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The disaster communication system in the city of Medan

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Abstract This study aims to analyse the communication system carried out in disaster management in Medan City, analyse the communication system carried out by the Medan City Regional Disaster Management Agency (BPBD) in tackling disasters in Medan City according to Islamic communication principles, analyse the BPBD communication system model in tackling disasters in Medan City, and analyse the communication barriers faced by the Regional Disaster Management Agency (BPBD) in tackling disasters in the city of Medan. This study uses several theories, namely communication formulas according to Harold Lasswell, dependency theory (dependency theory) and innovation diffusion theory, to describe the basic concepts and discuss research findings. This research is a research with a qualitative approach and uses a descriptive method after doing data collection by using interviews and documentation. The data analysis results show that the Regional Disaster Management Agency (BPBD) of Medan City applies a communication system according to the communication formula according to Harold D Lasswell.

Keywords: communication system; disaster management; city of medan

INTRODUCTION

The city of Medan, as one of the cities in North Sumatra, also cannot avoid the potential for disasters to occur throughout the year, which are difficult to predict when they will occur. Based on data compiled from various reports, Medan City has experienced several disasters, including floods, winds, earthquakes and residential fires. Among the disasters that often occur are floods and fires. As one of the cities in North Sumatra, Medan City always experiences flooding throughout the year because it is surrounded by rivers and borders the upstream area of the river, namely Deli Serdang and Tanah Karo.

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Almost every day, fire disasters also occur in the city of Medan. Besides that, there is also an enormous potential for earthquakes because the city of Medan, located in the province of North Sumatra, has a geographical area relatively close to the source of the Sinabung volcanic disaster in the Karo district. As part of the geographical area of Indonesia, which is located in the province of North Sumatra, it has the potential to experience earthquake disasters because Indonesia is an earthquake-prone area because it is traversed by the confluence of 3 tectonic plates, namely: the Indo-Australian Plate, the Eurasian Plate, and the Pacific Plate (Bmkg.go.id, 2022).

In short, if we explore the various natural disaster events in the city of Medan, ranging from earthquakes to floods that occur seasonally. Starting from the earthquake disaster, it has been recorded that in 1886 a robust earthquake strength occurred for 5-6 minutes. The 1886 earthquake was similar to what happened in 2017. Then on July 18, 1908, the earthquake occurred again. Then in 1936, a strong earthquake occurred. Dozens of buildings were damaged—dozens of moderate and small buildings in Medan. In 1939 a pretty big earthquake happened again (Poestahadepok, 2018). On September 6, 2011, a 6.5-magnitude earthquake occurred. Then the last earthquake occurred on February 14, 2017, in the early hours of the night (Susetio, 2017).

Natural disasters such as floods are natural disasters that often occur (Kühne et al., 2021). Occurs every year in the city of Medan. From the data collected, from 2011 to 2020, there were floods at the end and the year's beginning. In 2011, 10 sub-districts in Medan City submerged at least 300 houses. One resident said that this flood is similar to the flood that occurred in 2002 (Tempo.com, 2011). Then almost ten years later, severe flooding also occurred in December 2020. This flood was the worst in the last 20 years. At least 2,773 houses were submerged, covering 1983 families and 5,965 people (Rahmawati, 2020).

The city of Medan, one of the largest cities in Indonesia, must, of course, think about how to build and organise an effective communication system to deal with disasters that occur effectively. Through the Regional Disaster Management Agency (BPBD) of Medan City, it is proper to prepare an effective communication system by utilising all the potential and existing facilities in a big city like Medan. So that in the future, if a disaster occurs, the City of Medan is ready to minimise the impact caused by the disaster. Through three pillars, namely Government, Business and Community, formulated by BPBD in disaster management, it is essential for every stakeholder, especially the community, to obtain guarantees for the creation of accurate data and information needed to prepare themselves for disasters that can occur at any time. Therefore, through related institutions such as BPBD as the leading sector, Medan City can realise an effective communication system.

A communication system is needed, so disaster management activities are more well-coordinated and run effectively and efficiently. The involvement of many parties in disaster management shows a communication system that works both naturally and through policy interventions (Badri, 2018; Palen & Hughes, 2018; Susilo et al., 2020). Because in principle, as mentioned above, the system involves various elements, elements or components that are interrelated in an inter-relationship to achieving one goal.

In disaster management, the communication system refers to planning and preparedness after a disaster occurs. Communication in disasters is not only needed in a disaster emergency but also crucial during and, more importantly, before a disaster occurs (Nurdin, 2015; de Leon et al., 2021; Liu & Mehta, 2021).

To interpret the communication system, it is first emphasised that there is a system theory in communication. Systems theory has had a significant influence on the study of human communication. Gregory Bateson (in Littlejohn, 1999) is the founder of the line theory known as relational communication. He argues that in communicating (as a form of a system), communication participants convey a message that contains ambiguous meanings and complementary or symmetrical relationships. The message's meaning is ambiguous, namely, a message that contains message content and a message that contains a relationship (relationship massage) (Fisher, 1978). The definition of a complementary relationship is a form of behaviour followed by opposing actors that are complementary. In symmetry, one person's action is followed by another similar action. Here we begin to see how the interaction process creates the system's structure. How people respond to each other determines the type of relationship they have.

Aubre Fisher (in Perspectives on Human Communication) applies systems concepts to communication. The analysis begins with behaviours such as verbal comments and nonverbal actions as the smallest unit of analysis in the communication system. These observable behaviours (a message) are the only vehicle for connecting individuals in a communication system. Fisher believes this talk flow says very little about the communication system (Fisher, 1978).

The system can be defined as a set of elements that carry out activities or develop schemes or procedures for carrying out a processing activity to achieve something or several goals, and this is done by processing data/or energy or goods (objects) within a certain period to produce information or goods (objects) (Nurudin, 2004).

