

The Role of Twitter in Disaster Communication by the Indonesian Government: A Case Study of the Cianjur Earthquake

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ABSTRACT

Indonesia is a country highly prone to natural disasters, including earthquakes. In this context, social media—particularly Twitter—plays a crucial role in facilitating disaster communication between the government and the public. This study aims to analyze how two Indonesian government agencies, the Meteorology, Climatology, and Geophysics Agency (BMKG) and the National Disaster Management Agency (BNPB), utilized Twitter to disseminate disaster-related information following the Cianjur earthquake in November 2022. A qualitative content analysis method was applied to examine the official Twitter accounts @InfoBMKG and @BNPB_Indonesia, using NVivo 12 Plus software. The findings reveal that @InfoBMKG demonstrated higher communication intensity and a stronger focus on earthquake-related issues, both in terms of tweet volume and the use of relevant hashtags, compared to the more general content shared by @BNPB_Indonesia. This study concludes that the frequency, consistency, and relevance of shared content significantly influence the effectiveness of government disaster communication on social media. These insights are expected to contribute to the improvement of risk communication strategies and disaster information management in Indonesia.

Keywords: twitter; disaster communication; government social media; BMKG; BNPB; Cianjur earthquake

INTRODUCTION

Indonesia is a country highly prone to natural disasters due to its location along the Pacific Ring of Fire (Utomo & Purba, 2019). Various natural disasters have significantly impacted Indonesian society (Setiawan et al., 2022). Given the frequent historical occurrence of natural disasters in the region, it is essential to study them thoroughly. Understanding the impact and characteristics of each event is crucial for recovery and reconstruction efforts, disaster mitigation, and disaster education (Ramdani et al., 2019). In particular, strengthening social media communication can enhance situational awareness and improve emergency response (Z. Wang & Ye, 2018).

Social media plays a critical role during disaster situations (Zou et al., 2021). It is increasingly viewed as essential for sending alerts, identifying critical needs, and focusing emergency responses (Carley et al., 2016). The dimension of civic engagement between individuals and institutions becomes especially apparent during crises and disasters through social media platforms (Hasfi et al., 2021). Among these platforms, Twitter has emerged as one of the most popular tools for collecting, analyzing, and summarizing emergency-related information to support response efforts and decision-making (Comes et al., 2015). The use of platforms such as Twitter significantly increases during natural disasters (Karimiziarani et al., 2022). A study by Eriksson & Olsson (2016) reported that the public perceives Twitter as a tool to alert users about disaster emergencies, access real-time updates, and find reliable news sources.

Social media analysis can reveal key insights from Twitter during disaster events, which governments can leverage effectively (Pourebrahim et al., 2019). Social media has played a crucial role for governments in disseminating information about situations, risks, and personal protective actions (Y. Wang et al., 2021). Hong & Kim (2016) found that the government's use of social media can facilitate the gathering of public opinions and ideas, especially during disaster situations. Social media data has emerged as a valuable source of big data, drawing increasing attention in government-led disaster management (Wu et al., 2021), as it is frequently used as an emergency communication tool to distribute aid and coordinate information recipients (Vera-Burgos & Griffin Padgett, 2020).

In recent years, researchers have studied government use of social media during disasters and have provided a range of insights. For instance, Twitter, when used by government agencies, can offer an effective mechanism for citizen participation in providing public information services during emergencies (Chatfield et al., 2013). Twitter can also help inform communication strategies used by governments in addressing crisis and disaster risks (Y. Wang et al., 2021). A study by Putri Pratiwi et al., (2021) stated that social media plays a key role in fostering communication among stakeholders and building public trust in government actions. Furthermore, the information provided by government agencies offers timely updates for the public. Takahashi et al., (2015) found that governments use social media to coordinate aid efforts and to alert affected communities. Considering the widespread use of social media in Indonesia and findings from previous studies, we believe there are numerous opportunities for future research on the role of social media in disaster communication (Irawan et al., 2020).

