


## The Role of Social Media in Shaping Social Movements: A Case Study of #Daruratreformasi In Indonesia Using Text Mining and Network Analytics

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DATE	ABSTRACT
Accepted: Revised: Published:	<p><i>The social movement #DaruratReformasi emerging in Indonesia since July 2024 has attracted widespread attention both nationally and internationally. This study aims to analyze the communication dynamics and interaction patterns within the social media network of the movement using text mining and network analytics approaches. Topic modeling identifies the dominant key issues in public discourse, while social network analysis reveals the main actors and influencers involved in information dissemination and public opinion formation. A modularity approach is employed to detect naturally formed discussion communities within the network, and temporal analysis illustrates the phases of the movement's development from initiation to its peak in November 2024. The results indicate that social media serves as a strategic platform for social mobilization and political advocacy, with key actors distributed across interconnected communities. Additionally, the involvement of government institutions as central actors highlights the two-way communication dynamics within the digital public sphere. These findings underscore the urgency of understanding social network structures in the context of modern digital social movements and provide implications for public communication management and mass mobilization strategies in the digital era.</i></p> <p><b>KEYWORDS</b> Social Media, Social Movements, #DaruratReformasi, Text Mining, Network Analytics, Topic Modeling, Network Analysis, Influencers, Social Mobilization, Political Reform.</p> <p> This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International</p>

## INTRODUCTION

Social movements in the digital era have undergone significant transformation with the emergence of social media as a primary platform for expressing opinions, building solidarity, and organizing collective actions (Earl & Kimport, 2011; Maher & Earl, 2019). In Indonesia, the *#DaruratReformasi* movement serves as a tangible example of how citizens utilize social media to advocate for reform while voicing dissatisfaction with ongoing political, social, and economic conditions (Muinao & Ratnamala, 2024). Through platforms such as Twitter, Instagram, and Facebook, this movement has gained widespread visibility and engaged diverse segments of society, including activists, journalists, and public figures (Lau, Chen, & Lee, 2022).

The *#DaruratReformasi* social movement began to emerge and grow significantly between July and November 2024 in response to various public grievances spanning multiple aspects of national life. A notable symbol of this movement is the use of the Garuda emblem dominated by the color blue in its official logo (Ozduzen, 2020). This blue color is not merely an aesthetic element but conveys a strong symbolic message encompassing hope, peace, and unity, effectively serving as a visual communication tool to convey aspirations and rally solidarity among broader society (Swarup Kumar, Ramesh, & Varma, 2022).

Social media, with its interactive nature and rapid dissemination capabilities, plays a crucial role in accelerating the spread of information and mobilizing support for social movements. However, a key challenge in this context is to understand the core issues advocated within online discourse and to identify central actors involved in information dissemination. Therefore, an in-depth analysis of social media's influence on the *#DaruratReformasi* movement is essential to reveal discussion patterns, dominant topics, and the roles of key influencers shaping the movement's dynamics (Ravecca, Perez, & Thompson, 2022).

The *#DaruratReformasi* movement has attracted significant attention not only at the national level but also internationally. With thousands of active social media users following, sharing, and discussing issues surrounding the movement, *#DaruratReformasi* demonstrates substantial digital mobilization power in shaping public opinion and influencing political discourse. The high volume of participation makes this movement an important case of how social media can be utilized as a platform for collective action and social advocacy.

Moreover, the movement has been covered by prominent international media such as *BBC News* and *Reuters*, which reported on the developments of *#DaruratReformasi* as part of a broader phenomenon of digital protests sweeping various countries in the era of information globalization (Guo & Saxton, 2014; Valenzuela, 2013). This international attention confirms that *#DaruratReformasi* is not merely a domestic event but part of a global wave of digital social movements demanding democracy and social change (Castells, 2012; Chadwick, 2013).