Departing from the above notions, the communication system can be interpreted as a set of things about the process of delivering messages that relate to each other and form a whole. Like a system, a communication system consists of 4 (four) things, namely (Fisher, 1978): 1) The objects of the communication system, in the form of communication elements (communicators, messages, media, communicants, effects), 2) Attributes of the communication system, in

the form of the quality or property of the system and its communication elements, 3) The internal relationship of the communication system, the relationship between the participants of the communication participants (communicators and communicants) as members of the system, which can be marked through their communication messages, 4) Environmental communication system, a communication system has an environment, namely: social systems, political systems, cultural systems and so on. They do not exist in a vacuum but are influenced by their surroundings.

This study will discuss the communication system that has parts or elements of communication and is an aspect contained in a communication activity (figure 1). Communication elements include communicators, messages, channels, communicants and effects. Harold Lasswell put forward the definition of communication: "The process of passing symbols, ideas, ideas, feelings and thoughts to others by answering the question, who says what and with which is the channel to whom with what effect? (who says what, with what channel, to whom, and how does it affect?)." (Mulyana, 2017). Lasswell's paradigm shows that communication is the process of delivering messages by communicators to communicants through media that cause specific effects.

Figure 1. Elements of communication (Lasswell Model)
Source: (Mulyana, 2017)

The paradigm of the communication model put forward by Lasswell also provides an understanding that in communication, five elements depend on each other (Wiryanto, 2004). The five elements in question are: 1) The source is often referred to as the sender, encoder or communicator. The source is the party that initiates the communication. The source can be an individual, group, organisation, party and others whose nature is to convey information, 2) Message is what is communicated by the source to the recipient. The message is a set of verbal symbols such as language or words or nonverbal, namely actions or gestures such as thumbs up, a nod of the head, smile, or gaze, all of which are considered to represent the feelings, values, ideas or intentions of the source (Mulyana, 2017), 3) Channels are media or vehicles used by sources to convey messages to recipients. In mass communication, media can be divided into two forms, namely: first, print media such as newspapers, magazines, books, brochures, stickers, bulletins, banners and others. In addition to the two media mentioned, activities and places that are commonly found in rural communities can also be seen as social communication media, such as village halls, social gatherings, art stages and folk parties (Cangara,

2016; Istiqomah, 2019), 4) Receiver are often also referred to as targets, audiences, communicants and others. Recipients can consist of one or more and can also be in the form of groups. The receiver is an essential element in the communication process because, in essence, the recipient is the target of communication, 5) Effect, namely what happens to the recipient after receiving what is conveyed. Communication's effect can occur in addition to knowledge, from knowing to knowing more. Effects can also occur in behaviour, changes in beliefs, entertainment and others.

Communication is a system. Communication barriers can occur in situations and conditions and in all elements or elements that exist in communication, including environmental factors in which communication occurs. Communication disturbances or barriers occur if an intervention interferes with one of the communication elements, and then the communication process cannot take place effectively. Meanwhile, communication barriers are intended to prevent the communication process from taking place as expected by the communicator and recipient (Cangara, 2016).

It can be concluded that communication barriers occur due to several factors, namely; socio-psychological-anthropological barriers, semantic barriers, mechanical barriers, ecological barriers, as well as the presence of personal factors and organisational factors as the cause of the creation of communication barriers both personally, in groups, and organisations.

Systems theory in organisational communication is usually seen as "structural-functional." From the definition given by Farace and his colleagues about the organisation, one of the important resources in the organisation is information. Using information theory as a basis, Farace and colleagues defined information to reduce uncertainty. When people can predict the patterns that will occur in the flow of tasks and relationships, then uncertainty can be reduced, and information can be obtained. Communication is a reduction of uncertainty through information because communication includes using standard forms of symbols that are mutually understood by the participants (McQuail, 2010).

Systems theory is a loosely organised and highly abstract set of principles that serves to direct our thoughts but is bound to various interpretations. Any discussion of systems concerning interdependence shows that a system's components or units are interdependent. A change in one component brings about a change in every other component. An understanding of the concept of interdependence is an integral part of defining systems and systems theory (Mulyana, 2013).

Here are some things related to the system proposed by Pace and Faules (Mulyana, 2013): 1) Nonsummativity. This shows that a system is not just the sum of its parts. When these components relate to each other in interdependence, the system acquires an identity separate from each component, 2) Elements of structure, function, and

evolution. Structure refers to the relationship between the components of a system. The superior-subordinate relationship, for example, can be distinguished by status, an element of structure and 3) Openness. An organisation is a social system. Its boundaries are penetrated, which allows the organisation to interact with its environment, thereby obtaining energy and information, 4) Hierarchy. A system may be a super system for other systems and a subsystem for a more extensive system. The flow of information across a system's boundaries can affect the system's structural-functional behaviour.

In disaster management, the role of the media is needed, and the need for media increases in disaster conditions as uncertainty occurs (Bail et al., 2021). Dependency theory in mass communication is known as media dependency theory or media system dependency theory. Media dependence theory is built on the idea that the more people depend on the mass media to fulfil their needs, the more critical the role of mass media in a person's life is and therefore, the mass media will have a significant influence on that person (DeFleur & Ball-Rokeach, 1989). The media have a greater chance of having an effect during times of social change, conflict, and disasters. Likewise, in Indonesia, when the Aceh Tsunami natural disaster occurred in 2004 or the suicide bombing tragedy in the Sarinah area of Jakarta in January 2016 until the recent presidential election, people turned to the media as a reference to understand these events. that important. As a result, the media have a greater opportunity to have an impact in every occurrence of social change, and conflict in society.

Then to provide an understanding that in tackling disasters both before, when they occur, and after a disaster, there is what is called the diffusion theory of innovation, which is a combination of two words, namely diffusion, which means the process of disseminating information or socialisation, and innovation is a new idea, new idea or new technology. Introduced to specific communities to improve welfare and social life (Rogers & Shoemaker, 1971). So that the diffusion of innovation can be understood as the process of spreading and socialising a new idea or new idea for specific community groups.

Diffusion is a process by which an innovation is communicated through specific channels over a certain period to members of a social system. Diffusion can also be interpreted as a particular type of communication where the message is a new idea, idea or technology. Innovation is a new idea, idea or technology that a group of social systems, individuals, groups or communities is not well known. So that the diffusion of innovation can be interpreted as a process where an idea, idea or new technology is communicated through certain media in a specific time dimension to a social system (individual, group or community), this new idea or idea is slowly accepted by the audience through a process of diffusion and selection by the adopters.

