Social Network Analysis of the Government's Mobility Restriction Policy in Indonesia During Covid-19 Pandemic

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Abstract

In order to mitigate the adverse effect of Covid-19 pandemic, the government of Indonesia enforced mobility restriction policy (PSBB) between April and July 2020. This policy was met with various responses from the fastly growing digital space. We capture 8000 Indonesian twitter conversation on the issue. Social Network Analysis is applied to identify different role of users in amplifying the policy either positively or negatively. We identify three main actors with government related actors and the media positioned closely. However, contrasting opinion by the opposition dominates the conversation and they affect public perception on the government's PSBB policy. The findings recall the current debate of the need for content moderation by social media user community to mitigate public opinion manipulation by influencers.

Keywords: *Social Network Analysis, Social-Media, Mobility Restriction, Covid-19 Policy.*

A. INTRODUCTION

Citizen participation and political communication are no longer carried out by a conventional way such as television or radio. Present days, citizen participation can be defined by social media. For example, Supriatna et al. (2022) and Widiastuti (2023) provide an example where social media via Twitter gave an aggressive support for the candidates they support. At that time, the hashtag *#thepowerofemakemak* and the Pepes women's mobilization movement are the right cases to show that without parties or direct involvement in the practical political system. In this case, they were able to color the political discourse during the 2019 Presidential Election process in Indonesia.

Another example is the hashtag of *#2019gantipresiden* where the problem situated on the 2019 election. The tendency at that time was some people feel that it is the right to change a president. It was a Twitter hashtag and social media campaign in which Indonesian users shared their disapproval towards the Joko Widodo presidency. The main purpose of this campaign was a constitutional effort to replace the current president in the 2019 general election in which also involved identity such race and religion. This movement however, gained wide support where there were 110 thousands mention about it, compared to 18 thousands of *#jokowi2periode* as the competitor (Fadillah & Chang, 2021; Pitaloka, 2021).

Those two examples of hashtag were moved by person, persons and/or group of people, which also sometimes involve robotic, bot and/or AI. Thus, these examples are evidence that the role of influencers in managing public sentiment and the construction of political discourse, where in this case, driven by women's participation

and political person (Blommaert, 2020). This movement cannot be catched purely catched and observed by manual or human intervention. One of many reasons is hashtag constitutes in the chamber of online while human interventions are only happened by senses. Therefore, there should be a new way to capture the movement in the social media, internet and digital which makes an equal intervention of digital to digital (Schwab, 2016).

One of equal interventions is using Social Network Analysis (SNA). In general, SNA is one of the most popular methods used to view social networks. SNA uses to find patterns distribution and discovers key players on social media by looking at the general overview of the network and the metrics, such as degree centrality (indegree and outdegree), betweenness centrality and reciprocity. Furthermore, SNA is also used to study linking organizations that have betweenness on centrality highest levels and is well positioned (Boulianne, 2015; Santoso & Veliyanti, 2021).

In the political and social sciences context, SNA can be used as a way, tool and/or method phenomenon of social and politics, consists of content, spread of the information and sentiment of the content and spreadness. Content means that SNA can capture what contents in the social media which questions of how many times particular words appeared are the main focus. Spreadness means that SNA can potray where the information goes, by whom and what organizations received that information. Sentiment can reveal the tone of the information, is it any hate speech, negative comment or the opposite, are the primary focus (Neri et al., 2012; Lai & To, 2015; Azmi et al., 2021).

SNA in the above research reveals that the hashtag #ThePowerOfEmakEmak is not only an effort to manage public sentiment where political communication is constructed, but is also able to attract household economic issues to become national issues. Although in some aspects it is less effective because users are limited to their own circle. However, those aspects indicate that political motivation tends to be towards the interests of certain groups compared to more political motives for participating in the democratic process (Burstein, 2003; Tan et al., 2014).

The political motives in democratic participation will be observed by the Large-Scale Social Restrictions (PSBB) policy implemented by the government in response to the Covid-19. This policy in response of pandemic has become one of the main focuses of attention in efforts to handle this global health crisis. In this case, this study Social Network Analysis (SNA) is a useful tool for understanding social dynamics and relationships between actors in implementing PSBB policies (Disantara, 2020).

