Public value creation through social media networks: Mixed methods research on Indonesia's disaster management agencies

Uuf Brajawidagda

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Public value creation through social media networks: Mixed methods research on Indonesia’s disaster management agencies

Uuf Brajawidagda

This thesis is presented as part of the requirements for the award of the Degree of the Doctor of Philosophy at University of Wollongong.

June 2016
I, Uuf Brajawidagda, declare that this thesis, submitted in partial fulfilment of the requirements for the award of Doctor of Philosophy, in the School of Computing and Information Technology, Faculty of Engineering and Information Sciences, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

Uuf Brajawidagda
28 June 2016
ABSTRACT

Public value represents the net benefits created by government for various stakeholders in society. Hence public value often includes both economic value and social value. While economic value includes efficiency gains and reduced costs of operating public programs, social value (or socially oriented value) can encompass intangible benefits such as government transparency, government accountability, citizens’ trust in government and public safety. The open government initiatives across the world have stimulated wide adoption and use of social media platforms by governments at all levels which can change the relationships and interactions between government and the public. Through the use of social media platforms by government, the public can be more directly involved in the public service delivery and policy making. Hence, social media can be used as a strategic tool in alignment with government performance goals to create public value. Despite the emerging research on the public value creation through social media use, however, the literature lacks a theoretical framework for explaining how the public value can be created through the strategic use of social media by government.

Therefore, this study addresses a central research question: *How does the government create public value through social media use?* To answer this question, an extensive systematic literature review was undertaken to identify factors influencing public value creation by governments through the use of social media. A research model was developed which draws on the Integrative Model of IT Business Value (Melville et al. 2004). This study employed a sequential exploratory mixed methods approach by undertaking case study research in the first phase and an online survey in the second phase. The case study research analyzed government Twitter data and conducted case interviews with a senior manager or an operational manager from ten disaster management agencies in Indonesia. The online survey obtained 124 usable responses (an 18% return rate) from social media team members of Indonesian disaster management agencies.

Within-case and cross-case analysis of the case study results were used to develop instruments for the online survey and to provide completeness to the online survey results. A structural equation modelling tool (PLS-SEM) was used to assess the online survey results. Meta-inferences analysis of the case study findings and online
survey results suggest that at the organizational level, public value creation is positively influenced by a value creation process that comprises social media use, social media policy, an innovative organizational culture, communication, and disaster management. The results also suggest the full mediating role of public’s co-production on the relationship between the value creation process and public value creation. The model indicates that 47.6% of the variance of public value creation is explained by the model constructs.

At the process level, disaster management performance is positively influenced, indirectly through communication, by social media use and social media policy, but not by innovative organizational culture. The model explains 39% of the variance of the constructs. This study has practical implications for government in regards to the importance of the strategic use of social media, social media policy and innovative organizational culture in order to realize the expected public value creation through social media use. Specifically in the value creation process, the results of this study strongly suggest the complementary role of social media policy to the strategic use of social media for improving the disaster communication and disaster management.
LIST OF PUBLICATIONS


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CHAPTER 1. INTRODUCTION

This introductory chapter provides the summary of this study. Section 1.1 provides the background of the study and describes the research gap. The research question and research aims are presented in Section 1.2. A brief outline of the research methodology used to answer the research question is presented in Section 1.3. The contributions and limitations of the study are summarized in Section 1.4 and the structure of this doctoral thesis in presented Section 1.5.

1.1 Background

The 2009 US Open Government Directive and similar public policies in other countries have accelerated social media use in government (Bertot et al. 2010a; Bonsón et al. 2012). Governments at the local, state and national levels across the world have used social media for different purposes (Bonsón et al. 2012; Chatfield & Brajawidagda 2013a; Mossberger et al. 2013; Oliveira & Welch 2013; Bonsón et al. 2015). Similarly, government departments and agencies such as disaster management agencies have been using social media to mitigate the risks posed by disasters, prepare for, respond to and recover from disasters (Yates & Paquette 2011; Chatfield et al. 2013; Cho et al. 2013; Chatfield & Brajawidagda 2014; Chatfield et al. 2014). As with any other government information communication technology (ICT) implementation, the impact of social media use should be critically assessed based on public value creation (Cordella 2007; Cordella & Willcocks 2010; Cordella & Bonina 2012; Harrison et al. 2012; Bannister & Connolly 2014; Pang et al. 2014).

Public value can be defined as the overall value created by the government for various stakeholders (Kelly et al. 2002; Harrison et al. 2012; Nabatchi 2012). In this study, public value is viewed as consisting of economic value and social value. Economic value is related to of government actions including effectiveness, efficiency, reliability and other business-like measures (Barzelay 2001; Diefenbach 2009). Social value on the other hand, concerns the obligation of the government to enhance the wellbeing of society in areas that cannot be measured in financial terms. These areas include equity, fairness, justice and safety (Harrison et al. 2012; Jetzek et al. 2013).
Public value is often considered to be a comprehensive measure of the performance of the government (Kelly et al. 2002; Alford & O'Flynn 2009). Unlike other organizational performance measures, public value should not be assessed merely based on the performance outcomes, but also on the process through which the overall public value is created (Moore 1995; Benington 2009). Public value can be created through public service delivery, policies, laws and other actions (Kelly et al. 2002; Alford & O'Flynn 2009). The process of the public value creation includes the direct and indirect involvement of the public in defining and delivering the public value (Moore 1995; Benington 2009). Through direct participation (e.g. consultation, co-production or crowdsourcing of the public service delivery) or indirect participation (e.g. election of the representatives), the public is involved in the public service delivery and policy making processes.

The advent of social media has opened up new possibilities for governments to work and interact with the public (Bertot et al. 2010a; Mergel 2012a). Governments use social media to engage with the public in the public service delivery and policy making process (Bertot et al. 2012b; Chun & Luna Reyes 2012). Not only that, prior studies confirm the efficacy of social media in facilitating citizen crowdsourcing and public co-production in crisis and non-crisis situations (Linders 2012; Chatfield et al. 2013; Chatfield & Brajawidagda 2014). By providing various mechanisms for the public to participate in public service delivery or policy making, social media is a strategic tool for governments to create and enhance public value.

Prior studies indicate various public values have been realized by governments through social media use, including government transparency (Chatfield & Brajawidagda 2013a; Stamati et al. 2015), trust in government (Warren et al. 2014; Park et al. 2015), effectiveness (Abdelsalam et al. 2013), citizens’ satisfaction towards government performance (Mergel 2013a) and responsiveness (Bekkers et al. 2013). The degree to which public value is realized varies across organizations and is influenced by internal and external factors faced by governments (Bertot et al. 2010a; Bertot et al. 2012b; Kavanaugh et al. 2012; Bekkers et al. 2013; Zheng 2013). Internal factors include leadership, policy, privacy and data security, culture, and governance (Bertot et al. 2012b; Kavanaugh et al. 2012; Lee & Kwak 2012;
Chatfield & Brajawidagda 2013a; Zheng 2013), while external factors include public participation level (Meijer & Thaens 2013; Mergel 2013a; Mossberger et al. 2013).

While empirical studies have shown the public value that can be created through the use of social media, the literature still lacks conceptual frameworks for explaining public value created from social media use by governments (Warren et al. 2014; Park et al. 2015). Existing studies on public value creation neglect external organizational factors, which are crucial in public value creation, and these studies have therefore failed to provide a comprehensive framework for understanding how organizations benefits from their social media use (Warren et al. 2014; Park et al. 2015). Similarly, studies in information systems (IS) literature provide only a few frameworks for analyzing value creation through social media networks, and they incorporate only internal organizational factors (Miller & Tucker 2013; Trainor et al. 2014).

In light of this gap in the literature, this study aims to investigate public value creation through social media networks by governments. This study incorporates both internal and external organizational factors in the value creation process. An extensive literature review was undertaken to identify various public values created through social media networks and the internal/external factors influencing public value creation by governments. Indonesian disaster management is selected as the context of this study for two main reasons: 1) Indonesia has one of the largest populations of social media users (Semiocast 2012) and 2) prior research on government use of social media has shown evidence of public value creation by Indonesia disaster management agencies (Chatfield & Brajawidagda 2013a; Chatfield & Brajawidagda 2013b; Chatfield et al. 2013). A research model was developed based on the Integrative Model of IT Business Value (Melville et al. 2004).

1.2 Research question and aims of the study

To fill the gap in the literature, the central research question of this study is formulated as follows:

How does the government create public value through social media use?
To answer the research question, the primary aim of this sequential exploratory study is to investigate public value creation through social media networks by governments by incorporating both internal and external organizational factors in the public value creation process. Specifically, this study aims to:

1) investigate the internal and external organizational factors influencing the public value creation process
2) develop a new framework for explaining the public value creation process
3) develop the measurement model of the new framework
4) test the structural model of the new framework.

1.3 Research methodology

To answer the research question, this study employs a sequential exploratory mixed methods approach by undertaking case study research in the first phase and an online survey in the second phase. Sequential studies have two main advantages: 1) the first phase can influence the second phase, and 2) having two phases with differing approaches increases the richness of a study (Creswell 2003; Venkatesh et al. 2013).

The case study research in the first phase was undertaken at ten disaster management agencies in Indonesia. The case study research has two main sources of evidence: semi-structured interviews and Twitter data posted by the ten disaster management agencies. These two data sources are examined through within-case and cross-case analyses. The results of the case study are used to further develop survey instruments and to provide a perspective which complements the view provided by the results of the structural equation modeling (SEM) analysis of the online survey in the second phase of this study.

In the online survey in the second phase of this study the participants were social media team operators, managers, or people in other positions that were responsible for organizational social media. The online survey data was then examined using SEM analysis in order to test the relationships between the factors in the research model. The results of the SEM analysis are compared with the case study findings. Finally, the integrative view based on the qualitative and quantitative results, or meta-inference, is developed.
1.4 Research contributions and limitations

This study makes theoretical, methodological and practical contributions. Theoretically, this study contributes to the IS literature by developing and testing value creation through social media networks (Aral et al. 2013; Schryen 2013). Furthermore, the Integrative Model of IT Business Value (Melville et al. 2004), which was developed in the private-sector context, is tested and validated in the public-sector context, with the potential to extend its utility in the IS literature. Methodologically, this study enriches the literature by demonstrating cross-case analysis, SEM analysis on multi-dimensional model and integration of the results through meta-inferences (Venkatesh et al. 2013). Practically, the findings of this study provide feedback for Indonesian disaster management agencies on their social media use practices and value creation processes. Moreover, the findings may inform other government agencies about the enhanced use of social media in the creation of public value.

One limitation of this study is that was conducted in a developing country, which might affect the generalizability of the results. Another is that for the online survey, this study did not conduct a pilot survey to test the use of the newly developed instruments. As a result, some of the survey data suffer from kurtosis. The sample for the case study research was purposively selected and this might affect the replication results. Finally, this study relies on the perception of the respondent that might introduce bias.

1.5 Thesis structure

This thesis consists of nine chapters. Chapter One is an introductory chapter that presents the background of the study, the research question and aims, the research methodology, the contributions and limitations of the study, and the thesis outline. Chapter Two presents the context of this study, which is disaster management, and it provides an overview of disaster management agencies in Indonesia.

Chapter Three is the literature review chapter. It provides a comprehensive review of the literature on public value, social media and the salient factors influencing public value creation through social media use. Based on the literature review and the context of this study, Chapter Four presents the research model. The hypotheses
are also discussed in this chapter. In **Chapter Five**, the research methodology for this study is discussed. This includes the selection of the research methods, the research design, case study research, survey instrument development, the online survey and finally the interpretation of mixed method research findings.

**Chapter Six** presents the case study results. First, within-case analysis is conducted to introduce and explain all cases involved in this study. Second, cross-case analysis is undertaken to gain insight into the constructs employed. Finally, the development of the survey instrument is presented based on the themes in built from the cross-case analysis. As mentioned earlier, Twitter data (i.e. number of tweets per day, number of retweets, number of replies, time between first and last tweet, etc.), is used as part of the case study data beside the interviews. Therefore, while the title of Chapter 6 is “Analysis of Qualitative Data”, Twitter data is presented in Chapter 6 to maintain the integrity of the case study result. **Chapter Seven** presents the online survey results. This includes descriptive and SEM analysis. Discussion on SEM analysis, the implementation of the analysis, data preparation and the results of the SEM analysis are presented.

**Chapter Eight** discusses the case study findings and SEM analysis results. The research findings from the two different research methods are presented. Following that, a comparison of these two sets of results is undertaken to assess the agreements or disagreements between the findings. Based on that, research model is revised and a final integrative interpretation is build. Finally, **Chapter Nine** provides the concluding remarks, including the research contributions, limitations and future research directions.
CHAPTER 2. CONTEXT OF THE STUDY

This chapter explains the context of the study which is disaster management, and more specifically, Indonesian disaster management agencies. An overview of disasters is provided in Section 2.1. Following that, a comprehensive overview of disaster management is presented in Section 2.2. Communication, which is one of the important processes in disaster management, is discussed in Section 2.3. Finally, an overview of disaster management agencies in Indonesia is presented in Section 2.4.