METHODOLOGY

This researcher uses a qualitative approach with descriptive methods, namely research that is intended to understand the phenomena experienced by the research subjects, for example, behaviour, perception, motivation, action, language, and others in a special natural context (Barlian, 2016). The phenomenon referred to in this study is about the communication system carried out by the Regional Disaster Management Agency (BPBD) of Medan City to tackle disasters in Medan City. In this study, the informants were; Medan City Government involved in disaster management activities, namely; Medan City Regional Disaster Management Agency and related sub-district and village parties in disaster management.

Data collection techniques in this study use triangulation techniques using interview and documentation instruments. This study uses an interactive data analysis model, the most straightforward data analysis technique and is widely used by qualitative researchers, namely reduction, data display, and data verification and conclusion drawing. This interactive data analysis always refers to the concept offered by Miles & Huberman (1994), which consists of data reduction, data display, and drawing and verifying conclusions (Ibrahim, 2015).

This study determines the data's validity (truth worthiness), namely the need for inspection techniques. Researchers carry out examination techniques based on several specific criteria. There are four criteria used, namely the degree of trust (Credibility, which consists of extension of participation, persistence of observation, triangulation, peer checking, referential adequacy, negative case studies, member checking); Transferability/Details (transferability); Dependency/Dependency audits; Assurance/assurance audit (Confirmability) (Moleong, 2017). In this research, the technique used to check the validity of the research results is done by using the triangulation technique.

RESULTS AND DISCUSSION

Communication System

As a communicator in a communication system, the Regional Disaster Management Agency (BPBD) of Medan City does its best to deliver various messages or information to related parties. Of course, this role must be carried out with full responsibility and in accordance with its capacity and capability. In this case, the role of the communicator carried out by the Regional Disaster Management Agency (BPBD) of Medan City has been carried out correctly in accordance with its duties and functions. There are three areas in the Medan City BPBD: sector one, disaster prevention and preparedness. Field two is emergency and logistics, and field three is rehabilitation and reconstruction. In running the communication system, the Medan City Regional Disaster Management Agency (BPBD) has been doing it with a communication system in accordance with the formula paradigm of Harold D. Lasswell

with slight modifications, which were analysed through data collected through interviews and documentation conducted by researchers. In contrast, a BPBD communicator The city of Medan also conducts two-way communication with its communicants.

In order for the communication delivered to run effectively, a communicator should have four important factors, namely knowledge, experience, motivation and attitude, which will be described as follows (Knapp & Vangelisti, 1996):

Knowledge is a fundamental factor that argues that the communicator has a knowledge base. Knowledge is divided into content knowledge. This knowledge can be obtained from books, lecturers and other experiences. Then, procedural knowledge that is very useful determines how to become an effective communicator. Then the communicative experience factor can be achieved through observing others (diagnosing ability) and participating with others (building performance skills). Then the motivational factor that fosters the desire to communicate is significant. Therefore, in many cases, exemplary willingness to communicate in building a dialogue with others is a factor in the formation of misunderstandings about what is wanted and needed in the relationship. Lastly, attitude is critical in building effective communication with others (Knapp & Vangelisti, 1996). All these factors already exist in the Medan City BPBD as a communicator in tackling disasters.

Then as a communicator for the Medan City BPBD, he produces messages that are conveyed to his communicants. Of course, in this case, the message generated should contain matters related to disaster management. The message represents the communicator's ideas that are exchanged through sure signs (mainly physical ones) containing a specific purpose. Messages are usually deliberately channelled by communicators to communicants to get specific results, which are usually predetermined (Purwasito, 2017). The message generated is in the form of correspondence and socialisation and educational materials or an appeal to the entire community through the sub-district head to hold ditch cleaning activities by working together, doing reforestation in the Watershed (DAS), urging the public not to litter in rivers and others directly or using banners as media.

In conveying its message, the Medan City BPBD uses several media, channels or vehicles, such as training, simulations or rehearsals. This is in accordance with research conducted by Muritala et al. (2018). They concluded that community-based communication processes such as interpersonal seminars and town hall meetings should be used to create disaster awareness and complement media efforts. Then there is an early warning system that currently exists only on a community-based basis. The Medan City BPBD, in collaboration with the community through the Ward, created an Early Warning System (EWS) by relying on the community's active role as a

community-based early warning system communication in the form of existing local wisdom.

The Medan City BPBD also applies social media as a communication channel to adjust to the progress and development of information and communication technology. The social media used by the Medan City BPBD are WhatsApp (WA), Facebook and Instagram, and radio networks. The use of social media and radio networks by the Medan City BPBD in practice is very relevant, considering that current technological advances provide easy access to communication. This is in line with what is described in the diffusion of innovation theory, which can be interpreted as a process in which an idea, idea or new technology is communicated through certain media in a particular time dimension to a social system (individual, group or community). The audience slowly accepts this new idea or idea through a process of diffusion and selection by the adopters. This theory believes that an innovation diffuses throughout society in a predictable pattern. Some groups will adopt innovation as soon as they understand the innovation, but other groups take a long time after seeing positive results before adopting the innovation (McQuail, 2010).

In accordance with the collected interviews, it can be seen that the communication conveyed by the Medan City BPBD to its communicants is the regional apparatus organisation from the sub-district, which is then forwarded to the Ward and then to the head of the neighbourhood. The communicant is the recipient of information or messages conveyed by the communicator. The communicant element should not be ignored because the communicant largely determines the success or failure of a communication process. In its implementation, the Medan City BPBD has applied the concept of mass communication by applying the innovation diffusion theory, which uses opinion leaders to deliver messages or information to the public. From the sub-district head to the Village head and the communication arrangements, the emphasis is on persuasion, invitation or counselling to participate in accepting an innovation. The higher the qualification of the agent of change or the extension agent who persuades or invites, the faster the process of adopting innovation by the community. This is because the credibility, insight, reputation and character of an opinion leader who is the spearhead (innovators) determines whether or not an innovation is accepted by the public (Bungin, 2006).

