

# Trends in Knowledge Management within Open Government

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## Abstract

In realizing the aspirations as a democratic nation, the provision of high-quality information transparency by the government is essential, especially for the legislative body as the people's representation. To transform information into a fundamental consideration for public policies, effective knowledge management is needed from the community, who act as active users of this information transparency. This study aims to analyze the trends in research concerning knowledge management and open government. Data sources were obtained through the Web of Science for publications from 2019 to 2023, focusing on the fields of political science, management, and social reform. The applied method utilized bibliometric analysis with tools such as VOSviewer and Biblioshiny. The study's results identified a total of 2251 keywords, which were then refined to 259 keywords through data selection. From the VOSviewer analysis, the study yielded 1144 links and 4 clusters, indicating the interconnectedness among keywords. This interconnectedness was further illustrated through Network Visualization, Overlay Visualization, and Density Visualization. Meanwhile, the Biblioshiny analysis, conducted using the R Application, involved visualizations like WordCloud, TreeMap, and Trend Topics related to the keywords.

## Keywords

Bibliometric; Knowledge Management; Open Government; VOSviewer; Biblioshiny

## INTRODUCTION

The increasing accessibility of information technology and communication is closely related to the demand for a more dynamic form of governance. The lack of quality government performance, coupled with limited information transparency, further drives the emergence of pressures from the broader society, especially in scrutinizing the track record of representing council members. Public oversight over council members often falls short due to the public's political illiteracy and limited access to these council members. One of the efforts to reduce political illiteracy and enhance public access

is by implementing open parliament initiatives. Open parliament is an initiative aimed at increasing transparency within the parliament. It focuses on providing open information about parliamentary activities while also fostering collaboration with civil society.

Open parliament itself is a form of adoption from open government. The suboptimal performance of the government combined with the lack of information transparency will continue to generate pressure from the wider society. On the contrary, a government that provides public access will gain increasing trust from the community (Mardiyanta, 2013). According

to the survey results from the Edelman Trust Barometer Global Report 2022, the level of trust in ASEAN governments such as Indonesia, Singapore, Malaysia, and Thailand is relatively high compared to 28 other countries worldwide, with consecutive percentages of 76, 74, 62, and 60. However, despite this, the enhancement of performance quality across all government sectors still requires support through various policy innovations.

Indonesia, as a country with a relatively high level of public trust in the government globally, should consider the availability and quality of transparency that impacts how accessible the public's understanding of representation is. However, before heading towards a level of public trust that yields significant impacts, it's necessary to have a healthy management of public knowledge that can effectively function as a crucial component of a democratic society. Public knowledge itself can be seen as the sum of what the public knows to fulfill the function of utilizing information to achieve objectives (Kitcher, 2011). In this regard, often public actions do not align with the knowledge possessed (Sari, 2021), hence requiring a knowledge management approach to ensure that knowledge can be well-organized and more beneficial.

Issues related to knowledge management in accessing parliamentary transparency continue to be a concern and are considered essential for research and evaluation as part of an ongoing endeavor. Considering that public information is meant to emphasize social benefits and the rational basis of policies, knowledge management functions as a synergistic combination of data and the capacity for processing information technology, along with the creative and innovative capacity of humans. This is because policies fundamentally reside at the apex of the

hierarchy of human thought content that has been derived from data, information, knowledge, and understanding (Saussois, 2014).

The better the information is made available, the greater the likelihood that the public can identify common goals. Damage to the knowledge management system can pose real challenges to democracy (Laihonen, 2019). In line with the research conducted by Berkovitz and Fire (2022), information transparency, particularly concerning parliamentary transparency in a country, influences the functions of the parliament and aids in monitoring government performance. Apart from being a crucial component, knowledge management also serves as the initial step, beginning with understanding aspirations, experiences, and concerns to generate the best enthusiasm in fulfilling political promises.

In relation to this issue, knowledge management holds a crucial value. The best solution to democracy's challenges is more democracy, where unfixable ignorance becomes more abundant, leaving no choice but to attempt to address it by establishing channels of representation for citizens to restore public trust and promote democratic ideals. Considering the state of accessibility to public representation, which is perceived as insufficiently transparent, particularly in regards to the profiles and activities of council members, this accessibility can provide ease for interaction and the ability to view the performance track record of these members.

