

Publication Trend of Public Sentiment Towards Indonesia Government Policies

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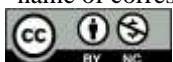
Abstract: There are 167 million social media users in Indonesia. Some of these users express their opinions on social media known as public opinion. Public sentiment is the classification of public opinion into several classes. Understanding public sentiment through some public policies can benefit the government. Publication trends can be a stepping stone to deeply understanding a research topic. No research was conducted on the publication trend of public sentiment toward Indonesian government policies on social media. This study aims to explore publication trends in the area of public sentiment toward Indonesia government policies on social media using bibliometric analysis. The Scopus database is used to gather abstracts and keywords, funding details, citation information, bibliographical information, and other information. Search document terms used are "public", "sentiment", "social media", "government", "governance," and "policy" rolled within the article title, abstract, and keywords. Research publication trends were visualized using VOSViewer co-occurrence keyword analysis, which resulted in seven clusters from all the collected literature. The research trend is climbing significantly in 2018–2021, but decreasing in 2022. The University of Indonesia is the institution that produces the most documents and IOP Conference Series on Earth and Environmental Science is the publication place that publishes the most documents. Decision trees, random forests, logistic regression, naïve bayes, support vector machines and long-short-term memory are part of the machine learning algorithms recycled and Twitter is the most used social media platform.

Keywords: Bibliometric analysis; Indonesia Government Policies; Machine Learning Algorithms; Public Sentiment; Publication Trends;

INTRODUCTION

Public opinion refers to the collective attitudes, beliefs, emotions, and ideas of a particular group of people, usually within a society or a specific community, regarding various issues or topics (Y. Wang et al., 2023). Public opinion can be grouped into several classes based on their similarity. Grouping similar opinions into several classes is known as sentiment. Grouping public opinion into several sentiments is known as public sentiment. Public sentiment can be influenced by several factors, including social, political, economic, cultural events, media coverage, and individual experiences (Azeez et al., 2022). Public sentiment can be classified into different categories, such as positive, negative, neutral, or mixed (Z. Wang et al., 2017). It can also be further divided based on specific emotions, such as anger, anxiety, satisfaction, happiness, or excitement (Z. Wang et al., 2017). Understanding public sentiment can be beneficial for government policy (Georgiadou et al., 2020;

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Nurmawiya & Harvian, 2021; Xie et al., 2020; Yang et al., 2022). There are various methods used to study public sentiment, such as surveys, polls, social media analysis, and sentiment analysis of textual data. Nick and Ben study public opinion on social media by collecting data through surveys or polls and then later conducting social media analysis by qualitative and quantitative methods, best known as mixed-method approaches, manually (Anstead & O'Loughlin, 2015). Since data has grown exponentially as a result of cheaper storage and computation power, acquisition and analysis of data manually is difficult to conduct as the number of data points increases and so does social media opinion production by the public. A recent researcher conducted research in sentiment analysis using computational aids. Ahlgren studies publication trend in sentiment analysis using bibliometric analysis (Ahlgren, 2016). Unfortunately, his finding does not state Indonesia as one of the top twenty countries among those countries that published literature on sentiment analysis.

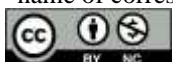
Indonesia, the emerging countries in the southeast Asia, predicted become a great industrial country in 2045 (Rokhman et al., 2014). The Indonesian population has embraced social media as a means of communication, entertainment and staying connected with friends and family. The social media landscape is continuously evolving, and new platforms and trends may emerge. Additionally, the popularity of certain social media platforms can change rapidly, influenced by factors such as user preferences, marketing efforts, and government regulations. Indonesia has 167 million active social media users. Some of these users express their opinions about government policies on social media. The dark side of public sentiment has consequences for Indonesian society's polarization (Jati, 2022). Any research related to public sentiment in Indonesia is an important topic for Indonesia government to deliver proper policy. Therefore, the contribution of this article is to show the publication trend of public sentiment research towards Indonesia government policies on social media and become the initial step in understanding public sentiment for better public policy.