2.1 Disaster

The term disaster is used to refer to different concepts: events that create danger (e.g. tornadoes, earthquakes, floods, nuclear leaks) and the impacts of such events (Alexander 1997). While there is no universally accepted definition (Alexander 1997; Shaluf et al. 2003), a disaster can be defined as a calamitous event, human-made or natural, that is large on scale, is difficult to predict, is relatively infrequent, has adverse effects, has unknown outcomes which disrupt the social and economic life, and for which the impact exceeds the ability of affected community to cope using its own resource (Donahue & Joyce 2001; UNISDR 2007; Ahmed 2011; IFRC 2014).

The term disaster has been used interchangeably with “crisis” and “emergency” (Shaluf et al. 2003; McEntire 2014). A crisis is a combination of “events and processes that carry severe threat, uncertainty, an unknown outcome and urgency” (Farazmand 2014, p.3). An emergency is “an unexpected event which places life and/or property in danger and requires an immediate response through the use of routine community resources and procedures” (Drabek 1996, p.6). McEntire (2014) attempted to distinguish between the terms crisis, emergency and disaster based on impact, number of injuries, number of deaths, damage level, disruption level, area of the impact, availability of the resources, number of responders and time taken to recover. He proposed that crises have less impact than emergencies or disasters, while emergencies have the same level of impact as disasters. Though the distinction between these terms might be helpful to indicate the scale of the impact, they are in
fact exchangeable and the use of the terms largely depends on the context (Alexander 1997; Shaluf et al. 2003).

In general, disasters are classified based on their causes (Carter 1991; Eshghi & Larson 2008; McEntire 2014). A disaster can be classified as natural or human-made/technological (Eshghi & Larson 2008; Jha & Duyne 2010). Natural hazards can further be classified as geophysical (earthquakes, landslides, tsunamis and volcanic eruptions), hydrological (extreme temperatures, drought, wildfires, heat wave), climatological (cyclones, tornado, storms) or biological (disease epidemics, animal plagues) (UNISDR 2004). Human-made/technological disasters include displacement of populations (due to conflicts, wars), industrial disasters (e.g. refinery explosions, nuclear power plant leaks) and transport disasters (air crash, ship crash).

In evaluating the risks of a disaster, two factors are usually involved: hazards and vulnerability (UNISDR 2004; Wisner et al. 2014). Hazards are events, activities or phenomena that might cause the loss of human life and create both social and economic disruption (UNISDR 2004). The characteristics, intensity and frequency of a hazard determine its severity. Vulnerability refers to “the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard” (Wisner et al. 2014, p.11). The level of risk posed by a disaster depends on the combined effect of the hazard and the vulnerability of the affected area.

While most disasters cannot be prevented, technology, including information technology, can be used to reduce disaster risks (Reddick 2011b; McEntire 2014). Technology increases the ability of communities and governments to understand the characteristics and behavior of hazards through studies of previous disasters. In addition, technology can be used to anticipate future hazards through continuous monitoring. Prior studies have shown the important roles played by information technology to identify and monitor hazards including through remote sensing, field surveys, measurements, mapping and simulation (Alexander 1991; Reddick 2011b). Recent studies have shown that social media allows individual to act as human sensors in recognizing, reporting and monitoring hazards through crowdsourcing from the public (Goodchild & Glennon 2010; H. Gao et al. 2011; Chatfield & Brajawidagda 2014).
The level of vulnerability of an individual or a community is highly influenced by physical, social, economic and environmental factors (UNISDR 2004). Physical factors include population density, remoteness and infrastructure quality. Social factors include levels of literacy, education levels, social equity and traditional values. Economic factors mainly consist of economic measures including income, level of debt, access to credit and insurance. Environmental factors deal with ecological systems and exposure to hazards. Prior studies have shown the role of information technology in reducing vulnerability or identifying and reaching vulnerable groups during disasters (Quarantelli 1997; Chatfield et al. 2010; Reddick 2011b). These studies have used radio-frequency identification (RFID), field surveys, mapping and simulation (Quarantelli 1997; Chatfield et al. 2010; Reddick 2011b). Social media can be used to reduce vulnerability by gaining the attention of the responder through social media, or by providing information for other people in the vulnerable area (Adam et al. 2012; Chatfield & Brajawidagda 2014).

2.2 Disaster management

Disaster management or emergency management is an approach that deals with the complex requirements for coping with a disaster (Donahue & Joyce 2001; Henstra 2010). Prior studies have used the term disaster management interchangeably with emergency management (Donahue & Joyce 2001; Comfort 2007; Haddow et al. 2007). The concept of emergency management was introduced by the National Governor’s Association in 1979. Donahue and Joyce (2001) define emergency management as “a complex policy subsystem that involves an intergovernmental, multiphased effort to mitigate, prepare for, respond to, and recover from disasters” (p.728).

The overarching goal of disaster management is to lessen the impact of a disaster on a community. Disaster management is developed in order to systematically identify policies and activities that are necessary before, during or after disasters strike. Disaster management has been viewed as referring to efforts to increase the capability of government to deal with various types of emergency and disaster situations that involve many agencies from different levels and jurisdictions (Waugh & Straib 2006).
Disaster management puts the event which creates the disaster as the focal point in identifying the actions required. This is because, as summarized by Donahue and Joyce (2001), disasters are large, uncertain, dynamic and infrequent. In terms of scale, the response to a disaster requires more capacity than the affected community has. Disasters develop quickly and are hard to avoid. It is also hard to predict the occurrence of disaster. Furthermore, the same hazards can have different impacts and levels of severity. Finally, disasters are rare to the affected community.

Disaster management classifies the complex interagency management of disasters into four phases: mitigation, preparedness, response and recovery. Mitigation consists of activities to eliminate or reduce the probability or impact of a disaster (Henstra 2010). Similar to the disaster risk reduction concept, this phase includes activities related to the hazards and the community affected by the hazards. The activities related to the hazards include hazard identification and efforts to modify the source of the hazard. The activities related to the community focus on reducing the community’s vulnerability to the hazard. These activities include land use planning, building codes, educating the community and providing insurance for the community (McLoughlin 1985; Donahue & Joyce 2001).

The preparedness phase consists of activities that enhance the readiness of organizations and communities to respond when a disaster occurs (Donahue & Joyce 2001; Altay & Green III 2006). Activities in the preparedness phase include hazard analysis, hazard status monitoring, projection of the exposure, training responders, increasing the response capability and advancing the development of early warning systems (McLoughlin 1985; Donahue & Joyce 2001).

The next phase, response, consists of immediate actions following to a disaster. These include resource allocation, employment of emergency procedures, providing assistance for the victims (Donahue & Joyce 2001; Altay & Green III 2006), collaboration with the public and inter-organizational response coordination (McLoughlin 1985; Donahue & Joyce 2001; Morris et al. 2007; Bharosa et al. 2010; Nolte et al. 2012). This phase aims to reduce or eliminate the secondary impacts of a disaster, and it can include patrolling for looting, and dealing with contaminated water supplies.
The last phase, recovery, is when the disaster has passed. It consists of activities to bring community life back to normal (Donahue & Joyce 2001; Altay & Green III 2006). Activities in this phase include efforts to restore public facilities, re-establishing public services, repairing social cohesion, re-establishing economic activities, rebuilding infrastructure (both public and private), and rehabilitating the psychological condition of victims.

2.3 Disaster communication

Prior studies have recognized the important role of communication in disaster management (Kapucu 2006; Manoj & Baker 2007; Marincioni 2007; Nowell & Steelman 2013). Communication in disaster is closely related to crisis communication which has been extensively studied in the public relations and organizational communication literature (Benoit 1997; Reynolds & Seeger 2005; Seeger 2006). Fearn-Banks (2010) defined crisis communication as “the dialog between the organization and its public prior to, during, and after the negative occurrence” (p.7). Studies on crisis communication focus primarily on how to maintain an organization’s image after a crisis situation (Benoit 1997; Reynolds & Seeger 2005; Seeger 2006). Effective crisis management includes communications that deal with the crisis, and communications that enhance the organization’s reputation (Reynolds & Seeger 2005; Goggins et al. 2012).

In disaster management, communication is a salient factor during the mitigation, preparedness, response, and recovery phases. Successful communication in the mitigation and preparedness phase contributes to actions that reduce the risks and enhance government capability and community capacity for dealing with future disasters. Similarly, communicating policies, goals and action plans to all stakeholders might increase the support for an organization and might lead to more efficient disaster response. In the response and recovery phase, the establishment of timely, accurate and reliable communication leads to good coordination in disaster response and recovery.

Communication is essential in disaster management because disasters always involve the public and multiple organizations with different roles and resources. Disaster management agencies often (if not always) come from different jurisdictions and
government levels, and they also include non-profit organizations (Paton & Jackson 2002; Kapucu 2006; Simo & Bies 2007; Waugh 2007; Nolte et al. 2012). Communication establishes the overall disaster management performance by enhancing fast and accurate decision-making based on the information provided by the organizations involved (Kapucu 2006). Poor communication often results in poor collaboration between organizations. In turn, this results in poor disaster management performance.

In disaster management, organizations not only receive information, but also collect and distribute the information to the public and to other organizations. The audiences for information during disaster situations include the general public, disaster victims, the business community, the media, elected officials, first responders and volunteer groups (Haddow et al. 2007). Communication, therefore, is the process of internal or external message exchange through various channels for these various audiences (Kapucu 2006). Seamless information sharing definitely enhances collaboration between these organizations and with the public.

Previous studies have indicated that social media contributes to dealing with technological and organizational challenges during disaster situations (Kapucu 2006; Garnett & Kouzmin 2007; Manoj & Baker 2007; Kapucu 2009; Bharosa et al. 2010; Yates & Paquette 2011; Kavanaugh et al. 2012; Chatfield et al. 2013; Chatfield et al. 2014). Technological challenges are often caused by communication infrastructure breakdowns which occur during disasters. While restoring communication infrastructure will take time, each organization involved in the disaster response usually has its own communication infrastructure. In many cases, interoperability among the different communication infrastructures becomes a major challenge. Chatfield et al. (2014) found that when Hurricane Sandy struck the east coast of the US in 2012, social media provided viable communication channels while the 911 and 311 phone numbers were overloaded. Similarly, in the 2013 Oklahoma Tornado, Chatfield and Brajawidagda (2014) found that the National Weather Services (NWS) introduced the hashtag #okwx to increase interoperability among the public, non-profit organizations (NPO) and governments in dealing with the disaster. Organizational challenge mainly relates to the hierarchical structure that creates time-consuming decision-making processes and increases information gaps between
organizations (Manoj & Baker 2007). In the 2010 Haiti Earthquake, social media eased the organizational challenges by eliminating the reliance on formal liaison structures (Yates & Paquette 2011).

2.4 Indonesian disaster management agencies

2.4.1 Overview of Indonesian disaster management

Indonesian disaster management has significantly changed since Law 24/2007 on Disaster Management was enacted in 2007 (Government of Indonesia 2007b). Law 24/2007 satisfies the requirements of the UN-agreed international strategy for disaster reduction, known as the Hyogo Framework for Action (HFA). Before the law was enacted, the national lead agency for disaster management was the National Disaster Management Coordination Agency (BakornasPB). A massive transformation process in Indonesian disaster management was undertaken after the 2004 Indian Ocean Earthquake and Tsunami. The transformation process included the evaluation on the role of BakornasPB as coordinator of emergency and disaster response agencies. One of the evaluation results was to increase the coordinating power of the BakornasPB for more effective disaster management.

The overarching purpose of Law 24/2007 is to provide a legal basis for the establishment of a comprehensive structure and governance for disaster management as a response to climate change and to support to sustainable development (Government of Indonesia 2007b). At the national level, Law 24/2007 clearly states the requirement for the establishment of the National Disaster Management Agency. At the local level, Law 24/2007 requires the local government, at both the provincial and the city/regency level, to establish the local disaster management agency. At the national, provincial and city/local levels, the responsibilities of the disaster management agencies include disaster risk reduction, integrating disaster risk and development, protecting the community from the impact of disasters, dealing with displaced community, disaster recovery and budget allocation for disaster management.
2.4.2 The national, provincial and city/regency disaster management agencies (BNPB and BPBD)

Based on Law 24/2007, two follow-up regulations were enacted at the national level. The first regulation was Government Regulation 21/2008 on the Implementation of Disaster Management (Government of Indonesia 2008a). The second was Presidential Regulation 8/2008 on the National Disaster Management Agency (BNPB) (Government of Indonesia 2008b). The first provides guidance on the activities undertaken before, during and after disasters, while the latter deals with the official establishment of the BNPB. The establishment of local disaster management agencies at the province and city/regency levels was started in 2008.

At the national level, in comparison to the previous BakornasPB, the BNPB has more political and organizational power. Even though the head of BNPB is not a member of Ministerial Cabinet, the head of BNPB reports directly to the President and has more coordination power than the previous head of BakornasPB. Indonesian disaster management involves various organizations with different jurisdictions at all levels.