From the presented phenomenon, the problem statement that can be derived is how to map the gaps in previous studies related to knowledge management in the implementation of open government, as viewed through bibliometric analysis using tools like VOSviewer and Biblioshiny. The

research's objective is to provide a comprehensive overview of several journals over the past seventeen years and trace the development of scholarly activities identified through Web of Science. This aims to identify new research gaps and understand the interrelationships between areas of interest and other research disciplines through bibliometric analysis.

## RESEARCH METHOD

In this study, the methodology employed was bibliometric analysis, utilizing the keywords "knowledge management" and "open government" sourced from scholarly publications within the Web of Science. The document retrieval method involved using Boolean Operators "AND" to combine and form two keywords based on all fields. To track the data's progression, the researcher selected a time frame of the last five years, spanning from 2019 to 2023.

To utilize data as references in a research study, it should meet several attributes, including relevant titles, time range limitations, journal sources, authors, affiliations, abstracts, and keywords tailored by the researcher. The search was conducted through the scholarly citation index of Web of Science. The obtained results were then exported in RIS and BibTex formats on February 27, 2023. Subsequently, the exported data would be analyzed using the VOSviewer application (version 1.6.19) to determine the progress of scholarly publications on knowledge management and open government within the timeframe of 2019 to 2023. The analysis encompasses journal sources, author names, affiliations, document types, countries, and citation topics. Moreover, the analysis includes co-authorship, co-occurrence, co-citation, and thematic analyses. To illustrate the stages and sequence of this research completion process, a flowchart is provided in Figure 1.

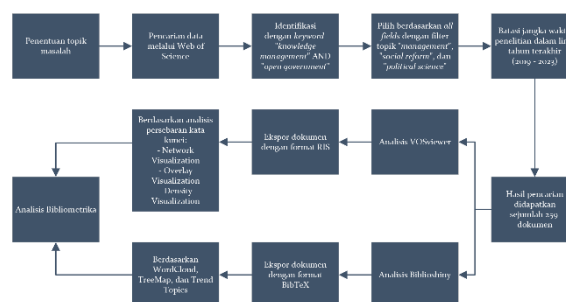


Figure 1. Bibliometric Analysis Flowchart.

Based on the flowchart above, it can be observed that the bibliometric analysis employed utilized VOSviewer and Biblioshiny with the keywords "knowledge management" and "open government." The initial step involved determining the problem topic based on the developing phenomenon. In this case, the researcher addressed a topic related to how the public can manage their knowledge of the information openness presented by government institutions. Once the problem topic was determined, the researcher proceeded to search for data through the Web of Science using the OpenVPN application, which facilitates access to subscribed e-Resources at Universitas Airlangga. The researcher then entered the keywords "knowledge management" and "open government" in the search column, using Boolean Operators "AND" in the all fields category. Subsequently, a time range of the last five years was specified to narrow down the data search to the most recent years, namely 2019 to 2023. This led to the discovery of 259 documents, which were then exported for further analysis.

From the exported documents, the bibliometric analysis was conducted using VOSviewer and Biblioshiny. With VOSviewer, the researcher started by importing the exported RIS format documents and created a map based on the text data derived from reference manager files. The process involved screening based on titles and abstracts, using binary

counting, threshold settings, determining the number of terms, and verifying relevant topics. After these steps, a keyword distribution map was generated, including Network Visualization, Overlay Visualization, and Density Visualization. In contrast, with Biblioshiny, the researcher uploaded the exported BibTeX format documents from Web of Science. This led to various visualizations of the required data. In this case, the researcher utilized features like WordCloud, TreeMap, and Trend Topics to understand the distribution of the keywords "knowledge management" and "open government."

## RESULTS AND DISCUSSION

### Based on Publication Year

According to the search results, scholarly publications related to the keywords "knowledge management" and "open government" within the timeframe of 2019 to 2023 in Web of Science amount to 259 documents. Furthermore, Table 1 below illustrates the fluctuating trend over this five-year period. It can be noted that the year 2021 had the highest number of publications, while the year 2023 remains with the lowest number of publications.