This research aims to investigate how social networks between various stakeholders, such as government, society and the private sector as well as itsinfluence in the implementation of PSBB policies. We use SNA to analyze communication, collaboration and information exchange between various parties involved in handling the pandemic. The research results reveal a complex and dynamic pattern of relationships in this social network, with direct implications for the effectiveness of PSBB policies (Freeman, 2004; Andriani, 2020).

The findings of this study can help the government and other stakeholders in designing, implementing and evaluating PSBB policies more effectively, as well as improving coordination and collaboration between all parties involved in handling Covid-19. This research also provides insight into how social network analysis can be used as an important tool in understanding policy dynamics in the context of a public health crisis.

Covid-19 Background

The Covid-19 pandemic spread rapidly since its first discovery in Wuhan, China, in November 2019. The first Southeast Asian countries to announce the entry of this virus into their country for the first time were Thailand and the Philippines in January 2020. At this time the Indonesian government has not detected the presence of Covid-19 despite the controversy surrounding this issue. The controversy that has emerged is the attitude of the Indonesian government towards the beginning of the Covid-19 pandemic, which can be seen through several statements by government officials denying the existence or not taking the potential threat of this virus seriously (Jahangir et al., 2020; Lim, 2021; Platto et al., 2021). Chairil (2020) wrote about the government's response, which he called desecuritization. This incident occurred until early March 2020.

Confirmation of the existence of Covid-19 was first tracked in South Jakarta, and then followed by widespread spread in the Jabodetabek area on March 2020. By June 2020, the spread of this pandemic has massively reached most areas, especially on the islands of Java and Bali (see Figure 1). Following up on this problem, the government has anticipated this through a number of policies, one of which is Large-Scale Social Restrictions (PSBB) which took effect between March and July 2020 (Olivia et al., 2020).

Figure 1. The Spread of Covid-19 in Indonesia According to the Number of Infection Cases

Source: (Philips & Wicaksono, 2020)

In relation with descriptions above, this article tries to discuss how the dynamics of conversations regarding these policies emerge in the digital space in Indonesia, and see how the effectiveness of government public communication in particular is compared to other non-government actors. The dynamics of contestation

between government and non-government actors will be of particular concern, because this has longer implications related to the existence of a digital space that is neutral and free from domination or certain political agendas. In the next section, the author will explain the PSBB policy and how it impacts both community behavior and the economic sector in general.

PSBB Policy and Its Impact

PSBB policy is a form of non-medical intervention that aims to limit the spread of the virus through restricting people's movements. Jakarta and West Java were the first two provinces in Indonesia to implement this policy in early April 2020. Other provinces that followed were West Sumatra and Gorontalo. The PSBB implementation period varies slightly for each province. Implementation of this policy in the capital during the first two weeks of April was followed by an extension until early July 2020 (Roziqin et al., 2021).

The implementation of the PSBB policy, especially in the Jakarta area, parts of Banten and West Java, the large number of offices and various economic activities in these very dense areas have drastically decreased. This period was followed by the increasing popularity of the term work from home (WFH), especially among adults. Apart from offices and shopping centers, schools are also public facilities that are closed during the implementation of this policy. As with office activities, all teaching and learning activities have been transferred to online media (Hikmahwati et al., 2020).

Furthermore, in the health sector, the pandemic has contributed to an increase in unmet need, or unmet health needs. The highest change in this figure occurred in Jakarta, which increased from 2.8% to 3.9%. Meanwhile for the provinces of Banten and West Java, the unmet need figure ranges from 0.3 - 0.5% (Suraya et al., 2020). From those numbers, it can be predicted that the massive implementation of PSBB in the center of the Indonesian economy will have a major impact on related sectors, such as industry and trade. Since the beginning of 2020, the International Monetary Fund (IMF) has predicted that world economic growth will suffer a sharp correction, namely minus 3 percent (Mishra et al., 2022).

