

Social networks analysis of anticorruption messages on Twitter

Hendry Syaputra¹, Aceng Abdullah², Nuryah Asri Sjafirah³

^{1,2,3}Faculty of Communication Sciences, Universitas Padjadjaran, Bandung, Indonesia

ABSTRACT

Corruption poses a serious threat to a nation's progress and undermines public trust in the government. Therefore, it is often referred to as an extraordinary crime. Despite numerous measures being taken, it cannot be denied that corruption still occurs frequently. Thus, in addition to focusing on combating corruption, new approaches are important for disseminating anticorruption messages through various media, including social media. This study examines communication patterns, social network structures, key actors, and their roles in anticorruption messages on Twitter using Social Network Analysis (SNA) methods. Data collection techniques involve text mining or web crawling based on keywords using Gephi 0.97. The data was collected in December 2022, coinciding with the celebration of International Anticorruption Day (Hakordia). The results indicate that analysis units such as density, diameter, average path length, components, and modularity suggest that communication between actors in the network tends to be one-way, with some nodes serving as key actors. Interactions among Twitter users are minimal, with little or almost no reciprocal communication. Based on the patterns observed from the network of anticorruption messages and campaigns, the study reveals an asymmetrical communication network. In terms of actor centrality statistics, those with the highest centrality values are @kpk_ri, @democrazymedia, @tvonenews, @cnnindonesia, and @nazaqistsha. Each of these five actors plays a specific role in the network, depending on their backgrounds. This study concludes that in addition to government actors, mass media and even individuals play a crucial role in disseminating and campaigning for anticorruption messages.

Keywords: Social network analysis; actor centrality; anticorruption; Twitter; communication technology

Analisis jejaring sosial pesan anti korupsi di Twitter

ABSTRAK

Korupsi merupakan ancaman serius bagi kemajuan suatu negara dan merusak kepercayaan publik terhadap pemerintah. Oleh karena itu, korupsi sering disebut sebagai kejahatan luar biasa. Meskipun banyak langkah telah diambil, tidak dapat dipungkiri bahwa korupsi masih sering terjadi. Oleh karena itu, selain fokus pada pemberantasan korupsi, pendekatan baru penting untuk menyebarkan pesan anti-korupsi melalui berbagai media, termasuk media sosial. Penelitian ini bertujuan untuk mengidentifikasi bagaimana pola komunikasi, struktur jaringan sosial, serta aktor kunci dan peranannya dalam pesan antikorupsi di Twitter. Studi ini menggunakan metode Analisis Jaringan Sosial (SNA). Teknik pengumpulan data melibatkan text mining atau web crawling berdasarkan kata kunci menggunakan Gephi 0.97. Pengumpulan data dilakukan pada bulan Desember 2022, bertepatan dengan perayaan Hari Anti-Korupsi Internasional (Hakordia). Hasil penelitian menunjukkan bahwa unit analisis seperti densitas, diameter, panjang jalur rata-rata, komponen, dan modularitas menunjukkan bahwa komunikasi antara aktor dalam jaringan cenderung satu arah, dan terdapat beberapa simpul yang berfungsi sebagai aktor kunci. Interaksi di antara pengguna Twitter terbilang minim, dengan sedikit atau bahkan hampir tidak adanya komunikasi yang bersifat timbal balik. Berdasarkan pola yang diamati dari jaringan pesan dan kampanye anti korupsi, yang menjadi fokus penelitian ini, tampaknya terdapat sebuah jaringan komunikasi dengan pola asimetris. Dalam hal statistik sentralitas aktor, mereka yang memiliki nilai sentralitas tertinggi adalah @kpk_ri, @democrazymedia, @tvonenews, @cnnindonesia, dan @nazaqistsha. Kelima aktor ini masing-masing memainkan peran mereka dalam jaringan, tergantung pada latar belakang mereka. Studi ini menyimpulkan bahwa selain aktor pemerintah, media massa dan bahkan individu memiliki peran penting dalam menyebarkan dan mengkampanyekan pesan antikorupsi.

Kata-kata kunci: Analisis jaringan sosial; sentralitas aktor; anti korupsi; Twitter; teknologi komunikasi

Correspondence: Hendry Syaputra, Faculty of Communication Sciences Universitas Padjadjaran, Jl. Raya Bandung Sumedang KM.21, Hegarmanah, Kec. Jatinangor, Kab. Sumedang, Jawa Barat 45363. Email: hendry22001@mail.unpad.ac.id

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INTRODUCTION

Corruption remains a troubling issue in Indonesia, with its negative impacts extending beyond financial losses to the country. According to Indonesian law, specifically Law Number 20 of 2001, amending Law Number 31 of 1999 on the Eradication of Corruption Crimes, corruption not only affects the state's finances but also violates its citizens' social and economic rights. Therefore, combating corruption is deemed essential, considering it an extraordinary crime that requires serious attention.