This paper is organized as follows: Chapter one is an introduction. It describes the reasoning and research questions of this study. Chapter two is a literature review. It defines the concept of bibliometric analysis from different scenarios. Chapter three is the method. It describes the methodology applied in this study. Chapter four is the result. It represents the findings related to the research questions stated in Chapter one. Chapter five is the discussion. In this chapter, we explore the findings and their relation to the literature review in chapter two. Chapter six is the conclusion and suggestion. In this chapter, we conclude our study and state our limitations.

LITERATURE REVIEW

There are some publications discussing bibliometric research in recent years (Deng & Romainoor, 2022; Donthu et al., 2021; Ellegaard & Wallin, 2015; Huo et al., 2022; Jati, 2022; Kholidah et al., 2022; Mejia et al., 2021; Rasul et al., 2022; Sarirete, 2021; Su et al., 2021; Xu et al., 2022). Ellegaard and Wallin record that the use of bibliometrics has increased because of the sufficient number of publications on a topic and widely available tools to be used (Ellegaard & Wallin, 2015). Most of research in publication trend group the result based on countries, institutions, journals and keywords from specific topic such machine learning algorithm, healthcare and finance by exploring the visualization tools (Deng & Romainoor, 2022; Huo et al., 2022; Kholidah et al., 2022; Mejia et al., 2021; Rasul et al., 2022; Su et al., 2021; Xu et al., 2022). To conduct bibliometric analysis, Donthu et al define 5 steps such as define aim and scope, techniques chosen, collect data, and finally run bibliometric analysis (Donthu et al., 2021). Sarirete conducted a bibliometric analysis on public sentiment related to covid-19 vaccines from the Scopus database and revealed that Twitter is the most used social media to express public sentiment (Sarirete, 2021). Rasul et al suggest exploring sentiment analysis on social media-based advertising expenditure and its impact on stock performance (Rasul et al., 2022). Although, Ahlgren has studies sentiment analysis in Scopus database, he did not revealed the detail about Indonesia (Ahlgren, 2016). As far of our knowledge, no research conduct in the publication trend related to Indonesia Government Policies using bibliometric analysis using Scopus database.

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METHOD

This research methodology started by defining purpose and scope, data acquisition, data processing, and visualization. The study purpose to explore the recent trend of public sentiment on social media toward government policy in Indonesia. The scope of this study is to explore the trend by using bibliometric analysis approaches. The step-by-step methodology applied in this research is presented in the image below.



Fig. 1 Research Methodology

Bibliometric analysis is the method used to measure the scholarly impact and productivity of scientific publications (Donthu et al., 2021; Ellegaard & Wallin, 2015). It is a statistical tool to apply to academic literature, such as bibliographic data and powerful software computers, to gain insights from various aspects of research output, collaboration patterns, and trends within a specific field or across multiple disciplines (Paul & Barari, 2022). Some key elements of it are bibliographic data, citation analysis, collaboration analysis, journal impact factor, H-index, mapping, visualization, and trend analysis (Hou et al., 2018; Huo et al., 2022; Mejia et al., 2021; Sarirete, 2021).

Secondly, bibliographic data acquisition is conducted by defining search queries and exporting the results in CSV format from the scopus.com website to a local computer. The Scopus database is used to satisfy bibliographic data because it is one of two reputable academic databases in the world (Zhu & Liu, 2020). It is used to gather abstracts and keywords, funding details, citation information, bibliographical information, and other information. It was collected from the scopus.com website by applying a search document for the terms ("public" OR "sentiment" OR "social media" AND "government" OR "governance" AND "policy") in the search box and searching within the article title, abstract, and keywords. It filters in the range of 2018–2022, article and conference paper document type, English language, Indonesian country or territory, journal and conference proceeding source type, and finally only for the publication stage. The search result of 1140 documents exported as CSV formatted by selecting, abstracts and keywords, funding details, citation information, bibliographic information and other information. The CSV export consists of six files that are downloaded to the local computer.

