A bibliometric study of global trends in community resilience and spatial planning research (2000-2021)

E Zuraidi, I Caisarina*, M Agustina
Architecture and Planning Department, Universitas Syiah Kuala, Jalan Tgk. Syech Abdurrauf No.7, Banda Aceh 23111, Indonesia

*Email: irincaisarina@unsyiah.ac.id

Abstract. As the number of disaster events in all parts of the world increases, studies on the topic of community resilience and spatial planning are also increasing because of its role is believed can minimize the risk of exposure to disasters. This study aims to investigate the various kinds of published work related to this research topic worldwide to give meaningful insights on the trend of preceding publications. This study performed a bibliometric analysis of the community resilience and spatial planning related papers published between 2000 and 2021. Based on the keywords selected, the study obtained 144 scholarly documents associated to research topic from the Scopus online database as of August 2021. Authors then employed some tools for further analysis including Microsoft Excel to conduct the frequency analysis, Harzing's Publish or Perish for citation metric and analysis, and VOSviewer for data visualization purpose. The findings of basic bibliometric statistics are presented in this paper, with a focus on the rate of publication growth, citation analysis, and research productivity. Since 2000, the growth rate of literature in community resilience and spatial planning has increased gradually year by year. Most of the articles were published in journals and conferences, the majority of which were in English. Many of the research was in the field of social sciences and environmental sciences. The urban planning and community resilience were the most frequently used keywords, representing the main areas of research covered by the research topic. Most of the community resilience and spatial planning related research was conducted in United States. This study proposes that research on community resilience and spatial planning should be conducted in other less developed countries, as the disaster's impact was affected mostly in these regions.

1. Introduction
In recent years, we have been well informed about the various disasters that have hit cities in the world, both natural and non-natural disasters. Most cities were subjected to a catastrophic disruption that lasted for an extended period. Natural disasters have claimed lives and destroyed spatial spaces and its people [1]. We’ve also recently seen how the COVID-19 pandemic shocked cities worldwide, exposing the vulnerability of urban life and functions. This damage could possibly be reduced if cities and their communities had adequate resilience systems in facing any potential disasters [2]-[3].

Community resilience is an important aspect in generating environmental resilience, because community is part of the urban system along with other aspects including institutions, businessmen, individuals and other city elements as a system, which if it has sufficient capacity to survive and adapt to various shocks and the pressure will form a good environmental resilience system [4]. However, several studies have found that the current attitude to increase community resilience cannot be fully managed by local communities due to the lack of suitable approaches and measurement tools [5]-[6].
Spatial planning as a tool for organizing long term use of spaces through the strategies to manage the spaces with appropriate regulations and technical guidelines is increasingly used as one of the important instruments to mitigate the impact of the disaster and it is believed can minimize the risk of exposure to hazards [10]-[11]-[12].

The research on community resilience and spatial planning began in 2000. Since then, researchers have widely used this theme of discussion to further investigate the potential contribution of spatial planning in enhancing resilient of the community. Thus, this study seeks to use bibliometric analysis to examine the empirical studies published in the subject of community resilience and spatial planning. Bibliometric analysis defines as “a quantitative method for examining the knowledge structure and development of research fields through the examination of related publications” [13]. This study is the first overview that examines the evolution of the community resilience and spatial planning related scientific publications and identifies current areas of research interest as well as potential future research directions.

This paper consists of four parts and has the following structure as follows. The first part describes the objective of performing a bibliometric study. Then, in the second part described the methodology used for the study. The third part contains the outcomes of the related bibliometric statistics. The final part briefs the results, pinpoints potential subjects of study, and discusses some of the limitations of this study.

2. Materials and methods

The data for this study collected from Scopus electronic database as a basis to extract previous works on community resilience and spatial planning. Scopus is considered as the largest intellectual publications database when compared to others, namely Pubmed or WoS (Web of Science) [14]-[15]. The database provides all metadata of published documents including year, subject area, author name, access type, document type, keyword, source title, affiliation, source type, country, and language [15]-[16]. The following query has been entered into the search engine: TITLE-ABS-KEY ("community resilience" OR "resilient communities" OR "resilient community" AND "urban planning" OR "land-use planning" OR "urban planning" OR "city planning" OR "town planning" OR "regional planning"). We limited the search for community resilience and spatial planning studies by title, abstract, and keyword to further expand related scholarly works on the research area analyzed. Then, on August 24, 2021, the data was retrieved, yielding a complete of 144 records for analysis.