However, most of these studies have primarily focused on Western or developed contexts, with limited exploration of how government agencies in developing countries—such as Indonesia—strategically utilize social media to communicate during disasters. Moreover, existing Indonesian studies on BMKG and BNPB have largely remained descriptive, focusing on message dissemination or public perception, without analyzing the institutional logic, framing patterns, or comparative use of social media strategies between key agencies. The literature has not yet provided sufficient analytical understanding of how these institutions frame messages, engage the public, and coordinate inter-agency communication during disaster events.

Therefore, this study seeks to fill this gap by examining the communication strategies employed by two central disaster management agencies in Indonesia—BMKG and BNPB—through Twitter. Specifically, it investigates how their communication intensity, content focus, and hashtag strategies differed during the response phase of the 2022 Cianjur earthquake. This refined analytical framing allows the study to go beyond descriptive mapping and explore the underlying logic of institutional communication behavior in disaster contexts. By doing so, the study contributes theoretically by expanding the discussion of digital disaster communication in non-Western settings and practically by providing evidence-based recommendations for

strengthening inter-agency coordination and digital crisis response frameworks within the Indonesian disaster management system.

Recently, one region in Indonesia experienced a concerning natural disaster—an earthquake with a magnitude of 5.6 struck the Cianjur area in late November 2022. In response to this event, we are interested in analyzing the disaster communication efforts conducted by the Indonesian government, focusing on two official Twitter accounts: the Meteorology, Climatology, and Geophysics Agency (@InfoBMKG) and the National Disaster Management Agency (@BNPB_Indonesia). To address the identified gap, this study poses the refined research question: “In what ways do the Meteorology, Climatology, and Geophysics Agency and the National Disaster Management Agency utilize Twitter to construct, disseminate, and engage in disaster communication during the Cianjur earthquake response?” This analytical framing allows the study to go beyond descriptive mapping and explore the patterns, framing strategies, and interactivity that shape disaster-related communication in Indonesia. Based on this question, the study aims to conduct an in-depth analysis of the activities of these two accounts. This research contributes theoretically by expanding the discussion of digital disaster communication in non-Western contexts and practically by providing insights into how government agencies in Indonesia can optimize social media for effective crisis communication and citizen engagement.

RESEARCH METHODS

This study employs a qualitative content analysis method of Twitter social media to explain and identify disaster communication efforts in response to an earthquake in Indonesia. The qualitative approach involves analyzing Twitter data using a structured methodology (Silver & Lewins, 2007).

The steps for analyzing Twitter content in this research follow the approach outlined by (Lai & To, 2015). First, the actors to be analyzed are determined; in this case, the researcher selected government institutions responsible for handling earthquake disasters in Indonesia. Second, data collection is carried out by retrieving Twitter content from the accounts of these

identified government agencies. The data collection was conducted on November 24, 2022, which was three days after the Cianjur earthquake. The collected tweets represent the immediate post-disaster communication period, allowing the study to capture early government communication responses. Third, the data is classified and analyzed comprehensively. This third step is considered the most critical, as it requires the researcher to interpret the content gathered from each Twitter account involved in the study.

The Twitter content analysis in this study utilizes NVivo 12 Plus software, one of the available tools for Computer-Assisted Qualitative Data Analysis (CAQDA) (Sotiriadou et al., 2014). NVivo 12 Plus provides functionalities such as word frequency, cluster analysis, and text analysis to support data interpretation (Brandão, 2015; Woolf & Silver, 2017).

The stages of using NVivo 12 Plus in this study follow (Edwards-Jones, 2014), which include installing NVivo 12 Plus on Windows, adding the NCapture extension to Google Chrome, capturing Twitter content using the built-in NVivo NCapture and Google Chrome, importing captured Twitter data into NVivo 12 Plus desktop, managing Twitter content files in NVivo, performing automatic topic coding to create content categories, visualizing topics in diagram form, and analyzing similarities through the cluster analysis function. These steps using NVivo 12 Plus produce classified and interpretable data that can be used to draw conclusions and answer the research question.