Finally, data processing and visualization are complete using VOSViewer. VOSViewer stands for Visualization of Similarities Viewer. It is used for constructing and visualizing bibliometric networks (Deng & Romainoor, 2022; Eck & Waltman, 2014; Kholidah et al., 2022; van Eck & Waltman, 2010; Xu et al., 2022). It helps to gain insights deeper in structure and patterns of scientific literature bibliometric networks. Some key features of it include network visualization, overlay visualization, density visualization, cluster analysis, export, and sharing (van Eck & Waltman, 2023). It requires bibliographic data obtained from academic databases like Web of Science, Scopus, or PubMed to create meaningful visualizations and analyses (van Eck & Waltman, 2023).

Data processing and visualization start by opening the create map button on VOSViewer software and choosing create map based on bibliographic data. A bibliographic database file is selected as the data source option filter. The Scopus tab is selected, and six CVS files are exported, previously selected as file sources. Co-occurrence, functional counting, and all keywords all apply as filters in the analysis and counting method options. Thesaurus file was selected to reduce keyword redundancies. The threshold is set to 5, and the number of keywords produced is 352 from the 6240 keywords available. All 352 keywords are included in the verify keywords step to build a co-occurrence map. The next sections provide results and discussion by analyzing maps and meta-information visualized using VOSViewer.

RESULT

The publication trend of public sentiment toward Indonesia government policies on social media is climbing significantly in 2018–2021. It reaches its peak in 2021, with 282 publications published. Unfortunately, the trend is dropping in 2022, as shown in Figure 2. Articles dominate conference papers at 61,93% over 38,03%. In terms of university performance, as shown in Table 1, University Indonesia ranks at the top by publishing 135 documents, followed by Universitas Diponegoro (64), Universitas Gadjah Mada and Universitas Padjadjaran (58), Universitas Airlangga (47), and Universitas Brawijaya (33). The number of funding sponsors not stated reached 909 documents. There are 33 documents funded by Universitas Indonesia, 8 documents funded by Universitas Padjadjaran, 7 documents sponsored by Universitas Diponegoro, and 6 documents sponsored by Universitas Airlangga and Universitas Brawijaya.

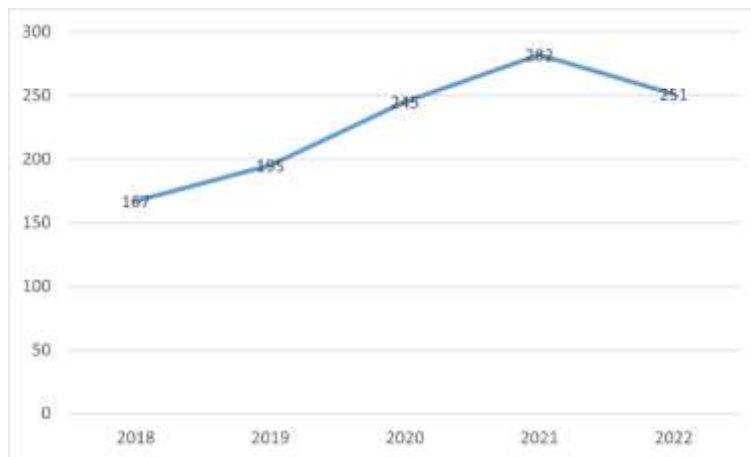


Fig. 2 Publication Number Year-of-Year

All of the documents are distributed in social science (386), environmental science (315), earth and planetary science (232), engineering (196), and computer science (188) and are distributed among the rest in different subject fields. The IOP Conference Series on Earth and Environmental Science dominates the publisher title with 158 documents. The E3S Web of Conference publishes 52 documents, and the Journal of Physics Conference Series publishes 33 documents. The IOP Conference Series Material Science and Engineering publishes 30. The International Journal of Innovation, Creativity, and Change publishes 23 documents.