The last element of communication is the effect of the communication made. Of course, the communication's effect is seen in how the communicant responds to what is conveyed by the communicator. In carrying out its role as a communicator, the Regional Disaster Management Agency (BPBD) of Medan City can be said to be excellent and effective regarding disaster management efforts in Medan City. Effects or influences can occur in the form of changes in knowledge (knowledge), attitudes, and behaviour. At the level of change in knowledge, influence can occur in the form of changes in

perception and opinion. Changes in attitude are internal changes in a person organised in the form of principles resulting from evaluations carried out on objects inside and outside him. Then behaviour change is a change that occurs in the form of action (Bungin, 2006). If described, the form of the communication system carried out by the Medan City BPBD is as follows in the Figure 2.

Figure 2. The form of the communication system carried out by the Medan City BPBD
Source: from research data processed by researchers (2022)

The communication system carried out by the Medan City BPBD has implemented the principles of Islamic communication. As teaching that is rahmatan lil alamin, Islamic teachings are teachings that are in accordance with human needs and development. Referring to the concept of rahmatan lil alamin, the researchers found that Islamic communication principles have been internalised in communication practices carried out by BPBD. Among the principles of Islamic communication carried out in communication are the principles of being selective and valid and taking into account the views and thoughts of others.

One thing that becomes very important in communicating is that as a communicator, he must ensure that the information he communicates is accurate or valid. As a communicant, he should be a person who is not easy to believe and easily influenced by the information conveyed. Therefore, this selective and valid principle is essential in communicating. In addition to adding credibility, accurate information avoids us falling into mistakes that lead to regret (Hefni, 2017). This principle is written in the Qur'an Surah Al-Hujarat paragraph 6, namely: O you who believe, if a wicked person comes to you with news, then examine it carefully, so that you do not inflict disaster on a people without knowing the situation that causes you to regret over it (The Qur'an Surah Al-Hujurat / 49:6).

Then the principle of considering the views and thoughts of others. In general, several people's combined views and thoughts will be better and of higher quality than the results of personal views and thoughts. Therefore, in Islamic communication, it is highly recommended to consult to get the views and thoughts of many people. In addition, a policy or decision taken by deliberation is psychologically perceived by all members of the community as a joint decision and responsibility that must be carried out as well as possible (Syukur, 2007). As the word of God in the letter Ali Imran verse 159

means; So it is because of the mercy of Allah that you are gentle with them. They will distance themselves from those around you if you are hard-hearted and harsh-hearted. Therefore, forgive them, ask for forgiveness, and consult with them on this matter. Then when you have made up your mind, put your trust in Allah. Verily, Allah loves those who put their trust in Him" (The Qur'an Surah Ali-Imran/03:159). In dealing with disasters, the Medan City BPBD has three communication system models, namely:

Pre-disaster communication system model

There needs to be prepared to reduce the impact of disaster risk (Sutton et al., 2021; Parida et al., 2021). To prevent and prepare for disaster, the Medan City BPBD carries out a series of activities to prepare the community for disasters that will occur and reduce the impact of disaster risk. The communication carried out by BPBD in disaster prevention and preparedness efforts are by conducting outreach, education or training. For this, the Medan City BPBD conducts a formal correspondence mechanism; namely, the Medan City BPBD wrote to the sub-district to ask for facilities and bring participants to attend counselling, socialisation, education or training. The sub-district or Ward party may submit an application letter to the Medan City BPBD asking to be a resource person in socialisation activities held by the sub-district or village. In accordance with systems theory in organisational communication, the communication carried out is formal and tiered, starting from the highest system structure to the lowest (Mulyana, 2013).

Regarding prevention and disaster preparedness, Medan City BPBD, as a communicator, applies a formal and bureaucratic communication system. As the statement submitted by the field of disaster prevention and preparedness of the Medan City BPBD below:

> *"It is clear that we have carried out socialisation, to the managers of high-rise buildings, early warning systems, evacuations, we carry out socialisation and simulations in the community, in high-rise buildings as well, then in disaster-prone areas, we have also implemented it, especially for high-rise buildings, we teach evacuation, emergency rescue when there is an earthquake at one point, how are rescues carried out…Then we make this risk reduction for the surrounding community then. We also hold socialisation, simulations, and rehearsals for communities in disaster-prone areas that we carry out, so if this kind of counselling, we wrote to the sub-district head to send representatives from their respective regions in disaster-prone areas in accordance with the potential for disasters in this Medan city, where floods occur most often" (Interview with Fahruddin, Head of Disaster Prevention and Preparedness, on January 3, 2022).*

"For example communication, of course using letters, so every time there is a disaster we write to BPBD, so what needs do we need… Sometimes BPBD has also provided assistance with facilities to us, for example, spraying, tube, etc. Nevertheless, what is certain is that the communication system carried out is by mail, so for information from here to BPBD, it is by letter, WA, telephone, sir. If the prevention information is through training or simulation, yes, sir, it is like that." (Interview with Erwin Elkana Tarigan, Head of General Sie Medan Baru, on February 2022).

