Tweeps and their tweeting behavior during natural disaster

Y Safitri¹, M Angeline¹ and D Wibowo¹

¹Marketing Communication Program, Communication Department, Faculty of Economics & Communication, Bina Nusantara University, Jakarta, Indonesia 11480

E-mail: Yuanita.safitri@binus.edu

Abstract. Every country needs to have a disaster mitigation measures to reduce the risks and impacts of hazards. Located in the ring of fire, Indonesia is no stranger to natural disasters. However, the country still has low disaster mitigation measures. One of the important tasks for disaster mitigation is understanding the role of social media during a disaster. Therefore, this study aims to answer the following questions: (1) What are Twitter function categories during natural disasters in Indonesia? (2) How is Twitter’s functional framework during natural disasters, especially between January 2018 and November 2019? The research applies a qualitative approach. Data are collected from Twitter from 1 January 2018 to 25 November 2019 using specific hashtags. Other than Twitter, data are also gathered from the National Disaster Management Agency (BNPB) website and the Disaster Channel. Disaster communication research is vital since it can help the government to possess a thorough understanding of Twitter’s functional framework. Thus, it will help to make an impactful policy. This study finds that there are eight Twitter functions categories during natural disasters: quick update, showing sympathy, increasing disaster awareness, fundraising, distributing and combating fake news, pushing government efforts, displaying real vs. amateur expertise, and organizational branding purposes.

Keywords: tweeps, tweeting behavior, natural disaster

1. Introduction

Indonesia has endured a big challenge in natural disasters in recent years. They range from serial earthquakes, floods, landslides, to tsunamis that kill hundreds of people and make thousands of people suffer. These events are inevitable and mostly without warning. Located in the ring of fire, no wonder in 2018, 2,426 natural disasters hit this country [1]. It was the most tumultuous year for Indonesia since 2007. The worst natural disaster occurred on 26 December 2004, when a massive earthquake befell in the western sea of Sumatra near Simeuleu Island. The earthquake triggered a tsunami that killed more than 225,000 people in eleven countries and caused severe destruction in many coastal areas in the affected countries. It was the biggest deathly natural disaster in the 21st century. On a positive note, the Indonesian government has been aware of the likelihood of natural disasters in Indonesia. Annually, they spend between $300 million-$500 million on recovery efforts following natural disasters [2].

Based on Presidential Regulation Number 8 of 2008, Indonesia Disaster Management Agency (BNPB) is the leading institution responsible for disaster preparedness in Indonesia. The implementation of BNPB’s duties in the regions is supported by the Provincial Disaster Management Agency (BPBD)
and districts/cities led ex-officio directly by the regional secretary. Now, the country has formed 34 provincial BPBDs and 428 regency/city BPBDs. However, The Strategic Planning of Disaster Preparedness in Indonesia for 2015-2019 clearly states that the government still needs to increase disaster management quality because of the vast disaster-prone area in the country. From that perspective, communication for disaster reduction becomes highly relevant. Effective communication will decrease the impact of the disaster [3, 4]. However, the efforts of disaster communication in Indonesia are quite limited, caused by the low disaster mitigation in this country [5].

Social media becomes essential in Indonesia, and the citizens also use it as a communication device during a natural disaster. During disasters, Indonesian citizen mostly turns to social media for a quick update on the situation. Jaeger et al. and Houston et al. state that social media offers the possibility of improved disaster communication. These technologies have the potential for increased information capacity, dependability, and interactivity [6, 7]. Social media during a natural disaster can cover the absence of traditional media to give up-to-date information [3, 4].

In a disaster context, Twitter becomes the fastest tool to share information than other social media platforms because of its conversational nature. To tweet on Twitter, the users or tweeps just need 280 characters or less. Twitter is considered a method for crisis interchanges, given its developing universality, correspondence rate, and cross-stage availability. Palen et al. characterize Twitter as the medium for “harvesting” data during an emergency occasion to figure out what is happening on the ground [8]. Through Twitter, influenced individuals or Search and Rescue Teams are simpler to arrive at the area. Additionally, it will be simpler for them to convey the present condition to a larger crowd. Based on the background, this study focuses on what Twitter can do during natural disasters in Indonesia from January 2018-November 2019.

The objective is to understand Twitter functions during natural disasters in Indonesia. By understanding each function of Twitter, the government can effectively use the channels to deploy relevant information during disasters. This study is essential to help governments and NGOs to have a better understanding of Twitter’s functional framework before making an impactful policy.