RESULTS AND DISCUSSION

Account Intensity in Disseminating Information

This analysis focuses on two government Twitter accounts that play crucial roles during disaster situations, particularly in the case of earthquakes. The Meteorology, Climatology, and Geophysics Agency (BMKG) is responsible for creating and disseminating early warning information for natural disasters such as earthquakes and tsunamis. Meanwhile, the National Disaster Management Agency (BNPB) holds the responsibility and function of coordinating and implementing disaster management activities in an integrated and planned manner.

Both agencies have long utilized social media—especially Twitter—as a tool for disseminating information. The Meteorology, Climatology, and Geophysics Agency (@InfoBMKG) joined Twitter in January 2010, while the National Disaster Management Agency (@BNPB_Indonesia) joined in August 2011. The images below also show that both accounts are integrated with the official websites of their respective institutions. This confirms that these are the official accounts used by BMKG and BNPB. Furthermore, both @InfoBMKG and @BNPB_Indonesia accounts are verified by Twitter, indicating official recognition.

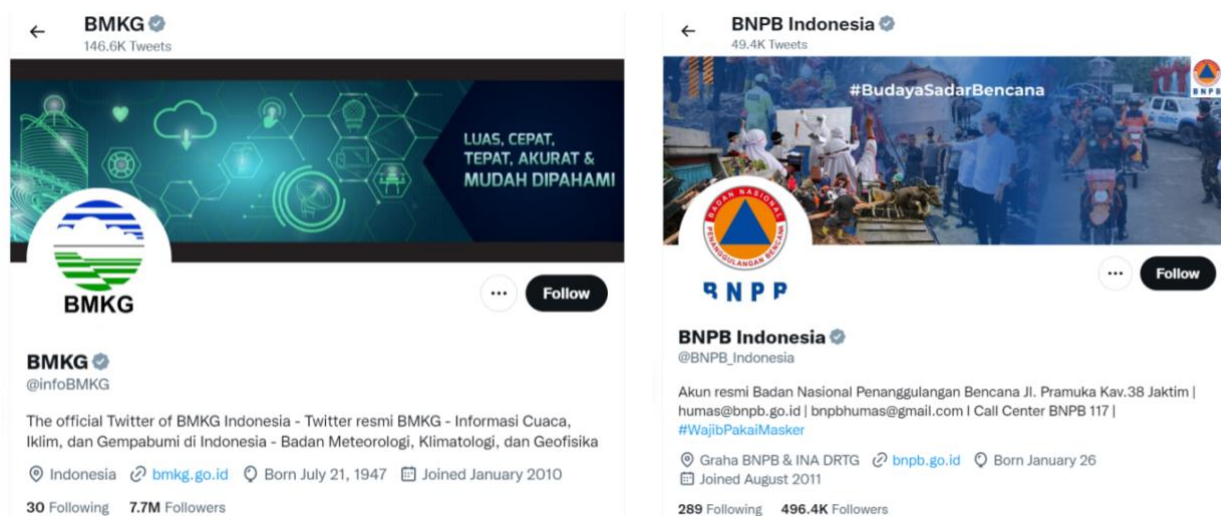


Figure 1 Twitter Account Interface (Source: Twitter Data Processed by the Author)

Twitter serves as a bridge for communication between the government and the public (Rezeki, 2020). The intensity of activity on an account, including tweets and retweets, reflects how effectively disaster communication is carried out in the post-disaster period. The figure below illustrates the activity level of both accounts based on the number of tweets and retweets. The total number of tweets and retweets from @InfoBMKG is 5,836, consisting of 5,831 original tweets and 5 retweets. In comparison, @BNPB_Indonesia produced a total of 2,058 tweets, with 1,938 original tweets and 120 retweets. According to Widagdhaprasana et al., (2022), consistent tweeting enables an account to credibly convey information on a specific topic. The higher the tweet

intensity, the more information is generated by the account, thereby reaching a wider audience on Twitter.