Temporally, the *#DaruratReformasi* movement shows significant changes in participation patterns and narratives developing on social media. In the initial phase, July

2024, the movement was relatively new with limited followers and interactions (Loader, Vromen, & Xenos, 2014). However, entering the second phase in November 2024, there was a drastic increase in follower count, discussion intensity, and digital mobilization involving diverse community groups (Blei, Ng, & Jordan, 2013; Sunstein, 2011). This developmental pattern reflects stages of narrative formation and strengthening, which serve as the main drivers in sustaining the momentum of the social movement.

Previous studies indicate that social media functions not only as a communication tool but also as a strategic space enabling collective identity formation, resource mobilization, and the organization of transnational social actions [1][7]. Furthermore, research on sentiment patterns and opinion polarization on social media suggests dynamic processes that can either strengthen or weaken social movements, depending on socio-political contexts and communication strategies employed.

The *#DaruratReformasi* movement in Indonesia exemplifies the transformative power of social media in shaping modern social movements, reflecting broader global trends in digital activism. Previous research highlights the critical role of platforms like Twitter in mobilizing collective action, as seen in movements such as *#BlackLivesMatter* and the *Arab Spring*, where social media facilitated rapid information dissemination and transnational solidarity. Studies by Tufekci (2017) and Castells (2012) emphasize how digital networks amplify marginalized voices, while Bennett and Segerberg (2013) underscore the “logic of connective action,” where personalized content drives participation. In the Indonesian context, Pratama et al. (2022) analyzed social media’s role in protests against alcohol investments, demonstrating its efficacy in rallying public support. However, gaps remain in understanding how localized movements like *#DaruratReformasi* leverage text mining and network analytics to navigate socio-political dynamics, particularly in non-Western democracies.

This study addresses these gaps by employing advanced computational methods to dissect the *#DaruratReformasi* movement’s digital footprint, offering novel insights into the interplay between online discourse and offline mobilization. By integrating *Latent Dirichlet Allocation* (LDA) for topic modeling and social network analysis (SNA) for influencer mapping, the research uncovers the dominant narratives and key actors driving the movement. Such an approach aligns with Morselli et al.’s (2020) work on sentiment dynamics in digital protests but expands it by incorporating temporal analysis to track the movement’s evolution. The findings contribute to theoretical frameworks like Gerbaudo’s (2012) concept of “choreographed participation,” revealing how Indonesian activists orchestrate online engagement to sustain momentum. Additionally, the study bridges methodological divides by combining qualitative interpretation of topics with quantitative metrics of influence, enriching the toolkit for future digital movement analyses.

The practical benefits of this research extend to policymakers, activists, and communication strategists seeking to navigate the complexities of digital dissent. For policymakers, understanding the network structures and key influencers can inform more responsive governance and crisis communication strategies, mitigating polarization.

Activists gain actionable insights into optimizing message dissemination, while scholars benefit from a replicable framework for analyzing social media-driven movements in similar contexts. Furthermore, the study highlights the dual role of government accounts as both targets and participants in digital discourse, offering a nuanced perspective on state-society interactions in the digital age. By illuminating these dynamics, the research not only advances academic discourse but also empowers stakeholders to harness social media's potential for democratic engagement and social change.

This study aims to analyze the influence of social media on the *#DaruratReformasi* movement in Indonesia using text mining and network analytics approaches. The study is expected to provide clearer insights into the role of social media in shaping social movements in Indonesia, particularly in constructing critical issues as well as in the dissemination and public response to these issues. This research also aims to analyze the communication structure and interaction patterns within the *#DaruratReformasi* social media network, as well as to examine the temporal impact and dynamics of the movement through social network analysis and text mining approaches. The study is anticipated to contribute a deeper understanding of social media's role in mobilizing communities and shaping political discourse in the digital age.

## RESEARCH METHOD

This study employs a quantitative research design combined with network analytics and text mining techniques to analyze the role of social media in shaping the *#DaruratReformasi* movement in Indonesia. The research adopts a descriptive and exploratory approach to identify key issues, influencers, and interaction patterns within the movement. The study leverages *big data analytics* to process large-scale social media interactions, ensuring a comprehensive understanding of the digital discourse dynamics.