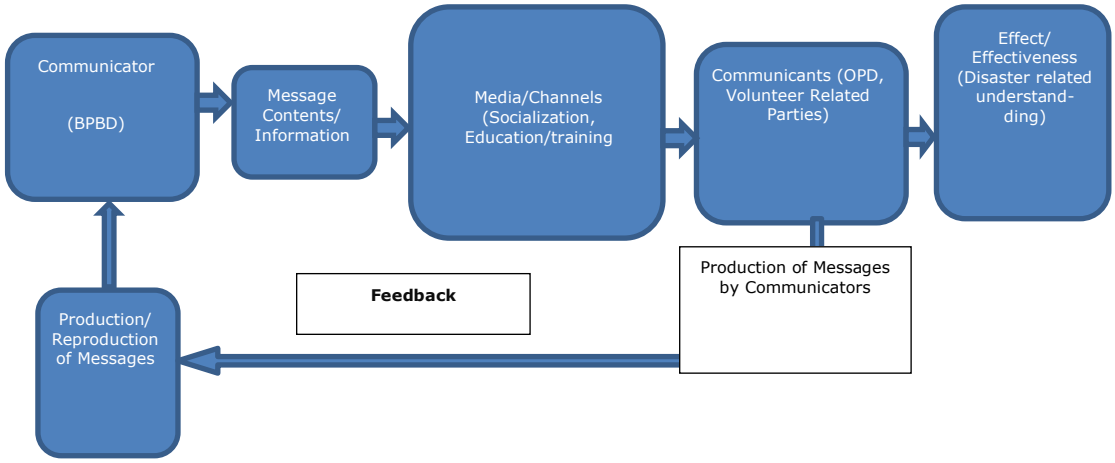

Figure 3. The flow of the Communication System Model for disaster planning and preparedness
Source: from research data processed by researchers (2022)

Observing the communication system carried out by the Medan City BPBD at Figure 3 illustrates that the pre-disaster communication carried out has a concept of understanding in accordance with system theory. It is said that systems theory has had a significant influence on the study of human communication. Communication participants convey a message that contains ambiguous meanings and complementary or symmetrical relationships. The message's meaning is ambiguous, namely messages containing message content and relationships (relationship massage) (Fisher, 1978).

The definition of a complementary relationship is a form of behaviour followed by opposing actors that are complementary. In symmetry, one person's action is followed by another similar action. Here we begin to see how the interaction process creates the system's structure. How people respond to each other determines the type of relationship they have (Fisher, 1978). This understanding provides an understanding that there is two-way communication between parties who communicate because of feedback which is marked by the actions taken by the communicator and then followed by reactions from other parties in the form of responding and giving feedback again. Likewise, the communication carried out by BPBD in pre-disaster communications as described above.

Disaster communication system model

In the case of an emergency, BPBD communicates outside the formal bureaucracy, which should be done. This is done because, considering that responsiveness and speed are needed in anticipating an upcoming disaster, communication is no longer from the Medan City BPBD down and tiers but open two-way communication, where each party can immediately inform about a disaster. Because for a disaster, it is necessary to move quickly without going through the administrative bureaucracy of mail, which is usually done bureaucratically. This is in accordance with what was described above. As stated by the Medan City BPBD through the head of its field as follows:

> *."..so if there is news of a disaster, who can inform first and then go there, please, because this is humanitarian...." (Interview with Ananda Sulung Parlaungan, Head of Rehabilitation and Reconstruction, on December 29, 2022).*
>
> *Then this is further strengthened by statements submitted by the sub-district and sub-district office data from interview quotations as follows;*
>
> *"…we do not care about correspondence; the administration can come later. Assist first, yes, technical assistance first, then the administration will follow." (Interview with Erwin Elkana Tarigan, Head of General Sie Medan Baru, on February 2022).*
>
> *."... for letters, you can follow, sir... yes, yes, there are some handlings that are emergency... indeed, disaster must be dealt with right away, cannot be conditioned to keep a letter but take action first... yes, we will move quickly, we do not have to wait for our letter or not. Like that is what it has been like for a long time now…." (Interview with Optima Manalu, Head of Medan Tuntungan Infrastructure Facility, on February 21, 2022).*
>
> *"…It does not have to be trimmed. We trim it down (no need to wait for the correspondence). Yes, the letters will follow. The letters were related to aid. If, for example, we have, oh yes, we give assistance, what rations and other things are at the back of the letter and even more so to those who provide some kind of receipt, so it will not be complicated by long-winded bureaucracy, the important thing is to execute it first. Because if we wait for another letter, people are already done…." (Interview with Laoda Akbar, Head of Medan Sunggal Infrastructure Facility, on February 2022).*
>
> *"As for us, the social media, yes, at least WA is the most effective, sir, other than WA maybe from a letter, it means that immediately from WA the letter will follow when a disaster occurs" (Interview*

with Tengkuu Mahmud Abdilah, Head of Medan Johor Infrastructure Facility, on February 2022).

"…When there is a disaster, it is like writing on cigarette paper. It is okay to use the budget. Nevertheless, what we do, is do first. As a formal procedure, the sub-district head wrote a letter to the BPBD because the budget might be in the BPBD. We do not have a budget for disasters. We came from a meeting and socialisation at the BPBD, first on WhatsApp, and then the letter came. It does not have to be formal; the important thing is that there is a meeting at the BPBD. This means we are speedy in information, physically following the important information first..." (Interview with June Hardiansyah, Head of Medan Petisah Infrastructure Facility, on February 2022).

In brief, it can be described the communication system carried out in disaster emergencies in Figure 4.