As one of the emerging countries, Indonesia is not an exception to this shock. According to data released by the Central Statistics Agency (BPS), Indonesia's economic growth throughout 2020 was minus 2 percent after growing by 5 percent in the previous year. The biggest decline this year occurred in the second quarter (minus 5.3 percent), namely when the pandemic became more widespread and the implementation of the PSBB policy was carried out on a large scale. This condition only recovered a year later, when average annual economic growth was at a positive figure of 3.7 percent (BPS, 2021).

The two provinces that implemented PSBB, Jakarta, Banten and West Java, experienced negative growth that was higher than the national average at 2.4%, 3.4% and 2.5% respectively. The magnitude of this impact is of course also due to the very

large economic scale of these three regions, with their contribution to national GDP amounting to more than 34% (Prabowo, 2021; Sagala et al., 2021; Suraya et al., 2020).

Increased internet access and use of social media

Along with the growth of the Indonesian economy, which has reached an average of around 5% over the last decade, coupled with the increase in population, the number of internet users is also increasing. BPS (2015) showed that the percentage of the population who said they had accessed the internet was only around 20%. In 2018 this number doubled and almost reached 50% the following year.

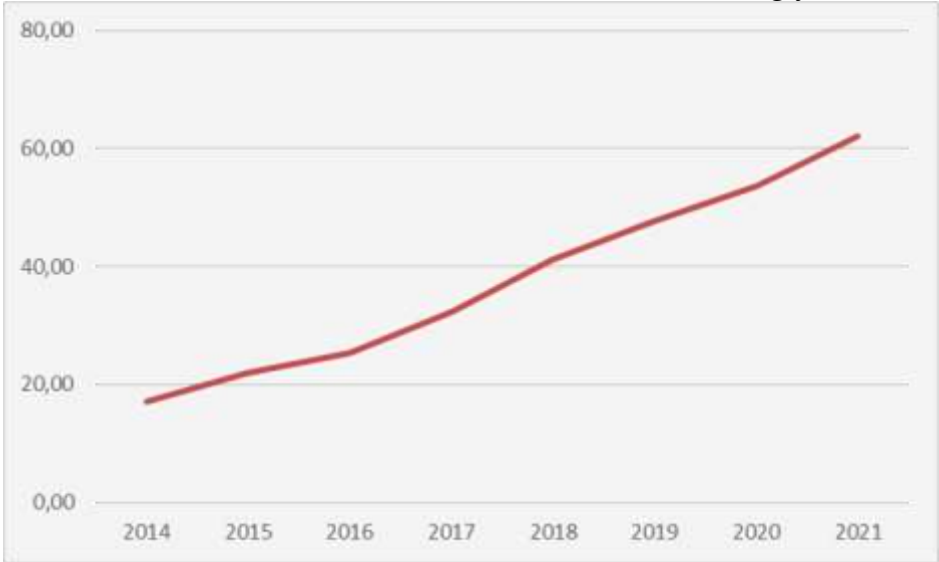

Figure 2. Proportion of Population with Internet Access 2014-2021

Source: (BPS, 2021)

During the pandemic in 2020-2021, the proportion of internet users in Indonesia increased, reaching more than 60%. Figure 2 showed that the dynamics of increasing number of internet users, as measured by the number of people aged over 5 years who have ever used the internet, has exceeded half of Indonesia's total population of 270 million people (BPS, 2020; BPS, 2021).

Restrictions on social mobility as a result of the PSBB policy certainly have an impact on the number of internet users. A number of people's activities have shifted to online mode, such as learning and work activities, which forces them to utilize this technology. BPS survey of residents aged 5 years and over who have accessed the internet revealed that there was an increase in access to the internet by 6 percent between 2019 and 2020, and by 8.6 in the following year. Jakarta and West Java contributed around 5.1 percent in 2020, and jumped to 8.8% in 2021 (BPS, 2019; BPS, 2020; BPS, 2021; BPS, 2022).

This indicates that during the periods of implementation of the PSBB there has been significant increase of internet users are slightly above the national average. This trend of increasing internet access can also be seen from other statistics released by BPS, namely computer mastery. It was recorded that the level of computer mastery for Jakarta and West Java from 2019 to 2020 increased by 2.5 percent on average, where the national increase was only 0.1 percent. Thus, it can be assumed that internet use

will increase, especially in Jakarta and West Java during the PSBB policy (BPS, 2019; BPS, 2020; Prabowo, 2021; Sagala et al., 2021).