The data population consists of all Twitter posts containing the hashtag *#DaruratReformasi* from July to November 2024. The sample includes over 1,000 records of tweets, retweets, and replies, selected using *purposive sampling* to ensure relevance to the research objectives. The sampling technique focuses on high-engagement posts and interactions involving key actors identified through network metrics. Research instruments include the Twitter API for data extraction, Python libraries (e.g., *Gensim* for *LDA*, *NetworkX* for *SNA*), and manual coding for qualitative validation. Validity and reliability are ensured through coherence score evaluation for topic modeling and cross-validation of centrality metrics in network analysis.

Data collection involves extracting tweets using the Twitter API, followed by preprocessing steps (*text normalization*, *stopword removal*, *stemming*, and *tokenization*). The procedure includes topic modeling (*LDA*) to identify dominant themes and social network analysis (*SNA*) to map interaction structures using metrics like *degree centrality* and *modularity*. Software tools such as Python, Gephi (for visualization), and Tableau (for data representation) are employed. Data analysis techniques include statistical analysis of topic distributions, community detection algorithms (Louvain method), and temporal analysis to track the movement's evolution. This multi-method approach

ensures robust insights into the digital mobilization patterns of *#DaruratReformasi*.

## RESULTS AND DISCUSSION

### Overview

This chapter discusses the findings from topic modeling and social network analysis (SNA) of public conversations on social media regarding the *#DaruratReformasi* movement. The study aims to identify the main issues discussed by the public as well as the key actors involved in the dissemination of information during the course of the movement.

### Key Issues in Public Discussions

Using the Latent Dirichlet Allocation (LDA) approach, several dominant topics were identified that reflect various socio-political issues widely discussed. The following table presents the topic interpretation results based on the main keywords and the underlying meanings of each topic

Table 1 Top Ten Topics

No	Topic Title	Main Keywords	Brief Interpretation
1	Democracy Under Threat	democracy, destroyed, decision, reform destroyed, democracy emergency	A strong narrative that democracy is being undermined by repressive policies and anti-critical attitudes.
2	Media Links and Official Information	t, https, co, site, official, journalist, staff	Dissemination of information through media links, press releases, and official institutional accounts.
3	Movement Actions and Narratives	emergency, reform, death, steal, monarchy, pn, mahiaddin	Harsh criticism of political power and calls to action.
4	Militarism and Authoritarian State Narratives	military, monarchy, people, state, jokowi	Public concerns over rising authoritarianism and military dominance.
5	Action Invitations and Event Information	invitation, coverage, conference, co, https, tolerance, era, minister	Information regarding press conferences, protest coverage, and calls for demonstrations.
6	Moral Crisis and Elections	people, Indonesia, election, state, crisis, moral	Distrust in political elites' morality and electoral integrity.
7	Controversial Legislation Issues	law, coalition, security, sector, civil, quarantine	Criticism of laws perceived to restrict civil rights.
8	Parliament and Representative Democracy	power, parliament, covid, politics	Focus on the weak role of parliament in safeguarding democracy and controlling executive power.

9	COVID-19 and Government Distrust	variant, failure, health	Public distrust toward pandemic management and its impact on emergency policies.
10	Jokowi, KPK, and Radicalism	jokowi, radicalism, machine, kpk, president,	Mention of the president's role, weakening of the KPK (Corruption Eradication Commission), and radicalism narratives used as politicization tools.

Figure 1 illustrates the ranking of the top ten topics resulting from the Latent Dirichlet Allocation (LDA) analysis based on the frequency of occurrence or total topic probability across the entire set of analyzed tweets. Each horizontal bar in the chart represents how frequently a topic appears and dominates the public discussion.