Based on data from the Corruption Eradication Commission (KPK), they have handled 1,310 corruption cases from 2004 to October 20, 2022. Over the past 18 years, the number of corruption cases handled by the institution has fluctuated. The KPK conducted the most corruption investigations in 2018, reaching 199 cases, while the lowest was in 2004, with only 2 cases. From an international perspective on corruption reports, Transparency International (TI) has recently published the results of the Corruption Perceptions Index (CPI) for the 2022 assessment year on a global scale, focusing on the theme: "Corruption, Conflict, and Security." The CPI is a composite indicator employed to gauge perceptions of corruption levels in the public sector,

derived from evaluations that range from zero (indicating high corruption) to 100 (indicating very clean) across 180 countries and territories. This methodology involves a combination of 13 worldwide surveys and evaluations of corruption levels conducted by business professionals and global experts since 1995 (International, 2023)

Based on the types of corruption cases, bribery is the most commonly handled by the KPK, with 867 cases. The highest number of bribery cases successfully addressed by the KPK was in 2018, reaching 168. It was followed by 119 cases in 2019 and 93 cases in 2017. The procurement of goods or services is the next most commonly handled corruption offense by the KPK, with 274 cases. Additionally, 57 cases of budget misuse, 49 cases of money laundering (TPPU), 27 cases of extortion, 25 cases of licensing and obstruction of investigation, and 11 cases of investigation obstruction were handled by the KPK. The KPK's report also noted that most corruption crimes were committed in district/city government institutions, with 537 cases from 2004 to October 20, 2022. It was followed by ministries/agencies with 406 cases and provincial governments with 160 cases.

Meanwhile, Statistics Indonesia (BPS, 2022) conducted an anticorruption behavior survey titled the Anticorruption Behavior Survey (SPAK). The survey produced the Anticorruption Behavior Index (IPAK), which

depicts the dynamics of anticorruption behavior in society. The IPAK for Indonesia in 2022 was 3.93 on a scale of 0 to 5. This score is higher than the achievement in 2021 (3.88). A higher index value approaching 5 indicates increasingly anticorruption behavior, while a value approaching 0 indicates increasingly permissive behavior towards corruption.

IPAK is structured based on two dimensions: Perception and Experience Dimension. The Perception Index value for 2022 is 3.80, a decrease of 0.03 points compared to the 2021 Perception Index (3.83). On the other hand, the Experience Index for 2022 (3.99) increased by 0.09 points compared to the 2021 Experience Index (3.90). IPAK for urban communities in 2022 is higher (3.96) than for rural communities (3.90). Higher levels of education are associated with a greater tendency towards anticorruption behavior. In 2022, IPAK for individuals with a basic education level (elementary school and below) was 3.87; for those with a middle education level (junior high and high school), it was 3.94; and for those with a higher education level (above high school), is 4.04.

As a follow-up to the ratification, the Indonesian government has established Presidential Regulation Number 55 of 2012 on the National Strategy for the Prevention and Eradication of Corruption (Stranas PPK, 2018) for the Long-Term (2012-2025) and

Medium-Term (2012-2014). The strategies outlined in Stranas PPK include prevention, law enforcement, harmonization of laws and regulations, international cooperation and asset recovery, anticorruption culture, as well as reporting mechanisms that prioritize corruption prevention efforts.

The national road map for SDGs is a plan that includes strategic policies and stages to achieve the SDGs from 2017 to 2030, in line with national development objectives. Corruption is addressed in Goal 16, which focuses on peace, justice, and strong institutions. One of the targets under Goal 16 is Target 16.5, which aims to substantially reduce corruption and bribery in all their forms. To accelerate efforts in anticorruption synergy, the government has issued a Presidential Regulation, with corruption being one of the global goals. One of the measures for SDGs Goal 16.5 is the result of the Anticorruption Behavior Survey (SPAK).

Despite numerous enforcement efforts, it is undeniable that corruption still occurs frequently. Indonesia has made various efforts to combat corruption through different means, yet corruption continues to persist across various institutions. Apart from enforcement, the Indonesian government continues its efforts to prevent corruption. Presidential Regulation No. 59 of 2017 on the Implementation of Achieving Sustainable Development Goals states that one

of the global goals is to strengthen inclusive and peaceful societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels. Goal 16, specifically Target 16.5, includes a global target of substantially reducing corruption and bribery in all its forms. Additionally, corruption is also a national target in the National Medium-Term Development Plan 2020-2024, aiming for an increase in the Anticorruption Behavior Index (IPAK) to 4.14 by 2024, according to Annex of Technocratic National Medium-Term Development Plan 2020-2024 (Bappenas, 2019).

It must be acknowledged that public awareness of anticorruption behavior is influenced by the government's campaigns and the public's knowledge of corruption issues. In 2022, based on the Anticorruption Behavior Survey (SPAK), the percentage of the population who received anticorruption information or campaigns, whether directly or indirectly, decreased from 65.52% (2021) to 61.16% (2022). This decrease is one of the factors contributing to a more permissive public perception towards corruption. In line with that, corruption may occur when three factors align: an individual holds authority, which includes the capacity to shape public policies and conduct public administration; economic rents exist (economic advantages within the context

of existing public policies); and the prevailing system offers opportunities for misconduct by public officials (Zachrie & Wijayanto, 2009). Corruption may be defined as an unethical deed, improper conduct, breach of ethics, lack of honesty, vulnerability to bribery, immorality, departure from moral standards, or expressions and declarations that degrade or slander (Abdullah, 2017)

Furthermore, in practice, anticorruption campaigns can originate from various sources. In 2022, based on a survey conducted by the Central Statistics Agency (BPS), the largest sources of campaigns received by the public were television, social media, the internet/web applications, and billboards/posters/banners/leaflets. Regarding prevention, the Chairperson of the Corruption Eradication Commission (KPK), which plays a key role in the fight against corruption in Indonesia, has declared that future anticorruption efforts will place a greater emphasis on prevention. The foremost goal is to enhance the existing system as part of preventive measures, concurrently with educating the public and maintaining the enforcement of laws. The vision for eradicating corruption during the KPK's leadership from 2019 to 2024 is a collaborative effort with the community to reduce corruption levels and foster progress in Indonesia (Winata, 2020). In other words, in recent times, the Indonesian

government has shifted its focus not only on combating and prosecuting corruption cases but also on exploring preventive measures against corruption. One of these measures is the dissemination of anticorruption messages through various media channels such as television, newspapers/magazines, films, advertisements, social media, banners, and more. Additionally, the government conducts campaigns and socializes core values and anticorruption principles, including through the use of Twitter and other social media platforms.