With this context of growing internet use, the PSBB policy implementation has been getting large of attention from the digital society or *netizen*. It is then interesting to observe how this policy is perceived by them, particularly related to the actors that influence the conversation. These social media actors are often called influencers, and in several cases they have the ability to shape public opinion and perception towards certain issues (Lim & Rasul, 2022; Bradshaw & Howard, 2017; Gorodnichenko et al., 2021).

Following the background description of the PSBB policy as well as its impact and social context, especially increasing access to the internet and interaction in the digital space, in the next sub-section the authors will discuss in detail the data and methods used in conducting social network analysis. Data extraction methods, which are a very important part of efforts to answer this research problem, will be the main focus. Meanwhile, the results of the analysis will be explained in the next section which will contain descriptive interpretation and centrality analysis calculations. Finally, the author provides conclusions on the results and outlines several alternative suggestions for strengthening similar research in the future.

B. LITERATURE REVIEW

The establishment of the PSBB policy in Indonesia has several similarities and differences with similar policies, for example the lockdown policy in the United States. In this country, decisions regarding restrictions on community activities are carried out in a decentralized manner. This happened in New York State where governor Andrew Cuomo announced a lockdown for March - April 2020 (Khubchandani et al., 2021). In Indonesia, the PSBB policy announcement was centralized with significant involvement of regional government. For example, in Jakarta the decision towards mobility restriction policy came from the central government through the Minister of Health. Meanwhile, policy announcements at the district/city level are made by the governor. As a result, this policy is more quasi-decentralized, where the role of the central government is still quite large at the provincial level (Hikmahwati et al., 2020; Khubchandani et al., 2021).

In the age of digital revolution, the public have larger power in affecting policy-making process by the government, especially an immediate one such as the PSBB policy. The public can also provide valuable input for the success of the policy (Batara et al., 2017; Driss et al., 2019). Thus, this require the government to provide effective communication strategy in order for the policy to work effectively.

One of the current medium for promoting government's policy is through social media. The rapid emergence of social media prompts the government to create enabling environment in the digital space, sometimes dubbed government 2.0, between the government and the society (Anttiroiko, 2010; Ninan et al., 2020). Song & Lee (2016) find that the use of government social media affects public perception positively. Thus, the failure to communicate to the public through the digital space

would lead to several consequences. Firstly, the public sphere would be dominated by non-government actors. And secondly, in certain significant issues, such as Covid-19 pandemic, this could render government's policy ineffective.

The following section explains the strategy taken by the author in answering the research questions above. First, the author explains how to collect research data and how to carry out initial processing before entering the main analysis stage. Next, the researcher explains the social network analysis (SNA) method and its supporting properties.

With the increasing trend of internet use in Indonesia, conversations in the digital space are also increasing. With this, the conversation will have its own meaning which more or less reflects real world conditions. This leads to the importance of conducting big data analysis.

In this paper, netizen conversations are focused on Twitter, which is one of the most popular social media in Indonesia. Several reasons why it is important to use data from this source are as follows:

1. Twitter has a very large user base with millions of tweets posted every day. Twitter is also included in the top five most widely used social media in Indonesia with a number of users of almost 15 million. With this large number of user conversations, it can be seen what perceptions and trends are emerging regarding a big issue.
2. Twitter is a text-based platform and contains interaction information between users. This makes it possible to build networks between users based on certain keywords.
3. Data openness that applies to almost all users, but more precisely at the time the data collection for this research was carried out. Twitter allows its users to mine significant amounts of data and the amount of information needed to perform SNA.

Twitter data mining or extraction was carried out on May 28 2020, in the middle of implementing the PSBB policy in Jakarta and West Java. However, the author cannot isolate Twitter conversations based on location, so the data obtained also covers other regions in Indonesia, although most of them are from the two targeted regions.