2. Literature review

2.1. Twitter as a social media platform

As one of the popular social media platforms, Twitter can allow users to send messages up to 280 characters. These messages are called tweets, and people who use twitter called tweeps, a hybrid of “Twitter” and “peeps,” a shortened version of “people”. She also adds that users can interact publicly with other users by retweeting, as indicated with the abbreviation “RT,” or by talking directly to another user using the @reply feature, which is done by including that user’s username in a tweet. Twitter, like other social media, has developed its distinct terminology and practices. One of them is the hashtag, which is created using the symbol “#” followed by a phrase to indicate the topic of the tweet (#hashtag). Some people search for and follow a sequence of specific hashtags or topics, referred to as a timeline [9].

2.2. Disaster communication

Located on the ‘ring of fire,’ it makes Indonesia profoundly defenseless against earthquakes and volcano eruptions [10, 11]. Disaster, as a potentially traumatic event collectively experienced, has an acute onset and is time-delimited [12]. In comparison, Houston et al. categorize disaster as natural (such as earthquake or tsunami), technological (such as oil spill), or human (such as terrorism) causes. They may produce physical, social, psychosocial, sociodemographic, socioeconomic, and political consequences. Typically, disasters can also be categorized as including a pre-event, event, and post-event phase [13]. Houston et al. state that crisis and risk communication are relevant to disaster communication [7].

2.3. Social media and disaster communication

In 2014, Alexander stated social media could be used in seven different ways during an urgent situation, i.e., listening to public debate, monitoring situations, extending emergency response management. It
could also be crowd-sourcing and collaborative development, creating social cohesion, furthering causes (including charitable donation), and enhancing research [14]. Appreciation of the positive side of social media is balanced by their potential for adverse developments, such as disseminating rumors, undermining the authority, and promoting terrorist acts.

Houston et al. classify social media users in the framework during a disaster, including communities, government, individuals, organizations, and media outlets. They identify fifteen distinct social media uses during disasters, ranging from preparing and receiving disaster preparedness information to detecting disasters before an event to (re)connecting community members following a disaster [7]. The framework demonstrates that a variety of people may utilize and produce disaster-related social media content. Consequently, social media use during disasters occurs at many levels, even within the same one.

In the context of Indonesia, Santoso categorizes social media usage during disasters as situational reports from a personal perspective, second-hand reporting, requesting help, coordinating rescue efforts, providing mental counseling, criticizing the government, expressing the hope and sympathy, discussing the cause of the disaster and (re)connecting community members [4].

2.4. Sustainability and disaster communication

Pandey and Okazaki promote the importance of the community’s participation to increase disaster management efforts. However, based on their research, many disaster management programs have failed to be sustainable at the local level after the end of the project by the government or NGO [15]. Consequently, without sustainability, disaster management efforts are hard to be maintained.

Based on the study of UNCRD, they find eight key factors for enhancing sustainability. Two of the key factors are community and supporting agencies. It shares common motivation and ownership for the initiation and sustainability of Community Based Disaster Management (CBDM) and wider stakeholders’ involvement and participation. It means that to develop sustainability in disaster management program, we need to focus on disaster communication. Hence, social media can be an essential tool to enhance the visibility of disaster communication [15].

3. Methodology

For this research, we use a qualitative approach, with narrative analysis method. By definition, narrative analysis is an approach taken to analyze data concerned with understanding how and why people talk about their lives as a story or a series of stories. Narrative analysis inevitably includes issues of identity and the interaction between the narrator and the audience(s) [16]. However, for this study, we use Twitter as an object. Thus, we analyze the narrative of tweets shared by individuals or organizations with the hashtags #gempa (#earthquake) and #tsunami.

Rosenwald and Ochberg suggest that narrative analysis disrupts the traditional social scientific analysis, which has realist assumptions and a focus on information collection. Instead, the focus shifts to look at the very construction of narratives and, likewise, the role they play in the social construction of identity. Personal stories are not merely a way of telling someone (or oneself) about one’s life; they are how identities may be fashioned [17].

For the data collection, we use several steps. First, we gather raw data from Twitter with Twitter Advance (https://twitter.com/search-advanced?lang=en). This stage is called a virtual observation. It is an observation method to obtain social and cultural phenomenon in the cyberspace [18]. Data are collected in a specific range of time, from 1 January 2018 to 25 November 2019 using Twitter Advance with hashtags #gempa and #tsunami. However, to make it more detailed, we use specific hashtags like #tsunamiselatsunda, #tsunamibanten, #gempalombok, #prayforlombok, #tsunamipalu, and #gempamaluku. We also virtually observe several key opinion leaders for disaster issues on Twitter, like Twitter of the late @Sutopo_PN, @Humas_BMKG, @BNPB_Indonesia, and @infomitigasi. After gathering some raw data, the collected tweet is categorized into its usage. Then, we analyze the data and make it into a functional framework. To enhance the objectivity of our study, we also interview the representative of DisasterChannel.co – the first disaster portal in Indonesia. For the anonymity of the
Twitter accounts, we hide the individuals’ account name by replacing several letters with ‘xxx.’ We also use secondary data from news articles, journals, and books related to disaster communication.