The significant difference in activity level indicates that BMKG plays a more proactive communication role, driven by its technical mandate to deliver real-time updates on seismic events. Frequent tweeting enables BMKG to immediately broadcast earthquake parameters and aftershock alerts to the public, fulfilling its early-warning function. Conversely, BNPB's fewer tweets suggest that its focus lies more in coordinating emergency responses and inter-agency actions, which are less visible on public social media platforms. This aligns with BNPB's operational nature as a coordinating body rather than a direct information provider.

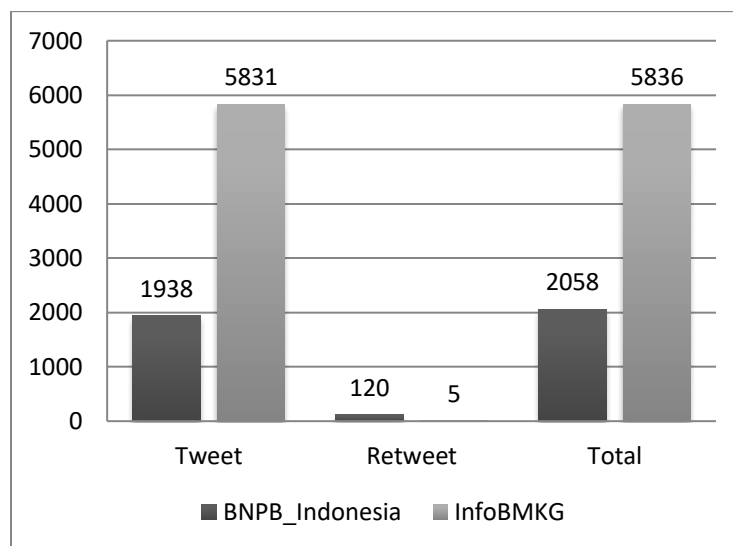


Figure 2 Types of Tweet Intensity (Source: Processed Using Nvivo 12 by the Author)

We also present the monthly activity intensity of both accounts over recent months. In general, the @InfoBMKG account has shown significantly higher intensity compared to @BNPB_Indonesia. The @InfoBMKG account has displayed an increasing trend in activity in recent months, in contrast to the @BNPB_Indonesia account, which has been relatively stagnant or even declining. A particularly noteworthy trend was observed during the Cianjur earthquake on November 21, 2022—@InfoBMKG's activity spiked in November and December, while @BNPB_Indonesia's activity decreased during the same period. Quantitatively, @InfoBMKG

disseminated more information than @BNPB_Indonesia during the Cianjur earthquake. This temporal pattern suggests that BMKG’s communication is event-driven and reactive to seismic occurrences, whereas BNPB’s communication follows a longer-term coordination rhythm.

This differentiation has meaningful implications. The dominance of BMKG in online disaster communication reinforces its visibility as the primary source of disaster-related information, which can enhance public trust in technical updates but may also overshadow the broader coordination messages from BNPB. Moreover, the lack of synchronized intensity between both agencies reveals a fragmented communication landscape—one focused on real-time alerts (BMKG) and another on institutional coordination (BNPB)—indicating that Indonesia’s government disaster communication remains functionally segmented rather than integrative.

This finding suggests that BMKG’s communication pattern was more event-driven and responsive, reflecting its mandate as an early-warning agency, whereas BNPB’s relatively lower activity indicates a focus on coordination and recovery rather than real-time dissemination. This difference implies a division of communicative roles between the two agencies—BMKG emphasizing immediacy and alert, while BNPB emphasizes institutional coordination—supporting the argument that government disaster communication in Indonesia remains functionally segmented rather than integrative.