The number of conversations targeted initially was 8 thousand tweets, taking into account data availability and data mining limitations due to the new Twitter API policy. This policy, which went into effect shortly after the transfer of ownership of the app to new owner Elon Musk, limited the number of tweets that could be retrieved. The new policy requires a paid license which has implications for at least two things. The first is the unpreparedness of researchers to be able to obtain API access, especially in terms of funding, and the second is the unclear implementation of the new policy from early to mid 2023. To overcome these limitations, researchers used a dataset provided by Evan Martua via the git-hub page his with the following link https://github.com/evanmartua34.

To get analysis results that have good accuracy, it is necessary to treat the data that will be used. The first data sorting is by filtering Indonesian language tweets. This was done to isolate observations only on conversations carried out by Indonesian speakers. Without filtering foreign languages, there is the possibility of misidentifying the meaning of words due to the similarity of words.

This research uses a network analysis method known as SNA to map the actors in conversations regarding the PSBB policy. The mapping in question requires at least three main components which include spots, edges, and modularity/clusters (Alamsyah et al., 2018). SNA itself in this case can be defined as a "social structure consisting of individuals symbolized by nodes, who are connected interdependently with other actors based on friendship or the same interest in a particular issue based on table 1:

Table 1, SNA Components and Description

No.	SNA Components	Description
1	Nodes	Points on the SNA map that represent actors involved in conversations regarding the PSBB issue.
2	Edges	The line connecting two or more actors in SNA shows the degree of connectivity.
3	Modularity / cluster	Cluster refers to a grouping of edges in one particular position in SNA which indicates a certain interaction tendency.

Source: (Tan et al., 2014)

A simplified visualization of the SNA map that connects nodes (grey) and shows modularity (light blue) is shown in Figure 3 as follows:

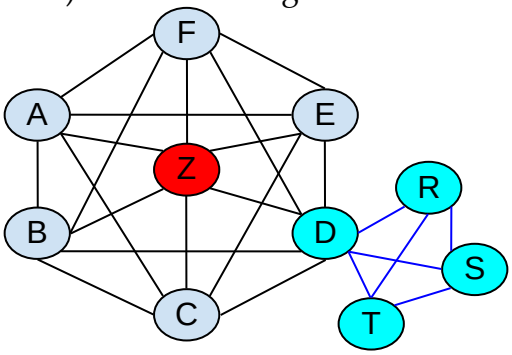

Figure 3. Simplified SNA Model

Source: (Authors, 2023)

To calculate modularity, the author uses the following formula:

$$Q = \frac{1}{4m} \sum_{ij} \left(A_{ij} - \frac{k_i k_j}{2m} \right)$$

Where:

Q = score of modularity

M = number of edges

A_{ij} =

k_ik_j = expected value

Next, the author will also calculate degree centrality, which measures the relationship between nodes, as well as betweenness centrality, which maps the degree and weight of influence of a nodes on other related nodes. The degree centrality calculation is given as follows

$$C_D(\ \ ) = d(\ \ )$$

where $d(\ \ )$ is the amount of information that this node has with other nodes in the network (Diannzah, 2021). The betweenness centrality calculation is given as the following formula:

$$C_B(\ \ ) = \frac{\Sigma gjk(\ \ )}{gjk}$$

$\Sigma gjk(\ \ )$ is the number of shortest distances from node j to node k that pass through node i, while gjk is the number of shortest paths between 2 nodes in the network.

C. RESULTS AND DISCUSSION

This article departs from the author's motivation to map and measure the influence of government policies in the realm of public discourse, specifically to determine the effectiveness of government political communication. In this section, the author will first provide a description of the results of the data processing that has been carried out, then carry out an explanatory discussion by linking the findings with existing literatures.

Conversation Topics and Top-Influencers

Based on captured Twitter conversations during the implementation period of the PSBB policy in May 2020, it can be seen that there are a number of words that are very related. Figure 1 shows the twenty most frequently used words related to Covid-19. Prior to this, the researcher had first filtered out irrelevant words in Bahasa Indonesia, for example location adverbs such as *di* and *ke* or conjunctions such as *yang* and so on. Apart from that, Figure 3 also does not include the word PSBB, which appeared in conversations more than 6000 times.