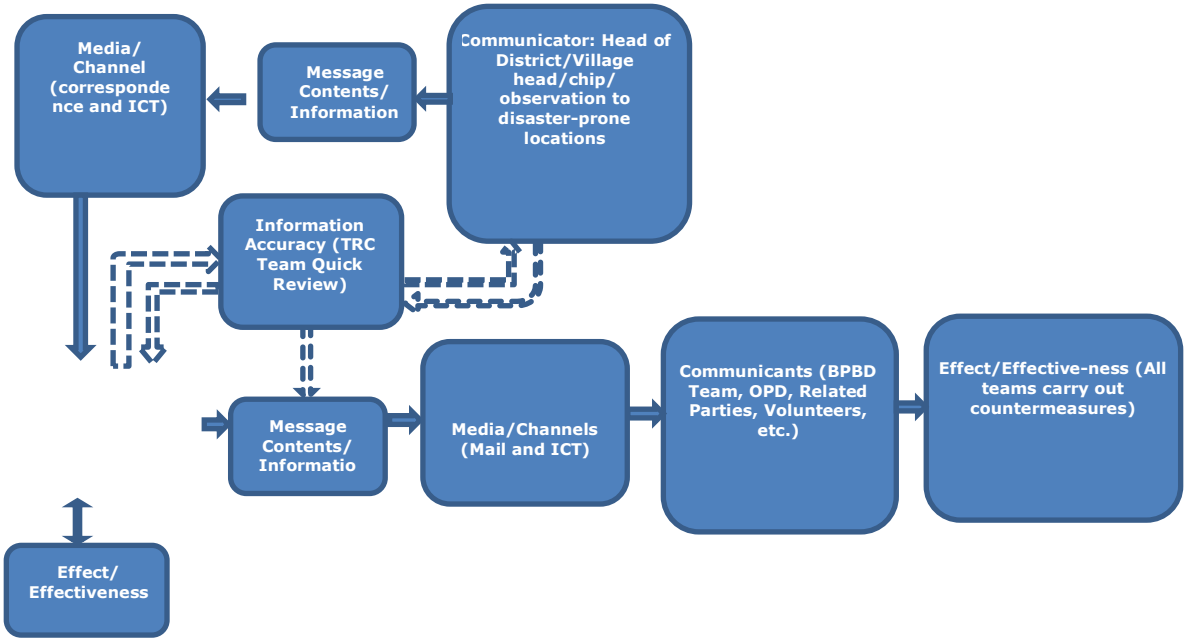

Figure 4. The flow of the Disaster Emergency Response Communication System Model
Source: from research data processed by researchers (2022)

From Figure 4, it can be seen that in conducting disaster emergency response communications, the Medan City Regional Disaster Management Agency (BPBD) can be explained as Medan City BPBD is not only a communicator but also a communicant in terms of obtaining information data from disaster-affected areas as a source, namely the sub-district head and district headward. After the BPBD received information from the sub-district and village, it did not immediately inform the relevant parties, but the BPBD carried out rapid and direct monitoring of the disaster-prone areas. Then the

Medan City BPBD produces messages to be conveyed through communication media, namely using communication information technology with Handy Talky (HT), Hand Phone (HP) or WhatsApp (WA) social media application, and then the data or information submitted is followed up by evacuating and providing assistance to disaster victims

The exciting thing is that it turns out that WA social media is a very effective communication medium in accelerating the delivery of information. The use of social media such as WhatsApp (WA) is part of human progress utilising developing information and communication technology. This fact is not surprising because the researchers got data from a study that, generally, as many as 68% of respondents were WhatsApp users. Then followed by Facebook and e-mail, 64% of respondents, 51% of respondents are Instagram users, and 48% use line users (Gelgel, 2020).

While the use of HT is effective because it supports radio signals, if the internet network is damaged, then HT becomes a beneficial and effective communication medium in communicating information about disasters. It is not required to use formal communication in the form of correspondence in a disaster emergency. The most important thing is that information arrives immediately, and correspondence may follow to be delivered for formal bureaucratic administration. The use of technology in communication is in line with a theory called the diffusion of innovation.

This new change in the disaster communication process is called innovation. Innovation provides various possibilities of a new alternative or several alternatives for individuals or organisations as a tool to help solve problems. Diffusion is the process by which innovations are communicated through multiple channels over time among members of a social system. Furthermore, diffusion is described more accurately by the convergence model, in which participants generate and share information with other parties to achieve mutual understanding. In disaster communication, communication can be in the form of linear and convergence (Tamitiadini et al., 2019; Mirbabaie et al., 2021).

After the information reaches the communicant, which in this case is the BPBD Rapid Response Team, strategic government agencies and institutions can assist in disaster management as well as the existing volunteers. So that the parties are responsive and immediately take action to deal with disasters due to the communication carried out by the Medan City BPBD. The emergence of the effect of the communication carried out is the expected result. In disaster management, it is necessary to have the role of various parties in responding to disasters that occur, as stated by the National Disaster Management Agency (BNPB), which involves stakeholders related to disaster management by considering their respective portfolios. Involving all stakeholders related to disaster management with the

principle of "Sapalibatism." This is a term popularised by BNPB, namely greeting (greeting, greeting) disaster victims what they need, then getting involved (involving, involving) the existing potential, such as the business world, government, community and so on (Nugroho & Sulistyorini, 2018; Susilo & Putranto, 2021).

Post-Disaster Communication Model

Then rather than after a disaster occurs or after a disaster, this is a recovery phase. In the post-disaster situation, the recovery phase begins, which is an effort to restore the community's living conditions to their original state or better than before the disaster occurred through reconstruction and rehabilitation activities (Tamitiadini et al., 2019). Furthermore, during the rehabilitation or post-disaster period, communication is essential to return disaster-affected communities to normal living conditions. Conducting counselling, socio-economic empowerment, and restoring the community's social life are activities that require a good understanding of communication. The right communication approach will make the mental healing efforts of disaster survivors run faster (Lestari, 2018).

Before carrying out post-disaster rehabilitation and reconstruction, the Medan City BPBD first collected data on the impacts caused by the disaster by assigning a team to directly collect field data and coordinate with the sub-district head to the head of the environment. The information obtained from the sub-district head was validated again by the team from the Medan City BPBD. After the data was collected and confirmed to be valid, the data was submitted to stakeholders, the government, the business world and the wider community to take appropriate, effective, accurate and measurable actions in response to a disaster.

> *"We went directly to the field. It was agreed with the BPD and related agencies, including the Indonesian National Army/Police of the Republic of Indonesia. We have also prepared a bulletin board for information related to disaster events at the prepared post. It cannot be locked because it can change too, but it still comes from data at the command post… If data can be summarised into valid data, it will be distributed to other parties. Sometimes the media enlarges the existing data. It is the government's job to convey valid data after the study is carried out. Data cannot be directly provided to other parties before the data is truly valid. That is why the data must be completely validated, so there are no errors in the submitted data submitted…. As soon as possible, the data can be obtained in 1 day. We validate it from the Head of Environment, the village head, the Police of the Republic of Indonesia, Indonesian National Army. If it has been agreed upon, it is reported and informed to the stakeholders…." (Interview with Ronald Fredi Sihotang, Head of Emergency and Logistics, on December 24, 2021).*

"…after this disaster, the data will be validated later. I will give you the form, including the means… our validation already has data, but it must be validated to areas such as the village head to the local sub-district head, crosscheck again because they know the area better… after we know where we think about how much food is needed, how much is the response team if we see the evacuation, what is the percentage according to my brother..." (Interview with Ananda Sulung Parlaungan, Head of Rehabilitation and Reconstruction, on March 14, 2022).