**Table 1.** Trend of Publications with Keywords "Knowledge Management" and "Open Government" from 2019 to 2023

Year	Document	Percentage
2023	6	2.317%
2022	59	22.780%
2021	77	29.730%
2020	64	24.710%
2019	53	20.463%
Total	259	100%

In other words, the results of publication documents related to the keywords "knowledge management" and "open government" from the years 2019 to 2023

can be detailed as follows. In the year 2019, there were 53 publications; in 2020, there were 64 publications; in 2021, there were 77 publications; in 2022, there were 59 publications; and in 2023, there were 6 publications. Thus, the total number of publications is 259.

### Based on Journal Sources

According to the search results, scholarly publications related to the keywords "knowledge management" and "open government" on Web of Science demonstrate diverse journal sources. However, the researcher has presented the top ten journal sources with the highest number of publications, as depicted in Figure 2. The journal source occupying the highest position is SAGE Open with a total of 13 documents. It is followed by Sustainability with 11 documents. Subsequently, Journal of Innovation Knowledge, Journal of The Knowledge Economy, and Lecture Notes in Computer Science each have 6 publications. Further down the list, Government Information Quarterly has 5 documents, followed by Journal of Technology Transfer and VINE Journal of Information and Knowledge Management Systems, each with 4 documents. Finally, IEEE Access and Industrial Marketing Management have 3 documents each.



**Figure 2.** Trend of Publications with Keywords "Knowledge Management" and "Open Government" Based on Journal Sources.

**Based on Author Names**

According to the search results, scholarly publications related to the keywords "knowledge management" and "open government" on Web of Science showcase a multitude of author names. However, the researcher has presented the top ten author names with the highest number of publications, as shown in Figure 3. The authors occupying the highest position in terms of publications are Janssen M. and Vendrell-herrero F., each with 4 documents. They are followed by Arias-oliva M., Bustinza O.F., Hilgers D., Kraus S., Musiello-neto F., Opazo-basaez M., Romanelli M., and Rusa O.L., each with 3 publications.

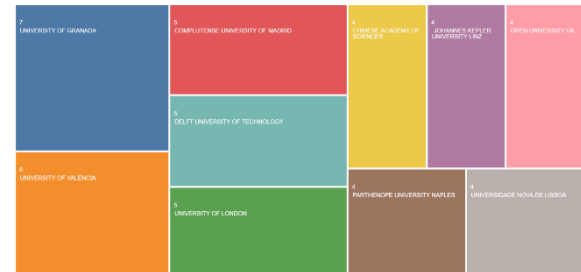


**Figure 3.** Trend of Publications with Keywords "Knowledge Management" and "Open Government" Based on Author Names.

**Based on Institutions**

According to the search results, scholarly publications related to the keywords "knowledge management" and "open government" on Web of Science originate from various institutions. However, the researcher has presented the top ten institutions with the highest number of publications, as depicted in Figure 4. The institution with the highest position in terms of publications is the University of Granada with a total of 7 documents. It is followed by the University of Valencia with 6 documents. Subsequently, Complutense University of Madrid, Delft University of Technology, and University of London each have 5 publications. Further down the list,

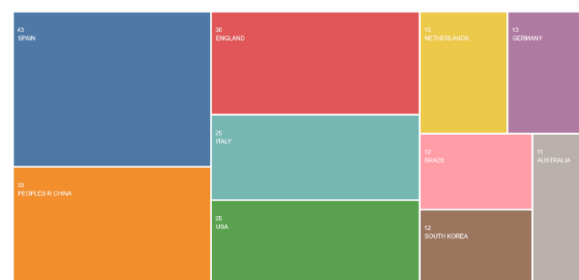
Chinese Academy of Sciences, Johannes Kepler University Linz, Open University UK, Parthenope University Naples, and Universidade Nova De Lisboa each have 4 publications.



**Figure 4.** Trend of Publications with Keywords "Knowledge Management" and "Open Government" Based on Institutions.

**Based on Countries**

According to the search results, scholarly publications related to the keywords "knowledge management" and "open government" on Web of Science originate from various countries or regions. However, the researcher has presented the top ten countries with the highest number of publications, as shown in Figure 5. The country with the highest position in terms of publications is Spain with a total of 43 documents. It is followed by the People's Republic of China with 33 documents, and then England with 30 documents.



**Figure 5.** Trend of Publications with Keywords "Knowledge Management" and "Open Government" Based on Countries.

Following that, Italy and the USA each have 25 publications. Further down the list, Netherlands has 15 publications, Germany

has 13, Brazil and South Korea have 12 each, and Australia has 11 publications.