This shows that most of the conversations that took place were about government policy, and other words that appeared directly or indirectly were also related to PSBB. The first two words in Figure 3 form the terminology “new normal”, which is related to Covid-19 is Indonesia, which shows the context of the location where the conversation took place. Meanwhile, the next five words that often appear in many tweets are related to the implementation of the PSBB policy. One of them is the word "extended", which refers to the government's decision to extend the implementation of the PSBB until July 2020.

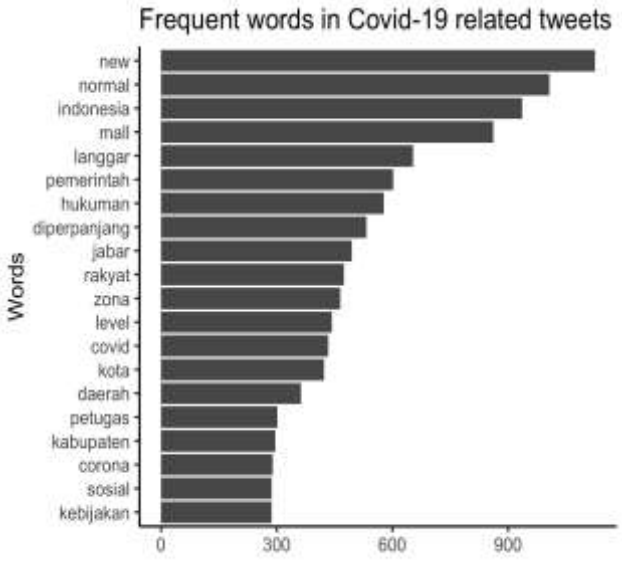

Figure 4. Top 20 Words Related to PSBB Policy

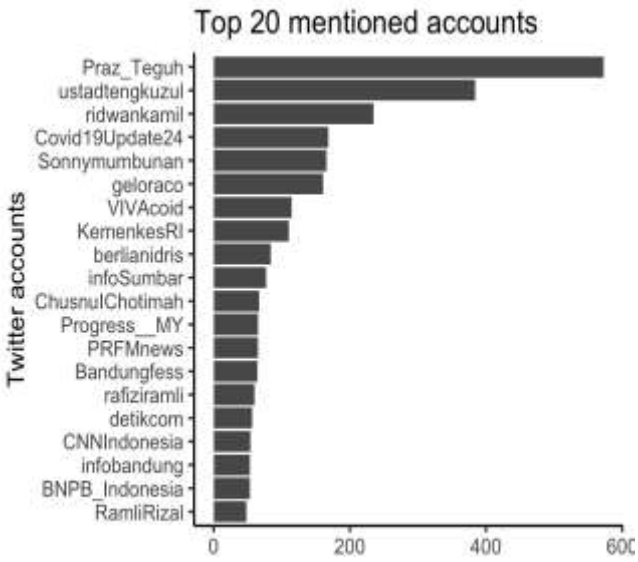

Figure 5 Top 20 Influencers Related to PSBB Policy

Source: (Authors, 2023)

In terms of people/accounts who dominate the conversation, we found that the top mentioned one stands on a neutral position. The second most mentioned, with the account handle name of @ustadtengkuzul, is very often found to stand in opposition to the government's. Since before the covid happened, he already garnered netizens' attention for his opposition activities through social media. The account is followed by almost half a million twitter users, as of the end of 2022. Highest influencers from the pro government account is the Governor of West Java, Ridwan Kamil. The second highest account from the government is the Health Ministry (@kemenkesRI). At almost the bottom of figure 5 another government affiliated account is being mentioned frequently, @BNPB_Indonesia. In terms of the conversation topics based on hashtags used, Covid 19 is the highest, followed with '*dirumahaja*' (better stay at home) and 'bersatulawancovid19' (together against covid 19), as is shown in Figure 6.