BNPB works in cooperation with other ministries and agencies as follows:

1. For search and rescue disaster victims, BNPB works with the national armed forces, the National Police and the National Search and Rescue (Basarnas).
2. To help displaced people, BNPB works with the Ministry of Social Affairs (Kemensos).
3. To map hazardous areas, BNPB works with the Geospatial Information Agency (BIG).
4. To develop early warning systems,
   a. BNPB works with the Ministry of Energy and Mineral Resources (KESDM) and the Meteorological, Climatological and Geophysical Agency of Indonesia (BMKG) for geological hazards.
   b. BNPB works with the Ministry of Public Works (PU), the Ministry of Agriculture (Kementan), the Ministry of Environment and Forestry (KLHK), the National Institute of Aeronautics and Space (LAPAN), and BMKG for hydro-meteorological hazards.
5. To prevent disaster related to environmental degradation, BNPB works with the KLHK.
6. To prevent biological disasters, BNPB works with Ministry of Health and Ministry of Agriculture.

Short descriptions on the ministries/agencies mentioned above are presented in the next sections.

As of 15 July 2015, there were 34 province-level disaster management agencies (BNPB 2014b). Thus, all provinces have established local disaster management agencies. Of the 510 regencies/cities in Indonesia, only 226 have established their disaster management agencies (or 44%) (BNPB 2014a). At the national, provincial or city/regency level, BNPB or BPBD always acts as the coordinating agency for other agencies.

2.4.3 The National Armed Forces (TNI)

According to Law 34/2004 on the National Armed Forces (Government of Indonesia 2007c), the TNI has two roles during disaster situations. The first is to assist in the disaster response, including dealing with displaced people and distributing aid. Second, the TNI is actively involved in search and rescue operations. Prior research has indicated the significant role of the TNI in search and rescue operations during the QZ8501 air crash (Brajawidagda et al. 2015). The TNI consists of the Indonesian Army, Indonesian Air Force and Indonesian Navy. These three forces have sub-organizational units including territorial commands, airbases and navy bases throughout Indonesia that provide infrastructure and resources that can be quickly utilized in the disaster preparedness, response and recovery. Some of these sub-units were found to actively use social media for disaster management activities.

2.4.4 The National Police (Polri)

According to the Head of the National Police Regulation 17/2009 on Disaster Management (Government of Indonesia 2009a), Polri has crucial roles before, during and after disasters. These include communicating disaster warnings, search and rescue, evacuation of victims, public kitchens, distributing aid, and maintaining security during all disaster phases. It is also clearly stated that the police should coordinate with the BNPB and BPBD. Similar to TNI, Polri has its province- and city/regency-level offices that are ready to support disaster preparedness, responses
or recovery. As of 15 July 2014, there are 32 province-level and 400 city/regency level police offices (Polri 2014). Some of the province/city/regency level police offices were found to have an active social media use for disaster management activities.

2.4.5 The National Search and Rescue (Basarnas)
In disaster management, Basarnas has the main responsibility for search and rescue operations in ship/air incidents and provides assistance for search and rescue operations in other disasters, including natural disasters. Based on Law 99/2007 on the National Search and Rescue Agency, the head of the agency is directly responsible to the President. As of 15 July 2014, Basarnas has 34 SAR regional offices and 60 SAR stations (Wikipedia 2014). Some of these regional offices/SAR stations were found to be active in social media use for disaster management activities.

2.4.6 The Ministry of Social Affairs (Kemensos)
This ministry has responsibility for dealing with people affected by natural disasters or social conflicts. In particular, this ministry is responsible for the affected people’s basic needs and psycho-social services (Government of Indonesia 2015a). This ministry has counterparts (e.g. Department of Social Affairs or another organization) in almost all provinces and regencies/cities in Indonesia. This ministry also organizes volunteers from Youth Disaster Preparedness (Taruna Siaga Bencana/Tagana) throughout Indonesia. Some of the province/city/regency level offices of this ministry were found to be active in social media use for disaster management activities.

2.4.7 The Geospatial Information Agency (BIG)
Previously, this agency was called the National Mapping Agency (Bakosurtanal). According to Government Regulation 9/2004 on Geospatial Information (Government of Indonesia 2014b), this agency is responsible for providing disaster area maps. In disaster situations, this agency provides updated maps for the area affected by the disaster.
2.4.8 The Ministry of Energy and Mineral Resources (KESDM)

This ministry is responsible for geological hazards (Government of Indonesia 2015c). One of the departments in this ministry, the Centre of Volcanology and Geological Hazards Mitigation (PVMBG), is responsible for geological hazard mitigation. Specifically, the PVMBG has a special unit, the Centre for Investigation and Technology Development of Geological Disasters (BPPTKG), that is responsible for monitoring the status of active volcanoes and provides early warnings for volcanic eruptions. The PVMBG and BPPTKG were found to be active in social media use for disaster management activities.

2.4.9 The Ministry of Public Works (PU)

The Ministry of Public Works has responsibilities in hydro meteorology-related disasters and provides assistance during the response and recovery phases (Government of Indonesia 2013). This ministry is responsible for the river basin territories. The ministry also has resources for bringing infrastructure back to normal that is important for disaster response and recovery. This ministry has counterparts (e.g. Department of Public Works or other organizations) in almost all provinces and regencies/cities in Indonesia. Some of the province/city/regency level offices of this ministry were found to be very active in social media use for disaster management activities.

2.4.10 The Ministry of Agriculture (Kementan)

In disaster management, there are two roles for the Ministry of Agriculture. First, this ministry is responsible for dealing with fires in plantation areas (Government of Indonesia 2014a). Second, this ministry has to deal with droughts (Government of Indonesia 2007a). This ministry has its counterparts (e.g. Department of Agriculture or other organizations) in almost all provinces and regencies/cities in Indonesia.

2.4.11 The Ministry of Environment and Forestry (KLHK)

Previously, this ministry consisted of two ministries: the Ministry of Environment and the Ministry of Forestry. Both ministries were involved in disaster management. This new ministry is responsible for protected forests, mitigating climate change and dealing with hazardous waste (Government of Indonesia 2004; Government of
Indonesia 2009b). This ministry has counterparts (e.g. Department of Forestry or other organizations) in almost all provinces and regencies/cities in Indonesia.

2.4.12 The National Institute of Aeronautics and Space (LAPAN)

According to Law 21/2013 on Outer Space, this agency is responsible for providing early warnings about the hazards caused by outer space weather. In addition, this agency has a mandate to mitigate and respond to disasters related to debris from outer space (Government of Indonesia 2015b).

2.4.13 The Meteorological, Climatological and Geophysical Agency of Indonesia (BMKG)

BMKG is responsible for early warnings about hydro-meteorological and geological hazards, including earthquakes, tsunamis, high seas, cyclones and other severe weather events. As of 15 July 2014, BMKG has five regional centers with 175 meteorological, geophysical or climatological stations throughout Indonesia. In addition, the central office of BMKG runs the nation’s tsunami warning facilities, namely InaTEWS (Indonesia Tsunami Early Warning Systems). Some of the stations were found to be very active in social media use for disaster management activities.
CHAPTER 3. LITERATURE REVIEW

This chapter reviews the literature on public value creation through social media and the internal/external organizational factors influencing public value creation processes. Therefore an overview of public value is presented in the Section 3.1, followed by social media use in governments in Section 3.2. After identifying the gap in the literature, the existing frameworks for analyzing value creation are discussed in Section 3.3. Finally, the salient factors that influence public value creation are discussed in Section 3.4.

3.1 Overview of public value

3.1.1 Definitions of public value

The term of public value was coined by Moore (1995) in the early to mid-1990s and was taught in the Kennedy School of Government at Harvard University. Since then, public value has been widely accepted by public policy makers in the UK, Europe, Australia, New Zealand and some other developed countries over the past decade (Kelly et al. 2002; Try & Radnor 2007). Studies have often used the terms public value, public values and public interest interchangeably (Bozeman 2002; Jørgensen & Bozeman 2007; O’Flynn 2007). Even though the concept of public value has been discussed for the past 20 years, there is no generally accepted definition (Benington 2009; Alford 2011; Rutgers 2015).

As presented in Table 2.1, there have been various definitions of public value. Most of the relevant studies view public value as the value created by government for its various stakeholders through various activities (Kelly et al. 2002; Harrison et al. 2012; Nabatchi 2012). Other studies highlight the important role of the collective view of the public (Alford & Hughes 2008; Benington 2009; Talbot 2011) and the crucial role the public plays in public value creation (Bozeman 2007; Meynhardt 2009).

As shown in Table 3.1, Kelly et al. (2002) offered an outcome-oriented definition when they defined public value as “the value created by government through
services, laws regulation and other actions” (p.4). More recently, however, Nabatchi (2012) and Talbot (2012) have taken a more citizen-centric perspective of government, which is given a mandate and power by the citizens, and has obligations to create public value. This implies that public value creation is the overall performance of the governments (Alford & O'Flynn 2009).

Table 3.1 Definitions of public value

<table>
<thead>
<tr>
<th>Definition (Public value is…)</th>
<th>Reference</th>
</tr>
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<tbody>
<tr>
<td>The value created by government through services, laws regulation and other action</td>
<td>Kelly (2002, p.4)</td>
</tr>
<tr>
<td>1) The rights, benefits, and prerogatives to which citizens should (and should not) be entitled 2) The obligations of citizens to society, the state and one another 3) The principles on which governments and policies should be based</td>
<td>Bozeman (2007, p.13)</td>
</tr>
<tr>
<td>“Consumed” collectively by the citizenry rather than individually by clients</td>
<td>Alford and Hughes (2008, p.131)</td>
</tr>
<tr>
<td>About the values held about the relationship between an individual and societal entity (constructs like group, community, state, nation) that characterize the quality of this relationship</td>
<td>Meynhardt (2009, p.206)</td>
</tr>
<tr>
<td>1) What the public values 2) What adds value to the public sphere</td>
<td>Benington (2009, p.233)</td>
</tr>
<tr>
<td>The combined view of the public about what they regard as valuable</td>
<td>Talbot (2011, p.27)</td>
</tr>
<tr>
<td>Is the appraisal of what is created by government on behalf of the public</td>
<td>Nabatchi (2012, p.699)</td>
</tr>
<tr>
<td>The product of governmentally-produced benefits, produced when market mechanisms are unable to guarantee their equitable distribution</td>
<td>Harrison et al. (2012, p.90)</td>
</tr>
</tbody>
</table>

Other studies highlight the important role of the public in the public value creation process. Alford (2008) provided a simple definition of public value as the value that is “consumed collectively by the citizenry rather than individually by clients” (p.131). He further discussed the important roles of the citizens in value co-production in the public value creation process. Talbot (2011) defined public value as “the combined view of the public about what they regard as valuable” (p.28). This suggests that the public have the right to define the public value created by governments. Similarly, other definitions offered by Bozeman (2007), Meynhardt (2009) and Benington (2009) hold that the public have the right to collectively
determine public value based on their preference and to be involved in the public value creation process.

3.1.2 Value created by government

This study holds the view that public value is the overall value created by the government for the public through various actions that the public are involved in the value creation process (Kelly et al. 2002; Harrison et al. 2012; Nabatchi 2012). Thus, this study recognizes public value as a performance measurement framework to broadly evaluate government performance (Kelly et al. 2002; Alford & O’Flynn 2009). This study also recognizes the important role of public involvement in defining the public value created by government (Bozeman 2007; Alford & Hughes 2008; Benington 2009; Meynhardt 2009; Talbot 2011). Governments have to consider the public’s views when defining public value because public value is created “not just through ‘outcomes’ but also through processes which may generate trust or fairness” (O’Flynn 2007, p.358).

As suggested by previous studies, the ultimate goal of government is to create public value for various stakeholders (Moore 1995; Bozeman 2007). Public value includes both economic value and social value (Moore 2000; Bozeman 2007; Alford & Hughes 2008; Benington 2009). Economic value mainly concerns business-related organizational performance measures including efficiency, reliability, customer satisfaction and many other economic measures (Barzelay 2001; Diefenbach 2009). In contrast, social value focuses on the fulfilment of the missions of the government such as establishing fairness, safety, equity, social justice and other values that are difficult to assess with economic measures (Moore 1995; Moore 2000). In the public value literature, social value is labelled as public value (Benington 2009; Alford 2011).

The economic value created by governments has been discussed and labelled as the New Public Management (NPM) (Hood 1991; Pollitt & Bouckaert 2001; Aucoin 2002). NPM marked a shift in public service delivery, from a bureaucratic approach to a managerial approach (Hood 1991; Hughes 2003). The managerial approach, characterized by downsizing, decentralization and disaggregation, aims to enhance
the effectiveness and efficiency of public service delivery by adopting approaches from the private sector (Hood 1991; Ferlie 1996; Kaboolian 1998; Box 1999).

NPM is also associated with a market-oriented approach that is based on the efficacy of market mechanisms in delivering public services (Hood 1991; Kaboolian 1998). In this approach, public service delivery is viewed as a customer-seller type of relationship (Lane 1999). Citizens are viewed as customers and their satisfaction is achieved through responding to their preferences (Box 1999; Diefenbach 2009). This approach also assumes that the improvement of public service delivery can be achieved through privatization, contracting out and the development of internal markets (Christensen & Lægreid 2001; Ferlie & Steane 2002). Similar to the managerial approach, a market oriented approach is also adopted from the private sector. Having these two approaches, governments define and realize economic value through improvement to the quality of public service delivery according to effectiveness, efficiency, reliability and many other business-related performance measures (Barzelay 2001; Diefenbach 2009).