### Based on Document Types

According to the search results, scholarly publications related to the keywords "knowledge management" and "open government" on Web of Science encompass a total of 259 documents with various document types. Further details are provided in Figure 6 below, which illustrates the highest-ranking document types in sequential order. It begins with the document type "article," amounting to 214 documents, followed by "proceeding paper" with 30 documents, then "early access" with 27 documents, "review article" with 13 documents, "editorial material" with 2 documents, and finally, "book chapters" and "data paper," each with 1 document.



**Figure 6.** Trend of Publications with Keywords "Knowledge Management" and "Open Government" Based on Document Types.

### Based on Journal Categories

According to the search results, scholarly publications related to the keywords "knowledge management" and "open government" on Web of Science encompass a total of 259 documents with various citation topics. Further details are provided in Figure 7 below, which illustrates the most frequent citation topics in sequential order. It begins with the category "Management," comprising 101 documents, followed by "Business" with 56 documents, then "Information Science Library Science" with

37 documents, "Public Administrations" with 27 documents, and the categories with the least citations are "Computer Science Interdisciplinary Applications," "Environmental Sciences," and "Environmental Studies," each with 17 documents.



**Figure 7.** Trend of Publications with Keywords "Knowledge Management" and "Open Government" Based on Categories.

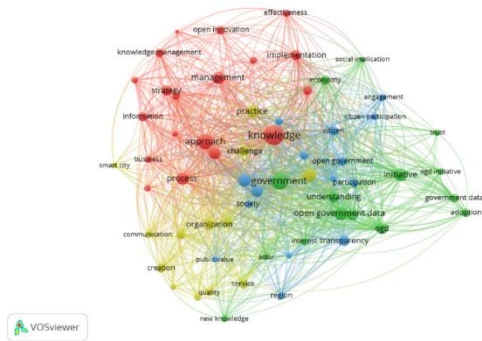
### Visualization of Publications in VOSviewer

#### Network Visualization of Keyword Distribution

Based on the data gathered from Web of Science, a total of 1454 keywords were obtained. Subsequently, the visualization results generated a total of 62 keywords that met the display criteria related to knowledge management and open government. There were 1144 links or connections between subject keywords, forming 4 clusters. The first cluster consisted of 19 subject keyword items, the second cluster had 15 items, the third cluster had 15 items, and the fourth cluster had 13 items. The presence of these four clusters led to the creation of the Network Visualization analysis, which aims to illustrate the various interrelated connections among the acquired keywords. Additionally, Overlay Visualization was used to showcase the publication years of the data, while Density Visualization illustrated the dominance of data in terms of the density of researched subjects. Further

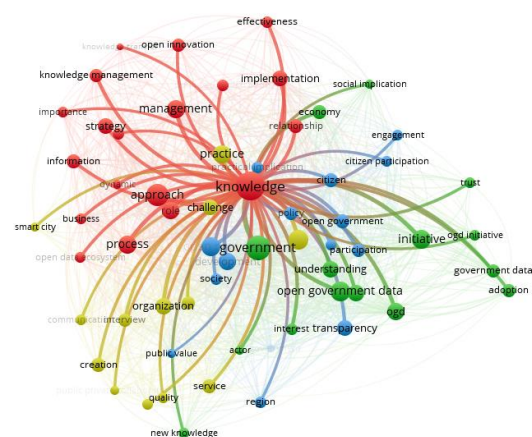


visualization results are depicted in Figure 8.



**Figure 8.** The Results of Network Visualization with VOSviewer from 2019 to 2023.

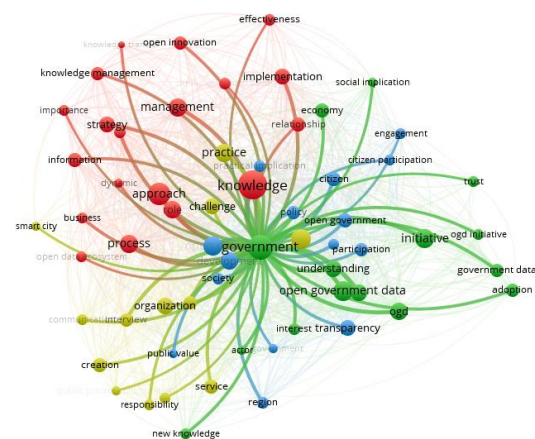
To further clarify the visualization of each cluster, the researcher provides images for each cluster along with explanations to facilitate readers' understanding of its components. Cluster 1 is highlighted in red and comprises 19 items. The largest item within this cluster is the keyword "knowledge," which has 60 links, a total link strength of 262, and occurs 27 times. It is followed by the keyword "approach," which has 57 links, a total link strength of 198, and occurs 16 times. Subsequently, the keyword "process" is present with 53 links, a total link