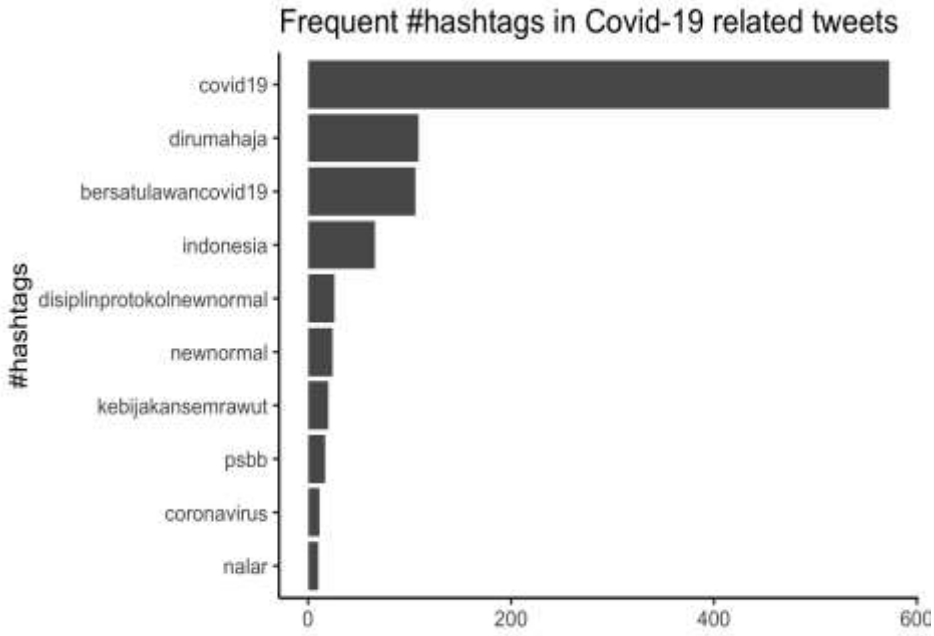

Figure 6. Top 10 Hashtags Related to Covid-19
Source: (Authors, 2023)

Social Network Analysis

Conversations between netizens in the digital space as explained above can be mapped into a social network map. In the context of this Twitter conversation, the network is the relationship between one account user and another account. Figure 6 shows such a network map (social network graph) which divides the collected big data into a number of interaction clusters. Larger number of nodes surounding a center node reflects larger score of degree of centrality.

Visually we can see that there are at least three clusters, namely (1) government actors, (2) mass media, and (3) non-government actors. Government actors in the map are given yellow letters, while the others are white. There are three government actors who have emerged, namely the Ministry of Health (KemenkesRI), the National Disaster Management Agency (BNPB), and the Governor of West Java Ridwan Kamil. These government accounts are of course in support of the PSBB issue. They actively advocate on the implementation of the policy throughout April and May of 2020.

Meanwhile, the second cluster is mass media. This includes several online media that are widely known such as detik.com, VIVA news, and CNN Indonesia. Apart from that, other mass media elements are classified as alternative media such as PRFM News, Bandung Info, and West Sumatra Info. In this case, Geloraco is also included as an alternative media account even though it has partisan tendencies.

The last network cluster can be seen to contain non-governmental actors and most of them are political figures. The accounts with the biggest names are RamliRizal, which is the account of former Coordinating Minister for Economic Affairs Rizal

Ramli, and ustadtengkuzul which is owned by Tengku Zulkarnaen. It is also worth to note that this last mentioned account has generated more buzz than the government affiliated accounts as can be seen in Figure 4. Of course, there are a number of other actors in the network map in Figure 7, but this paper filters only the twenty largest accounts and displays only seventeen accounts in the graph to simplify descriptive analysis. As a major influencers in the PSBB issue, these accounts are in opposition to the government's policy.