Governmental organizations need to involve the public in defining and creating social outcomes (Benington 2009). This is not only because these values cannot be simply considered as the summation of individual preferences, but also because the process of the value creation should increase trust in government and improve fairness (Kelly et al. 2002; O’Flynn 2007, p.358). The value creation process can be in the form of direct or indirect participation to enable the public to decide together what they value as a collective (Alford 2002; O’Flynn 2007). By involving the public, government defines what the society values in terms of fairness, safety, justice, wellbeing and many other social values (Moore 2000; O’Flynn 2007).

3.1.3 Measuring public value

This study views public value as the total benefits created by government, including economic value and social value. Prior studies have never proposed or tested public value based on these two values at the organizational level (Jetzek et al. 2013). Prior studies on public value at the organizational level have proposed and empirically tested public value in various contexts (Hood 1991; Van Wart 1998; Kernaghan 2003; Jørgensen & Bozeman 2007). The development of measures of public value
were based on administrative values (Hood 1991; Kernaghan 2003; Van Der Wal & Huberts 2008; Bannister & Connolly 2014), the relationship between government and stakeholders (Jørgensen & Bozeman 2007), modes of governance (Andersen et al. 2013), managerial commitment (Berman & West 2012) and the strategic triangle of public value developed by Kelly et al. (2002) (Grimsley & Meehan 2007; Seltsikas & O'Keefe 2010; Harrison et al. 2012; Karunasena & Deng 2012; Omar et al. 2013). Other studies at the national level have measured public value according to economic values and social values of open data (Jetzek et al. 2013). While this thesis observes public value creation at the organizational level, and hence, the measurements of economic value and social value developed by Jetzek et al. (2013) are not applicable.

This study identified the twelve most-cited values in prior research as shown in Table 3.2. There are many more values that were only mentioned by one or two studies such as security, loyalty, and honesty that are not shown in the table. Table 3.2 indicates that studies on public value in the e-government context failed to identify some of the prominent values highlighted by other studies. For example, innovativeness, effectiveness and reliability were found in all prior studies except those in the e-government context (Kernaghan 2003; Van Der Wal & Huberts 2008; Berman & West 2012). Similarly, some of social values such as fairness and legality have never been empirically tested in the e-government context (Kernaghan 2003; Berman & West 2012; Andersen et al. 2013). In contrast, trust in government and services are only found in the e-government context (Grimsley & Meehan 2007; Harrison et al. 2012; Omar et al. 2013; Bannister & Connolly 2014; Scott et al. 2016). This gap suggests the need for more comprehensive measures in order to assess public value.
Table 3.2 Most often cited public values in the existing typologies

<table>
<thead>
<tr>
<th>Public value</th>
<th>Economic value</th>
<th>Social value</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency</td>
<td>√</td>
<td>√</td>
<td>Hood (1991)</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>√</td>
<td>√</td>
<td>Kernaghan (2003)</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>√</td>
<td>√</td>
<td>Jørgensen and Bozeman (2007)</td>
</tr>
<tr>
<td>Innovativeness</td>
<td>√</td>
<td>√</td>
<td>Van Der Wal and Huberts (2008)</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>√</td>
<td>√</td>
<td>Berman and West (2012)</td>
</tr>
<tr>
<td>Reliability</td>
<td>√</td>
<td>√</td>
<td>Andersen et al. (2013)</td>
</tr>
<tr>
<td>Accountability</td>
<td>√</td>
<td>√</td>
<td>Grimsley and Meehan (2007)</td>
</tr>
<tr>
<td>Openness</td>
<td>√</td>
<td>√</td>
<td>Seltsikas and O’Keefe (2010)</td>
</tr>
<tr>
<td>Fairness</td>
<td>√</td>
<td>√</td>
<td>Harrison et al. (2012)</td>
</tr>
<tr>
<td>Legality</td>
<td>√</td>
<td>√</td>
<td>Karunasena and Deng (2012)</td>
</tr>
<tr>
<td>Trust in government</td>
<td>√</td>
<td>√</td>
<td>Omar et al. (2013)</td>
</tr>
<tr>
<td>Service</td>
<td>√</td>
<td>√</td>
<td>Bannister and Connolly (2014)</td>
</tr>
</tbody>
</table>

As shown in Table 3.2, these twelve values are classified as economic and social values. Some values have only been proposed as concepts while others have been empirically tested in an e-government context. The classification of the twelve values in Table 3.2 is based on the previous literature and subjective judgments according to...
the interpretation of the author. In Table 3.2, economic value consists of efficiency, effectiveness, responsiveness, innovativeness, citizens’ satisfaction and reliability. Prior studies in the e-government literature have indicated that all these values are associated with the reduced cost of the public services gained from the implementation of IT in governments and therefore can be classified as economic value (Grimsley & Meehan 2007; Harrison et al. 2012; Omar et al. 2013; Bannister & Connolly 2014; Scott et al. 2016). Meanwhile, social value consists of accountability, openness, fairness, trust in government, legality and service. In the disaster management context, Safety is the Service provided by government. All these values are intangible outcomes that are closely related to the well-being of the community or hard to be measured with economic currency. Therefore, these values are classified as social value.

3.2 Social media use in government

3.2.1 The definitions of social media

The 2009 US Open Government Directive and similar public policies in other countries have accelerated social media use in governments (Bertot et al. 2012a; Bonsón et al. 2012; Linders 2012). Using social media is considered to be an effective way for government to engage and collaborate with the public (Bonsón et al. 2012; McNutt 2014; Warren et al. 2014; Zheng & Zheng 2014; Bonsón et al. 2015; Lev-On & Steinfeld 2015; Zavattaro et al. 2015). The various forms of public engagement and collaboration are crucially important for defining and creating public value (Moore 2000; O’Flynn 2007).

Despite significant interest in social media use, however, there has not been a commonly accepted definition of social media in the literature (Magro 2012). This study follows the definition provided by Criado et al. (2013). They defined social media as “a group of technologies that allow public agencies to foster engagement with citizens and other organizations using the philosophy of Web 2.0” (p.320). This definition is aligned with this study because it not only provides a context, but also highlights the main function of the technology, which is to engage citizens and other agencies. This also indicates the recognition of the public’s role in public value creation. By underscoring the organizational context, the definition of Criado et al.
(2013) encompasses various social media platforms including blogs (e.g. Wordpress, Blogspot), microblog (e.g. Twitter, Tumblr), social networking sites (e.g. Facebook, Google+), discussion forums (e.g. Reddit), and media sharing (e.g. YouTube, Instagram, Flickr). At the same time, this definition excludes social gaming sites (e.g. zynga) and virtual game worlds (e.g. Microsoft’s X-Box, Sony’s Playstation) that focus on personal and individual use (Kaplan & Haenlein 2010).

Other definitions of social media are provided in Table 3.3. So far, the most cited social media definition has been provided by Kaplan and Haenlein (2010). They defined social media as “a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content (UGC)” (p.61). Two ideological foundations of this definition are Web 2.0 technology and UGC. Similarly, Kietzmann et al. (2011) defined social media as “mobile and web-based technologies to create highly interactive platforms via which individuals and communities share, co-create, discuss, and modify user-generated content” (p.241). Web 2.0 ideology encourages software developers to provide architecture for internet users which enables value creation through more participatory involvement in content creation (O’Reilly 2005). Participative platforms such as those provided by Web 2.0 are essential to provide a publication context for content that is produced by end users (UGC) which leads to both economic and social impacts (OECD 2007). These two definitions refer to the use of social media for personal use and do not reflect the context of the study.

Table 3.3 Various definitions of social media

<table>
<thead>
<tr>
<th>Definition (Social media is...)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>A group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content (UGC)</td>
<td>Kaplan and Haenlein (2010, p.61)</td>
</tr>
<tr>
<td>Mobile and web-based technologies to create highly interactive platforms via which individuals and communities share, co-create, discuss, and modify user-generated content</td>
<td>Kietzmann et al. (2011, p.241)</td>
</tr>
<tr>
<td>Internet-based applications that enable people to communicate and share resources and information</td>
<td>Lindsay (2011, p.1)</td>
</tr>
<tr>
<td>Internet-based applications that enable people to communicate and share resources, e.g. Facebook, Twitter, YouTube, blogs, chat rooms</td>
<td>Taylor et al. (2012, p.20)</td>
</tr>
</tbody>
</table>
A broad term of variety of web-based platforms and services that allow users to develop public or semi-public profiles and/or content, and to connect with other users’ profiles and/or content  

Houston et al. (2015, p.3)

A set of online tools that are designed for and centered around social interaction  

Bertot, Jaeger and Grimes (2012b, p.1)

A set of tools and systems that allow an organization to achieve these social capabilities (SLATE-Search, Linking, Authoring, Tagging and Extension and Signals for employee to utilize and exchange resources), hence Social Enterprises.  

Chun et al. (2012, p.441)

A group of technologies that allow public agencies to foster engagement with citizens and other organizations using the philosophy of Web 2.0.  

Criado, Sandoval and Gil-Garcia (2013, p.320)

Lindsay (2011) defined social media as “internet-based applications that enable people to communicate and share resources and information” (p.1). This definition was then slightly modified by Taylor et al. (2012) to become “internet-based applications that enable people to communicate and share resources, e.g. Facebook, Twitter, YouTube, blogs, chat rooms” (p.20). Similarly, Houston et al. (2015) defined social media as “a broad term of variety of web-based platforms and services that allow users to develop public or semi-public profiles and/or content, and to connect with other users’ profiles and/or content” (p.3). These two definitions are too broad and refer to the application of social media for personal use too.

In e-government literature, Bertot et al. (2012b) provided a generic definition of social media. They focused on the capability of social media to enable social interaction among its users, as they view social media as a “set of online tools that are designed for and centered around social interaction” (p.1). Chun and Reyes (2012) provided a definition of social media from a government point of view based on the six components of social capabilities (McAfee 2006). In their definition they described social media as “a set of tools and systems that allow an organization to achieve these social capabilities (SLATE-Search, Linking, Authoring, Tagging and Extension and Signals for employee to utilize and exchange resources), hence Social Enterprises” (p.441). This definition provides a context, but neglects the core concept of social media in government that highlights the role of the public.

3.2.2 Social media use by governments

The open government and similar initiatives have triggered a massive adoption and use of social media by government across the world (Bertot et al. 2010a; Bonsón et
al. 2012). Governments at the local, state and national levels have employed social media for different purposes including: to increase transparency, to engage citizens and to promote collaboration (Bonsón et al. 2012; Chatfield & Brajawidagda 2013a; Mossberger et al. 2013; Oliveira & Welch 2013; Snead 2013; Bonsón et al. 2015; Lev-On & Steinfeld 2015; Sivarajah et al. 2015).

Early studies on government social media use have mainly explored the potential benefits of social media in the government context (Bertot et al. 2010a; Bertot et al. 2010b; Lee & Kwak 2012; Picazo-Vela et al. 2012). The potential benefits that can be obtained when governments use social media include: responsiveness, efficiency, fairness, user convenience, openness, accountability, trust in government and democracy (Bertot et al. 2010a; Bertot et al. 2010b; Lee & Kwak 2012; Picazo-Vela et al. 2012).

More recent studies have identified the benefits obtained from social media use. This include economic values such as effectiveness (Abdelsalam et al. 2013), citizen satisfaction (Mergel 2013a) and responsiveness (Bekkers et al. 2013), and social values such as openness (Chatfield & Brajawidagda 2013a; Stamati et al. 2015) and trust in government (Warren et al. 2014; Park et al. 2015). In other words, social media is a strategic tool with which governmental organizations can create public value.

3.2.3 Social media use by disaster management agencies

Social media has been used by governments at the local, state and national levels (Bonsón et al. 2012; Chatfield & Brajawidagda 2013a; Mossberger et al. 2013; Oliveira & Welch 2013; Snead 2013; Bonsón et al. 2015; Lev-On & Steinfeld 2015; Sivarajah et al. 2015). Social media has been widely used by disaster management agencies to improve disaster management performance through collaboration with the public or with other agencies. The benefits of social media use by disaster management agencies are often linked to improved disaster management performance.

Among the first uses of social media by disaster management agencies in disaster situations occurred in the US during the 2009 Oklahoma Fire (Starbird et al. 2010).
The study reported that the Oklahoma Department of Emergency Management, Oklahoma City and the Oklahoma County Sheriff's Office were among the Twitter users that received the most retweets during the disaster. However, the study did not explore further the effects of this social media use on disaster management performance. Similarly, Kongthon et al. (2012) and Jung and Moro (2014) also mentioned government social media use during the 2011 Thailand Flood and the 2011 Great East Japan Tsunami, but did not further discuss how the use of social media affected disaster management performance.

The enhanced disaster management performance through the use of social media are found in the studies of social media during the 2010 Haiti Earthquake, the 2011 Queensland flood in Australia, the 2012 Sumatra Earthquake in Indonesia, the 2012 Hurricane Sandy in the US and the 2012 Oklahoma Tornado in the US (Yates & Paquette 2011; Chatfield & Brajawidagda 2012; Goggins et al. 2012; Chatfield et al. 2013; Chatfield & Brajawidagda 2014; Chatfield et al. 2014). These improvements in disaster management performance have included: faster collaboration between agencies, faster disaster responses, faster rumor clarifications, increased disaster awareness, disaster risk reduction and improved collaboration with the public (Yates & Paquette 2011; Chatfield & Brajawidagda 2012; Goggins et al. 2012; Chatfield et al. 2013; Chatfield & Brajawidagda 2014; Chatfield et al. 2014).

