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Enhancing Urban Resilience through Technology and Social Media: Case Study of Urban Jakarta

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Abstract

In the past five years, DKI Jakarta has enhanced his service through smart city concept. Various technologies have been utilized to improve the government service, including the disaster risk management and urban resilience, especially facing the flood. BPBD of DKI Jakarta province, the appointed government agency for managing the disaster has been pushed to use various technologies. To support BPBD strengthening its disaster management services, several initiatives are conducted by Private Sectors, Universities and NGOs. This includes the Disaster Information Management System (DIMS) supported by Fujitsu; Peta Jakarta developed Wollongong University in collaboration with Twitter Inc.; Rapid Need Assessment developed by WVI and Humanitarian Openstreetmap Team; *Pantau Banjir* and Crop application developed by Jakarta Smart City unit; and *Qlue*, an open application. The purpose of this research is to analyse the progress and impact of this technology. We used qualitative methodology, such as interview, secondary data document, and field assessment to collect the data needed. The result is that the BPBD and DKI Jakarta government resilience improved. These technologies improve the planning, response, decision making, and to evaluate the disaster responses, especially flood.

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1. Introduction

Urban in developing countries already exposed to the climate change impacts and riskier due to geography setting and the dynamic vulnerabilities. The Increasing of the vulnerabilities characterized by a dense and large population, economic growth, and rapid land use conversions. The land use conversions as the result of uncontrolled urban development and the drivers that cause environmental degradation [1] [2]. Climate induced hazard such sea level rise extreme weather, coastal flooding, and landslides have gradually increasing in term of intensity while irregular in term of its pattern and frequency [3] [4] [5]. Prior to hazard occurrences, urban capacities need to be increased. These can be done through good planning and urban management practices, such as the land use policies and controls, provision of urban infrastructure capacity to climate risks, increase of government capacity and resident awareness of climate-related hazards. Without these actions, impacts will be overwhelming [6] [7] [8].

Indonesia has many large growing cities with a more dynamic trend of urbanization marked by increasing economic growth and activity, rapid population growth, and dense populations such as Jakarta, Bandung, Medan, Surabaya and Balikpapan [9]. Recent studies by McKinsey (2012) show that recent acceleration growth rate occurred at medium sized cities of Indonesia [10].

DKI Jakarta province, as the capital city of Indonesia, has experienced floods since 1621 which was followed by a sequence of floods ever since. The high numbers of flood affected areas in Jakarta are due to high vulnerability to several physical, social, economic, and environmental factors which increase the susceptibility of a community to the impact of hazards. Currently, Jakarta is the most populated city in Indonesia, with 10.187 million people in 2013 [11], which also increase its vulnerability to disaster. The Provincial Disaster Management Agency (BPBD) for Jakarta reported 35% of villages were impacted by flood in 2012. Meanwhile, BPBD reported 46% of villages were inundated in 2013, affecting 248,846 persons or 97,608 households, resulting in 18,018 IDPs. The number of affected people in floods in January 2014 was 134,662 persons or 38,672 households in 100 urban villages, with 62,819 people's displaced [12]. These figures illustrate the vast impact of flood in the capital city of Indonesia.

High population density resulting from Jakarta's rapid growth resulted in concomitant, increased land use for various functions, including for homes, industrial and high-rise buildings. The result was fewer green belt areas with less fortunate people driven to live in areas that are not designated as living areas, including riverbank areas. Moreover, Jakarta located in a low land area with an average height of 7 m above sea level. Around 40% of the city's area is located below sea level and is crossed by 13 natural rivers, with more than 1,400 kilometres of manmade waterways. Jakarta has an average precipitation rate of 350 mm with a peak rainy season in January and February. The Indonesian Agency for Meteorological, Climatological, and Geophysics (Badan Meteorologi, Klimatologi, and Geofisika or BMKG) projects that by 2030 the precipitation rate will have increased to 4.09% compared to a precipitation rate of 0.3% in 2013. Jakarta's susceptibility to flooding is further aggravated by the previously mentioned factor of fewer greenbelt areas, as well as river constriction due to land usage, increased flooding due to blockage of city water drainage and coastal tidal flooding.

In the past five years, DKI Jakarta has been enhancing their service through smart city concept. Various technologies have been used to improve the government service, including the disaster management and urban resilience. BPBD Jakarta, appointed as the government agency for managing the disaster, has been pushed to use various technologies. To support the agency, Wahana Visi Indonesia (WVI), several other NGOs, and DKI partners help BPBD to improve their capacity. *Qlue* app, smart city, Disaster Information Management Systems (DIMS), Peta Jakarta (social media real time mapping), and mobile rapid need assessment are several products that has been used in Jakarta to enhance their disaster management system. The purpose of this research is to analyse the progress and impact of this technology.

This paper discusses one case study, the Jakarta disaster management that using technology and recent social media for obtain data and analysis for better responses in urban disaster. The common uses disaster is flood, both because the long term massive development without considering the Jakarta physical setting that consists of many rivers and a city near the sea. Each of the technology and the social media discussed to explore the function of these tools and how it is help Jakarta disaster management. We start by reviewing the general Jakarta disaster management and then we discuss the role of each technology and the social media.

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