**Figure 9.** Results of Cluster 1 Visualization Based on Network Visualization with VOSviewer on Keyword Distribution.

strength of 120, and occurs 10 times. From the image below, it can be inferred that the themes or subjects connected to Cluster 1 include "knowledge," "government," "initiative," "approach," "open government data," and others within the context of the keywords "knowledge management" and "open government" search.

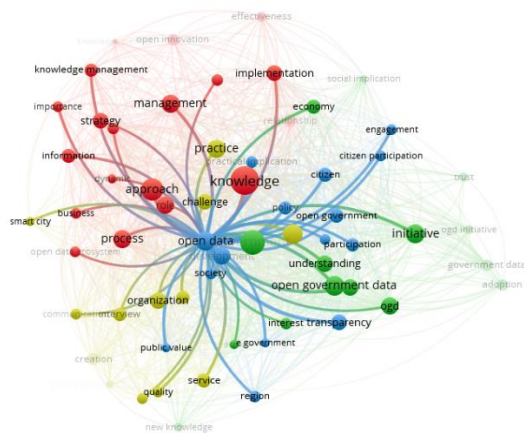
Cluster 2 is depicted in green and encompasses 15 items, with the keyword "government" being the most prominent. It has 61 links, a total link strength of 245, and occurs 20 times. Following that is the keyword "country," with 53 links, a total link strength of 130, and occurrences 8. Subsequently, the keyword "understanding" appears with 52 links, a total link strength of 110, and occurrences 8. From the image below, it can be inferred that the themes or subjects connected to Cluster 2 include "knowledge," "management," "organization," "open government data," and others within the context of the keywords "knowledge management" and "open government" search.



**Figure 10.** Results of Cluster 2 Visualization Based on Network Visualization with VOSviewer on Keyword Distribution.

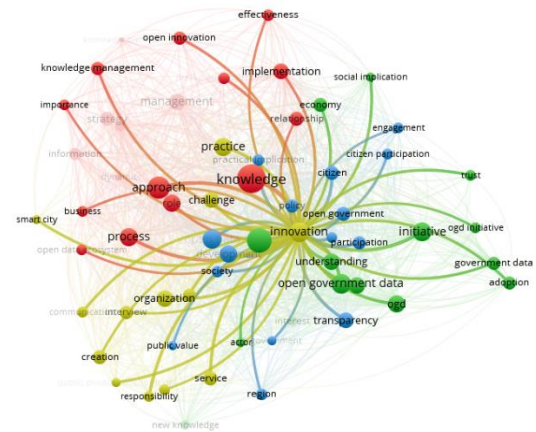
Cluster 3 is represented in blue and comprises 15 items, with the keyword "development" being the most prominent. It has 51 links, a total link strength of 112, and

occurs 9 times. Following that is the keyword "open data," with 49 links, a total link strength of 113, and occurrences 11. Subsequently, the keyword "practical implication" appears with 48 links, a total link strength of 91, and occurrences 4. From the image below, it can be inferred that the themes or subjects connected to Cluster 3 include "knowledge," "open government data," "innovation," and others within the context of the keywords "knowledge management" and "open government" search.



**Figure 11.** Results of Cluster 3 Visualization Based on Network Visualization with VOSviewer on Keyword Distribution.

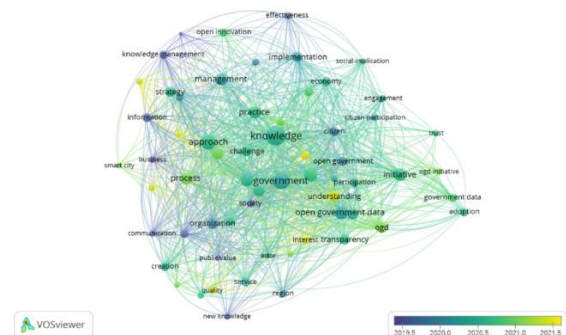
Cluster 4 is visualized in yellow and encompasses 13 items, with the keyword "innovation" being the most prominent. It has 53 links, a total link strength of 130, and occurs 12 times. Following that is the keyword "practice," with 52 links, a total link strength of 122, and occurrences 10. Subsequently, the keyword "organization" appears with 46 links, a total link strength of 93, and occurrences 8. From the image below, it can be inferred that the themes or subjects connected to Cluster 4 include "knowledge," "approach," "initiative," and others within the context of the keywords "knowledge management" and "open government" search.