4. Results

4.1. Disaster in Indonesia between January 2018 and November 2019

Between January 2018 and November 2019, there are 3885 disasters happened in Indonesia, including flood, landslides, abrasion, tornado, forest fires, earthquakes, tsunami, and volcano eruptions (BNPB, 2019).

The catastrophic events caused 4814 fatalities and other casualties. Unfortunately, not all disasters became trending conversations on Twitter. Only some became a trending topic, such as the earthquake in Lombok on 29 July 2018; tsunami in Central Sulawesi on 28 September 2018; tsunami in Sunda Strait on 22 December 2018; and earthquake in North Maluku on 14 November 2019. This phenomenon shows that not all citizens gain awareness of disasters that may happen in the country. Low awareness is one of the challenges in disaster communication and mitigation.

There are some reasons for a tweet to be trending, such as talking about unique things and compiling a personal story with a trending topic [19]. Furthermore, when Twitter users add a link on their tweet or use hashtags, it will increase people’s engagement. By writing tweets as simple as possible, people can easily understand the message.

Based on our research, in disaster context, a tweet can be favored when the user uses specific hashtags (i.e., #gempa #tsunami #prayfor …), adds a link from a reliable source (in Indonesia context, it is BNPB and BMKG), and attach video with the tweet. In disaster situations, disaster victims tweeting to help other victims also simultaneously become citizen journalists [20].

4.2. Key opinion leaders in disaster context

Katz states that there are critical shared traits and behaviors of opinion leaders that can be divided into three dimensions [21]. Firstly, ‘who one is,’ it includes specific personality characteristics or values held by the individual. Secondly, ‘what one knows,’ it includes the degree of knowledge and expertise about a particular issue or product. Lastly, ‘whom one knows,’ it includes the number of contacts people that have as part of their circle of friends and acquaintances. As a combination of these traits and behaviors, opinion leaders not only help to draw the attention of others to a particular issue, product, or behavior but also, perhaps most importantly, to signal how others should respond or act. Weimann adds that this influence may occur by doing certain behaviors. For example, it can be by giving advice and recommendations, serving as a role model that others can imitate, and persuading or convincing others. It can also be done by way of contagion. In this process, ideas or behaviors spread with the initiator, and the recipients are unaware of any intentional attempt at influence [21].

In social media, individuals who are actively talking about a particular topic have the potential to be an influencer [22]. For organizational accounts on Twitter, if they use conversational language, personified human persona, and consistent topic, they can also be opinion leaders.

Indonesia used to have a key opinion leader for natural disasters. His name was Sutopo Purwo Nugroho, the spokesperson of the Indonesian National Board for Disaster Management (BNPB). Sutopo actively tweeted using his personal accounts @Sutopo_PN. Through his tweets, Sutopo shared about possible occurrences and disasters affected areas in Indonesia. Not only that, he also shared about other things, like his health condition due to his lung cancer, and his muse, a famous Indonesian singer, Raisa. Sutopo was always the most awaited person to share official information from the Indonesia government. Sadly, on 7 July 2019, Sutopo passed away. Months after he passes away, people are still missing him, especially when disasters hit Indonesia.

Below are several tweets in August and September 2019, that showed the loss of Indonesian Twitter users of Sutopo, especially during disasters. “Jawa abis kena gempa rindu bgt sama @Sutopo_PN biasanya langsung update ke beliau” (Java, after being hit by an earthquake, really missed @Sutopo_PN, because he usually updated the news directly) from @aldobanxxx. Another example “Forest fire is a disaster and Indonesia yet to ready to relieve disaster without him. RIP Mr.
“Sutopo” from @astroxxx. To respect his service, BNPB even names its ballroom after him. This gesture shows how influential he is in disaster communication in Indonesia.

On the other hand, there are several reliable institutional Twitter accounts for disaster-related news. It is @infoBMKG, an official Twitter account of the Indonesian Meteorology, Climatology, and Geophysics Council. With 4.64 Million followers per 25 November 2019, this account becomes the most reliable when it comes to natural disaster updated information. Other reliable sources for natural disasters are @BNPB_Indonesia, an official Twitter account of the Indonesian National Board for Disaster Management, and @infomitigasi, an account that actively tweets about disaster risk reduction. However, these two accounts are not as popular as @infoBMKG.

