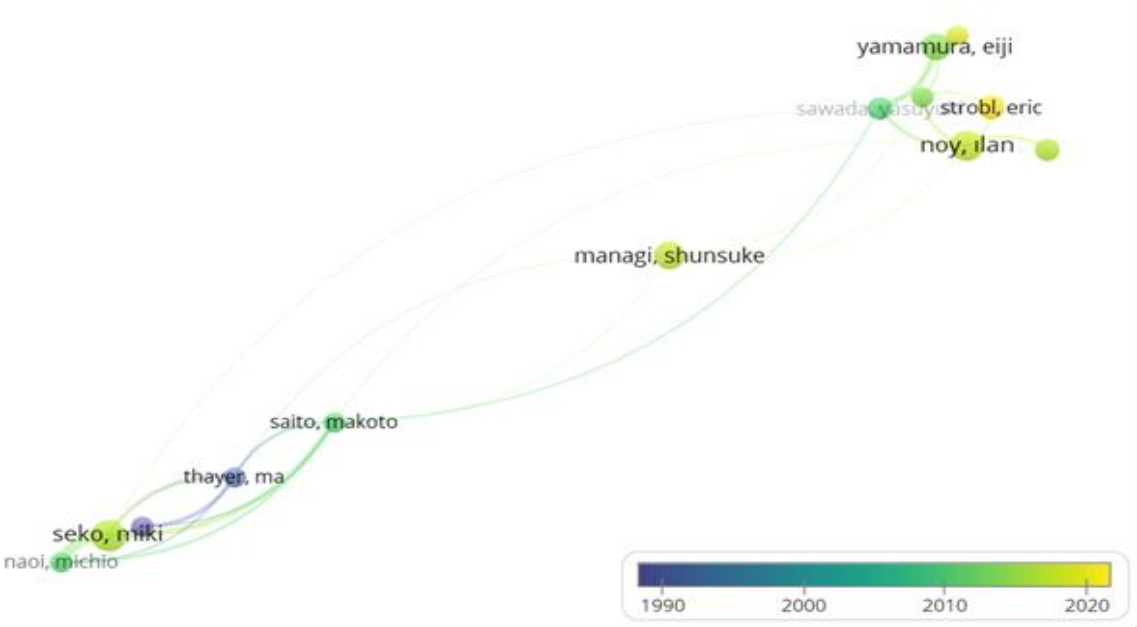


Figure 3. Co-Author Analysis

When looking at the map, it can be claimed that the authors with the most publications—taking into account both the number of publications and the number of citations—are represented with the largest font. Instead of using the authors' total number of publications and citations at this stage, it is important to rank the two associated variables according to the degree of influence attained. Although the quantity of publications in the subject matters, their quality contributions to the literature and amount of citations should be given priority. Accordingly, authors (number of publications, number of citations) will be ranked first by those with the highest number of publications. In this direction, the top 5 authors with the most publications are respectively; Miki Seko (10.105), Ilan Noy (9.278), Shunsuke Managi (8.90), Eiji Yamamura (7.116) and Mitsuru Okiyama (6.18). Considering the impact levels, it is seen that the authors who could not enter the top 5 with the highest number of publications had the highest effectiveness with the publications they wrote. Among the authors with the highest impact in the literature, Jiuh-Biing Sheu, who has 5 publications and 119 impact levels with 597 citations, comes first. Ma Thayer, who made 80 impact levels with 4 articles and 318 citations, came in second. The writers (effect levels) after these are, in order, Eduardo Cavallo (60), Ds Brookshire (49), and Yasuyuki Sawada (34). Even while it is clear that the influence level in this direction differs from the large number of publications, it can still be argued that it is more significant.

3.2. The Journals with the Most Publications

In addition to the writers' contributions to the literature, the periodicals that provide their works a chance to be read by readers are crucial to the mapping analysis. The largest number of publications in the area, the amount of citations they have gotten, and the degree of impact they have may all be used to gauge a journal's contribution to the literature. The selection of these journals will serve as a guide for choosing the journals to which writers working in the subject should submit their work.