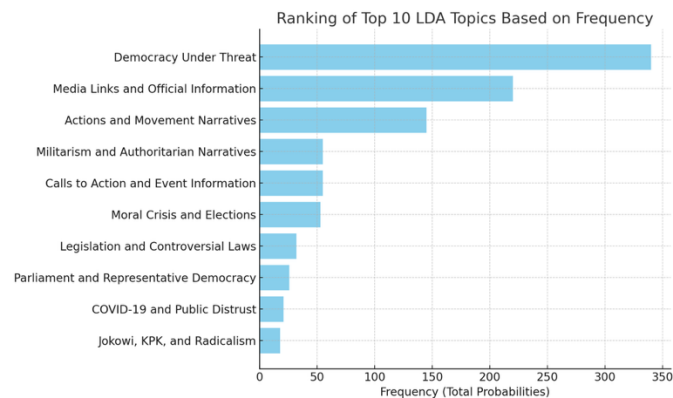


Figure 1. Topic Modelling

The most dominant topic is "Democracy Under Threat," which has the highest frequency of occurrence among all topics. This topic includes keywords such as "democracy," "destroyed," "reformdestroyed," and "democracyemergency." The dominance of this topic indicates that public concern over the decline in democratic quality is the strongest issue voiced in digital conversations. Many tweets use hashtags or narratives expressing worries about government repression and the silencing of public criticism.

The second-ranked topic is "Media Links and Official Information," highlighting the important role of media and official information channels in disseminating discourse and documentation of actions. This is evident from the frequent appearance of links and accounts of journalists or institutions actively reporting on events related to the movement.

The "Movement Actions and Narratives" topic ranks third, reflecting various forms of public protest expressions such as calls to action, criticism of political elites, and demands for change through hashtags and explicit statements. This topic reinforces the finding that social media serves as a primary tool for mobilizing contemporary social movements.

Mid-distribution topics include “Militarism and Authoritarian State Narratives,” “Action Invitations and Event Information,” and “Moral Crisis and Elections,” which collectively illustrate the complexity of issues raised by the public. For example, the militarism topic reflects concerns about the dominance of repressive state power, while the moral and election topic indicates dissatisfaction with the quality of leadership and the democratic process.

The last three topics in the distribution—“Controversial Legislation and Laws,” “Parliament and Representative Democracy,” and “COVID-19 and Public Distrust”—have lower frequencies. Nonetheless, these topics remain significant as they indicate that institutional issues and emergency policies also color public opinion, albeit with smaller volumes.

Finally, the topic “Jokowi, KPK, and Radicalism” appears as the least frequent topic. It contains criticism of the president, issues concerning the weakening of the Corruption Eradication Commission (KPK), and the use of radicalism as a narrative to justify government actions. Although it ranks lowest in frequency, this topic remains important as part of the opposition’s narrative structure against authority.

Overall, this visualization illustrates that public conversations regarding the #DaruratReformasi movement on social media are diverse but centered around the crisis of democracy, the need for transparency of information, and disappointment toward state institutions. In this context, social media acts as a discursive ecosystem enabling society to express dissatisfaction openly and collectively.

## **Key Actors and Influencers in #DaruratReformasi**

### ***Network Structure***

The social network analysis of the #DaruratReformasi data employed a modularity-based approach using the greedy modularity algorithm, revealing naturally formed discussion communities within social media conversations. Each community represents groups with similar interests, roles, or perspectives within the movement, ranging from student activists, journalists, non-governmental organizations, to educational and opposition accounts.

Key actor identification was performed by measuring degree, betweenness, and eigenvector centrality on a filtered graph containing only valid accounts. The results highlight ten main actors with significant influence in disseminating information and shaping public opinion within the network. These actors come from diverse backgrounds, including public figures, media accounts, and individuals actively participating in digital discussions.

Modularity-based community coloring illustrates how these key actors are distributed across several distinct but interconnected discussion groups. Node sizes proportional to centrality values strengthen the visualization's depiction of how information and influence flow within the #DaruratReformasi network.

Overall, the modularity approach combined with centrality analysis provides a comprehensive overview of the social structure of the #DaruratReformasi movement and

the pivotal roles of key actors driving the communication dynamics within the movement.