Based on research conducted in various countries, there are best practices regarding anticorruption messaging. For example, in Nigeria, it was found that messages emphasizing the efficiency of taxation in the absence of corruption effectively reduced the likelihood of bribery by non-pessimistic perceivers (Cheeseman & Peiffer, 2020). In India, a 60-second radio advertisement aired on the quiet day before the elections significantly decreased the vote share of parties involved in vote-buying, with minimal effects on voter turnout (Schechter & Vasudevan, 2023). According to (Köbis et al., 2022) during and after placing posters throughout a medium-sized South African town, incentivized measures of social norms and bribery were assessed in a mobile lab. A total of 311 participants stemming from the general population took part. In line

with the pre-registered predictions, the results reveal that people: (1, posters disseminating social norms related to anticorruption can effectively reduce bribery. However, Peiffer and Alvarez (2016) suggest that anticorruption messages sometimes inadvertently reinforce the public's belief that corruption is widespread and common, leading to a more positive (pro-corruption) attitude towards corruption. Then, a Tanzania anticorruption study (Camargo, 2022) said that impulse social networks are a delivery mechanism for implementing anticorruption interventions.

When in Uganda, a substantial intervention orchestrated by civil society organizations aimed at decreasing vote buying during Uganda's 2016 elections is examined in our study. The consequences of this intervention are within the framework of a theoretical model. In this model, incumbents enjoy advantages due to being the first to act and possessing a positive image, vote buying and campaigning complement each other, and voter reciprocity plays a crucial role in the effectiveness of vote buying. In the end, while the intervention did not succeed in reducing vote buying overall, it did result in short-term electoral advantages for challengers (Blattman et al., 2019)

In general, all types or forms of communication campaigns always utilize media as a well-structured channel for delivering

messages to the planned audience. According to (Weiss & Tschirhart, 1994), the objective of a campaign is to achieve specific changes in attitude and behavior among a large number of individuals targeted by the campaign. A campaign is “a series of planned communication actions aimed at creating specific effects on a large audience over a specific period” (Venus, 2013).

Discussing the types of campaigns essentially involves discussing the motivations behind organizing a campaign program. These motivations, in turn, will determine the direction and objectives of the campaign. Therefore, based on this relationship (Venus, 2013) divides campaign types into three categories. Among these three categories, one is suitable for the anticorruption campaign program: ideological or cause-oriented campaigns, which are oriented towards specific goals and often have social change dimensions. Therefore, in Kotler's terms, these types of campaigns are referred to as social change campaigns aimed at addressing social issues through changes in public attitudes and behavior (Lee & Kotler, 2020).

Similar research has been conducted by other researchers, such as a previous study conducted by Aisyah et al. (2022), which examined the role of the press in the PPKM social network on Twitter as information disseminators. The study revealed centrality measures such as degree,

closeness, betweenness, and eigenvector centrality. The press actors with the highest popularity scores in the PPKM social network were @detikom, followed by @cnnindonesia, @asumsico, @nuicemedia, and @kumparan. The formed pattern of relations showed an effective asymmetrical communication pattern for information dissemination. The research suggested that the press should be more mindful in seeking perspectives and crafting headlines on social media, as the number of followers does not influence information dissemination on Twitter.

Furthermore, research on social media's network structure has also been conducted (Bakry, 2020), depicting various network structures and types formed based on the hashtag #Bandunglawancovid19. The network consists of four main components, each with its actors. The actor @humasBdg had the most relationships, with 113 connections among other actors. Additionally, 13 actors acted as bridges between the main network and other networks. The network types observed were two-mode networks and hub-and-spoke communication patterns with asymmetric relationships. Through network visualization, the research demonstrated that effective message delivery on social media can be achieved by several actors, as found in this study.

The choice of Twitter as the social media

platform is due to its characteristic of being text-based and often considered a source of news in certain cases (Fletcher & Nielsen, 2018). Social media serves as the primary avenue for individuals to consume, share, and engage in discussions about scientific innovations and disputes (Brossard & Scheufele, 2013). When it comes to social media, Twitter prominently stands out in the minds of the populace, particularly in Indonesia's major urban areas. According to Social (2023), the user base of Twitter in Indonesia reached a total of 18.45 million in the year 2022.

This research focuses specifically on analyzing the dissemination and campaign of anticorruption information on the social media platform Twitter. The research questions can be formulated as follows: How are the communication patterns and social network structures in anticorruption messages on Twitter, and who are the key actors involved in the dissemination of anticorruption messages on Twitter?