4.3. Twitter functions during natural disasters in Indonesia
During catastrophic events, conventional media, like television, print newspaper, and magazine are no longer reliable for the quick update. Individuals will go to social media for quicker updates of the event. This tendency can be a benefit for Indonesia since social media penetration already reaches 49% out of the total population in the country [23].

Based on our analysis, we divide Twitter functions during natural disasters into eight categories: quick update, showing sympathy, increasing disaster awareness, fundraising, distributing and combating fake news, pushing government efforts, displaying real vs. amateur expert, and organizational branding purposes. Details of each function are explained.

4.3.1. Quick update
In devastating situations, citizens eagerly wait for updated news in all media outlets. While waiting for news journalists to arrive in the impacted area, they turned to social media for quick updates. Twitter has proven to be the fastest way to spread the news. Based on our research timeline, there are four significant disasters in several regions, i.e., earthquakes in Lombok, a tsunami in Central Sulawesi tsunami in Selat Sunda; and another earthquake in Maluku. Reliable sources like BMKG and BASARNAS (National Search and Rescue Agency) are using Twitter to give the fastest updated information to their audiences.

For example, on 14 November 2019, a big earthquake of 7.4 SR hit Maluku and had a potential tsunami, BMKG spread the news using their official Twitter account as follows: “#Peringatan dini Tsunami di MALUT-SULUT. Gempa Mag 7.4. 14 Nov 2019 23:17:41 WIB Lok: 1,63LO, 1,26 BT Kdlmn 10KM #BMKG” (BMKG Twitter account)

Even though it was happening in the middle of the night, the tweet hit 8.6K retweet, 7.8K likes, and 1.1K reply. Mostly the reply showed people’s sympathy about the disaster. BMKG stopped the early warning tsunami after three hours. Even though the tweet does not hook people’s attention, but from the comment section, we can see that people are relieved because the tsunami warning is over. Here is the example of the tweet: “terima kasih BMKG, bisa tidur nyenyak lagi” (Thank you so much BMKG, I could sleep tight again)

In a catastrophic situation, information about the victims is needed, especially for the family. Twitter helps to share this kind of information faster than other social media. Other than organizations that focus on disasters by giving quick information, individuals in the disaster area are often the first to share the news. They are practicing citizen journalism. Deutsch and Radscht describe it best as digital journalism conducted by amateurs. It underscores the link between practice journalism and its relation to the political and public sphere [24]. Here is the example of digital journalism: @dorxxx tweeted on 19 August 2018 “Felt the freaking earthquake in Bali with episodes of tremors and aftershocks last night!! Wasn’t a good experience! #bali #lombok #PrayForLombok #earthquake.”

The tweet above is from an individual who was in Bali when a series of earthquakes hit Lombok and Bali. She used her Twitter to show how panic she was. She also told the world about the event. Here is another tweet that shows how netizen is trying to give the news as soon as possible: @abangkaxxx on 22 December 2018 tweeted “Update Tsunami Banten hingga 23/12/2018 pukul 07:00 WIB, data sementara jumlah korban dari bencana tsunami di Selat Sunda tercatat 40 orang meninggal dunia, 584
orang luka-luka dan 2 orang hilang #BergerakBantuKorban #TsunamiBanten.” (Banten Tsunami update until 12/23/2018 at 07:00 WIB, temporary data on the number of victims of the tsunami in Sunda Strait recorded 40 deaths, 584 injured, and 2 missings).

From the hashtag used #bergerakbantukorban (move to help the victims), the tweet above was intended to encouraging people to be a volunteer or assist the victims. Indonesian online media, like Detik.com and Kumparan.com, Seruji News, were also attempting to be the first to report the news using their Twitter account. Here is the example of Seruji News giving information about tsunami Banten victims: @serujinews on 22 December 2018 tweeted “BNPB: Korban Tsunami Banten: 62 orang tewas, 584 luka, 20 hilang #AkuSERUJI #TsunamiBanten,” (Latest data from BNPB: Tsunami Banten recorded 62 deaths, 584 injured, and 20 still missings).

4.3.2. Showing sympathy
Other functions of Twitter during disaster situations are showing sympathy to the affected people. Based on our study, when disaster hit one region in Indonesia, netizens are usually very fast to express their emotions towards the events. Here are some of the reactions:

@nadineolxxx on 14 November 2019 tweeted “Innalillahi wainnailaihi rojiun…stay safe saudaraku … potensi Tsunami, gempa besar ini Peringatan Dini #Tsunami untuk wilayah: MALUT, SULUT, Gempa Mag:7.4, 14-Nov-19 23:17:41 WIB, Lok:1.63 LU, 126.40 BT (134 km BaratLaut JAILOLO-MALUT), Kedlmn:10 Km #BMKG https://inatews.bmkg.go.id” (Innalillahi wainnaihai rojiun … stay safe my brother … tsunami potential, this great earthquake was an early warning for #Tsunami in Northern Maluku and Northern Sulawesi).