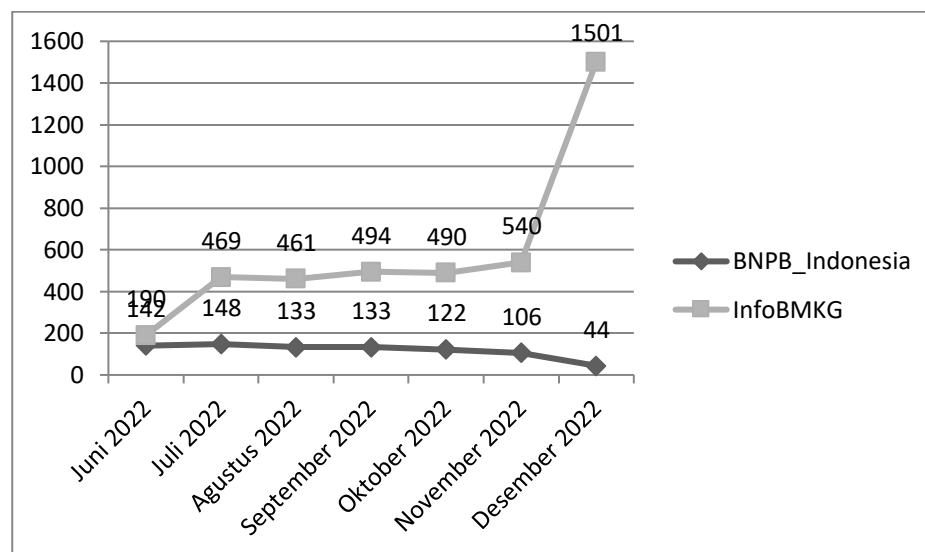


Figure 3 Monthly Account Intensity (Source: Processed Using Nvivo 12 by the Author)

Dominant Hashtags on Each Account

Hashtag dominance is one of the most important aspects to emphasize in any social media analysis, especially on Twitter. The presence of specific hashtags on each account reveals the identity of the information being posted. Hashtags generally become popular on social media not only because they offer a new way for users to communicate but also because they provide an effective method to engage in conversations about specific topics, people, or events (Zappavigna & Martin, 2018).

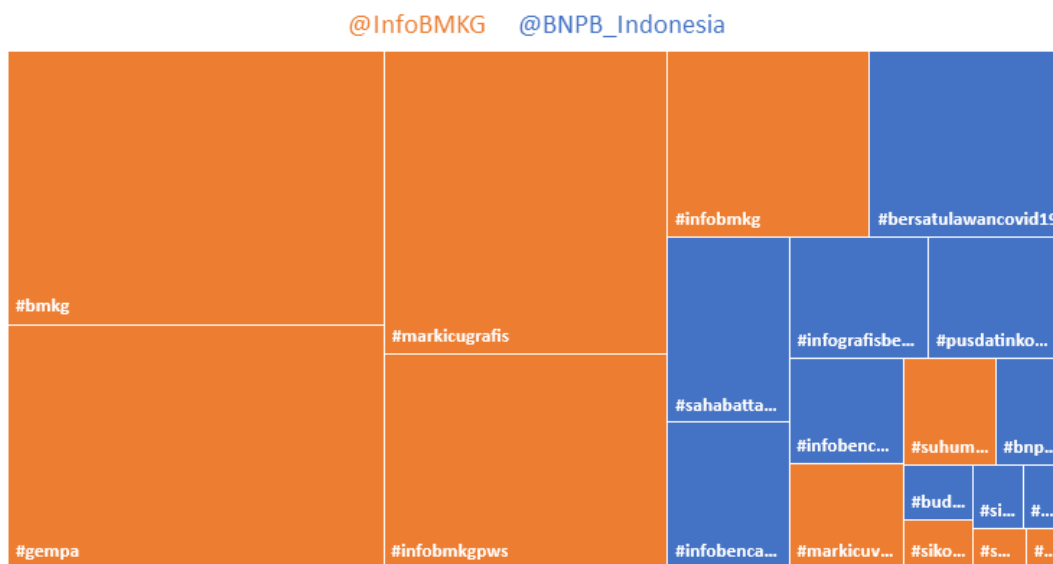


Figure 4 Treemapping of Dominant Hashtags on Each Account (Source: Processed Using NVivo 12 Plus by the Author)