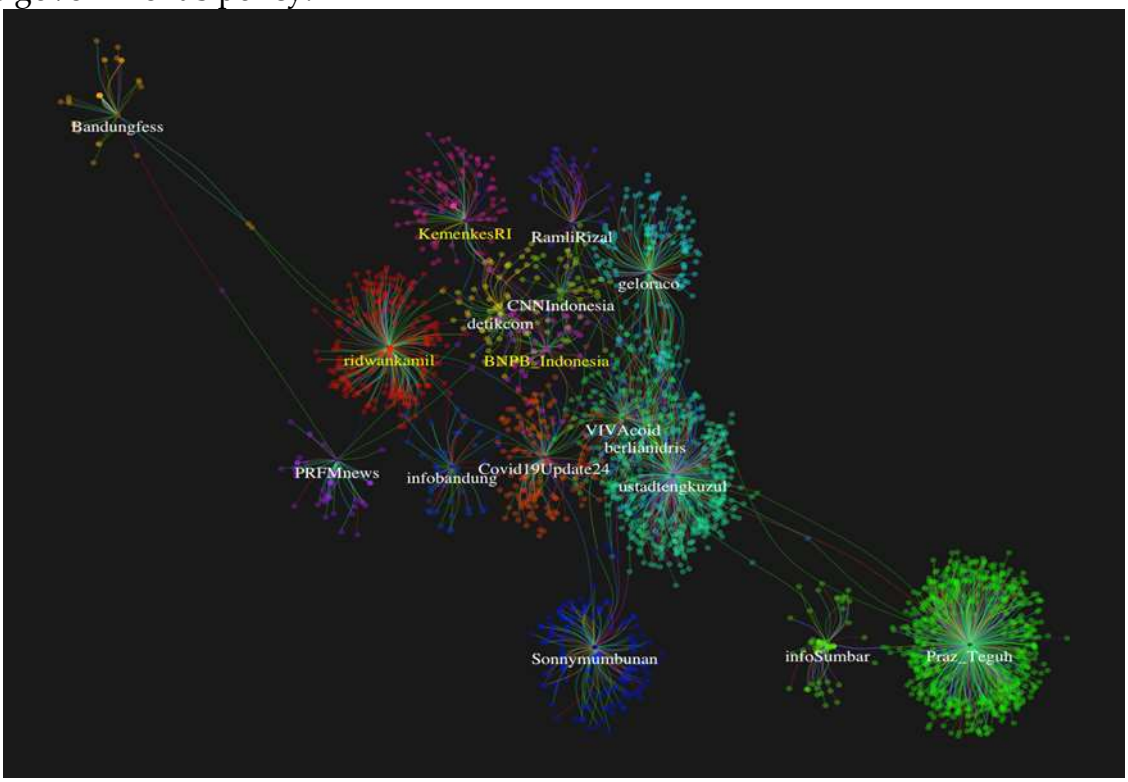

Figure 7. Social Network Graph of Twitter Conversation Related to PSBB Policy
Source: (Authors, 2023)

If we look closely at Figure 7 above, most of the clusters are close to each other, while others such as the Praz_Teguh, Sonnymumbunan, and Bandungfess accounts are far away. The closeness of these clusters indicates that there are interconnected relationships between users, thus high score of betweenness centrality, namely those who mention accounts that are in different clusters.

From the results discussed above we can see that despite government's presence in the digital space i.e. Twitter, they do not dominate the conversation regarding the PSBB policy. In the previous case studies regarding digital public discussion in Indonesia (Fadillah & Chang, 2021; Pitaloka, 2021), influencers played a significant role in directing public opinon. In the case of PSBB, the presence of overly negative sentiment by influencers could pose a threat to the success of government policy. It is then important for the government to have a sound social media strategy in order to promote their policy. The failure to generate support from the public could lead to the risk of no one follows it. In the case of PSBB there is yet to be a serious threat to the government from the Twitter community, but the imbalances of conversation where those opposed still should be.

D. CONCLUSION

PSBB policy is a major Indonesian government intervention in mitigating the adverse effect of Covid-19. This paper investigates the public conversation regarding the issue and which actors exert dominant role in affecting public opinion in the digital space. Results unveil that while government actors, both central and local governments, are present in advocating the issue in the social media, they do not dominate the conversation based on the number of user mentions. The SNA further shows that non-state actors have larger influence over the PSBB and Covid-19 issue during the early period. These findings call for several recommendations.

First, there is the need for the government to exercise strategic communication in order to 'win' online conversation regarding their policy. Without this strategy there is the long-term risk that negative perception will grow stronger that would eventually let the public abandoning its implementation. This may happen when the government opposition, some of them are major influencer in the issue, dominate public conversation. Second, in order to safeguard their policy the government need to gather support from civil society and other strategic stakeholders. Positive perceptions formed by these actors would direct online public opinion in favor of the government's policy.

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