As most Indonesian are Moslems, so it is common to use Islamic expression in the tweets. On the tweet above, she used “innalillahi wainnailaihi rojiun” to express sadness because of the tragedy that happened in Maluku. In Indonesia, narratives of natural disasters are commonly about human sins and God’s wish. It shows in the tweet: @sp_i_xxx on 30 September 2018 tweeted “Before & after. #prayforpalu there is no power and effort only to our god asking for help … lighten the burden of our affected brothers. Amen #tsunami #PrayforSulteng #PrayForLombok.”

Tweets related to sympathy are usually followed by encouragement for relevant parties to give fast response to the victims. For example, @vijayxxx on 29 December 2018 tweeted “When I saw this video, my heart whispered a silent prayer for those who lost their lives in #TsunamiSelatSunda. May God grant strength to survivors & their families. All help should be extended to them & the rehabilitation work must speed up. Video is said to be shot by Susi Air.”

The same narration is also displayed in the tweet below: @hwtaxxx on 19 August 2018 tweeted “My thought goes to people, families, and all the volunteers in Lombok and surroundings. Wish the disaster could end soon and government @Jokowi_ID @setkabgoid immediately make the status as National Disaster if necessary. #prayforlombok.”

4.3.3. Rising disaster awareness
Tsunami in Selat Sunda and Lombok earthquake has opened many eyes about the importance of disaster awareness. Suddenly, Twitter becomes a place to share their concern about the lack of knowledge that Indonesian has about disaster preparedness. For instance, @Sulxxx on 24 December 2018 tweeted “no one can predict tsunami or earthquake properly Indonesia called “the ring of fire” so we must stay ready we should learn from Japan about disaster management #DisasterEducationforAll #Indonesian #PrayForSelatSunda #PrayForAnyer #prayforpalu #prayforLombok.” And @Ukxx on 17 March 2018 tweeted “Our thoughts and prayers are with those affected by the earthquake and we hope that the trapped tourists will soon be rescued. Once again we would like to stress the importance of letting the authorities know of your whereabouts for safety purposes. #PrayForLombok.”
4.3.4. Pushing the government to increase efforts on disaster

What unique about Twitter is that the user can tag anyone, even though they are not following each other. This feature makes the users easily talk with “untouchable person” like president, politician, and government. This feature is often used by users to prompt the government or politicians to make more efforts on disasters because when we talk about disasters in Indonesia, it focuses more on the post-event that is the preparedness.

Here is the example of how Twitter users demanded Joko Widodo and Prabowo, who at that time were president candidates to be more severe in climate change efforts: @fatimahxxx on 18 March 2018 tweeted “Meanwhile #PrayForJayapura #PrayForLombok #prayforjogja to all my brothers and sisters suffered. Severe weather is something that we would face more often. We must work harder to adapt! Climate change is that urgent, @jokowi @prabowo let’s be more serious to this issue, please!”

Another example that shows how citizen concern about disasters: @susi_xxx on 19 August 2018 tweeted “Another magnitude-7.0 earthquake struck again in Lombok. Hospitals in Mataram, the capital city suffered damage & can’t function. International community please urge Indonesian Gov’t to declare national disaster. #lombokearthquake #PrayForLombok.”

This function shows how Twitter presents a valuable mode of disseminating information when disasters hit [20]. He also added that tweeting had become more democratic and social stratifications are profoundly blurred.

4.3.5. Fundraising

Another function of Twitter is for fundraising purposes. Most individual accounts are also keen to rise crowdsourcing donations or retweet other accounts who initiated the donations for the victims of disasters. The act of fundraising on Twitter has the same purpose and initiative as in the offline sphere. However, the distinctions are just on the apparatus that make raising money simpler than previous. For example, @mssetixxx on 26 August 2018 tweeted “Need continuous support. More than 400.000 ppl homeless @diahvita @LAZISMU @IntartoJoko @Ainn8888 @iskan_dahlan @budhie19 @marifinilham @aagym #PrayForLombok #LombokCare @BNPB_Indonesia.”