RESEARCH METHOD

The collection method uses text mining or web crawling based on anticorruption and corruption keywords on Twitter social media. In simple terms, web crawling, in this case, means searching for all information with certain keywords (Bakry, 2020). For part of the initial

data collection, the Gephi 0.97 application with the Twitter Streaming Importer V2 module was used. In collecting data for this research, the web scanning or web crawler method was used with web scanning software. Web scanning itself is the process of investigating all the information on a website using a robot. This research uses this application to identify all accounts that use the keywords "corruption" and "anticorruption" on Twitter.

The data processing process in this research consists of two stages. The first stage is collecting tweets, retweets, mentions and replies using data mining and web scanning analysis methods. This process aims to identify relevant and irrelevant tweets to the research problem, thereby facilitating data analysis. Next, the researcher determined the name generator. This stage is carried out to determine the actors who appear in conversations based on these keywords on Twitter (Bakry, 2020). As a result of this process, a list of the names of the participants involved in the interaction will be created. The next stage is identifying the name interpreter. At this stage, researchers look for relationships between one point and another.

The data analysis techniques used in this study are relation analysis and actor analysis using the Fruchterman Reingold and Force Atlas algorithm. The force atlas algorithm is used to depict the distribution patterns and

Table 1 Data Analysis Design

Analysis Level	Unit of Analysis	Information Output
System	Density	The density of relationships between actors (nodes) in the network
	Diameter	The furthest distance between one actor and another actor in a network
	Distance	The average distance between actors and other actors
	Components	Grouping actors (social media accounts) in a network
	Modularity	Group of actors involved in the conversation the same and care for each other
Actor	Degree Centrality	The popularity of actors in the social network or the number of connections from and to the actor
	Closeness Centrality	The proximity of an actor to other actors
	Betweenness Centrality	Identifying actors that serve as intermediaries within the network
	Eigenvector Centrality	The importance of actors who have connections with other actors

Source: (Borgatti, S. P., Everett, M. G., & Johnson, 2013), (Bakry & Kusmayadi, 2021)

message relations based on the anticorruption keyword. The choice of layout using the force atlas and Fruchterman Reingold algorithms is because these algorithms can be used to visualize relatively large networks with graph sizes ranging from 1 to 10,000 nodes. However, the advantage of this algorithm lies in its focus on quality, which can be helpful in exploring real data and providing precise graphic interpretations with minimal bias (Jacomy et al., 2014).

There are several key concepts in social network theory (Borgatti, S. P., Everett, M. G., & Johnson, 2013); first, actors (nodes) refer to individuals or entities involved in the social network. Nodes can be people, teams, departments, organizations, industries, or any other entity capable of establishing relationships with other entities. Second, ties (ties) describe the relationship or connection

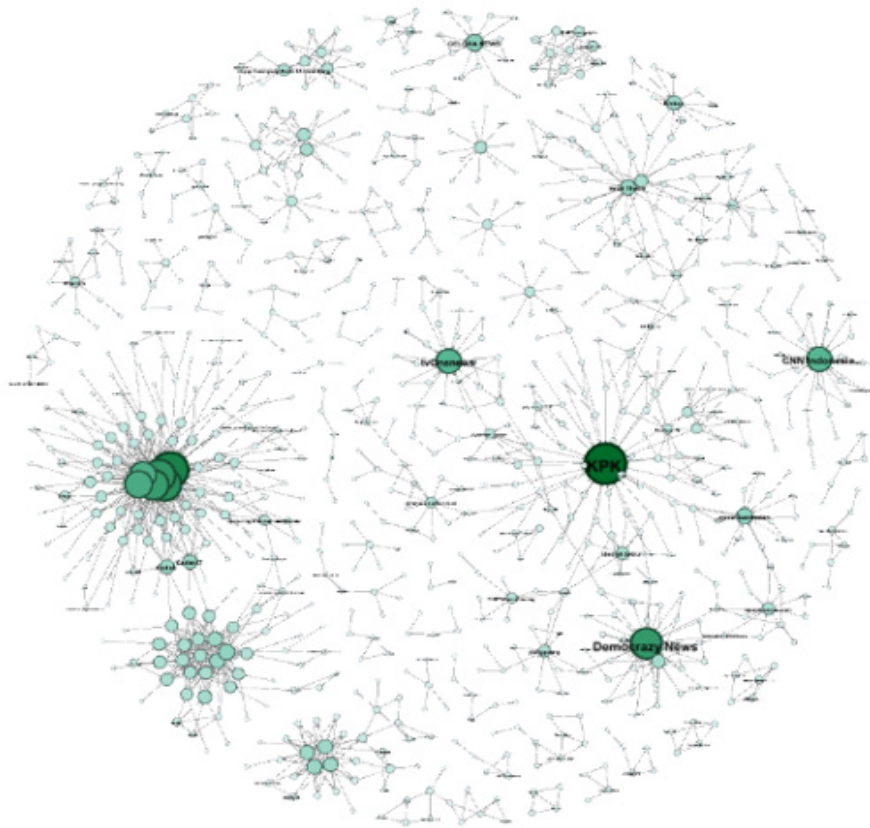
between two actors in a social network. Ties can be symmetrical (both actors have a strong mutual bond) or asymmetrical (one has greater influence in the bond). Third is centrality, which describes how important an actor is to a social network. Actors with high centrality have many ties with other actors or are connected to those with high centrality. Fourth, distance refers to how close or far the relationship is between two actors in a social network. According to social network theory, individuals are connected through various social ties such as friendship, cooperation, interaction, or communication channels. Social networks can vary, ranging from small networks consisting of a few individuals to large networks involving many individuals (Borgatti, S. P., Everett, M. G., & Johnson, 2013). Distance can be measured based on the number of steps or bounds required to reach one actor from another.