**Figure 12.** Results of Cluster 4 Visualization Based on Network Visualization with VOSviewer on Keyword Distribution.

*Overlay Visualization of Keyword Distribution*

The results of Overlay Visualization indicate that darker-colored circles signify research conducted over a relatively longer period, particularly in the year 2019. In the image below, it's evident that keywords such as "knowledge management," "effectiveness," "communication," "open government," "knowledge transfer," and the like have been studied over an extended period. Conversely, lighter-colored circles indicate research conducted over a relatively shorter period, particularly in the year 2023.



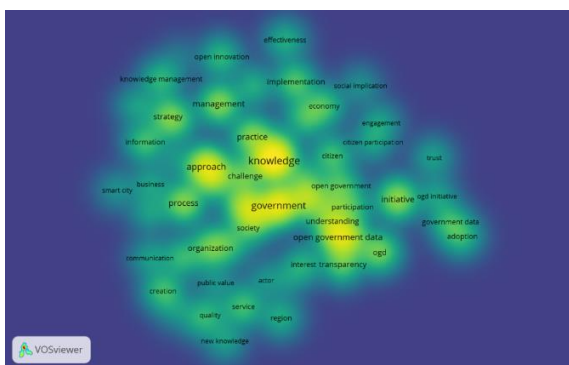
**Figure 13.** Results of Overlay Visualization with VOSviewer for the Years 2019-2023.



In the figure 13, keywords like "importance," "policy," "understanding," "dynamic," "interest," "quality," and others fall within the recent research timeframe. Thus, it can be concluded that the majority of keywords pertain to research conducted over a longer duration, which could serve as an impetus for future studies.

#### *Density Visualization of Keyword Distribution*

The results of Density Visualization reveal that brighter colors indicate that extensive research has been conducted. This is illustrated through keywords such as "knowledge," "approach," "government," "open government data," and "understanding." Conversely, darker colors signify that there has been relatively less research related to the mentioned keywords, such as "knowledge management," "adoption," "trust," "open innovation," "smart city," and so forth. Meanwhile, the darker blue background is referred to as the area, which does not hold significant meaning. Consequently, this presents opportunities for further research, particularly concerning data openness within legislative bodies that are linked to knowledge management.



**Figure 14.** Results of Density Visualization with VOSviewer for the Years 2019-2023.

### **Visualizing Publications in R Application (Biblioshiny)**

#### *WordCloud Analysis*

The result of bibliometric analysis using the R Application is shown below, based on the keywords "knowledge management" and "open government," utilizing the WordCloud feature. It indicates that the most prominent words are "adoption," "innovation," and "management." Subsequently, other notable words include "impact," "barriers," "determinants," "performance," and "transparency." Therefore, the keywords "knowledge management" and "open government" within the context of legislative bodies and parliamentary transparency can signify a new direction, considering the limited research in this area concerning Indonesia as a democratic nation.

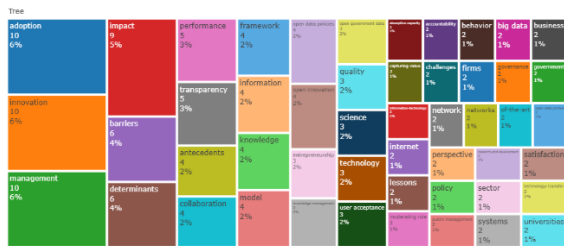


**Figure 15.** WordCloud Visualization Results using Biblioshiny for the Years 2019-2023

#### *TreeMap Analysis*

The result of bibliometric analysis using the R Application is presented below, based on the keywords "knowledge management" and "open government," utilizing the TreeMap feature. It reveals that the most prominent words are "adoption," "innovation," and "management," each accounting for 6 percent. Following that, the next notable word is "impact," accounting for 5 percent, then "barriers" and "determinants" at 4 percent, and "performance" and "transparency" at 3 percent. Consequently, the connection between knowledge management and open government still reflects a lack of research in the last five years. This is evident by the keywords "knowledge management" and

"open government data," which are still at a 2 percent value.