The bibliometric analysis was performed on all selected documents. The following analysis tools were used in this study: Microsoft Excel 2019 was used to compute the frequency and percentage of each publication, as well as to create appropriate graphical representations; Harzing's Publish and Perish tool was used to compute the citation metrics; and VOSviewer (version 1.6.17) was used to create and portrait the bibliometric links.

3. Results and discussion

The collected data was analysed to determine annual growth, document types, languages, source types, subject areas, country productivity, keywords, citations, and authorship. Most of the results were shown as a frequency and percentage. We presented data for yearly development as the total of retrieved documents per year, including occurrence and percentage, up to 24 August 2021.

3.1. Documents and source types

The collected documents were first analysed to verify the document types and source types. Articles, conference papers, and book chapters, are examples of document types, whereas source types include conference proceedings, journals, book series, trade journals, and books. According to Sweileh et al. (2017), conference papers appearing in the document type differed from those appearing in the source type [17]. Conference papers are documents presented at seminars that were most likely published as
full journal articles. Despite the fact that the document type originated from a conference paper, some conference papers were also published in conference proceedings or as a book chapter within the source type. This study discovered eight different types of documents related to community resilience and spatial planning, namely articles, conference papers, book chapters, books, reviews, conference reviews, editorials, and notes. According to Table 1, the majority of publications (65.28 percent) were articles, followed by conference papers (18.06 percent). Other types of documents reported for almost 17% of total documents, with each accounting for less than 10%. With less than 2% each, the lowest three types were note and editorials, as well as conference reviews.

| Document Type         | Total Publications (TP) | Percentage (%) |
|-----------------------|-------------------------|----------------|
| Article               | 94                      | 65.28          |
| Conference Paper      | 26                      | 18.06          |
| Book Chapter          | 10                      | 6.94           |
| Book                  | 5                       | 3.47           |
| Review                | 4                       | 2.78           |
| Conference Review     | 2                       | 1.39           |
| Editorial             | 2                       | 1.39           |
| Note                  | 1                       | 0.69           |
| Total                 | 144                     | 100            |

Figure 1 shows 5 (five) various types of sources. The most common type are journals (71 percent), followed by conference proceedings at 14 percent. Books and book series also contribute a significant number of documents, accounting for 8 percent and 6 percent, respectively, while trade journals contribute the least, accounting for 1 percent.

**Figure 1. Source type.**

### 3.2. Languages of publications
According to Table 2, the majority of the documents retrieved were available in English (97.93 %). Still, several records were issued in other languages, that are Chinese, Persian, and Spanish, each with one document.

| Language | Total Publications (TP) | Percentage (%) |
|----------|-------------------------|----------------|
| English  | 142                     | 97.93          |
| Chinese  | 1                       | 0.69           |
| Persian  | 1                       | 0.69           |
3.3. Publication by year and annual growth
The first research on community resilience and spatial planning was published in 2000 by Burby, Deyle, Godschalk, & Olshansky with their paper entitled, “Creating hazard resilient communities through land-use planning” [18]. From 2006 to 2010, the number of associated publications increased gradually. However, there has been a fluctuating increase since then (as shown in Fig. 2). According to Fig. 2, the number of publications in 2021 is expected to increase even further, reaching the highest level since 2016. Furthermore, even though 2021 is still not over, several publications have been listed and are indexed in the Scopus database.

![Publications by Year](image_url)

**Figure 2.** Total number of publications by year.

3.4. Subject area
This analysis additionally presented the issued papers according to their subject areas. The majority of the findings on community resilience and spatial planning were in the social sciences, accounting for 56.94 percent of all documents, followed by environmental science at 40.28 percent, engineering at 29.86 percent, and earth and planetary sciences at 20.83 percent. Figure 3 reveals the other topics covered in community resilience and spatial planning research.