Table. 1 Top 10 Institution Performance in Indonesia

University	QS Top Universities Raking 2023	Number of Documents Published	Number of Documents Sponsored
Universitas Gadjah Mada	232	58	3
Institute Teknologi Bandung	235	31	1
Universitas Indonesia	248	135	33
Universitas Airlangga	369	47	6
Universitas IPB	449	26	1
Institut Teknologi Sepuluh Noverber	701-750	14	N/A
Universitas Padjadjaran	751-800	58	8
Universitas Diponegoro	801-1000	64	7
Universitas Brawijaya	801-1000	33	6
Bina Nusantara University	1001-1200	29	2

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Total keywords identified to categorize 1140 documents is 352 keywords. These keywords classified into 7 cluster as shown in figure 3. Cluster 1, which is the red cluster, consist of 111 keywords. Human, public health, government, health care policy, pandemic is among the most occurrences and the higher link strength cluster 1. Cluster 2, which is the green cluster, consist of 80 keywords. Public policy, economic, sustainable development, planning, environmental protection, public administration, policy analysis are the most occurrences and the higher link strength in cluster 2. Cluster 3, which is the blue cluster, consist of 62 keywords. Information system, information use, decision making, smart city, public service, e-government are the most occurrence and the higher link strength in cluster 3. Cluster 4, which is the yellow cluster, consist of 44 keywords. Indonesian, policy, local government, governance approach, policy making are the most occurrence and the higher link strength in cluster 4. Cluster 5, which is the purple cluster, consist of 35 keywords. Covid-19, social media, social networking (online), sentiment analysis are the most occurrence and the higher link strength in cluster 5. Cluster 6, which is the light blue one, consist of 15 keywords. Indonesia, good governance, decentralization, policy implementation, corruption, collaborative government is the most occurrence and the higher link strength in cluster 6. Cluster 7, which is the least one, consist of 3 keywords are attention, disaster, hospital.