Table 2 Top Ten Actors

No	Actor	Degree Centrality	Betweenness Centrality	Eigenvector Centrality	Combined Ranking Score
1	sunhaefs	0.0458	0.0405	0.6850	8.0
2	piooya	0.0293	0.0671	0.0742	19.0
3	jokowi	0.0348	0.1021	0.0097	19.0
4	yoonepufy	0.0385	0.0387	0.0101	25.0
5	grumpybearl	0.0220	0.0717	0.0092	26.0
6	tanyarlfs	0.0073	0.0840	0.0189	30.5
7	DPR_RI	0.0092	0.0394	0.0519	33.0
8	B_Hendratmo1	0.0256	0.0246	0.0039	34.5
9	ayy_yyyyyy	0.0073	0.0047	0.1714	35.5
10	DivHumas_Polri	0.0092	0.0449	0.0034	36.0

Based on the centrality analysis of the #DaruratReformasi social media network, ten key actors were identified as playing significant roles in information dissemination and public opinion shaping. The actor with the highest degree centrality is sunhaefs, scoring 0.0458, indicating that this account has the largest number of direct connections within the network. This suggests that the account serves as a highly active interaction hub, directly connecting with numerous other users and acting as a focal point in the #DaruratReformasi discourse.

Meanwhile, the highest betweenness centrality value is held by jokowi with a score of 0.1021. This highlights the actor's critical role as a bridge or connector between various communities within the communication network. Such a position allows jokowi to serve as a strategic node in information flow and in linking distinct discussion groups, thereby exerting considerable influence over the narrative dissemination.

Regarding eigenvector centrality, which measures an actor's influence based on connections to other influential nodes, sunhaefs again ranks highest with a value of 0.6850. This indicates that beyond having numerous direct ties, this account is connected to other highly influential users, solidifying its dominance and strategic importance within the network.

In addition to these primary actors, other accounts such as piooya, yoonepufy, grumpybearl, and tanyarlfs also demonstrate significant centrality values. Their presence reflects their roles as active contributors in the online discussion, collectively facilitating information diffusion, opinion formation, and mobilization of support within the #DaruratReformasi movement.

Equally notable is the involvement of formal institutions such as DPR\_RI and DivHumas\_Polri. Although these accounts represent government entities and are often targets of criticism within protest discourse, they emerge as central actors due to their official roles in public communication and direct engagement with the public through



social media platforms. Their centrality underscores the complex, dialogical dynamics between governmental institutions and civil society in the digital public sphere.

Finally, the combined ranking score, integrating degree, betweenness, and eigenvector centrality metrics, provides a comprehensive overview of the most influential and strategic actors in the network. This composite score illustrates how these actors simultaneously contribute to driving discourse, bridging communities, and amplifying narrative propagation in the #DaruratReformasi movement on social media. These findings offer valuable insights into the digital social structure and mechanisms of influence within contemporary social movements.