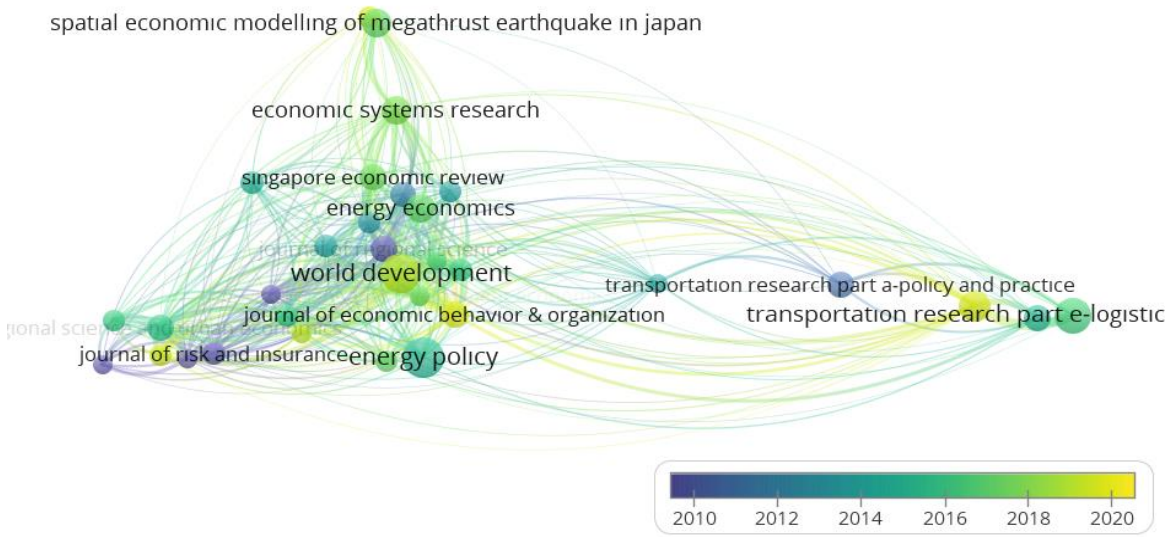


Figure 4. The Journals with the Most Publication

Figure 4 shows the journals that contribute to the literature, but the scale in the lower right corner of the figure also shows the journals' years of publishing frequency. The top 5 journals that contributed the most publications to the literature, as determined by bibliometric mapping analysis, are, in order, Energy Policy (22,757), World Development (20,468), Transportation Research Part E-Logistic and Transportation Review (17,1686), Socio-Economic Planning Sciences (13,185), and Energy Economics (11,204). These 5 journals can be expressed in order based on the quantity of publications, however when the impact levels of the articles are included, the order changes. From this point of view, the first among the journals with the highest impact level is the "Transportation Research Part E-Logistic and Transportation Review", which has 17 publications and 99 impact levels with 1686 citations. Following this journal, "Journal of Regional Science", which is not among the top 5 journals with the highest number of publications and has 9 publications, 804 citations and 89 impact levels, and 5 publications with 81 impact levels and "Land Economics" with 405 citations. is coming. In the fourth place is “Transportation Research Part A: Policy and Practice”, which has 9 publications and 661 citations and 73 impact levels. And finally in fifth place; “Journal of Environmental Economics and Management”, which has 5 publications, 281 citation levels and 56.2 impact levels, can be expressed.

3.3. Leading Authors in the Bibliography

Within the bibliometric mapping analysis; by performing summary analysis and keyword analysis, information about the scope of the study was provided. In addition to these, another limitation that should be examined within the bibliometric mapping analysis is expressed as bibliographic analysis. Although the bibliography is the portion of the article where the authors, works, and journals are stated and serves as the foundation for the current investigation, a thorough examination of the bibliography will be conducted in this area of the study.

Figure 5 will show up if the writers who are cited the most in the bibliography are examined first.