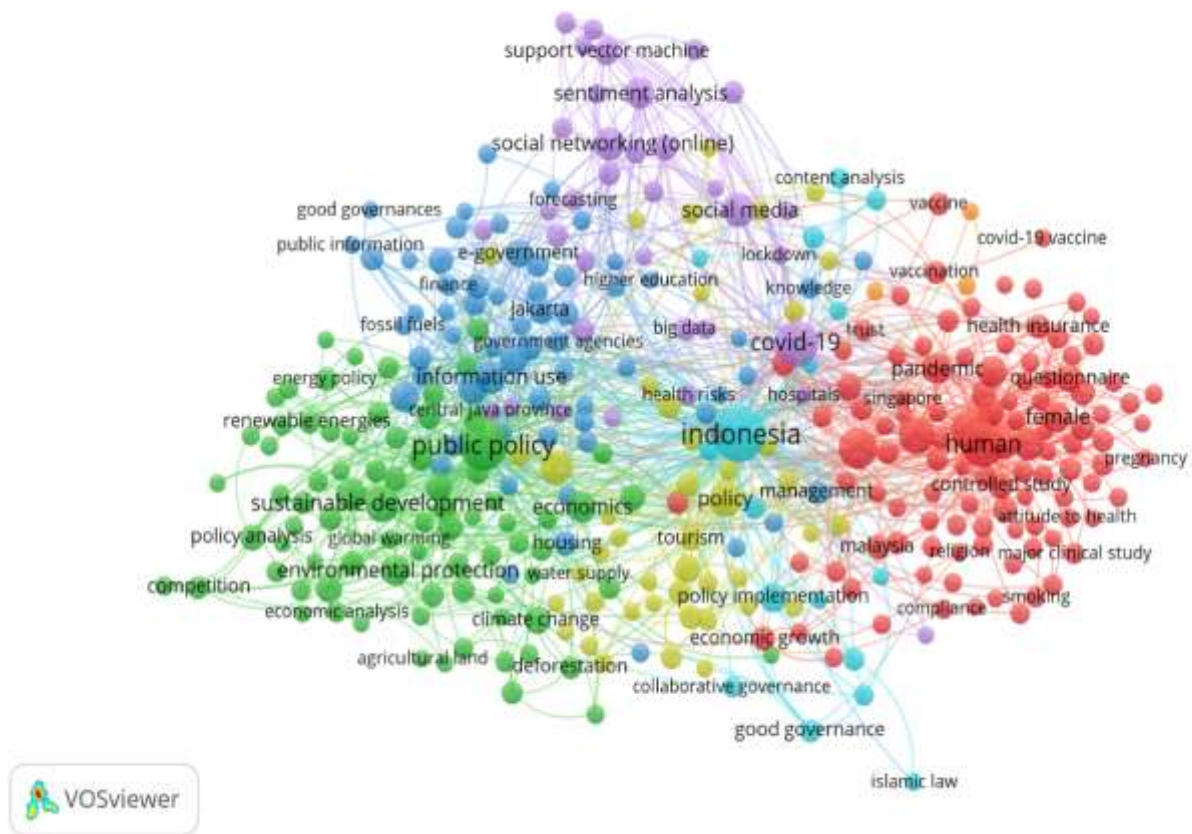


Fig. 3 Network Visualization of co-occurrence keyword from 1140 documents

Deep diving into cluster 5 in figure 4, we can summarize that the concentration of cluster 5 is mostly talking about sentiment analysis and related keywords. Decision trees, random forests, logistic regression, naïve bayes, support vector machines and long-short-term memory are part of the machine learning algorithms recycled to conduct sentiment analysis studies. Twitter is the most commonly used platform to gather public opinion data in most sentiment analysis studies.

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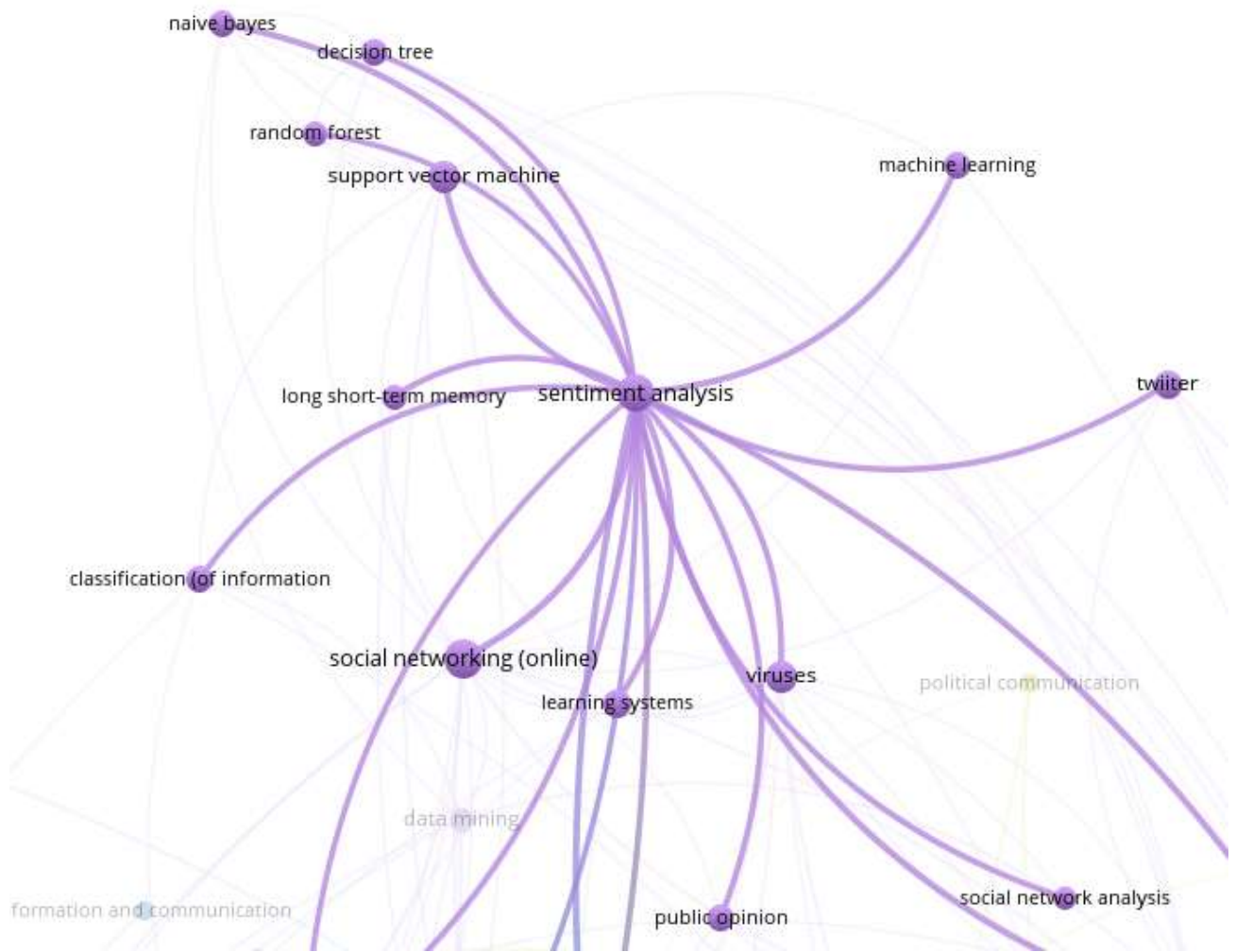