RESULTS AND DISCUSSION

Based on web crawling and data mining, the researcher identified 875 nodes and 1601 edges or interactions between actors and processed them in the data. Based on data analysis using Ucinet and graph theory, the results provide an overview of the types of relations and the structure of the communication network formed based on the predetermined keywords. Data collection was conducted within a specific timeframe due to the likelihood of increased response when information is related to a specific moment or time.

In this case, web crawling was carried out

during December 2022, coinciding with the International Anticorruption Day observed on December 9th each year. It aligns with a study conducted by (Borg et al., 2021), as the actors involved usually begin to cease their reactions when they lose interest in the subject matter and have adapted to new norms. As mentioned earlier, this study has two levels of analysis: the system and the actor levels, analyzed using the Gephi application with the force atlas and Fruchterman Reingold algorithms. Based on the analysis, there are results regarding the centrality of actors and relationship patterns in the network using the keywords “corruption” and “anticorruption”.



Source: Processed using Gephi 0.97, 2023

Figure 1 Patterns of Anticorruption Message and Campaign Network

Actors and the structure of their relationships can be studied from the perspective of communication network structure. The status of actors can be influenced and determined by other actors within the communication network. The analysis conducted in this research aims to describe the network model and how the network structure can affect communication behavior among Twitter users. This description is based on social network ties that connect actors within a network system. Two main factors in social communication networks exist actors and the relationships/connections between actors (Bakry, 2020).

As previously mentioned, social network patterns consist of the interaction patterns of each actor. Relationships on Twitter are formed when actors engage in actions such as replies, retweets, and quotations of other actors' tweets, creating complex communication patterns and network structures. Actors who gather similar and related information establish connections among themselves. It can also lead to the tendency for individuals to prefer others who share essential social characteristics, as found in social psychology studies (Bogatti et al., 2013).

The method of communication network analysis is closely related to the development of social research methods in social network systems using sociometric data. Sociometric methods were developed by Moreno,

introducing a new method in the social sciences that aims to study "intragroup relationships" or the relationships among group members within a group (Suprpto, 2011). In building social relationships within a communication network, each actor brings their characteristics, and the configuration of actors entering or exiting the social network affects the structure of interactions. Communication network models or patterns can be distinguished into two types: radial personal network model and interlocking personal network model. The network model can be centralized (interconnected) with a high level of integration or dispersed (radial) with a low level of integration (Rangkuti, 2007)

Network density is the ratio between the number of existing and possible edges. Results: A density of 0.002 indicates that only 0.2% of all possible edges in this network actually exist. The very low density (0.002) indicates that most of the nodes in this network are not directly connected. Only a small fraction of all possible connections exist in this network.

In low-density networks, connectivity between nodes is often facilitated by a few key nodes having many connections. These nodes act as hubs that connect various parts of the network. It shows that communication between actors in the network tends to be one-way. Interaction between Twitter users is minimal, with little or almost no reciprocal

communication. Even though these networks have low density, the efficiency of information dissemination may still be quite good if several hubs or key nodes connect many nodes. The relatively small diameter and low average path length in subsequent analyses support this assumption.

The following network structure analysis is the network diameter. A smaller diameter in a network makes it easier for nodes to communicate with each other because the distance is shorter. A diameter of 5 indicates that the maximum distance between the two most distant nodes is five edges in this network. It shows that although some nodes may be far away, the overall network is still relatively compact. A small diameter like this indicates that no node is too far isolated from other nodes, meaning the network is still quite efficient at connecting the furthest nodes.

Next is the average path length. The fewer accounts that have to be traversed, the better because it shows that the network has strong relationships. The average path length of 2,081 indicates that the average distance between two nodes in the network is about two edges. It indicates that the network has a fairly high level of connectivity, with most nodes reachable in just a few steps. It indicates an efficient network and may have good communication between nodes.

In social networks, this pattern can indicate the existence of several individuals or groups who act as the main connectors. These individuals have many connections that connect them with many other people, thereby speeding up the spread of information. Overall, this analysis shows that the network has a fairly compact and efficient structure in terms of connectivity, but it is worth nothing to isolate some nodes that may require attention to improve overall connectivity.

In the component analysis, it can be seen that the presence of 53 weakly connected components compared to 828 strongly connected components indicates a significant difference in network connectivity when the direction of the relationship is taken into account. It indicates that although many nodes have some one-way connections, very few have sufficient reciprocal connections.

The structure and dynamics of the network that is formed can show that the network has several nodes or groups that function as hubs or connection centers, but direct two-way communication between nodes is very limited. In a social or communication context, this could mean that there is a central figure connecting many nodes, but effective reciprocal communication between nodes is more limited.

In other words, there is an asymmetric relationship, which refers to one-way

interaction, where some individuals play a role in communication while others do not (Eriyanto, 2014). In this context, there are only a few actors who appear to have influence and are significant in discussing anticorruption messages in Indonesia. Based on the observed patterns of the anticorruption message and campaign network, which is the focus of this research, there appears to be a network with an asymmetrical pattern. This pattern arises because network connections on Twitter are not limited to actors who follow each other. It is in line with the nature of Twitter as a social media platform, where users can view tweets or statements from certain actors without having to follow or be followed by them.

