Management of Information and Communication Technology for Earthquake Disaster Management in Jayapura City

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A R T I C L E I N F O	A B S T R A C T
  	This study aims to analyze ICT management in the earthquake disaster in Jayapura Regency. This study uses a qualitative descriptive design. Sources of data come from secondary sources, which include books, journals, online news, and various documents according to the research theme. Based on research results, comprehensive and clear handling of natural disasters has been regulated in Article 5 of Chapter 3 of Law 24/2007 concerning disasters. In ICT management, Badan Nasional Penanggulangan Bencana (BNPB) and Badan Penanggulangan Bencana Daerah (BPBD) use official websites as information channels. Regarding disaster management information and communication systems, BNPB and BPBD themselves have a Disaster Management Operations Control Center, hereinafter abbreviated as Pusdalops PB. The people of Jayapura City mostly access information independently through social media.

INTRODUCTION

Information and Communication Technology (ICT) has a very strategic role in various ways. The spread of COVID-19 around the world has proven how ICT is a medium for sharing information about the status of disasters on a global scale (Komalasari, 2020; Sosiawan, 2015). In various fields, ICT is very helpful in carrying out the exchange of information so that anyone can be aware of exposure to a pandemic (Komalasari, 2020). In addition, in several incidents where ICT was paralyzed, it reduced the social security of the community. we can see this in the various events of Indonesia's national disaster. for example, the Aceh Tsunami in 2004, the Yogyakarta Earthquake in 2006, and the West Sumatra Earthquake in 2009. In these cases, only a few moments when ICT was disrupted, even completely paralyzed, caused panic among the people. In the government sphere, the disruption of ICT hampers coordination related to mitigation, hampers logistical assistance and humanitarian assistance for disaster victims. even though in a disaster situation requires fast and effective handling. This can be seen from the earthquake in Yogyakarta, where the communication line was cut off for an hour, triggering the spread of the issue of the south sea tsunami which made everyone panic more (Sosiawan, 2015).

With this vital role, (O'Brien, 1999) as an ICT management expert has described the functional and physical components of ICT management. Functional components include data assessment, information presentation, administrative and operational systems for personnel, periodic management reporting systems, database systems for each organizational unit, and data management to link information system components. While the ICT component physically includes hardware, software, data storage databases, operational procedures or instructions for users, operators, and data system analysis.

Indonesia is included in an earthquake-prone area. With a geographical location that connects tectonic plates, including active mountains affect this vulnerability. With this critical point, it is crucial for decision making based on data and information transmitted through ICT, one of which is the Geospatial Information System (Arifin, 2016). Recently, at the beginning of 2023, an earthquake with a magnitude of 5.4 hit the Jayapura City area (Pugu, 2023). This earthquake caused damage to various government building infrastructure and health buildings (Wibawana, 2023). It was recorded from January 2 to February 4 2023 that the earthquake that occurred in Jayapura City touched 882 times (Lahur, 2023).

In connection with ICT management for disaster management, (Bowman, Graham Jr, & Gantt, 2007) developed an affordable disaster communication system called the Man-portable and Interoperable Tactical Operation Center (MITOC). This communication system is a sophisticated device that can be transported by vehicle and moved around in an emergency situation. The communication channels used by MITOC are laptops, radios, various systems that connect wirelessly with satellites in disaster situations.

Based on this explanation, it is necessary to carry out further research that outlines the urgency of ICT in disaster situations. ICT is not only useful for anticipating the occurrence of natural disasters, but also useful in critical

situations when disasters occur. The main focus on Sosiawan's research points are to know how ICT management in the Yogyakarta earthquake contributed to research exploration in different contexts. So, this study aims to analyze ICT management in the earthquake disaster in Jayapura Regency.

THEORETICAL REVIEWS
ICT Management

Information technology management is a combination of technology management and information technology that aims to achieve organizational goals using computers. From this definition, information technology management implies the first meaning means the management of a collection of several systems, infrastructure, and information contained therein (Rajaraman, 2018). The application of information technology in an organization's information system appropriately by considering reasonable costs to obtain optimal benefits, the resulting accurate, timely and relevant information will provide benefits and money.