The fundraising efforts are shown not only by individuals but also from institutions, both private and governmental. Disaster is just like momentum for them to maintain or build the image of “kind” and “philanthropy.” Mostly, organizations use the momentum as an act of corporate social responsibility. Here are examples of how organizations used Twitter for fundraising information:

@E2Cindonesia on 16 January 2019 tweeted “Thank you once again to all participants on the Fund Raising for Tsunami Selat Sunda in early January. Your donations have been collected and distributed directly with the help of our friends from the Customer…”;

@Forumbitcoixxx on 13 November 2018 tweeted “Thank you for your Contribution. Hopefully Lombok will be BETTER and BIGGER #savelombok #prayforlombok #lombok #donation #crypto #berbagi #donasi #naturaldisaster #bitcoin #stellarlumens”

@DivHumas_Polri on 26 January 2019 tweeted “Kapoldes Pandeglang, AKBP Indra Lutrianto Amstono SH., M.Si turut menengadiri Tabligh Akbar dan Penggalangan infaq bantuan musibah Tsunami Selat Sunda yang diisi ceramah Ustadz Abdul Somad di Alun-Alun Kabupaten Pandeglang, Jum’ at (25/1) pukul 19.30 WIB” (Pandeglang Police Chief, AKBP Indra Lutrianto Amstono SH., M.Si also attended the Tabligh Akbar and Fundraising for the Sunda Strait Tsunami disaster relief which was filled with lecture from Ustadz Abdul Somad at Pandeglang District Square on Friday (25/1) at 19:30 WIB)

The use of storytelling strategy is an important factor when individuals or organizations do fundraising. However, it is challenging to create a consistent story when disaster-prone areas are too vast. With ‘Twitter please do your magic’ phenomenon, it is easier for individuals to hold fundraising for disaster-related issues.
4.3.6. Distributing and combating the fake news
Ironically, another function of Twitter is the distribution of hoax or fake news. During a disaster, a high number of fake news spreads over Twitter. For example, throughout the Lombok earthquake, there is false news about logistics hoarded, and there will be more significant aftershocks. In a disaster situation, fake news often becomes a trigger of mass panic. It quickly spreads, especially through social media.

The Indonesian government is very concerned about fake news, and the administration reacts quickly by utilizing a few authority Twitter accounts, such as @info_BMKG and BNPB_Indonesia. This positive initiative from the legislature to battle fake news has circulated to the citizens. Many individual accounts are also concerned and try to remind each other not to propagate the false news. Nonetheless, during a disaster, it is challenging to isolate fake or real news.

4.3.7. Displaying amateur experts vs. real experts
Twitter’s function during natural disasters is to show citizen amateur analysis. We call it “amateur expert.” Many people strive to express their opinions and analysis about the disaster. As its nature, Twitter is a decent place to discuss and debate over almost everything, including natural disasters. That is why many people, even if they are not experts in natural disasters, are eager to express their opinions about it. Like the tweet below, when the Twitter user complained about Lombok’s earthquake, which did not escalate as a national disaster:

@mrs_fixxx a beauty blogger tweeted “STILL NOT NATIONAL DISASTER???!!! Come on!!! #prayforLombok #staystrongLombok!!!! #internationaldisaster I think!!! ... @UN”

However, in terms of disaster opinion, many real experts also give their analysis through Twitter. It is one of the great things about this platform. The medium can potentially be a discussion forum between experts and commoners. This phenomenon demonstrates how the platform can fostering democracy.

Unfortunately, on social media, it is difficult to distinguish between experts and ordinary people. What becomes dangerous is when ordinary people’s opinions are considered as expert’s opinions by Twitter users. Mass media and institutions need to do further checks on experts’ backgrounds to utilize this medium more optimally.

4.3.8. Organizational branding purposes
The last function of Twitter when disaster strikes is organizational branding purposes. Many organizations use the momentum of disaster as an opportunity to show the ‘good guy’ image and care for the community. Some examples can be seen below:

@konsxxx on 1 November 2018 tweeted “Distribution of Emergency Response Cash Transfer in Sembalun Lawang. @konsxxx1 and volunteers supported by @IRxxx. #PrayForLombok 1 October, 2018. http://www.konsxxx

@Kedxxx on 16 January 2019 tweeted “Items (clothing, food, sanitary products) donated by GermanEmbassy staff for victims of December Tsunami in Sunda Strait handed over to Regional Secretary of Pandeglang. #bantuankorbantsunami #sekdapandeglang #tsunamiselatsunda.”

@SFxxxs_ on 24 August 2018 tweeted “Humanity Action for Lombok by PT XXX Perkasa read more on http://sfrexx

@MSxxx on 2 January 2019 tweeted “More than 16,000 people have been displaced by the tsunami that Sunda Strait in #Indonesia on 22 December. XXX has conducted 326 medical consultations. http://bit.ly/2LIDx85 #TsunamiSelatSunda.”