The following analysis at the system level in network patterns and structures is modularity. The higher the modularity score, the clearer the groups that form in the network. Each group formed is assumed to be a different community, requiring further specification of the network in each community. The result is that there are 61 communities with a modularity value of 0.902.

A 0.902 modularity indicates that the network is highly segmented into well-defined communities, with strong internal interactions within each community. With 61 communities, this network shows significant fragmentation, indicating the existence of many relatively independent subgroups. Interaction within

each community is likely to be very strong, but communication between communities may be more limited, indicating limitations in the flow of information between communities. Some nodes connect communities, enabling information flow or coordination between different communities. This analysis shows that the network is highly organized into many well-defined communities, with strong interaction within and more limited communication between communities.

Based on the observed patterns of message and anticorruption campaign networks, which are the focus of this research, a radial communication network with an asymmetric pattern is evident. This pattern arises because the network connections on Twitter are not unique to mutually following actors. It aligns with the characteristics of Twitter as a social media platform, where users can see the tweets or statements of specific actors without necessarily following or being followed by them. Asymmetric relationships refer to one-way interactions where some individuals play a role in communication while others do not (Eriyanto, 2014).

Among the numerous actors that emerged, in this study, the researchers will focus on selecting and analyzing the statistics of the top five actors. It should be noted that the selection of these five actors is based on the

data collected by the researchers using the Gephi 0.97 application based on the specified keywords. These five actors have a relatively high level of popularity compared to other actors in this network. This is because these five media actors have the highest centrality value in the main network. The objective of the analysis at this level is to determine the extent to which information related to anticorruption messages spreads throughout the entire network of these actors, namely @kpk_ri, @democrazymedia, @tvonenews, @cnnindonesia, and @nazaqistsha.

Degree centrality measures the number of interactions or edges that occur on a particular node. In other words, degree centrality indicates an actor's popularity in the social network or the number of relationships from and to the actor. From the various indicators related to social network analysis, we can observe that based on the graph, some accounts have a higher degree than others. Among the five actors studied in this research, the account @kpk_ri ranks first

in terms of degree centrality, which represents the popularity of the actor in the social network or the number of relationships from and to the actor, with a value of 47, significantly higher than the other accounts. The second rank is occupied by the account @democrazymedia with a value of 35, and the third rank is held by the account @cnnindonesia with a degree value of 27.

From the perspective of the communication network, the @kpk_ri account is the node with the highest degree among the other accounts. It indicates that the anticorruption message is predominantly communicated by the @kpk_ri account. The Corruption Eradication Commission (KPK) is a state institution within the executive branch that is responsible for the prevention and eradication of corruption crimes (Tipikor) in accordance with the law, while the other actors are mass media.

Closeness Centrality (CC) measures the proximity of an actor to other actors in the

Table 2 Social Network Statistics of Anticorruption Messages and Campaigns

No	Label	Degree	Closeness Centrality	Betweenness Centrality	Harmonic Closeness Centrality	Eigenvector Centrality
1	@kpk_ri	47	0,64706	0,00113	0,72727	1
2	@democrazymedia	35	0,66667	0,00045	0,75000	0,24
3	@cnnindonesia	27	0,66667	0,00017	0,75000	0,17
4	@tvonenews	27	0,66667	0,00054	0,75000	0,24
5	@nazaqistsha	16	0,34043	0,00024	0,41667	0,14

Source: Processed using Gephi 0.97, 2023



Figure 2 Degree Centrality in the Network of Anticorruption Messages and Campaigns

hand, the actor with the lowest CC value is the account @nazaqistsha.

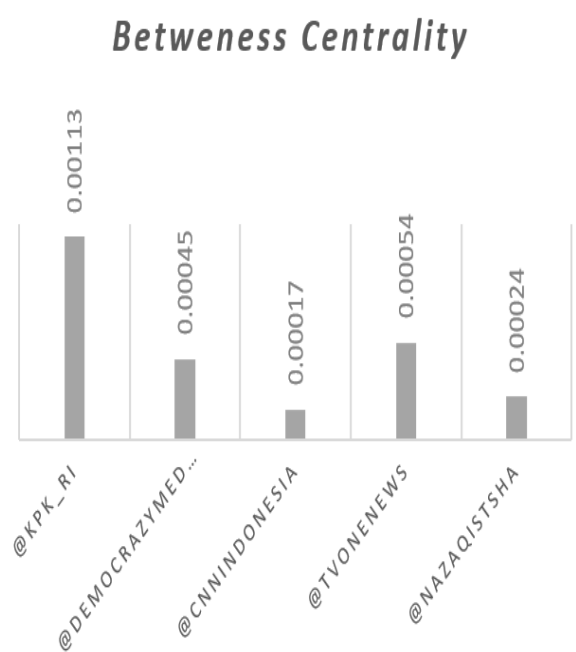
Betweenness centrality (BC) is a measure that indicates the role of a node as an intermediary. The more paths that have to pass through a particular node (e.g., with no alternative routes), the more important that node becomes. In other words, BC identifies which actors serve as intermediaries in the network.