ICT in Disaster

The success of crisis management depends on good and effective anticipatory preparations (Sauvagnargues-Lesage & Ayral, 2007). (Chatfield & Brajawidagda, 2012) explains that extreme events in the past can be a signal for disaster-prone countries to increase preparedness and response through sensors and early warning systems. (Ciampalini et al., 2015) shows how Messina as a province has used remote sensing or satellite imagery to be hit by landslides.
Generally, when a natural disaster occurs, victims need information about their family's position and location of assistance (Hossmann, Legendre, Carta, Gunningberg, & Rohner, 2011). In turn, humanitarian organizations that provide emergency assistance also need ICT facilities to identify disaster locations in an effort to supply food logistics and donations for first aid. (Kancanasut et al., 2007) that in an emergency, disaster volunteers who go to disaster sites, really need more effective communication by sending and receiving multimedia information from experts. The activity of disseminating information on disaster conditions through the emergency internet network was also carried out by the ICT community which was named AirPutih during the 2004 Aceh tsunami and contributed to the acceleration of information, as well as the urgent needs during the emergency response (WIDYASARI, 2009). Thus, ICT in disaster situations has three important cycles; on preparedness before a disaster occurs, response during a disaster, and recovery related to post-disaster situations.

METHODOLOGY

This study uses a qualitative descriptive design. Sources of data come from secondary data which includes books, journals, online news, and various documents according to the research theme. Specifically, the documents used refer to the official websites of BPBD Papua Province and BPBD Kota Jayapura. The data collection technique uses observation and documentation techniques.

Data analysis refers to the stages developed by (Miles & Huberman, 1992) carried out with the stages of data collection, data presentation, and drawing conclusions.

THE RESULTS

On February 9, 2023, an earthquake in Jayapura City resulted in the death of four residents who were in a cafe (Muhari, 2023). Based on the monitoring of Badan Meteorologi, Klimatologi, dan Geofisika (BMKG), the disaster occurred in the afternoon, around 15.28 WIT. With this incident, the cafe on the seafront collapsed, most of the educational facilities and health facilities suffered minor damage.

Disaster Management Policy Framework

Comprehensive and clear management of natural disasters has been regulated in article 5 chapter 3 of Law 24/2007 concerning natural disasters. In the perspective of regional government administration, efforts to reduce disaster risk are an integral part of the mandatory affairs which are the authority of the regional government. This becomes relevant when it is linked to the government's function, namely providing protection to the community, including making efforts to impact disaster risk. This is mandated by 2 (two) laws and regulations, namely Law Number 32 of 2004 concerning Regional Government and Law Number 24 of 2007 concerning Disaster Management. In article 18 it is stated that for city/district regional government level, the agency that handles it is Badan Nasional Penanggulangan Bencana (BNPB). The BPBD is organizationally led by an official at the level below the regent/mayor or echelon IIA. In this regard, in accordance with the guidelines for the formation of BPBD issued by the Head of the National Disaster Management Agency (BNPB) No 3 of 2008, BPBD consists of the Head of BPBD, Disaster Management Steering Element, and Disaster Management Implementing Element.

The position of the BPBD head according to the guidelines for the formation of the BPBD is carried out and held concurrently (ex officio) by the Regional Secretary who is directly responsible to the Regional Head. The Disaster Management Steering Committee has the main task of formulating disaster management policies; Disaster management monitoring; and Evaluation in the implementation of disaster management. The Disaster Management Implementing Element has the main task of coordinating other regional work units in the region, vertical agencies in the region, business institutions, and/or other parties required at the pre-disaster and post-disaster stages; lead the coordination of human resources, equipment, logistics from other regional work units, vertical agencies in the region and other steps required in the context of handling disaster emergencies; and the implementation of disaster management in a coordinated and integrated manner with other regional work units in the regions, vertical agencies in the regions with due observance of the policies for implementing disaster management and the provisions of the applicable laws and regulations.

DISCUSSION
BNPB and BPBD ICT Management in Disaster Management

In ICT management, the National Disaster Management Agency (BNPB) and Badan Nasional Penanggulangan Bencana (BNPB) use official websites as information channels. In addition, research tracing shows that BPBD uses social media and direct visits to conduct socialization and education for the community. An overview of the existing system or an ongoing system at the BPBD Jayapura City shows that disaster management data processing at Badan Nasional Penanggulangan Bencana (BNPB) Jayapura is still done manually and there is no system that can perform data processing. quickly, precisely and guaranteed data security.

In implementing disaster management information and communication systems, BNPB and BPBD have a Disaster Management Operations Control Center, hereinafter abbreviated as Pusdalops PB, which is the implementing element. In carrying out its main tasks and functions, Pusdalops refers to the Regulation of the Head of BNPB Number 15 of 2012 concerning Guidelines for Pusdalops BNPB. The establishment of Pusdalops PB in Provincial BPBD and Regency/Municipal BPBD is under the Emergency and Logistics Division and is directly responsible to the BPBD Executive Head. During its formation, the organizational structure of the Pusdalops PB was adapted to the needs and characteristics of where the BPBD was located.