Among the first forms of social media used for collaboration between agencies was via internet forums during the 2010 Haiti Earthquake (Yates & Paquette 2011; Goggins et al. 2012). The studies of these forums provide evidence of fast collaboration between agencies and more rapid disaster responses (Yates & Paquette 2011; Goggins et al. 2012). Social media acts as collaborative workspace for knowledge sharing among the staff members and provides quick information on who, what, where and how to access the knowledge (Yates & Paquette 2011). In this way, staff members were able to make quicker decisions and they enhanced their disaster management performance by providing fast disaster response.

Ehnis and Bunker (2012) analyzed Facebook notes posted (2012) by the Queensland Police Service (QPS) during the 2011 Queensland flood in Australia. One of their important findings is that social media is an effective tool for clarifying false information or rumors. Facebook notes that contain clarifications of rumors always
get highest responses from the public through likes/comments. Three studies on co-production and crowdsourcing through social media show evidence of collaboration between disaster management agencies and the public (Chatfield et al. 2013; Chatfield & Brajawidagda 2014; Chatfield et al. 2014). Social media is also an effective tool for disaster management agencies to release information prior to disaster events to increase disaster awareness or reduce the impact of disasters (Chatfield & Brajawidagda 2014; Chatfield et al. 2014).

3.2.4 Challenges of social media use by governments

While the benefits of social media have been identified, studies have indicated different levels of social media use among governments (Abdelsalam et al. 2013; Meijer & Thaens 2013; Mergel 2013a; Mossberger et al. 2013; Bonsón et al. 2015). Various factors contribute to the different levels of social media use across organizations and can be categorized as internal and external organizational factors.

Internal organizational factors include policy, privacy and security, culture, and governance (Bertot et al. 2012b; Kavanaugh et al. 2012; Lee & Kwak 2012; Zheng 2013). Based on a case study involving social media directors from several disaster management agencies in Arlington, Kavanaugh et al. (2012) found that clear guidance for the daily use of social media is one of the internal organizational factors that influences the ability of an organization to gain value from social media. Similarly, the privacy and security of information is an important issue for the government (Bertot et al. 2012b; Kavanaugh et al. 2012). Not only that, governments have to change its culture to be more open to the public in order to gain benefits from their social media use (Bertot et al. 2010a).

As for external factors, prior studies have identified citizens’ participation through social media as a key factor for creating public value through social media (McNutt 2014; Warren et al. 2014; Zheng & Zheng 2014; Bonsón et al. 2015; Lev-On & Steinfeld 2015; Zavattaro et al. 2015). In view of the important role of public participation, government needs to develop strategies to increase public participation through social media (Meijer et al. 2012; Abdelsalam et al. 2013; Meijer & Thaens 2013; Mergel 2013a; Mossberger et al. 2013). Various metrics have been introduced to measure the public’s participation. They range from simple social media platform
statistics (Abdelsalam et al. 2013; Chatfield & Brajawidagda 2013a) to more comprehensive metrics that include popularity, commitment of the audience and total engagement scores (Bonsón & Ratkai 2013).

3.2.5 Public value of social media

Based on the public value identified in previous studies, this study proposed ten values to measure public value creation through the use of social media in the disaster management context. The ten values are derived from the twelve most cited public values in previous studies, as discussed in Section 3.1.3. Economic value criteria are: responsiveness, efficiency, effectiveness, satisfaction and reliability. The social value criteria are: trust in government, accountability, openness, fairness and safety. Safety is used to replace service in the social criteria because the main aim of any disaster management agency is to keep the public safe from disasters.

Trust in government

Trust in government is an important measure of public value (Kelly et al. 2002; Grimsley & Meehan 2007; Bannister & Connolly 2011b; Harrison et al. 2012). The degree of trust by the public of the government is a measure of the extent to which the government achieves its goals. Previous studies have found that successful IT implementation by government increase public trust in government (Welch et al. 2005; Tolbert & Mossberger 2006; Grimsley & Meehan 2007; Morgeson Iii et al. 2011; Kim & Lee 2012). The relationship between social media and trust in government has also been observed in recent studies (Warren et al. 2014; Park et al. 2015). Warren et al. (2014) found that engagement through social media influences the public’s propensity to trust organizations involves and leads to trust in government (Welch et al. 2005). Park et al. (2015) concluded that the direct involvement of a government’s leading officer increases the public’s trust in that agency.

Openness

Openness or transparency is one of the main values produced through e-government in democratic world (Bannister & Connolly 2014). The implementation of e-government aims to establish an information culture for governments that is
characterized by the openness of the government in relation to policy-making processes (Layne & Lee 2001; Welch et al. 2005; Tolbert & Mossberger 2006; Dawes & Helbig 2010). Openness describes the degree to which governments allow the public to observe the processes which take place inside governments (Bertot et al. 2010a; Chatfield & Brajawidagda 2013a). Social media use by government has been linked closely to the efforts of governments to provide greater transparency through information dissemination and dialogue (Bertot et al. 2012a; Bonsón et al. 2012; Katz & Halpern 2013; Snead 2013; Stamati et al. 2015). One of the plausible ways to establish government transparency is by disclosing information related to policy and decision-making processes through social media (Bertot et al. 2010a; Chatfield & Brajawidagda 2013a; Brajawidagda & Chatfield 2014).

Accountability

Accountability is a familiar notion in the government context and has been recognized as an important value in public administration (Kearns 1994; Kernaghan 2003; Berman & West 2012; Bannister & Connolly 2014). In general, accountability describes the degree to which a government takes responsibility on its actions. The relationship between accountability, transparency and participation as interdependent concepts in participatory government has been studied in recent e-government literature (Dawes 2010; Bannister & Connolly 2011a; Harrison & Sayogo 2014). Social media use by government has been linked closely to the effort of governments to provide greater accountability through information dissemination (Bertot et al. 2012a; Bonsón et al. 2012; Katz & Halpern 2013; Snead 2013; Stamati et al. 2015).

Fairness

Fairness is an important public value (Bruijn & Dicke 2006; Hui & Hayllar 2010) and describes the degree to which governments provide equal access to all members of the public. In e-government, accessibility is often linked to equity of access or to providing access to people with a disability and this increases the fairness of the organization’s public service delivery (McDonald et al. 2011; Yu & Parmanto 2011). In disaster situations, accessing government services could be a challenge since telecommunication facilities might not work properly. There is evidence that the use of social media by governments enables the public to access government services
and thus promotes government fairness by providing greater access for the people who would otherwise have limited access to information (Acar & Muraki 2011; Chatfield et al. 2014).

Safety

Public safety is an important element of public value (Hood 1991; Bruijn & Dicke 2006; Spano 2009; Harrison et al. 2012). It includes protecting the security of citizens, preventing citizens from exploitation and discrimination (Kernaghan 2003; Bannister & Connolly 2014). In a disaster context, the establishment of public safety is the main aim and the primary service of disaster management agencies (Donahue & Joyce 2001; McEntire et al. 2002). Thus, safety is an important value that should be realized through social media.

Responsiveness

Responsiveness is an important value in public services (Kernaghan 2003; Bannister & Connolly 2014) and describes the ability of government to provide services within a given time. E-government research has highlighted responsiveness to citizens’ inquiries as an important value (Karunasena & Deng 2012). It includes answering inquiries, delivering services and responding to feedback (Gauld et al. 2009; Bertot et al. 2012a). Bekkers et al. (2013) argue that social media monitoring is crucial to ensure responsiveness. Studies on the social media use of disaster management agencies during disaster situations has provided evidence that rapid government responses can be promoted through social media (Chatfield & Brajawidagda 2014; Chatfield et al. 2014).

Efficiency

Efficiency is an important value in both the information system and public administration literature (Kernaghan 2003; Melville et al. 2004; Karunasena & Deng 2012; Bannister & Connolly 2014). It measures the degree to which a resource is utilized for a certain output. Studies agree that the use of information technology contributes to minimizing the cost of collecting, distributing, and accessing government information (Roberts 2006; Tolbert & Mossberger 2006; Reddick 2011a; Ku & Leroy 2014). Though it is hard to measure overall efficiency (Kavanaugh et al.
2012), studies agree that social media provides more efficient ways of collecting, distributing, and accessing information, not only by and for government, but also by, for and among citizens (Bekkers et al. 2013; Chatfield et al. 2013).

**Effectiveness**

Effectiveness is one of the most important values in public service provision (Kernaghan 2003; Jørgensen & Bozeman 2007). Effectiveness is the degree to which a service achieves an intended outcome. Effectiveness is a crucial measure of economic value in information technology research (Melville et al. 2004; Schryen 2013). While it is hard to link social media use to overall government effectiveness, studies have acknowledged that social media provides effective information sharing, information reach and information collection (Sakaki et al. 2010; Chun & Luna Reyes 2012).

**Satisfaction**

Citizen satisfaction can be achieved by meeting citizens’ expectations. Previous e-government studies often linked the use of information technology to citizens’ satisfaction (Welch et al. 2005; Grimsley & Meehan 2007; Alawneh et al. 2013). Social media can be a strategic tool for governments to use to meet citizens’ expectations through higher engagement with citizens in determining the service level or obtaining feedback about public service delivery (Mergel 2013a).

**Reliability**

Reliability is an important value in public service provision (Kernaghan 2003; Jørgensen & Bozeman 2007). Reliability refers to the degree of dependability or availability of a service. Reliability describes the ability of an organization to provide a certain service level for a specified time. Previous studies suggest that social media offers reliability by acting as viable communication channel during disaster situations (Acar & Muraki 2011; Chatfield et al. 2014).
3.3 Framework for analyzing the value creation of social media

3.3.1 The absence of the framework – the missing link

Studies have shown that public value is created through social media (Bertot et al. 2010a; Bertot et al. 2012b; Chatfield et al. 2013; Stamati et al. 2015). However, little attention has been paid to the value creation mechanisms involved (Warren et al. 2014; Park et al. 2015). Existing studies on public value creation have failed to provide a comprehensive framework for explaining how social media creates value for governments. In the e-government literature, for example, Warren et al. (2014) proposed a model to analyze the influence of social media use on trust propensity that leads to the trust in government ($R^2=0.12$). The value of $R^2$ of 0.12 is suggesting that the model does not adequately explain the trust in government (Hair et al. 2014). Park et al. (2015) also observed how trust in government was developed through social media use. They concluded that the use of social media by the lead officer of a government mediates the relationship between the organization’s social media use and the public’s trust in government ($R^2$ was not reported). Similar to e-government literature, information systems (IS) literature provides only a few frameworks for analyzing value creation through social media networks (Trainor et al. 2014). In the context of customer relationships, Trainor et al. (2013) adopted the Integrative Model of IT Business Value (Melville et al. 2004) and developed their framework to analyze customer relationship performance ($R^2=0.15$).

There are two commonalities among the frameworks offered in e-government and IS literature. First, these frameworks did not consider any internal organizational factors that have been identified in previous studies, including policy (Bertot et al. 2012b; Kavanaugh et al. 2012; Bekkers et al. 2013), privacy and security (Bertot et al. 2012b; Kavanaugh et al. 2012), culture (Kavanaugh et al. 2012) and governance (Bertot et al. 2012b; Kavanaugh et al. 2012). Second, these frameworks did not incorporate the external organizational factors, mainly public participation, which is crucially important in the public value creation process (McNutt 2014; Warren et al. 2014; Zheng & Zheng 2014; Bonsón et al. 2015; Lev-On & Steinfeld 2015; Zavattaro et al. 2015). In the information systems literature, the study of value creation of information technology and other organizational resources is called IT business value.
3.3.2 IT business value

The study of value creation of information technology, or IT business value, has received considerable attention in the last two decades (Barua et al. 1995; Mata et al. 1995). Various frameworks, some of which have only been conceptual and some of which have been empirically tested, have been developed based on assorted approaches to explain value creation through information technology (Soh & Markus 1995; Kohli & Grover 2008; Schryen 2013). Some models have been based on individual use within organizational context (DeLone 1992; Seddon 1997; DeLone & McLean 2003) and others have been on organizational IT use (Soh & Markus 1995; Kohli & Grover 2008; Schryen 2013).

While most of the information systems literature has originated from a business environment, one might argue that the frameworks offered in the business context do not suit to the environment of the government. Like some prior studies (Hood 1991; Moore 2000), this study holds that the public and private organizations are similar in how they should achieve their organizational missions. A study of 382 managers from a variety of public and private sector organizations found commonalities of the core values held by managers in private and public organizations (Van Der Wal & Huberts 2008). Related to the context of this study, there are at least two reasons for extending the search for frameworks to the information systems literature. First, governments recognize the need to establish economic values such as efficiency, effectiveness and productivity. One of the aims of the use of social media by governments is to enhance economic value by increasing efficiency, effectiveness and productivity in communication and information sharing (Yates & Paquette 2011). Second, open government promoted through the use of social media increases citizens’ satisfaction by providing more public involvement in various government activities (Bertot et al. 2010b; Bertot et al. 2012b).