![Subject area](image_url)

**Figure 3.** Subject area.
3.5. **Keyword analysis**

VOSviewer software, an instrument for constructing and visualising bibliometric associations, was used to represent the author keywords. Figure 4 illustrates a network visualisation of the author keywords, in which the relationships with other keywords are illustrated using square size, colour, connecting line thickness, and font size. For instance, keywords with the same colour were frequently clustered together. As a result, in this study, community resiliences, spatial planning, natural disasters, social capitals, and urban areas all have a similar colour (blue).

![Figure 4. Network visualisation map of the author keywords.](image)

Based on the number of occurrences, keywords such as urban planning and climate change were discovered to be the most used keywords in community resilience and spatial planning research. Table 3 displays the top ten keywords used in the study.

| Author Keywords          | Total Publications (TP) | Percentage (%) |
|--------------------------|-------------------------|----------------|
| Urban Planning           | 55                      | 38.19          |
| Climate Change           | 28                      | 19.44          |
| Resilience               | 28                      | 19.44          |
| Community Resilience     | 26                      | 18.06          |
| Risk Assessment          | 26                      | 18.06          |
| Community Resilience     | 23                      | 15.97          |
| Disasters                | 23                      | 15.97          |
| Disaster Management      | 17                      | 11.81          |
| Sustainable Development  | 17                      | 11.81          |
| Floods                   | 16                      | 11.11          |
3.6. Geographical distribution of publications
There are 42 different countries that contributed to the publication of the analyzed document according to the country of origin to which the researcher is affiliated. Top countries contributed to the publications in community resilience and spatial planning research are presented in Figure 5. The United States ranks first with a total of 51 documents followed by Britain (16), Australia (14), and Italy (11) documents respectively.

![Geographical Distribution of Publication](image_url)

**Figure 5.** Geographical distribution of publications.

3.7. Citation analysis
This study used Harzing’s Publish or Perish, a software tool to determine the citation metrics for the retrieved data. This software used documents from the Scopus archive to calculate the citation metric and total citation for each document. The metrics for the records recalled as of August 2021, are recapitulated in Table 4. The recap includes the total sum of citations, as well as the number of citations per paper, citations per year, and citations per author.

| Metrics           | Data         |
|-------------------|--------------|
| Reference Date    | 24/8/2021 17:17:00 |
| Papers            | 144          |
| Citations         | 1983         |
| Years             | 21           |
| Cites/ Year       | 94.43        |

**Table 4.** Citations metrics.
Top five cited articles in the field of community resilience and spatial planning were listed in Table 6. An article entitled “Creating hazard resilient communities through land-use planning” by Lee, R.J. Burby, R.E. Deyle, D.R. Godschalk, R.B. Olshansky [18] received the highest citation (based on Scopus database) with a total of 219 citations (10.43 citations per year).

4. Conclusions
This paper represents a bibliometric study to get a well insight of the community resilience and spatial planning literature's trends, past review, predictions, and contributions. The topic was firstly research in 2020 and has fluctuate increased subsequently since then. In 2015, the figure of publications increased dramatically, with a total of 16 publications compared to 6 in 2014. The complete figure of publications in community resilience and spatial planning is expected to increase further in 2021, with 17 documents already published as of August 2021. Built on the keywords used by the authors, this analysis also discovers that the area’s most cover up in community resilience and spatial planning research are related to social sciences and environmental sciences. When compared to other developed countries such as the United Kingdom and Australia, the geographic distribution of the works reveals that the United States of America (USA) has the most publications as well as the most influence contributors in terms of the number of citations.

So, this study proposes that research on community resilience and spatial planning should be performed in other less developed or developing countries, as the disaster's impact was affected mostly
in these regions. This study also has a few shortcomings due to the database we used. As a result, despite Scopus being one of the largest databases, there are yet sources that are unindexed, and may have gone unnoticed. It's also worth noting that no examination enquiry is ideal, and that misleading outcomes can take place.

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