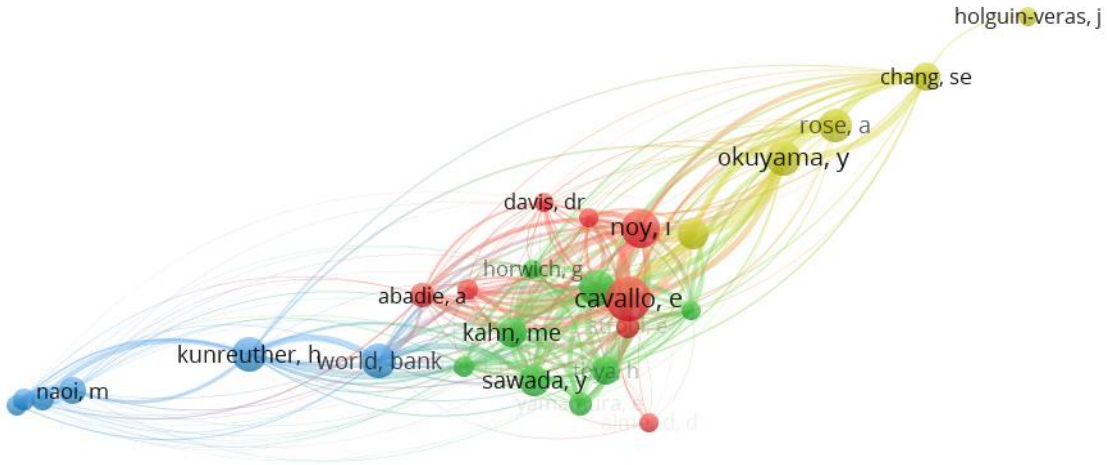


Figure 5. Leading Authors in the Bibliography

When the figure is examined, it is seen that more than one author is actively included in the bibliography. It is seen that the most cited author among these authors is Cavallo with 104 citations. The first 5 of the other authors (citation numbers) following this author are; Noy (86), Skidmore (78), Okuyama (73), and Kunreuther (72). Although the authors are the same as those listed above, the authors of the most referenced books are different. Table 2 lists these authors and the first five of their published works.

Table 3. Most Featured Authors and Their Works in the Bibliography

Citation	Citation Number
Skidmore, M., & Toya, H. (2002). Do Natural Disasters Promote Long-Run Growth, *Economic Inquiry*, 40(4). 664-687.	66
Kahn, M. (2005). The Death Toll from Natural Disasters: The Role of Income, Geography, and Institutions, *The Review of Economics and Statistics*, 87(2). 271-284.	59
Noy, I. (2009). The macroeconomic consequences of disasters, *Journal of Development Economics*, 88(2). 221-231.	57
Cavallo, E., Galiani, S., Noy, I., & Pantano, J. (2013). Catastrophic Natural Disasters and Economic Growth, *The Review of Economics and Statistics*, 95(5). 1549-1561.	48
Toya, H., & Skidmore, M. (2007). Economic development and the impacts of natural disasters, *Economics Letters*, 94(1). 20-25.	41

When the table is examined, it is seen that the number of citations, respectively, Skidmore, Vd. (2002) 66, Kahn (2005) 59, Noy (2009) 57, Cavallo, et al. (2013) for 48 and Toya, et al. (2007) for 41. When the table is examined, it is seen that Toya is among the top 5 most cited works in the bibliography with his two separate works, 2002 and 2007. In addition, Toya is among the authors most frequently cited in the bibliography with 54 citations.

3.6. Most Featured Journals in Bibliography

The journals that have a large number of citations and contribute significantly to the body of literature are those that are included in the bibliography as the most often referenced journals. The journals with the most citations, or those that are most frequently found in the bibliography, are shown in Figure 6 from this perspective.