Based on Figure 4, it can be observed that one account has a higher betweenness centrality compared to the other accounts. Among the five actors focused on in this study, the account (@



Source: Processed using Gephi 0.97, 2023

Figure 3 Closeness Centrality Levels of Five Actors



Source: Processed using Gephi 0.97, 2023

Figure 4 Betweenness Centrality Levels of Five Actors

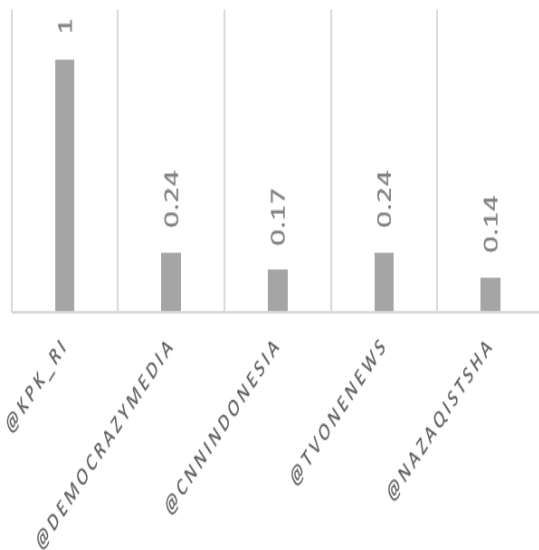
kpk_ri holds the highest betweenness centrality with a significantly larger value compared to the other accounts, at 0.0013. This value indicates that the @kpk_ri account serves as a key intermediary in spreading information related to anticorruption. The second and third positions are held by the @tvonenews account with values of 0.00054 and 0.00045, respectively. On the other hand, the fourth and fifth positions are occupied by the @nazaqistsha and @cnnindonesia accounts, with BC values of 0.00024 and 0.00017, respectively. In conclusion, each actor plays a role as an intermediary in the anticorruption message network, although the values may vary.

Eigenvector Centrality (EC) is a scoring mechanism assigned to each node, measuring

how well-connected that node is to other nodes with high centrality scores (Inayah & Purba, 2021). In other words, EC indicates the importance of an actor who has connections with other actors. In EC, the highest value is 1, meaning that the actor is a key player with many connections to other actors in the main network.

Based on the figure 5, it can be observed that one account has a higher eigenvector centrality compared to the other accounts. Among the five actors focused on in this study, the @kpk_ri account holds the top position with the highest eigenvector centrality value of 1, significantly larger than the other accounts. The second position is shared by the @democrazymedia and @tvonenews accounts, with a value of 0.24. Meanwhile, the fourth and fifth positions

Eigenvector Centrality

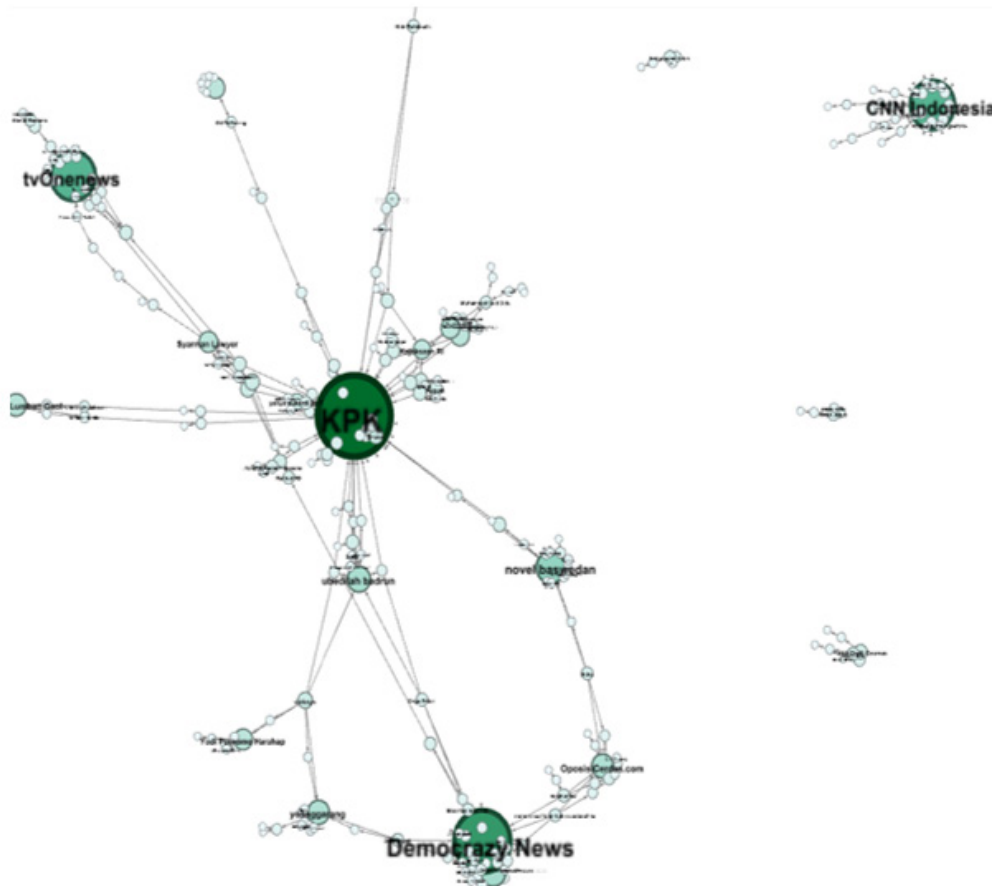


Source: Processed using Gephi 0.97, 2023

Figure 5 Eigenvector Centrality Levels of the Five Actors

are occupied by the @cnnindonesia and @nazaqistsha accounts, with EC values of 0.17 and 0.14, respectively.