Among the available frameworks for explaining IT value creation are: the process theory proposed by Soh and Markus (1995), the benefits of IT investment framework developed by Dehning and Richardson (2002), the IT and economic performance framework developed by Dedrick et al.(2003), the Integrative Model of IT Business Value (Melville et al. 2004), the ‘what we know’ schematic synthesized by Kohli and Grover (2008), the balanced scorecard-based framework proposed by Masli et al.
(2011) and the synthesized IS business value model proposed by Schryen (2013). A recent study undertaken by Pang et al. (2014) proposed a public value creation framework. However, once again, the model does not consider external organizational factors. Among the models listed above, only the Integrative Model of IT Business Value (Melville et al. 2004) satisfies the two criteria mentioned in the previous section and is therefore suitable to analyze the value creation through social media networks.

The Integrative Model of IT Business Value (Melville et al. 2004), shown in Figure 3.1, recognizes internal and external organizational factors that influence the value creation of the IT resources in an organization. This model was based on the Resource Based View (Barney 1991; Peteraf & Barney 2003) and posits that IT impacts both processes and organizational performance. This model consists of eight components grouped in one domain and three layers. The core domain is the so-called “IT Business Value Generation Process”. It consists of IT resources and complementary organizational resources that influence business processes and business process performance. In the first layer, the focal firm, the core domain influences organizational performance.

According to Melville et al. (2004), there are two other layers (competitive and macro environment) which also influence the degree to which organizations establish performance through information technology. In the Competitive Environment Layer, Industry Characteristics and Trading Partner Resources influence the extent to which organizations establish performance through information technology. In the Macro Environment, Country Characteristics also influence the degree to which organizations establish performance through information technology.
As mentioned in an earlier section, this model has been tested by Trainor et al. (2014) in the context of social media use for customer relationship management. Trainor et al. (2014) only tested the IT Business Value Generation Process and did not include organizational performance and external factors (trading partner resources and business processes, industry characteristics and country characteristics as shown in Figure 3.1). This means that Trainor et al. (2014) did not incorporate the most important resource in social media networks, which is the network. As a result, they failed to explain comprehensively value creation through social media networks. This study holds that the Integrative Model of IT Business Value (Melville et al. 2004) is an appropriate framework from the literature to explain value creation through social media. Therefore, this study uses this model to develop a research model.
3.4 Factors influencing public value creation through social media networks

This study has selected the Integrative Model of IT Business Value (Melville et al. 2004) to analyze public value creation through social media networks. This section focuses on the extension of the set of determinants in the original model which consist of IT resources, complementary organizational resources and trading partner resources. By involving these factors, the framework satisfies the need to incorporate internal and external organizational factors as discussed in the earlier sections.

Various forms of IT resources have been examined including IT investment, generic technologies, technical skills, IT use, IT expertise, back-end integrations and social media technology use, among others (Bhatt & Grover 2005; Ray et al. 2005; Coltman et al. 2007; Jeffers et al. 2008; Dong et al. 2009; Trainor et al. 2014). In the e-government field, similar measures of IT resources have been used. They include: IT investment, e-government use, IT use and government publication (social media use) (Lee & Perry 2002; Moon & Norris 2005; Norris & Moon 2005; Welch et al. 2005; Tolbert & Mossberger 2006; Grimsley & Meehan 2007; Seltsikas & O’Keefe 2010; Morgeson Iii et al. 2011; Kim & Lee 2012; Warren et al. 2014). Similarly, there have been studies examining the role of complementary organizational resources such as organizational culture, work practices and brand management (Gottschalk 2000; Alavi et al. 2006; de Búrca et al. 2006; Hulland et al. 2007; Jeffers et al. 2008; Chakravarty et al. 2013; Chen et al. 2014). The resources provided by partner organizations are referred to as partner support (Dong et al. 2009).

Based on the literature, four factors are proposed as the most important determinants of public value creation through social media use. These are: social media use, social media policy, innovative organizational culture and public’s co-production. While the social media use represents the IT resources, social media policy and innovative organizational culture are complementary organizational resources. Public’s co-production represents trading partner resources and business processes.

3.4.1 Social media use

Value creation through information technology has been observed in many ways (DeLone 1992; Venkatesh et al. 2008). One of the key components of theoretical frameworks on value creation through information technology is system use (Straub
et al. 1995). System use can be found in theoretical frameworks for value creation through information technology at the individual, group or organization level (Straub et al. 1995; Doll & Torkzadeh 1998; Venkatesh et al. 2008).

Recent studies in information systems indicate the important role of social media use in value creation at the organizational level (Miller & Tucker 2013; Trainor et al. 2014). Miller and Tucker (2013) suggested that the number of Facebook posts produced by an organization affects the amount of user-generated content related to the organization. Similarly, Trainor et al. (2014) found that social media technology use influences the quality of relationships with customers. Studies in the e-government literature have also linked social media use to value creation through public participation (Bertot et al. 2010a; Bonsón et al. 2012; Abdelsalam et al. 2013). Studies in e-government suggest that social media is an effective tool to establish more interaction with the public in order to attract public participation (Mergel 2013a; Mossberger et al. 2013).

To date, there is no universally accepted definition and measure of social media use. Studies related to social media use have examined: the number of social media channels deployed, the number of post in a certain social media channel or the number of interactions between organizations and the public or customers (Bonsón et al. 2012; Abdelsalam et al. 2013; Miller & Tucker 2013; Trainor et al. 2014). Despite different measures employed, previous studies have indicated that social media use is closely related to two concepts: 1) social presence in computer mediated communication and 2) system use in information systems literature (Kietzmann et al. 2011; Trainor et al. 2014).

Social presence is widely found in computer mediated communication such as e-learning (Franceschi et al. 2009; Kim et al. 2011), e-commerce (Gefen & Straub 2004; Pavlou et al. 2007) and virtual groups (Animesh et al. 2011). According to Kietzmann (2011), presence is an important concept that defines social media. The social media presence concept is based on the social presence concept (Short et al. 1976; Biocca et al. 2003) that refers to the sense of “being psychologically present” (Gefen & Straub 2004, p.410) or “being there” (Heeter 1992). Short et al. (1976) defined social presence as “the degree of salience of the other person in a mediated communication and the consequent salience of their interpersonal interactions”
Prior studies indicate that social media use is a measure of social media presence (Oliveira & Welch 2013; Trainor et al. 2014). The indicators used to measure the two concepts are the same. For example the number of social media platforms employed by an organization is referred to as social media presence in some studies (Bonsón et al. 2012; Abdelsalam et al. 2013) and is called social media use in other studies (Oliveira & Welch 2013; Trainor et al. 2014).

The concept of system use has been extensively used in the information systems literature and reflects the degree to which computer applications, hardware and IT infrastructure are deployed and utilized to achieve organizational goals. Social media can be considered to be computer applications that can be utilized to achieve organizational goals. System use is captured either objectively (i.e. based on computer logs) or subjectively (i.e. user assessment of duration and frequency) (Straub et al. 1995; Burton-Jones & Straub Jr 2006; Venkatesh et al. 2008; Liang et al. 2010). Venkatesh (Venkatesh et al. 2008) conceptualized system use as having three key elements: duration, frequency and intensity. Duration is the amount of time spent, frequency is the number of occurrences within a defined time interval and intensity is the degree of involvement with the system. Though this concept was defined at the individual level, it is also applicable to organizational social media use (Trainor et al. 2014; Zheng & Zheng 2014; Lev-On & Steinfeld 2015).

Drawing on social presence and system use, in this study social media use is defined as the level of effort deployed by an organization to increase its presence in social media. Three key elements are proposed based on system use and social presence: frequency, interactivity and duration (Venkatesh et al. 2008; Trainor et al. 2014; Zheng & Zheng 2014; Lev-On & Steinfeld 2015). Frequency is adapted from system use and defined as the number of postings in a given time interval. Frequency has been used to measure social media use in prior studies in e-government (Abdelsalam et al. 2013; Snead 2013; Zheng & Zheng 2014; Lev-On & Steinfeld 2015). By posting information frequently in various social media platforms, governments are trying to enhance their communication with the public (Mergel 2013a; Mossberger et al. 2013). In a disaster management context, an increased frequency of social media use helps the disaster management agencies to establish their disaster communication
through fast information sharing (Ehnis & Bunker 2012; Chatfield & Brajawidagda 2014).

Interactivity is the degree of interaction with the audience. The concept is derived from social presence and has been used in previous studies as a measure for social media use (Abdelsalam et al. 2013; Mossberger et al. 2013; Zheng & Zheng 2014; Stamati et al. 2015). By establishing interactivity, government provides space for citizens to increase their direct communication with government (Mergel 2013a; Zheng & Zheng 2014; Stamati et al. 2015). In the disaster management context, the interactivity of social media enhances disaster communication by increasing the ability to provide fast responses and two-way communication in response to citizens’ inquiries (Ehnis & Bunker 2012; Chatfield & Brajawidagda 2014).

Finally, the term duration is borrowed from system use and refers to the amount of time spent each day managing organizational social media accounts. Duration does not merely capture the total time needed for content creation, responding to the public’s inquiries, posting comments, updating status or creating posts (Venkatesh et al. 2008; Liang et al. 2010), but also reflects an organizations’ availability for social media monitoring (Bekkers et al. 2013). Social media monitoring can be defined as “continuous observation and analysis of social media networks and social communities” (Fensel et al. 2012, p.5). Most importantly, this includes observation of events reported by social media communities through social media. The duration of social media use affects governments’ communication by enhancing the capability to capture unfolding events through social media (Bekkers et al. 2013). In the disaster management context, the duration of social media use affects disaster communication by enhancing the capability to quickly detect disaster-related information in social media (H. Gao et al. 2011; Huiji Gao et al. 2011; Vieweg et al. 2014).

3.4.2 Social media policy

Prior studies have recognized policies as important tools for developing a shared understanding between top management and all employees regarding organizational strategic decisions (Ettlie 1983; Thompson & Higgins 1991; Zahra & Covin 1993; Huang et al. 2010). In the organizational decision-making context, policy has been
associated with organizational long range strategy (Zahra & Covin 1993; Lefebvre et al. 1997) and day to day practical guidance (Thompson & Higgins 1991; Huang et al. 2010). While the former is closely related to the innovation capability of an organization (Ettlie 1983; Zahra & Covin 1993), the latter affects the capacity of technology to create value for the organization (Thompson & Higgins 1991; Huang et al. 2010). This study is taking the second view and refers to policy to an organizational guidance.

As an effective form of guidance, organizational policies are usually set by top management based on the organizational goals (Huang et al. 2010; Vaast & Kaganer 2013) and present principles for decision-making by organizational members (Krüger et al. 2013; Vaast & Kaganer 2013). The principles of decision-making shape shared perceptions among an organization’s members regarding top management’s decisions on the use of technology to achieve organizational goals (Vaast & Kaganer 2013). In information technology (IT), organizational policies reflect the top management’s views on how information technology should be utilized to create value and avoid misuse for the organization (D'Arcy et al. 2009; Huang et al. 2010; Vaast & Kaganer 2013).

The impact of IT-related policies on the behavior of an organization’s members has been studied in the context of information security (Höne & Eloff 2002; D'Arcy et al. 2009; Bulgurcu et al. 2010). Prior studies on policy have observed employee attitudes towards organizational policy (D'Arcy et al. 2009; Bulgurcu et al. 2010). However, the extent to which IT-related policies might contribute to the value creation process has been less studied (D'Arcy et al. 2009; Huang et al. 2010). In contrast, the e-government literature clearly indicates that the absence of policies on social media use by governments could hinder the organization’s capability to realize the value of social media (Bertot et al. 2012b; Kavanaugh et al. 2012; Yi et al. 2013).

The important role of organizations’ social media policies has been studied in the information systems, communications, public relations, and e-government literature (Husin & Hanisch 2011a; Husin & Hanisch 2011b; Klang & Nolin 2011; Bertot et al. 2012a; Kavanaugh et al. 2012; Vaast & Kaganer 2013; Campbell et al. 2014). In the information systems literature, attention has been given to the policy development
framework and information disclosure mechanism (Gallaugher & Ransbotham 2010; Kaganer & Vaast 2010; Husin & Hanisch 2011a; Krüger et al. 2013; Pallegedara & Warren 2014). In the communications literature, studies have focused on the general picture of social media governance and social media use by employees (Macnamara & Zerfass 2012; Linke & Zerfass 2013). In the e-government literature, attention has been given to data management and the legal considerations upon which policies should be derived (Klang & Nolin 2011; Bertot et al. 2012b; Doran 2012; Magro 2012; Yi et al. 2013).

The names given to social media policies, and degree of detail contained in them vary across organizations (Hrdinová et al. 2010; Klang & Nolin 2011; Scott & Jacka 2011; Vaast & Kaganer 2013; Johnston 2015). In a study of 26 Swedish municipalities, Klang and Nolin (2011) found that there are various names used to refer social media policy. They included: guidelines, rules, strategy, advice and routine (Klang & Nolin 2011). Johnston (2015) also found different names were used to refer to social media policy, including handbook, content guidance, principles, and best practice guides. Moreover, some policies are embedded in other policies such as general codes of conduct (Johnston 2015). Vaast and Kaganer (2013) found wide variety in the amount of detail in policies. Their study on 74 corporate social media policies found that some policies were very detailed at the instructional level and others provide general guidance on social media use. In sum, social media policies vary among organizations (Hrdinová et al. 2010; Klang & Nolin 2011).