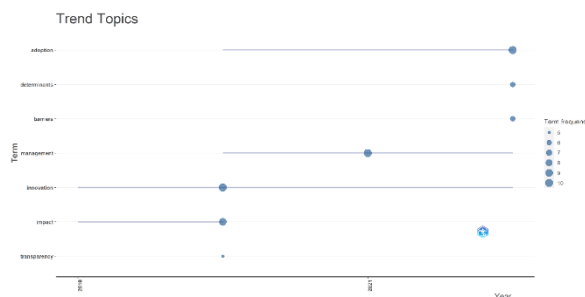


**Figure 16.** Treemap Visualization Results using Biblioshiny for the Years 2019-2023

### Trend Topics Analysis

The result of bibliometric analysis using the R Application is presented below, based on the keywords "knowledge management" and "open government," utilizing the Trend Topics feature. It shows that the most prominent keywords are as follows:

- a) "Adoption" was last researched in 2022 with a frequency pattern of 10.
- b) In the same year, "determinants" and "barriers" exhibited a frequency pattern of 6.
- c) "Management" was last trending in 2021 with a frequency pattern of 10.
- d) Following that, "innovation" showed a trend in 2020 with a frequency pattern of 10.
- e) In the same year, "impact" had a frequency pattern of 9, and "transparency" with a pattern of 5.



**Figure 17.** Trend Topics Visualization Results using Biblioshiny for the Years 2019-2023.

Reviewing the results and discussions from the document search on Web of Science related to the keywords "knowledge management" and "open government," it can be observed that Janssen M and Vendrell-herrero F are the top two authors who have published the most documents, with 4 publications each. One of the documents authored by Janssen M is titled "Understanding the evolution of open government data research: towards open data sustainability and smartness." This document delves into lessons for countries in the early stages of open government data development, aiming to extract the trajectory of open government data evolution. The research findings reveal that open government data research can be divided into four main phases, and the movement of open government data has extended to developing countries and smart cities. Various challenges and issues faced by researchers in each phase have driven the evolution of open government data research. This document is categorized in the International Review of Administrative Sciences in 2021 and has received a total of 13 citations.

Meanwhile, the highest number of citations was achieved by Ferran Vendrell-Herrero's paper titled "Challenging the knowledge resources complementarity hypothesis: a counterexample." This paper presents a perspective based on resource interactions, focusing on the interaction between managerial and employee knowledge, seen as a knowledge source that companies can utilize to enhance innovation. The research findings reveal a negative interaction between workforce skills and managerial experience in determining the likelihood of achieving product innovation. This negative interaction can have implications for knowledge management practices within

companies. The document has been categorized in Knowledge Management Research and Practice in the year 2021.

On the other hand, Spain, which has the highest number of publications related to the mentioned keywords, also contributes through a document titled "Understanding open data business models from innovation and knowledge management perspectives." This paper delves into Open Data Business Models (ODBMs) as sources of knowledge and innovation for generating economic and social value. The research findings articulate ODBMs across five themes: business models, smart city initiatives, business ecosystems, decision-making, and innovation. Taking a further step, the implementation of ODBMs can transform and transfer open data into valuable knowledge, aiding the development of institutions and fostering collaboration. This document has been categorized in the Business Process Management Journal in 2022.

## CONCLUSION

From the presented findings, it can be concluded that bibliometric analysis with visualization using VOSviewer discovered a total of 4 clusters among 62 related keyword items associated with knowledge management and open government. The first cluster consists of 19 subject keywords, the second cluster contains 15 subject keywords, the third cluster has 15 subject keywords, and the fourth cluster comprises 13 subject keywords. The highest number of citations was obtained by SAGE Open, totaling 13 documents, with the peak publication year in 2021. Furthermore, the most prolific authors are Janssen M and Vendrell-Herrero F, and they are affiliated with the University of Granada, Spain. Meanwhile, the bibliometric analysis using Biblioshiny indicates that the most frequent keywords include adoption, innovation,

and management. These three keywords signify ongoing research trends in the recent years.

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