This research shows the communication network for anticorruption messages during the commemoration of World Anticorruption Day. In the analysis of the network structure, units of analysis such as density (0.002), diameter (5), average path length (2.081), components (53 weakly connected components compared to 828 strongly connected components), and modularity (0.902) indicate that communication between actors in a network tends to be one-



Source: Processed using Gephi 0.97, 2023

Figure 6 Eigenvector Centrality at Anticorruption Message and Campaign Network

way. In low-density networks, connectivity between nodes is often facilitated by several key nodes that have many connections, such as @kpk_ri, @democrazymedia, @tvonenews, @cnnindonesia, and @nazaqistsha. Interaction between Twitter users is minimal, with little or almost no reciprocal communication. It can be seen from the number of retweets, which is greater than replies and mentions. Based on the observed patterns of anticorruption message networks and campaigns, which are the focus of this research, there appears to be a communication network with an asymmetrical pattern. This pattern arises because network connections on Twitter are not limited to actors who follow each other. It is in line with the nature of Twitter as a social media platform, where users can view tweets or statements from certain actors without having to follow or be followed by them.

In research conducted by Priambodo and Arianto (2022), the issue of corruption has become something that is often discussed by the general public, especially on social media Twitter. The interactions that occur on social media can ultimately form a communication or social network in line with the results of this research, which shows that there are networks related to anticorruption issues during the World Anticorruption Day period on Twitter social media, although in terms of the number

and density they tend to be low.

In forming social relationships in a communication network, each actor brings different personal characteristics, and an actor's entry or exit from a social network can influence interaction patterns. Communication network models or patterns can be divided into radial and interlocked personal network models. Network models can be centralized (connected) with a high level of integration or distributed (radial) with a low level of integration (Rangkuti, 2007). Asymmetric relationships refer to one-way interactions where some individuals play a role in communication while others do not (Eriyanto, 2014). In this context, there are only a few actors who appear to have influence and are significant in discussing anticorruption messages in Indonesia. The results of this research show that there are around five main actors who can be said to be significant in anticorruption social networks.

Looking at actor centrality statistics, including degree centrality, closeness centrality, betweenness centrality, and eigenvector centrality, it is clear that the actors with the highest centrality values in this social network are @kpk_ri, @democrazymedia, @tvonenews, @cnnindonesia, and @nazaqistsha. These five actors have their respective roles in the network when viewed from their respective backgrounds. As the main actor in government

institutions, @kpk_ri has a big responsibility in fighting corruption. They are responsible for law enforcement and monitoring the implementation of the state budget. Mass media (@tvonenews, @cnnindonesia) play an important role in shaping public opinion and monitoring government activities. The reporting of corruption cases by the mass media is often the main driver in triggering a public response and putting pressure on the government to act. While civil society (@democrazymedia, @nazaqistsha) includes NGOs, activists, and advocacy groups, independent/online media is a force that encourages transparency, accountability, and participation in preventing corruption. They are often critical voices monitoring government performance and advocating for policy reforms related to corruption issues.

CONCLUSION

The network structure analysis shows that several units of analysis, namely density, diameter, average path length, components and modularity, show that communication between actors in the network tends to be one-way. In low-density networks, connectivity between nodes is often facilitated by several key nodes that have many connections, such as @kpk_ri, @democrazymedia, @tvonenews, @cnnindonesia, and @nazaqistsha. Interaction between Twitter users is minimal, with little

or almost no reciprocal communication. Based on the observed patterns of anticorruption message networks and campaigns, which are the focus of this research, there appears to be a communication network with an asymmetrical pattern. This pattern arises because network connections on Twitter are not limited to actors who follow each other. This communication network pattern has important implications for understanding how information or influence is spread within a network. They can also help understand the communication dynamics between entities and their impact on opinion formation, decision making, or social change.

Based on the network pattern of the message and anticorruption campaign focused on in this study, it can be observed that the communication network formed is radial with an asymmetric pattern. It means that there is a central entity that functions as the main source or focal point of communication, while other entities are connected to this center. This pattern reflects an asymmetric direction and flow of communication among these entities. In the context of communication studies, this communication network pattern can have several important implications. The radial network pattern indicates that the flow of information tends to be centered around the central entity and then spreads to other entities. It can lead to a ripple effect or a domino effect,

where information originating from the central entity gradually spreads to other entities within the network.

These communication network patterns have important implications for understanding how information, or influence are disseminated within a network. They can also help understand the dynamics of communication among entities and their impact on opinion formation, decision-making, or social change. Looking at the centrality statistics of the actors, including degree centrality, closeness centrality, betweenness centrality, and eigenvector centrality, it is evident that the actors with the highest centrality values in this social network are @kpk_ri, @democrazymedia, @tvonenews, @cnnindonesia, and @nazaqistsha.

This research concludes that besides government actors, mass media, and even individuals play a significant role in disseminating and campaigning for anticorruption messages. In addition to focusing on the eradication and prosecution of corruption cases, preventive measures are also crucial, including spreading anticorruption messages through various media channels (television, newspapers/magazines, films, advertisements, social media, and banners) and conducting socialization of core values and anticorruption values through anticorruption campaigns. The study's findings are also anticipated to yield practical

implications in the battle against corruption. By gaining insights into key actors, communication patterns, and network dynamics associated with anticorruption messages on Twitter, it becomes possible to develop more efficient measures for combating corruption. This information can be applied by stakeholders, such as government agencies and anticorruption organizations, to create more effective communication strategies and garner broader public support.

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