Disaster communication must be supported by accurate, fast, reliable data and information. Disaster communication must also be supported by integrated, reliable and timely data and information for its acquisition (Spialek et al., 2021; Liu, 2022). Good quality of data and information will determine the quality of disaster communication and speed up the decision-making process about disasters. The characteristics of the data needed for disaster management are valuable data, namely, data that is precise, complete, economic, flexible, reliable, and relevant. Therefore, access to information and data plays a vital role in ensuring the success of disaster management because it is conceivable that if disaster management does not rely on data, there will be confusion in its handling (Nugroho & Sulistyorini, 2018).

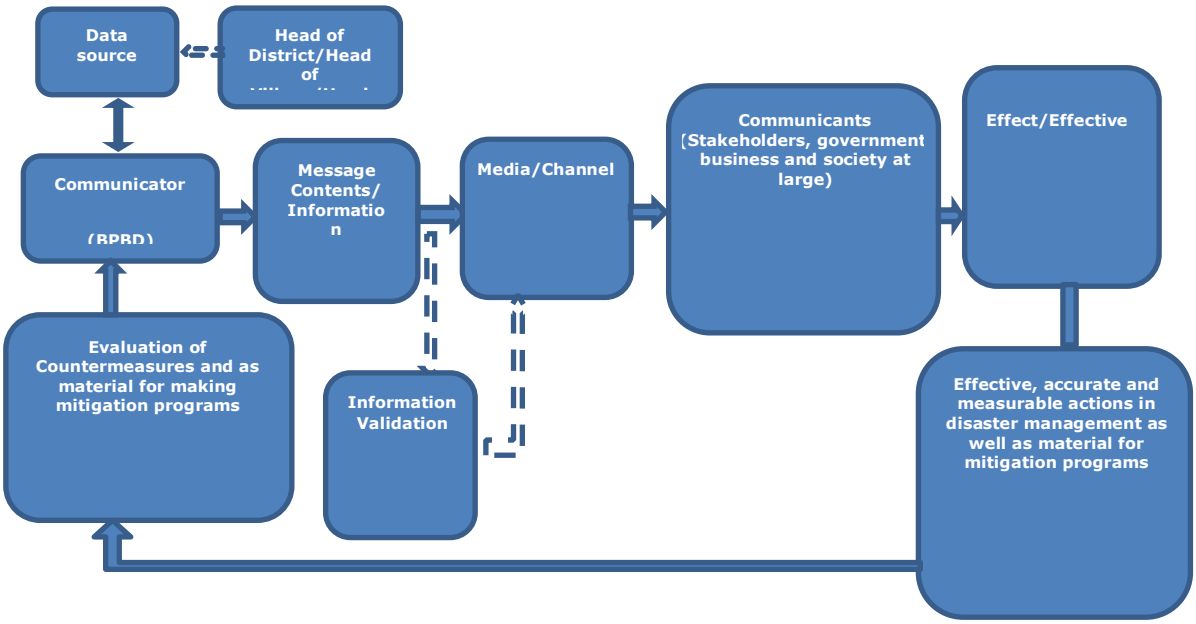

Figure 5. Post-Disaster Communication System Model Flow
Source: from research data processed by researchers

Then in obtaining the necessary data, the Medan City BPBD coordinates in stages or stages through the communication network. This communication network is done in order to obtain appropriate or valid data regarding disaster events that have occurred in an area.

With this tiered communication, the sub-districts who receive data from the Ward and Ward receive data from community representatives, namely the head of the neighbourhood. The data desired by the Medan City BPBD cannot be quickly used as reference data. This is in accordance with the notion of a communication network in which people exchange messages through specific routes. Communication networks differ in size and structure. For example, they may only be between two or three or more people and may also be among all people in the organisation. The shape of the network structure will also be different (Muhammad, 2015; Sukmono & Junaedi, 2020).

In the communication network (figure 5), the role of the individual in the communication system is determined by the structural relationship between one individual and another in the organisation. This relationship is determined by the pattern of individual interactions with the flow of information in the communication network.

After seeing the description of the existing communication system above, it can be concluded that the Medan City Regional Disaster Management Agency (BPBD) in carrying out its communication is adjusted to the stages of disaster management, namely communication during planning and preparedness in dealing with disasters, communication when a disaster occurs or at the time of the disaster, disaster emergencies, and post-disaster communication in which each situation has a different communication system.

Communication Barriers in Disaster Management

Pre-disaster Communication Barriers

As described above, the communication before the disaster carried out by the Medan City BPBD is to carry out socialisation, education, training and simulations. Before a disaster occurs, the Medan City BPBD focuses on disaster prevention and preparedness. For this matter, the Medan City BPBD conducted a series of outreach activities, simulations and education to communities in potential disaster areas. In its implementation, there are several communication barriers, including semantic barriers, semantic factors concerning language, and errors in pronunciation or writing that can lead to misunderstanding or misinterpretation, which in turn can lead to miscommunication (miscommunications) (Ruslan, 2018). Blake said that semantic barriers are communication barriers caused by errors in the language used. This can be seen in the socialisation or training situation carried out by the Medan City BPBD, where some participants were confused and asked about the meaning of what was conveyed by the resource person.

Second, social barriers. Then in terms of socialisation related to throwing behaviour, this is also experiencing communication barriers that make communication ineffective. Social barriers (psychosocial noise) Barriers to vast differences in aspects of culture, customs,

habits, perceptions, and values so that the tendencies, needs and expectations of the two parties communicating are also different (Ruslan, 2010). Society consists of various groups and layers that cause differences in social status, religion, ideology, education level, wealth level, and so on, all of which can become obstacles to smooth communication. What is stated above is the same as what is mentioned regarding the status barrier, which means there is a social distance between communication (Cangara, 2016). In line with what Cangara said that cultural barriers are obstacles that occur due to differences in norms, habits and values held by the parties involved in communication (Cangara, 2016).