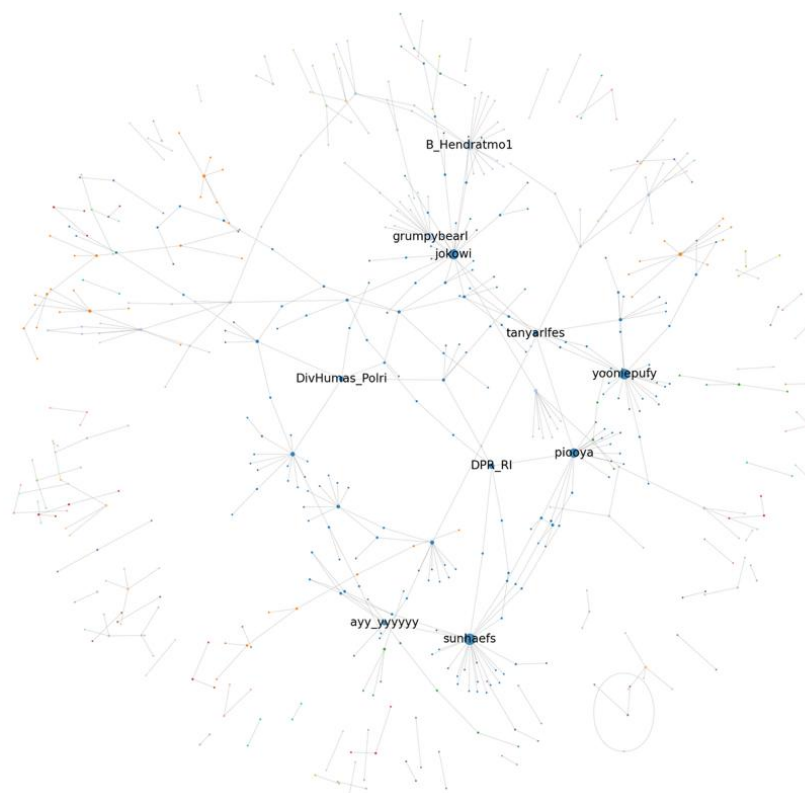


Figure 2. Fruchterman Reingold

The network visualization of the #DaruratReformasi conversation, generated using the Fruchterman-Reingold layout algorithm, clearly and systematically depicts the interaction structure among social media accounts. This layout employs a physics-based approach with attractive and repulsive forces between nodes, positioning each account so that closely connected nodes are placed near each other, while those farther apart indicate minimal interaction.

In the figure, larger nodes represent actors with high connectivity levels (degree centrality), making them focal points within the discussion network. The edges connecting nodes signify interactions such as mentions, retweets, or replies between users. The observed node distribution pattern indicates the existence of closely interacting

discussion groups, which strengthen the flow of information within the #DaruratReformasi movement.

Thus, this visualization not only illustrates individual relationships among users but also reveals how communication and influence propagate within the social media network, emphasizing the role of key actors in driving public discourse.

The presence of official government accounts such as @jokowi, @DPR\_RI, and @DivHumas\_Polri as central actors in the social media discussion around the #DaruratReformasi movement may appear contradictory, given that these institutions are typically subjects of public criticism.

However, this phenomenon can be understood through several key aspects based on social network analysis and the dynamics of digital communication:

1. High Frequency of Mentions and Retweets by the Public

These official accounts are frequently mentioned, retweeted, and replied to by many social media users. This reflects their position as focal points in the conversation, both as sources of official information and as objects of criticism. Consequently, these accounts naturally exhibit high degree centrality and betweenness centrality values due to their extensive connectivity within the network.

2. Role as Authoritative Information Sources

In the context of this movement, the public relies on these accounts for official statements, policy announcements, and government responses. Thus, these accounts not only serve as targets of criticism but also function as crucial channels for information dissemination, reinforcing their central position within the network topology.

3. Two-Way Interaction and Active Engagement

Some government communication units, such as @DivHumas\_Polri, engage directly with the public by responding to criticism, clarifying information, or issuing warnings. This interactive behavior enhances their role as connectors among community groups within the network.

4. Inherent Nature of Social Media Networks

Within the social media ecosystem, actors who are frequently referenced—whether positively or negatively—occupy central positions. Their presence reflects relevance and influence in discourse formation rather than dominance in narrative control.

The emergence of government-related accounts as central actors in the #DaruratReformasi social media network affirms their dual role as primary sources of information and objects of public oversight and criticism. This reflects the complexity of interaction between institutional communication and civic participation in the dynamics of contemporary digital protest movements [20].

Temporal analysis shows that the #DaruratReformasi movement experienced dynamic development starting in early July. During the initiation phase, social media activity began to increase with the emergence of initial critical narratives towards

government policies and demands for change [21]. Over time, the number of followers and participants grew significantly, marked by increased interaction volume, mentions, and retweets that broadened the movement's message reach.

In the escalation phase, increasingly active discussion clusters formed, with social media topics becoming more focused and varied, ranging from policy criticism to calls for collective action. Data also indicate that the movement peaked between mid to late July, where key actor involvement and public participation reached maximum levels, and primary topics intensified, gaining attention from both national and international media.

The process of social media topic formation reflects an organized and adaptive pattern of digital mobilization, wherein emerging issues rapidly attract community attention and spread widely through communication networks. These findings underscore how digital social movements can effectively leverage social media platform momentum and mechanisms to drive public opinion within a relatively short timeframe.