Social media policy is often derived, transferred or developed from existing policies (Klang & Nolin 2011; Vaast & Kaganer 2013; Johnston 2015). The types of existing policies that are usually referred to in developing social media policies include IT, communication and public relations, web and email policies (Klang & Nolin 2011; Vaast & Kaganer 2013). Therefore, any existing policies used by the organization to cover its interactions with citizens might be relevant to, and used as sources for, social media policy (Vaast & Kaganer 2013; Johnston 2015).

Previous studies on social media highlight the elements needed to guide social media use for organizational purposes (Hrdinová et al. 2010; Klang & Nolin 2011; Mergel 2012a; Pallegedara & Warren 2014). While most studies have mixed organizational and employee social media use into a policy, only Mergel and Greeves (2012a) have
identified the key elements of social media policy for organizational purposes. Most proposals for social media policies from the literature were intended to provide general principles for government agencies to use when developing their social media policies.

In this study, social media policy refers to the guidelines for the organizational social media use in order to achieve the organizational goals/missions. This study holds that organizational goals are achieved through better communication between organizations and all stakeholders. In relation to communication, prior studies suggest that the key elements of social media policy include organizational responsibility, delegation of authority and content management, continuous monitoring and providing timely response (Hrdinová et al. 2010; Klang & Nolin 2011; Mergel 2012a; Pallegedara & Warren 2014).

Organizational responsibility refers to the organizational roles and resource allocation by an organization to maintain its social media use (Mergel 2012b; Mergel 2013b). This is crucially important because one of the paths to increased social media use in governments is through bottom-up processes which arise from staff members’ personal initiatives (Kavanaugh et al. 2012; Mergel 2012a; Meijer & Thaens 2013). In this situation, minimum resources are allocated by the organization because social media has not been considered as an important communication channel for the organization. As the frequency of use and the responses from the public increase, the organization starts recognizing the value brought by its social media use. Once it realizes this value, the organization will start allocating resources and responsibilities to manage its social media operations. At this point, social media is recognized as one of the official communication channels for interacting with the public and therefore the organization defines roles and responsibilities that relate to social media operations (Mergel 2012b; Mergel 2013b).

Beside organizational responsibilities, studies have also recognized that developing authorization processes is one of the challenges faced by governments for providing timely responses to citizens’ inquiries (Klang & Nolin 2011; Kavanaugh et al. 2012; Zheng 2013). The time-consuming bureaucratic processes for information processing that are commonly found in governments are not appropriate for the fast interaction speeds in social media (Klang & Nolin 2011; Zheng 2013). The best way to solve
this problem is by delegating the authority for the interaction process to a specific department that is responsible for social media (Klang & Nolin 2011; Kavanaugh et al. 2012; Zheng 2013).

Content management practices deal with content creation, information disclosure, and record management (Hrdinová et al. 2010; Bertot et al. 2012b). The responsibility for content creation can be spread throughout to many different departments or a centralized by a social media department (Hrdinová et al. 2010; Johnston 2015). This means that the responsibility for the content quality control process (covering correctness, timeliness and reliability) should be determined (Hrdinová et al. 2010). For information disclosure, social media officers are often need to make quick judgements about whether certain information can be publicly available (Bertot et al. 2012b; Kavanaugh et al. 2012). Clear guidance and classification regarding information disclosure will improve the decision-making process without trespassing on the information security boundary (Höne & Eloff 2002; Bertot et al. 2012b). Finally, the high volume of data exchanged through social media means that the government needs to ensure that social media use complies with its record management policies (Bertot et al. 2012b).

The specific situations faced by disaster management agencies require policies on continuous monitoring and fast responses (Latonero & Shklovski 2011; Bird et al. 2012; Kavanaugh et al. 2012; Chatfield & Brajawidagda 2014; Chatfield et al. 2014). Social media monitoring includes continuous watch of the messages received by official social media accounts and important keywords for the organization that become trending topics (Latonero & Shklovski 2011; Bird et al. 2012; Kavanaugh et al. 2012). The monitoring activities require several groups of people that work in shifts to deal with the information sharing complexity and they need to make decisions based on the limited information available. To ensure standard operation procedures are followed for these two activities, policies should firstly support the 24-hour operation of social media accounts to maintain organizational readiness to respond to sudden disaster-related information through social media channels (Bird et al. 2012; Kavanaugh et al. 2012). Secondly, the policy should support the automatic social media data mining which is used to increase the organization’s capability to detect any disaster-related information that emerges in social media.
Therefore, to ensure effective social media monitoring, an organization requires policies. An organization needs policies on how to respond to information discussed in social media. Specifically, fast response to false information (or rumor) is one of the most important activities in the field of disaster-related information on social media (Bird et al. 2012; Kavanaugh et al. 2012; Chen & Sakamoto 2013). The role of governments as being credible information sources and tackling the spread of false information during disaster situations has been examined in previous studies (Oh et al. 2010; Bird et al. 2012; Kavanaugh et al. 2012; Chen & Sakamoto 2013; Oh et al. 2013). Clarification of false information by official social media accounts can reduce the level of uncertainty during disaster situations (Oh et al. 2013). Therefore, policies to ensure that an agency is able to detect and provide official clarification on false information are crucially important.

The establishment of policies on organizational social media use helps the development of understanding between top management and social media team members on how to best benefit from the organization’s social media use (Hrdinová et al. 2010; Bertot et al. 2012b; Kavanaugh et al. 2012; Mergel 2012a). The existence of social media policy helps the organization to align its social media use with the organizational goals (Mergel 2012a; Johnston 2015). Finally, social media policy is expected to guide social media use and create value for the organization by increasing the communication performance (Klang & Nolin 2011; Mergel 2012a).

3.4.3 Innovative organizational culture

Culture is a critical factor for an organization since it defines the way the organization and its members interact with key stakeholders in order to achieve its organizational goals (Douglas 1985; Schein 2010). The way culture influences an organization has attracted interest in various disciplines including sociology, marketing, management and information systems (Douglas 1985; Barney 1986; Deshpande & Webster Jr 1989; Hofstede 1991; Leidner & Kayworth 2006; Schein 2010). Culture has been defined in many ways (Douglas 1985; Hofstede 1991; Schein 2010). One definition that has been widely cited was provided by Hofstede
who defined culture as the “programming of the mind which distinguishes the members of one human group from another” (p.262).

Culture reflects collective social behavior and how individuals think (Douglas 1985; Schein 2010). Organizational culture, therefore, includes the basic values and basic assumptions that unconsciously guide organization members’ behavior (Douglas 1985; Schein 2010). Schein (2010) perceived organizational culture as “a pattern of shared basic assumptions learned by a group as it solved its problems of external adaptation and internal integration, which has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems” (Schein 2010, p.18). The unique path that the development of each of these learning outcomes takes it hard to imitate and therefore could be one of the sources of competitive advantage (Barney 1986).

Schein (2010) argues that culture operates at three levels: artefacts, values and basic assumptions. Basic assumptions are the core of the culture and the hardest part of culture to change in an organization (Schein 2010). The role of senior managers in defining organizational culture depends on the way they set the basic assumptions for the organization. The artefacts (e.g. technology, procedures) and values (e.g. organizational mission, ethical values) will likely depend on the tone of the organization’s basic assumptions (Denison & Spreitzer 1991; Schein 2010). Even though prior studies highlight the role of senior managers, recent studies recognize the role of middle management in influencing organizational culture (Balogun & Johnson 2004; Moon & Norris 2005).

There are number of ways to consider the relationship between organizational culture, information technology and organizational performance (Leidner & Kayworth 2006; Kappos & Rivard 2008). One of the available relationships is that the organizational culture influences the value creation of IT (Weill & Olson 1989; Leidner & Kayworth 2006). Jeffers et al. (2008) studied the interaction between a type of organizational culture (open communication) and IT resources in the logistics industry. Their results found significant effects of the open communication on the relationship between IT investment and the process performance (Jeffers et al. 2008). In sum, organizational culture affects the firm’s ability to exploit IT (i.e. to achieve better customer service, reduce costs, improve agility, introduce new product lines,
and increase innovation) (Gottschalk 2000; Alavi et al. 2006; Chakravarty et al. 2013; Chen et al. 2014).

Organizational culture is a multi-faceted domain and can be viewed from various perspectives (Cameron & Freeman 1985; Denison & Spreitzer 1991; Bass & Avolio 1993; Schein 2010). Innovative organizational culture exists when an organization is externally oriented and provides flexibility toward changes (Cameron & Freeman 1985; Denison & Spreitzer 1991; O’Reilly et al. 1991). Innovative organizational culture is based on the view that organizations need to be creative and innovative in order to adapt to changes in the environment (Amabile et al. 1996; Chandler et al. 2000). Innovative organizational culture, therefore, is the extent to which organizations are able to develop work environments that encourage creativity and innovation (Cameron & Freeman 1985; Denison & Spreitzer 1991).

In the e-government context, the evolution from traditional e-government to Government 2.0 clearly induces the organization to be externally oriented (Layne & Lee 2001; Andersen & Henriksen 2006; Chun et al. 2010; Bonsón et al. 2012; Lee & Kwak 2012). Government 2.0 relies on the value that government should promote transparency, participation and collaboration in order to establish open government (Chun et al. 2010; Bonsón et al. 2012). These three aspects of open government require governments to interact more with the public and other stakeholders. In other words, governments are exposed to rapidly changing environments and therefore the existence of innovative organizational culture is critically important (Amabile et al. 1996; Chandler et al. 2000).

Organizations that support innovative culture are more flexible in terms of accepting new ideas, creativity, and informal information exchange, and encouraging experimentation (Moon & Norris 2005; Zhang & Sarker 2008; Benitez-Amado et al. 2010; Terziovski 2010). In contrast to private sector organizations, governments find it hard to meet these criteria because of the bureaucratic culture developed in the public organizations (Allen et al. 2001; Roy 2007; Yang 2009). In such situations, the role of managers is crucially important for governments to establish innovative organizational cultures (Wooldridge & Floyd 1990; King et al. 2001).
Communication through social media is characterized by rapid and informal information exchange (Bonsón et al. 2012; Abdelsalam et al. 2013). The public provides (unstructured) information, ideas and feedback to organizations through social media without the formal organizational communication templates that are usually used in government reports. This requires organizations to be open to new ideas in order to establish effective communication. Similarly, inter-agency communication through social media requires an innovative organizational culture. In their study on social media use by the US air force during the 2010 Haiti Earthquake, Yates and Paquette (2011) assert that one of the mechanisms available for social media to increase the information exchange and knowledge sharing is “by eliminating the reliance on formal liaison structures (both in terms of personnel and systems)” (p.10). Therefore, organizations that have innovative organizational cultures are largely able to enhance effective communication (Ehnis & Bunker 2012; Chatfield & Brajawidagda 2014).

3.4.4 The public’s co-production

The notion of co-production has been a focus in public administration, urban services and marketing literature for the last three decades (Whitaker 1980; Brudney & England 1983; Ostrom 1996; Alford 2002; Prahalad & Ramaswamy 2004; Payne et al. 2008). The literature on public administration often relates co-production to the involvement of the public in public service delivery (Whitaker 1980; Brudney & England 1983; Ostrom 1996). Ferris (1984) used the term co-provision to highlight the efficiency gains which result from citizens’ involvement (Ferris 1984). In the marketing literature, the terms co-production and co-creation are often used interchangeably (Lusch et al. 2007; Vargo 2009). In this study, the terms co-provision and co-creation are used interchangeably with co-production and are considered to have the same meaning (Needham 2008).

In the traditional concept of public service delivery, there are two distinct spheres: producers who actively distribute the service and consumers who play the more passive role of receiving the services (Sharp 1980; Brudney & England 1983). Here, the term producer refers to service agents and bureaucrats, while consumers are citizens who receive the goods and services provided by the producers. The concept of co-production recognizes the overlapping roles of government and citizens where
citizens play more active roles in public service delivery (Sharp 1980; Brudney & England 1983). The degree to which citizens are involved in public service delivery is reflected by the extent of the overlap (Sharp 1980; Brudney & England 1983; Joshi & Moore 2004).

Although the term of co-production has been widely used in the public administration literature, it has no commonly accepted definition (Joshi & Moore 2004). Ostrom (1996) focused on the outside resources involved in goods/services production systems when she defined co-production as “the process through which inputs are used to provide a good or service are contributed by individuals who are not in the same organization” (p.1073). Brudney and England (1983, p.1983) highlighted the citizen’s role in goods/services production when they defined co-production as “joint production of services by these two groups” (government and the citizens) (Brudney & England 1983, p.1983).