Third, motivational Barriers, the researchers found that there were also participants who were actually forced to participate in the socialisation, simulation or training activities held by the Medan City BPBD. This concerns the motivation of the participants, which resulted in the non-optimal reception of the message/information conveyed so that understanding the material presented by the participant resource persons was difficult. Motivation is a related obstacle from the listener, meaning that the listener who receives the message wants to receive the message or whether the listener is lazy and has no motivation, it can become a communication barrier (Putra et al., 2018).

Disaster emergency communication barriers

Situations that occur when a disaster occurs need fluency in communicating and accurately conveying messages or information. Sometimes communication barriers occur when disaster conditions occur. Among the communication barriers faced by the Medan City BPBD are; Barriers to the channel. Sometimes when faced with disaster conditions, there are communication barriers faced by the Medan City BPBD regarding communication channels. Sometimes when communicating, there is interference with the HT (handy talky) or HP (mobile) signal. This makes it challenging to coordinate with related parties. This obstacle makes the flow of information not channelled smoothly so that delays can occur and make efforts to deal with disasters.

Barriers to the channel occur because of irregular communication channels or the atmosphere around the communication process. This can also be said as a media barrier or a tool to convey messages. Barriers like this are called noise. Broken power lines, fluctuating signals, low battery, unclear television screen images, unclear writing, etc. (Widjaja, 2000).

Post-disaster Communication Barriers

After a disaster or a post-disaster situation, the Medan City BPBD collects data on the impacts caused by the disaster by assigning a team to directly collect field data and coordinate with the sub-district head to the head of the environment. The information obtained from

the sub-district head was validated again by a team from the Medan City BPBD. The situation also encountered obstacles in the communication carried out. Among the obstacles that occur are caused by: First, the Communication network, wherein obtaining the data required by the Medan City BPBD, they coordinate in stages or stages through the communication network. This is done in order to obtain appropriate or valid data regarding disaster events that have occurred in an area. With this tiered communication, from the sub-district that gets data from the Ward and the Ward from community representatives, namely the head of the environment, the communication that is carried out is experiencing obstacles. The data desired by the Medan City BPBD cannot quickly be used as reference data. The communication network is an obstacle caused by the many levels or links that must be passed by a message in communication. Messages sent in series or multiple chains tend to be changed by the recipient before continuing to be sent. According to Lewis (1987), only about 30% of messages sent in this chain match the original (Muhammad, 2016).

Second, this system of rules and policies relates to the absence of a Standard Operational Procedure (SOP) in terms of disaster management carried out and this is recognised by the Medan City BPBD as something that can hinder the coordination carried out. The unorganised communication carried out by the Medan City BPBD with various functions of the relevant government apparatus creates communication barriers. Who does what and how it is done has not been regulated in a regulation that binds various elements of the government. The rules, policies, and rules relating to thought and action influence how people communicate. The use of rigid rules and policies leads to an inability to agree, impersonal relationships, and a lack of emotional communication (Muhammad, 2015). Likewise, in terms of policies carried out by the government, among others, the existing flood canals have not been fully utilised, such as the canal in Titi Kuning, which was created to anticipate flooding from the upper reaches of the Deli River. The improvement of the watershed, which is currently occupied by the community for decades, has also not been brought under control by the government. Because, in principle, there are regulations made by the government that people are not allowed to live on the banks of the river except for government buildings. Although the government has socialised the community not to live and move from the riverbank area, the community does not want to move because it has been there for decades, and moving is costly. The government, in this case, must prepare relocation for the community. The absence of strict sanctions for people who dare to throw garbage into the river makes this behaviour still often carried out by the community.

Third, task specialisation is also a communication barrier carried out by the Medan City BPBD. BPBD Medan City cannot run alone as an

institution focusing on disaster management. The existence of several agencies and institutions that are related to disaster management also creates communication barriers in disaster management. Such as providing the facilities needed by the Medan City BPBD in coordination with other agencies or institutions specialising in tasks. Sometimes coordination or communication is hampered due to the assumption that the other party knows and immediately acts about what must be done. However, in reality, some problems are not fast enough to take action by those who are supposed to act according to their duties. This is because communication barriers involving task specialisation can narrow one's perception and affect how people communicate. Specialisation encourages competition and conflict among resources to complement new goals (Muhammad, 2015).

Based on the description above, there are several communication barriers faced by the Medan City BPBD, namely: semantic and motivational barriers that occur in the pre-disaster communication process, barriers to communication channels that occur in the disaster emergency communication process or when a disaster occurs as well as barriers to communication networks, systems policy rules and task specialisation in post-disaster communications.

CONCLUSION

The data analysis results show that the Medan City Regional Disaster Management Agency (BPBD) applies a two-way communication system that allows communicators and communicants to provide feedback on what is communicated. BPBD Medan City has also communicated with the principles of Islamic communication, including checking and validating so that the information produced is correct and in accordance with what it is and asking for opinions and input from related parties to produce information that can be accounted for the truth and accuracy of the data for the benefit of disaster management.

The model of a disaster emergency communication system or when a disaster occurs where in its implementation, the Medan City BPBD applies two-way communication and validates and verifies to obtain information in the form of data that is in accordance with the conditions in the disaster-affected area. Then the post-disaster communication system model in which, in its implementation, the Medan City BPBD collects data related to the number of people affected by the disaster, ensuring that no victims are missed during data collection. This is done so that the distribution of aid and handling of disaster victims is carried out appropriately. In this case, the Medan City BPBD conducts two-way communication and tiered communication through a communication network so that it is expected to produce accurate data that is useful for post-disaster management, namely rehabilitation and reconstruction. Then this study also reveals the obstacles in communication carried out by the Medan City BPBD.

The communication barriers experienced by BPBD are; semantic and motivational barriers that occur in the pre-disaster communication process, barriers to communication channels that occur in the disaster emergency communication process or when a disaster occurs as well as communication network barriers, policy rule systems and task specialisation in post-disaster communication.

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