## **Discussion**

The results of social media network analysis in the context of the #DaruratReformasi movement reveal interaction and influence patterns consistent with previous studies on the role of social media in social mobilization and public opinion formation [14][15]. The network modularity observed indicates the formation of closely-knit and segmented discussion communities, as described by the “echo chamber” theory [18], where groups with similar views tend to interact more intensively with each other.

The central roles of key factors such as independent accounts and public figures, including government officials, reinforce the concept that social media functions not only as a space for protest but also as an arena for negotiation and two-way communication between society and institutions [17]. This is particularly relevant in the context of #DaruratReformasi, where interactions among diverse groups demonstrate the complex dynamics of digital politics.

Findings regarding government actors emerging as connectors within the network, despite often being subjects of criticism, align with literature emphasizing the importance of transparency and institutional engagement in digital dialogue [16]. This suggests that the involvement of official institutions on social media can contribute to a more inclusive discourse dynamic, although tensions between protest actors and authorities persist.

Visualization using the Fruchterman-Reingold algorithm clarifies that the social network is not homogeneous but divided into interconnected communities with distinct boundaries. This supports the argument on the importance of differentiated communication strategies tailored to the characteristics of digital communities to maximize message dissemination effectiveness [19].

Thus, this study provides empirical and conceptual contributions to understanding how digital social movements like #DaruratReformasi develop and are managed through social media network structures. Practically, social movement actors and policymakers can leverage these insights to design more adaptive and responsive communication strategies aligned with the dynamics of digital society.

## CONCLUSION

This study examines the dynamics of the *#DaruratReformasi* social movement through social media network analysis using *modularity* and *centrality* metrics, while also considering the temporal development of the movement from early July to its peak. The findings reveal distinct phases in the movement's progression—beginning with initiation marked by increased interactions and the emergence of critical topics, followed by a growth phase characterized by the expansion of the follower network, and culminating in a peak phase distinguished by the engagement of key actors and the broadening scope of discussions at both national and international levels.

Discussion of Research Question 1 (*RQ1*) shows that topic analysis uncovered a highly diverse range of key issues in public discourse related to *#DaruratReformasi*. These main issues include criticism of government policies, calls for mass action, narratives surrounding militarism and democracy, as well as other socio-political topics dominating the conversations. The dynamic emergence of these topics aligns with the movement's development, illustrating how public discourse evolves through phases of mobilization and societal reflection.

For Research Question 2 (*RQ2*), social network analysis identified the main actors and influencers playing central roles in information dissemination and public opinion formation. Results indicate that these actors are distributed across various communities with differing levels of influence, where several key figures and institutions hold strategic roles as communication hubs and bridges between communities. This finding underscores the importance of understanding social structure and the influence of individuals and groups in driving and sustaining momentum in digital movements like *#DaruratReformasi*.

The social change brought by *#DaruratReformasi* is evident not only from the increased public participation in digital discourse but also from the increasingly organized interaction patterns and the formation of active communities that serve as primary drivers of the movement's narrative. Temporal analysis clarifies how social media topics evolve in accordance with the movement's phases, providing insight into the processes of mobilization and effective information dissemination.

This study also reveals the dual role of the government, which—despite being a target of criticism—actively utilizes social media to manage narratives, raise awareness, and monitor the movement's developments in real time. Conversely, the public demonstrates increasing awareness and uses digital platforms as primary tools to initiate and organize social actions, reflecting a transformation in political behavior in the digital era.

More broadly, the findings affirm the urgency of social media as a primary arena for discourse contestation and a driver of contemporary social change. The large number of followers and the attention garnered, including from international media, demonstrate that the *#DaruratReformasi* movement is not merely a local phenomenon but part of a

global wave of digital mobilization with significant impacts on social and political governance.

Therefore, this study serves as an important reference for understanding how modern social movements form, evolve, and interact with institutional powers, while also offering strategic implications for policymakers and social actors in addressing the challenges of communication and public opinion management in the digital world.

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