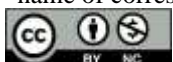
Fig. 4 Keyword Concentration of Cluster 5

DISCUSSIONS

The publication trend tends to decline in 2022, possibly because of publication delay. Publication delay ranges from 100 days – 1000 days (Guo et al., 2021). Data acquisition for this research was conducted in May 2023, which is less than 100 days of publication delay tolerance for an article published in 2022. IOP Conference Series on Earth and Environmental Science published more documents compared to others possibly because of its high impact factor compared to other publishers found in this research based on records in scimagojr.com therefore, they have to accommodate more authors who want to publish their articles there. Universitas Indonesia is the top institution publishing an article because of the internal budget provided by the university to support researchers based on Table 1. Universitas Indonesia provides almost 25% of published articles funded by university funds.

Keywords distributed among 7 clusters with broad topics discussed among them are health, economics, electronic government, policy context, sentiment analysis and disaster. This broad discussion topic emerged because of the wide aspect of the government policies domain. Cluster 5 reveals the most of algorithms, media social and analysis techniques used to conduct research on sentiment analysis of Indonesia government policies. Not surprisingly, LSTM is among the algorithms used because it's the deep learning approach that should have the best performance when applied to huge datasets such as sentiment analysis on social media.

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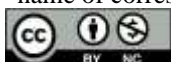
CONCLUSION

This study contributes to the recent trend of public sentiment on social media toward government policy in Indonesia. This research shows the recent trend of publication number, institution contribution, and publisher contribution on this topic. Throughout the bibliometric analysis, Cluster 5 summarizes the trend of machine learning algorithms and social media platforms used to conduct sentiment analysis. This study has limitations and can encourage future research. Firstly, web of science database data sources was not collected in this study. Combining two of the most reputable scientific databases, such as Scopus and the Web of Science, enriches the data source for the study. Secondly, deeper analysis using VOSViewer, such as analysis on density visualization, may open the black box about saturated keywords used in recent research documents. Thirdly, bibliometric analysis uses quantitative approaches, whose quality 1140 document has not been explored profoundly. Therefore, deeper analysis of each of the 1140 documents by an expert will contribute in a different way in the future.

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