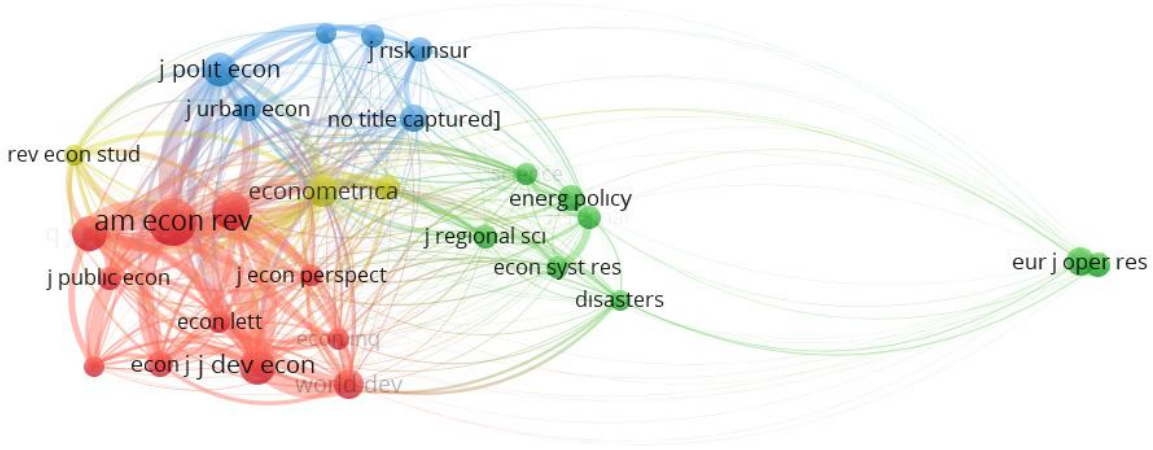


Figure 6. Most Featured Journals in Bibliyography

Although there are more than one place in the table, the journals that appear most prominently in the table with the largest font can be expressed as the journals with the highest number of citations. In addition, the colors on the map in the figure are important in terms of showing the relationship of the related journals with each other.

The American Economic Review, which is shown in the image, is the journal that has the most articles in the area and is the most referenced in the bibliography, according to the bibliometric mapping study. It has 527 citations. Following this journal (number of citations), The Review of Economics and Statistics (318), Development Economics Definition (290), Quarterly Journal of Economics (286), Journal of Political Economy (267), Econometrica (248), World Development (200)), European Journal of Operational Research (187), Energy Policy (153), The Economic Journal (152), Journal of Urban Economics (149), Journal of Risk and Insurance (147), Transportation Research Part E: Logistics and Transportation Review (138), Journal of Econometrics (134), Journal of Public Economics (130), Risk Analysis (130), Land Economics (125), and Journal of Regional Science (122). These journals are important in terms of being the journals that bring the most cited publication on "earthquake" in the literature.

4. SONUÇ

A disaster is a series of uncontrollable natural or human-caused occurrences that, if they are not avoided or prepared for, can have disastrous social and economic repercussions. Disasters' destructive impacts necessitated that academic scholars, market-based policy makers, and management address the subject in the literature. The frequent occurrence of earthquakes among catastrophes is mentioned as another concern that requires cautious consideration. Numerous studies have considered earthquakes as significant natural disasters that cannot be stopped but require action to lessen their devastation. When the studies are looked at, risk management, disaster management, durability, etc. are reviewed in order to reduce the earthquake's damaging effect. Examining the research in the literature reveals that qualitative investigations are prioritized. Within the context of bibliometric mapping analysis, examination of earthquake-themed and economic-based research helps identify the authors and publications that are active in the area as well as the concepts that the topic is focused on in the literature.

A bibliometric mapping analysis of studies on earthquakes in the literature was conducted as part of the study because it will serve as a guide for researchers who conduct fieldwork and help identify the difficulties that should be taken into account based on the market and the range of hypotheses. The goal of the bibliometric mapping analysis is to identify the most frequently used terms in study abstracts, the keywords' primary subject areas, the most frequently referenced authors, and the most frequently cited authors in works and journals. The study's findings have implications for risk management, sustainability, resilience, etc. It is clear that research trying to lessen the impact of the earthquake are focused, and related terms are the ones that appear most frequently in the abstract and among the studies' keywords.

Additionally, it can be noted that Jiuh-Biing Sheu has the highest degree of efficacy in the subject based on the articles he has written and the amount of citations he has earned. Miki Seko has the most works published in the field, with ten. When the journals that publish works related to earthquakes that contribute to the literature are investigated, Energy Policy comes out on top with 22 publications. Additionally, the Transportation Research Part E-Logistic and Transportation Review has been named the journal with the greatest citations based on the quantity of articles, taking into consideration the degree of activity. When the study's bibliographies are studied, it becomes clear that Cavallo is the most often referred author and that The American Economic Review is the most commonly cited publication. As the most often mentioned piece in the bibliography, however, Skildmore and Toya's (2002) study came in first.

The devastating economic effects of the earthquake made it important to study the subject. According to the results of this study, although the earthquake issue is technically suitable for discussion; Economic results were also mentioned in the studies. It is very natural that natural disasters, which are shown as a significant cost for country economies, appear in the literature. This necessity manifests itself in this study as the need to focus on precautionary policies and not bear more economic costs.

It is anticipated that the data gathered as part of the bibliometric mapping study will act as a guide for researchers doing fieldwork. It may be said that any future academic study on the subject of earthquakes should advance in terms of managing earthquake risk and long-term risk reduction. It is recommended that decision-makers develop plans in this approach. In addition, it is recommended that variables and suitable test techniques be determined in order to conduct quantitative analysis in the field and to conduct research in this direction, based on the dearth of such studies in the field.

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