The figure above presents the dominance of hashtags on each account. On the @InfoBMKG account, the most frequently used hashtag is #bmkg, while on the @BNPB_Indonesia account, the most dominant hashtag is #bersatulawancovid19. Overall, the @InfoBMKG account shows a stronger presence in issue dissemination through hashtags compared to the @BNPB_Indonesia account. Regarding earthquake-related issues, @InfoBMKG has placed considerable emphasis, as reflected by #gempa being the second most frequently used hashtag.

A deeper semantic reading of these hashtags reveals distinct institutional orientations. The dominance of #bmkg and #gempa indicates BMKG’s focus on scientific credibility, immediacy, and real-time situational updates—positioning the agency as a “source of truth” during seismic crises. In contrast, BNPB’s top hashtags such as #bersatulawancovid19 and #sahabattangguh emphasize solidarity, resilience, and public education. This framing suggests that BNPB adopts a narrative of collective recovery and preparedness rather than immediate warning. Thus, while BMKG’s communication reflects a “technocratic framing” of disaster communication, BNPB employs a more “community-oriented framing.”

This interpretive difference underscores how institutional mandates shape digital disaster communication strategies in Indonesia. It also provides insight into the broader research question—showing that Twitter functions not only as an alert mechanism but also as a symbolic space where agencies construct institutional identities and shape public perception of authority, responsibility, and care during crises.

Table 1 Ten Most Popular Hashtags on Each Account

No.	InfoBMKG	Total	BNPB_Indonesia	Total
1	#bmkg	1848	#bersatulawancovid19	662
2	#gempa	1648	#sahabattangguh	406
3	#markicugrafis	1549	#infobencanabnpb	319
4	#infobmkgpws	1094	#infografisbencana	305
5	#infobmkg	676	#pusdatinkombnpb	305
6	#markicuvideo	215	#infobencanabnpb	218
7	#suhumaksimumharian	176	#bnpbindonesia	136
8	#sikontropis	60	#budayasadarbencana	68
9	#sobatbmkg	38	#siapapuntukselamat	58
10	#bibitsiklontropis	29	#gpdr2022	51

Source: Processed using NVivo 12 Plus by the author.

The findings of this study highlight the different intensities and focuses of disaster communication between the two key government agencies in Indonesia—BMKG and BNPB—on Twitter. Both institutions have a long-standing presence on the platform, with verified and officially integrated accounts, indicating their commitment to digital communication during disaster situations. However, their usage patterns and communication strategies differ significantly.

BMKG's Twitter account (@InfoBMKG) demonstrated substantially higher activity levels, particularly during the months surrounding the Cianjur earthquake in November 2022. This spike in tweet frequency reflects the agency's proactive approach to disseminating real-time disaster-related information, such as early warnings, earthquake updates, and meteorological data. The high volume of original tweets, rather than retweets, further reinforces BMKG's role as a primary source of authoritative information. This aligns with BMKG's institutional mandate as a scientific authority that prioritizes speed, accuracy, and credibility—traits that naturally translate into a high-frequency, information-centered communication style.

In contrast, BNPB's Twitter account (@BNPB_Indonesia) showed less consistent activity. During the critical months of the Cianjur earthquake response, its tweet volume decreased, suggesting a less aggressive use of social media as a communication tool during that specific disaster event. While BNPB is tasked with broader disaster response and coordination, its Twitter activity indicates a more general focus, with hashtags such as #bersatulawancovid19 and #infobencanabnpb dominating the content, rather than earthquake-specific hashtags.

This pattern can be explained by the institutional orientation of BNPB, which tends to emphasize long-term narratives of resilience, recovery, and public preparedness rather than short-term event reporting. The dominance of hashtags like #sahabattangguh and #budayasadarbencana reveals BNPB's framing of disaster management as a collective social responsibility, aiming to cultivate a culture of readiness and solidarity. In other words, BNPB's communication strategy is less about real-time crisis response and more about sustaining public awareness and resilience-building beyond individual disaster events.