@WFxxx on 26 December 2018 tweeted “We have teams in the country specialised in disaster response, and our logistics experts can help bring aid supplies and aid workers to the affected areas.” @WFxxx spoke to @AJxxx about the devastating #TsunamiSelatSunda.”
From the examples above, those who use this branding function are not only domestic organizations, but also international organizations. In a disaster situation, organizations can channel funding and assistance as a form of their corporate social responsibility. It will be better coordinated than individual efforts. Branding efforts during this disaster still get positive reactions from Twitter users. However, consistency is needed to maintain trust and loyalty from the audience.

Unlike the fundraising function, in branding purposes function, the organization only reports its actions for the people affected by the disaster. After direct action is given, the relevant organization may hold fundraising for related issues for the community in the disaster-prone area.

4.4. Twitter functional framework in natural disaster

The notion “I tweet; therefore, I am” from Murthy shows how vital the self-presentation of Twitter is. The act of tweeting is born from individual contributions and is about self-production [20]. Kwak clearly states that each communicative action has an element of self-advertising [25]. So, tweets as a mode of communication inherently involve methods to promote the propagator to a tweet to a broader audience. For example, if someone includes a trending hashtag in a tweet, it is often likely to be read by others through trending topic searches or retweets. However, there are many more Twitter functions, especially during natural disasters. Through this study, we try to illustrate the Twitter functional during a natural disaster in Indonesia (see Figure 1).

![Twitter Functional Framework During Natural Disasters in Indonesia](image-url)

To get the result of this study, we analyze the viral hashtags during major natural disasters in Indonesia from 1 January 2018 to 25 November 2019, including #tsunamiselatundu, #tsunamibanten, #gempalombok, #prayforlombok, #tsunamipalu, and #gempamaluku. By analyzing these hashtags, we categorize the tweets into three parts. It is based on whether the Twitter account represents institutions, individuals, or media. This category is used to see who use the most social media in the disaster area. We also divide the institutions’ section further into whether the account represents Indonesian government agencies or NGOs. Lastly, the media category is different from the other categories since the nature of media is to disseminate information. However, we also find out that the media uses Twitter
to gather additional information regarding the natural disaster. For instance, during the tsunami in Palu, several international media channels asked permission to Twitter users whether they can use the video footage as a source for their media. This fact is unique due to how thin the line between media and individual. In social media, everyone can be a content creator and consumer at the same time.

After dividing it into three categories, we conduct content analysis of the tweets and divided the published tweets into eight categories of functions. All categories of functions can be seen in Table 1.

| Functions category                | Description                                                                 |
|----------------------------------|----------------------------------------------------------------------------|
| Quick update                     | Providing information about the condition in the disaster-affected area during and after the disaster |
| Showing sympathy                 | Sending prayers and sympathy towards victims of the disaster               |
| Fundraising                       | Requesting for financial help during and after the disaster               |
| Increasing disaster awareness    | Providing information related to alertness and disaster warning, including disaster detection |
| Pushing government for action     | Discussing government efforts and responsibilities in managing the disaster |
| Distribution and combating fake news | Sending and clarifying what is considered as ‘useful’ information         |
| Displaying amateur vs. real expertise | Discussing the scientific, religion, or other causes of the disaster   |
| Organizational branding          | Providing updates of activities conducted by an organization related to the disaster |

This research finding provides an empiric description of Twitter usage during and after a disaster in Indonesia. We also find out that some of the usages (increasing disaster awareness, pushing the government for action, combating fake news, and displaying real expertise) can enhance disaster management sustainability. If communities keep using Twitter as one of disaster communication tools, it will be beneficial for sustaining Indonesian awareness on the disaster.

5. Conclusions
This study describes people’s narrative and behavior on Twitter during and after a disaster. By categorizing tweets, this research finds that there are eight Twitter usage functions: quick update, showing sympathy, increasing disaster awareness, fundraising, distributing and combating fake news, pushing government efforts, displaying real vs. amateur expert, and organizational branding purposes. This research also categorizes the tweets into three parts, based on whether the Twitter account represents institutions, individuals, or media. This category is used to see who use the most social media in the disaster area.

This study also has some limitations. Researchers only focus on a particular timeline with specific hashtags. During the selected timeline, more disasters have occurred in Indonesia. However, many of these events are not accessible on Twitter. Therefore, further studies may add a range of timeline or only focus on one disaster. Second, this research solely focuses on Twitter as the primary medium. Additional research is needed by focusing on other available social media. Lastly, researchers do not focus on local language that may be used on Twitter. Further studies should widen the hashtags by including the local language.
Acknowledgements
We thank Trinirmalaningrum from Perkumpulan SKALA and Disaster Channel for sharing about disaster in Indonesia.