The main tasks of the Pusdalops PB are divided into three cycles. First, before the disaster by providing support for activities before the disaster (collecting, processing, presenting disaster data and information) on a regular basis. Second, during a disaster by supporting the Emergency Response Command Post and the Implementation of Emergency Activities. Finally, post-disaster by supporting activities after the disaster occurred (data and information providers, especially in the implementation of rehabilitation and reconstruction).

Furthermore, from a functional perspective, Pusdalops PB has the functions of receiving, processing and distributing disaster information; function of receiving, processing and transmitting early warnings to related agencies and the community; emergency response function as a facilitator for the mobilization of resources for handling disaster emergency response in a fast, accurate, efficient and effective manner; and the functions of coordination, communication and synchronization of disaster management implementation.

The transfer of information regarding disasters is a very important factor to be carried out to the community. The routine activity carried out pre-disaster is conducting outreach, in which the Provincial BPBD cooperates with the Jayapura City BPBD. The main theme in this socialization and education is how the community can use appropriate and accurate information channels, so that they are able to anticipate things that need to be prepared before a disaster occurs (Pusdalops BPBD Papua, 2022). When a disaster occurs, BPBD also conducts outreach activities through inter-agency coordination meetings. This is to reduce the risks and impacts of disasters that occur. In addition, this coordination meeting aims to discuss the current condition of the earthquake in

the Jayapura City area (Pratiwi, 2023). Meanwhile, routine information channels regarding the latest conditions regarding earthquakes include data on the number of victims, refugees, and the effects of physical damage delivered through the official website of BPBD Papua.

Disaster management is carried out by involving various kinds of actions so as to minimize large losses, both life and property. The following is a disaster management procedure issued by the National Coordinating Agency for Disaster Management. There are four important things in disaster mitigation; available information and maps of disaster-prone areas for each type of disaster; socialization to increase public understanding and awareness in dealing with disasters, due to living in disaster-prone areas; know what needs to be done and avoided, and know how to save yourself if a disaster occurs; and regulation and arrangement of disaster-prone areas to reduce the threat of disaster.

This can be described in detail which includes prevention, mitigation, preparedness, response, relief, recovery, and rehabilitation activities. Prevention aims to provide instructions regarding preventive measures. Mitigation aims to minimize the impact. Specifically, regarding activities when a disaster occurs, the community really needs information related to early warning. The early warning system includes: activities to prepare and operate a communication system, place technical equipment in a safe place, and conduct training for rescue workers.

Based on search research shows that the people of Jayapura City mostly access information independently through social media. The main reliable source of information comes from Badan Meteorologi, Klimatologi, dan Geofisika (BMKG). This information is shared through social media groups as well as privately, so information spreads quickly. Meanwhile, for information regarding the number of victims and losses, the community refers to data released by the Jayapura City BPBD officially. This is in accordance with the objective of disseminating disaster early warning information which requires that the information must be accessible to the community, immediate, coherent, and official in nature. Thus, during and after an earthquake occurs, in general, the community has access to information related to the scale of the shock and is able to carry out mitigation measures to minimize its impact.

CONCLUSIONS AND RECOMMENDATIONS

Based on research results, comprehensive and clear handling of natural disasters has been regulated in article 5 chapter 3 of Law 24/2007 concerning disasters. In article 18 it is stated that for city/district regional government level, the agency that handles it is BPBD. The BPBD is organizationally led by an official at the level below the regent/mayor or echelon IIA.

In ICT management, BNPB and BPBD use official websites as information channels. BPBD uses social media and direct visits to socialize and educate the public. In implementing disaster management information and communication systems, BNPB and BPBD have a Disaster Management Operations Control Center, hereinafter abbreviated as Pusdalops PB, which is

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The people of Jayapura City mostly access information independently through social media. The main reliable source of information comes from the Badan Meteorologi, Klimatologi, dan Geofisika (BMKG). This information is shared through social media groups as well as privately, so information spreads quickly. Meanwhile, for information regarding the number of victims and losses, the community refers to the data released by the Jayapura City BPBD officially. However, an overview of the existing system or the running system at the Jayapura City Regional Disaster Management Agency (BPBD) shows that disaster management data processing at the BPBD Jayapura City is still done manually and there is no system that can processing the data quickly, precisely and guaranteed data security.

ADVANCED RESEARCH

This research is a qualitative research that uses secondary data sources from the official websites of BNPB and BPBD and online news. In addition, this study analyzes ICT management in disaster management with a locus in one region. So that further research needs to conduct studies with more adequate primary data sources and expand the scope of research in other areas.

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