The hashtag analysis further reinforces this divergence. @InfoBMKG effectively utilized targeted hashtags like #bmkg and #gempa, which directly relate to its core functions and the specific disaster event being analyzed. This indicates a more focused and situational use of social media to build public awareness and provide up-to-date information. Meanwhile, @BNPB_Indonesia employed more generalized and thematic hashtags, such as #budayasadarbencana and #sahabattangguh, which may reflect long-term disaster awareness campaigns rather than timely crisis response. From an interpretive perspective, this reflects a “preventive communication logic,” where BNPB prioritizes public education and resilience discourse over instant alerts.

The “why” behind these differences lies in the contrasting institutional logics and target audiences of the two agencies. BMKG’s communication is event-driven, seeking to inform and warn the public in real-time, while BNPB’s approach is narrative-driven, aiming to strengthen collective preparedness and inter-agency collaboration. These differences suggest that the two agencies occupy complementary roles in Indonesia’s disaster communication ecosystem—BMKG as the first informer and BNPB as the long-term coordinator of recovery and resilience.

These patterns suggest that BMKG utilizes Twitter not only as a public information channel but also as a tool for building trust and credibility during emergencies. The consistency and relevance of their content allow them to become a dependable source during critical times. On the other hand, BNPB may benefit from optimizing its Twitter strategy to increase engagement and visibility during high-impact disaster events. In particular, integrating BNPB’s long-term awareness framing with BMKG’s real-time responsiveness could enhance the coherence and public trust in Indonesia’s digital disaster communication landscape.

Overall, this discussion underlines the importance of institutional consistency, frequency, and thematic relevance in social media communication during disasters. While both agencies have demonstrated their presence on Twitter, the difference in their content strategies highlights the need for a more coordinated and responsive digital communication framework among disaster management institutions in Indonesia. Enhanced synchronization and content alignment could strengthen public trust and improve overall disaster response outcomes.

CONCLUSION

This study concludes that Twitter serves as a vital tool in Indonesia's disaster communication ecosystem, but its effectiveness varies across institutions. The @InfoBMKG account demonstrates a data-driven and event-specific communication model, leveraging real-time updates and targeted hashtags to enhance public trust and awareness. Conversely, @BNPB_Indonesia adopts a broader and less event-specific communication pattern, emphasizing long-term disaster awareness and recovery narratives rather than immediate crisis response.

Theoretically, this research contributes to the field of crisis communication and government social media communication by illustrating how institutional roles shape digital communication behavior during emergencies. It expands current understanding by showing that in developing country contexts, government disaster communication tends to be segmented according to agency mandates rather than integrated under a unified crisis response framework. This finding adds nuance to existing crisis communication theories, particularly in explaining how role specialization affects message intensity, framing, and public engagement.

To enhance effectiveness, BNPB should implement event-specific strategies, such as using pinned tweets for ongoing disaster responses, employing unique hashtags for each event (#GempaCianjur, #BanjirSemarang, etc.), and increasing tweet frequency during the critical emergency response phase. Meanwhile, BMKG could strengthen inter-agency collaboration by tagging BNPB and related institutions in alert posts, ensuring faster cross-platform dissemination. Joint hashtag campaigns and synchronized posting schedules could also improve message coherence and public visibility during national emergencies. Furthermore, developing a national "digital crisis protocol" that defines real-time coordination and shared communication standards across agencies would promote a more integrated and trusted disaster communication system.

This study is limited to two agencies and one disaster event; future research should broaden the scope to include additional institutions, multiple disaster types, and comparative analysis across different social media platforms. Incorporating audience engagement metrics (e.g.,

retweets, mentions, sentiment) would further enrich understanding of two-way disaster communication effectiveness in Indonesia's digital ecosystem.

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