References
[1] Disastrous year in Indonesia calls upon resilience for 2019. 2019. Available from: https://www.thejakartapost.com/life/2019/01/02/disastrous-year-in-indonesia-calls-upon-resilience-for-2019.html [Accessed 20th May 2019]
[2] With warning drums and river clean-ups, Indonesian women head off disasters. Available from: https://www.reuters.com/article/usindonesia-disaster-women/with-warning-drums-and-river-clean-ups-indonesian-women-head-off-disasters-idUSKBN1H036 [Accessed 20th May 2019]
[3] Takahashi B, Tandoc Jr E C and Carmichael C 2015 Communicating on Twitter during a disaster: An analysis of tweets during Typhoon Haiyan in the Philippines Computers in Human Behavior 50 392–398
[4] Santoso A D 2017 Tweeting in disaster area: An analysis of tweets during 2016 mayor floods in Indonesia Policy & Governance Review 1 178–188
[5] LIPI: Kesiasiagaan bencana Indonesia masih rendah. 2018. Available from: https://www.cnnindonesia.com/teknologi/20181227124247-199-356730/lipi-kesiasiagaan-bencana-indonesia-masih-rendah [Accessed 4th December 2019]
[6] Jaeger P T, Shneiderman B, Fleischmann K R, Preece J, Qu Y and Wu P F 2007 Community response grids: E-government, social networks, and effective emergency management Telecommunications Policy 31 592–604
[7] Houston J B, Hawthorne J, Perreault M F, Park E H, Hode M G, Halliwell M R, McGowen S E T, Davis R, Vaid S, McEllderry J A and Grith S A 2014 Social media and disasters: A functional framework for social media use in disaster planning, response, and research Disasters 39 1–22
[8] Palen L, Starbird K, Vieweg S and Hughes A 2010 Twitter-based information distribution during the 2009 Red River Valley flood threat Bulletin of the American Society for Information Science and Technology 36 13–17
[9] Florini S 2014 Tweets, tweeps, and signifyin’ communication and cultural performance on “Black Twitter” Television & New Media 15 223–237
[10] Disaster risk reduction. 2015. Available from: https://www.unicef.org/indonesia/26750.html
[11] Djalante R, Garschagen M, Thomalla F and Shaw R 2017 Disaster Risk Reduction in Indonesia: Progress, Challenges, and Issues (Springer)
[12] McFarlane A C and Norris F H 2006 Definitions and Concepts in Disaster Research Methods for Disaster Mental Health Research (New York: Guilford Publications Inc.) pp 3–19
[13] Houston J B, Pfefferbaum B and Rosenholtz C E 2012 Disaster news: Framing and frame changing in coverage of major US natural disasters, 2000–2010 Journalism & Mass Communication Quarterly 89 606–623
[14] Alexander D E 2014 Social media in disaster risk reduction and crisis management Science and Engineering Ethics 20 717–733
[15] Pandey B H and Okazaki K 2005 Community-based disaster management: Empowering communities to cope with disaster risks Regional Development Dialogue 26 52
[16] Gilbert N 2008 Researching Social Life (Sage)
[17] Rosenwald G C and Ochberg R L 1992 Storied Lives: The Cultural Politics of Self-Understanding (Yale University Press)
[18] Hine C 2015 Ethnography for the Internet: Embedded, Embodied and Everyday (Bloomsbury Publishing)
[19] Ini rahasia bikin tweet viral di Twitter. Asal tahu caranya, kamu bisa terkenal juga. 2019. Available from: https://www.hipwee.com/tips/membuat-tweet-viral/ [Accessed 2nd December 2019]
[20] Murthy D 2018 Twitter (Cambridge, UK: Polity Press)
[21] Nisbet M C and Kotcher J E 2009 A two-step flow of influence? Opinion-leader campaigns on climate change Science Communication 30 328–354
[22] Weeks B E, Ardèvol-Abreu A and Gil de Zúñiga H 2017 Online influence? Social media use, opinion leadership, and political persuasion International Journal of Public Opinion Research 29 214–239
[23] Global Digital Report 2018. Available from: https://digitalreport.weareresocial.com/
[24] Deutsch K and Radsch C 2012 Adapting concepts of media freedom to a changing media environment: Incorporating new media and citizen journalism into the Freedom of the Press Index ESSACHESS Journal
[25] Kwak H, Lee C, Park H and Moon S 2010 What is Twitter, a social network or a news media? Proceedings of the 19th international conference on World wide web pp 591–600