In light of the efficiency gained from the citizens’ involvement, Ferris (1984) defined co-provision as “the voluntary involvement of citizens in the provision of publicly provided goods and services or close substitutes” (p.326). Alford (1998) defined co-production as “the involvement of citizens, clients, consumers, volunteers and/or community organizations in producing public services as well as consuming or otherwise benefiting from them” (Alford 1998, p.128). Both Joshi and Moore (2004) and Bovaird (2007) highlighted the resources contributed by all parties (government, agents, users, volunteers, community groups) in service provision. All in all, the definitions agree on the important role of external parties (citizens, users, community, volunteers, non-public organizations and private sector, or the public) in the provision of public goods and services.

Governments are actively seeking the best ways to engage citizens for greater involvement in public service delivery co-production in order to provide more value to the public (Roberts 2004; Bryson et al. 2013). The motivations of the government include addressing deficiencies in public services quality, shortfalls in government capacity, and dealing with complex environments such as in disaster situations (Ostrom 1996; Joshi & Moore 2004). The role of the public in public service delivery through co-production is crucially important because some types of public services require the active involvement of citizens in order to create value (Alford 1998;
Alford 2002). As Ramírez (1999) asserts, value is “coproduced by two or more actors, with and for each other, with and for yet other actors” (Ramírez 1999, p.49).

Studies often link co-production with the creation of public value (Benington 2009; Alford 2011). Studies in the public administration literature provide examples of how value can be realized through different types of co-production, including 1) citizens requesting the services, 2) citizens providing assistance in the service delivery, 3) citizens substituting the services, 4) citizens consuming the services, 5) citizens discussing their expectation on the public service with the government, 6) citizens influencing the policy formulation and 7) citizens being involved in planning (Ostrom 1978; Whitaker 1980; Ferris 1984; Joshi & Moore 2004; Bovaird 2007). To assess whether co-production activities create value, Ferris (1984) suggested two criteria: first, whether voluntary citizens’ actions reduce the amounts of resources that the public sector must commit to maintaining a given service level, and second, whether increases in service levels can be obtained with a given amount of public sector resources.

Greater information technology utilization by government and citizens increases the opportunities for the public to be involved in the co-production of public service delivery (Meijer 2011; Clark et al. 2013). Studies in co-production through social media recognize the significant role of citizens in the co-production of public services (Meijer 2011; Lee & Kwak 2012; Linders 2012; Magro 2012; Chatfield et al. 2013). Similar to traditional public service delivery, modes of co-production through social media range from passive to active. This includes citizens consuming services, citizens requesting services, citizens providing assistance in service delivery, citizens consuming services, citizens discussing their expectations with the government, citizens influencing the policy formulation and citizens being involved in planning (H. Gao et al. 2011; Bunce et al. 2012; Vesnic-Alujevic 2012; Chatfield & Brajavidaga 2013a; Fredericks & Foth 2013; Hoffman et al. 2013; Chatfield & Brajavidaga 2014; Chatfield et al. 2014).

This study defines public co-production as the voluntary involvement of the public (individual, groups or society) in an organization’s provision of public services through social media including: extending the services, improving the services or reducing the government resources to realize the services. Through the use of social
media for co-production, the public plays an important role in influencing the ability of the government to realize public value. Therefore, the degree to which the public is involved in the co-production of public service delivery influences the capability of the government in public value creation.
CHAPTER 4. RESEARCH MODEL AND HYPOTHESES

As stated earlier, my research model was developed by drawing on the Integrative Model of IT Business Value. Therefore this chapter consists of two important sections. First, Section 4.1 presents definitions of the key constructs that are included in my research model. Second, Section 4.2 presents the research model and its hypotheses.

4.1 Constructs

This study has selected the Integrative Model of IT Business Value (Melville et al. 2004) to develop the research model used to analyze the process of public value creation through social media networks in the context of Indonesia’s disaster management agencies’ use of social media networks. The context of the study has been discussed in Chapter 2, including the salient processes of agencies’ communication and disaster management. Public value creation through the use of social media and its salient determinants have been identified and discussed in Chapter 3. The determinants do not include the industry and country characteristics because the context of the study shares the commonalities on these two factors. Therefore, this section highlights the selected constructs and provides the operational definitions of the constructs.

4.1.1 Social media use

This construct is the first determinant of public value creation through social media networks. In my model, social media use is viewed as involving new and emergent IT Resources (as shown in Figure 2.1) of the Integrative Model of IT Business Value (Melville et al. 2004).

One of the important concepts in social media is ‘social presence’ (Kietzmann et al. 2011). Government agencies establish their presence in social media by posting, replying, engaging and monitoring activities through social media platforms (Bonsón et al. 2012; Abdelsalam et al. 2013; Oliveira & Welch 2013; Trainor et al. 2014). Social presence describes the sense of “being psychologically present” (Gefen & Straub 2004, p.410) or “being there” (Heeter 1992) from the audience perspective. In
this study, social media use is defined as the active effort demonstrated by
government to increase its social presence in social media platform.

4.1.2 Social media policy

This construct is the second determinant of public value creation through social
media networks as discussed in Chapter 3. This construct represents Complementary
Organizational Resources (as shown in Figure 2.1) of the Integrative Model of IT
Business Value (Melville et al. 2004)

Policy can be understood as an organization’s long range strategy (Zahra & Covin
1993; Lefebvre et al. 1997) or as operational guidance for achieving organizational
goals (Thompson & Higgins 1991; Huang et al. 2010). This study adopts the latter
view and therefore considers good policy to be effective guidance for achieving
organizational goals. By providing guidance in the use of a technology, government
expects that the technology is effectively used to create value for the organization
(Thompson & Higgins 1991; Huang et al. 2010). In this study, social media policy
refers to the guidelines for the organizational social media use in order to achieve the
organizational goals/missions.

4.1.3 Innovative organizational culture

This construct is the third determinant of public value creation through social media
networks as discussed in Chapter 3. Similar to social media policy, this construct
represents the Complementary Non-IT Organizational Resources of the integrative
model of IT business value (Melville et al. 2004).

Organizations that support innovative culture are more flexible and more open in
terms of accepting new ideas, creativity, informal information exchange and
encouraging experimentation (Moon & Norris 2005; Zhang & Sarker 2008; Benitez-
Amado et al. 2010; Terziovski 2010; Chen et al. 2014). Innovative organizational
culture is the extent to which government has developed the workplace environment
that encourages creativity and innovation (Cameron & Freeman 1985; Denison &
4.1.4 Communication

This construct represents the Business Process (as shown in Figure 2.1) of the Integrative Model of IT Business Value (Melville et al. 2004). This construct is specifically proposed in the context of disaster management agencies and is derived from the disaster management literature. Communication is the key mission-critical process of disaster management (Comfort 2007; Garnett & Kouzmin 2007; Manoj & Baker 2007).

Communication is the process of internal or external organizational message exchange through various channels (Kapucu 2006). In this study, communication is defined as the degree to which government is able to utilize social media in sharing the mission-critical information with its key stakeholders including the public. Previous studies have indicated that the use of social media contributes to reducing technological and organizational challenges during disaster situations (Yates & Paquette 2011; Kavanaugh et al. 2012; Chatfield et al. 2013; Chatfield et al. 2014).

4.1.5 Disaster management

This construct represents the business process performance (as shown in Figure 2.1) of the Integrative Model of IT Business Value (Melville et al. 2004). This construct is specifically examined in the context of disaster management agencies. In public administration, service delivery, budgets and any other organizational performance domains, the most essential thing required of disaster management agencies is effective and efficient disaster management (Donahue & Joyce 2001; Waugh & Straib 2006).

Donahue and Joyce (2001) defined emergency management as “a complex policy subsystem that involves an intergovernmental, multiphased effort to mitigate, prepare for, respond to, and recover from disasters” (p.728). Previous studies have indicated that social media promotes efficient and effective disaster management by providing effective collaboration tools for agencies and the public to increase their awareness of disaster situations, thereby reducing disaster hazards and risks and improving disaster responses (Chatfield & Brajawidagda 2012; Chatfield et al. 2013; Chatfield & Brajawidagda 2014). Therefore, in this study, disaster management is defined as
the degree to which government is able to deploy social media to enhance effective and efficient disaster management cycle activities: preparedness, response, recovery, and risk mitigation.

4.1.6 The public’s co-production

This construct is the fourth determinant of public value creation through social media networks as discussed in Chapter 3. This construct represents Trading Partner Resources (as shown in Figure 2.1) in the Integrative Model of IT Business Value (Melville et al. 2004).

Ostrom (1996) defined co-production as “the process through which inputs are used to provide a good or service are contributed by individuals who are not in the same organization” (p.1073). Similarly, Ferris (1984) defined co-provision as “the voluntary involvement of citizens in the provision of publicly provided goods and services or close substitutes” (Ferris 1984, p.326). Based on Ferris’s (1984) definition, the public’s co-production is defined as the degree to which the public (individual, groups or society) are voluntarily involved in public services provision through social media; extending the services, improving the services or reducing the government resources to deliver the services.

4.1.7 Value creation process

In the Integrative Model of IT Business Value (Melville et al. 2004), the value creation process construct represents the IT Business Value Generation Process (as shown in Figure 2.1). This construct conceptually encompasses the all processes related to social media use, social media policy, innovative organizational culture, communication and disaster management. Therefore, in this study, the value creation process is defined as the degree to which organization is able to leverage social media use, social media policy and innovative organizational culture for the communication processes during all four phases of disaster management.

4.1.8 Public value creation

This construct represents Organizational Performance (as shown in Figure 2.1) in the Integrative Model of IT Business Value (Melville et al. 2004).
Kelly et al. (2002) defined public value as “the value created by government through services, laws regulation and other action” (p.4). In this study public value creation is viewed as the degree to which government is able to realize the potential economic value and social value through the use of social media networks.

In summary, the important definitions of the core constructs included in my research model are summarized in Table 4.1.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Media Use</td>
<td>The level of active effort demonstrated by government to increase its presence in social media platforms.</td>
</tr>
<tr>
<td>Social Media Policy</td>
<td>The extent to which government provides clear guidelines for its social media use to achieve the organization’s goals/missions.</td>
</tr>
<tr>
<td>Innovative Organizational Culture</td>
<td>The extent to which government has developed the workplace environment that encourages creativity and innovation.</td>
</tr>
<tr>
<td>Communication</td>
<td>The degree to which government is able to utilize social media in sharing mission-critical information with its key stakeholders including the public.</td>
</tr>
<tr>
<td>Disaster Management</td>
<td>The degree to which government is able to deploy social media to enhance effective and efficient disaster management cycle activities. This involves preparedness, response, recovery, and risk mitigation.</td>
</tr>
<tr>
<td>Value Creation Process</td>
<td>The degree to which an organization is able to leverage social media use, social media policy and innovative organizational culture for the communication processes during all four phases of disaster management.</td>
</tr>
<tr>
<td>Public’s Coproduction</td>
<td>The degree to which the public (individual, groups or society) is voluntarily involved in public services provision through social media. This involves extending the services, improving the services or reducing the use of government resources to deliver the services.</td>
</tr>
<tr>
<td>Public Value Creation</td>
<td>The degree to which government is able to realize potential economic value and social value through the use of social media networks.</td>
</tr>
</tbody>
</table>

### 4.2 My research model and hypotheses

This section presents the research model and hypotheses employed in this study. The research model is presented in Figure 4.1.
Social media use is a key determinant of the value creation through social media platforms at the organization level (Miller & Tucker 2013; Trainor et al. 2014). Studies on e-government literature have also linked social media use to value creation through the public’s participation (Bertot et al. 2010a; Bonsón et al. 2012; Abdelsalam et al. 2013). In this study, social media use is operationally defined as level of active effort demonstrated by government to increase its presence in social media platforms. Increased frequency of use indicates that government is extending their online social presence by disseminating information through social media (Mossberger et al. 2013). Interactivity means that government is providing a virtual sphere for social and political interaction between citizens and the government (Stamati et al. 2015). By enhancing interactions, government provides the opportunity for the public have more participation in policymaking (Mergel 2013a).

Interaction through social media can take place in many ways, such as forwarding a message (Mergel 2013a; Zheng & Zheng 2014), responding to a message (Mergel 2013a; Zheng & Zheng 2014; Bonsón et al. 2015), liking/providing a rating to a post or comment (Mergel 2013a; Bonsón et al. 2015) and providing feedback (Bertot et al. 2012b; Bonsón et al. 2012; Kavanaugh et al. 2012). Duration reflects the time spent by the organization to manage its social media accounts, including social media and monitoring (Bekkers et al. 2013). Duration of social media monitoring affects the organization’s communication responsiveness (Bekkers et al. 2013). All in all, increases in these three dimensions of social media use enhance organizational
communication through social media. Accordingly, this study proposes the following hypothesis:

**H1: Social media use positively influences disaster communication.**

Policy can be viewed as guidance for achieving organizational goals. Organizational policies reflect top management’s views on how information technology should be utilized to create value and avoid misuse for the organization (D'Arcy et al. 2009; Huang et al. 2010; Vaast & Kaganer 2013). Prior studies in e-government literature clearly indicate that the absence of public policies in social media use could hinder an agency’s ability to realize the value of social media (Bertot et al. 2012b; Kavanaugh et al. 2012; Yi et al. 2013). The existence of good policy ensures that social media use conforms to the current administrative practice through sufficient communication guidance (Klang & Nolin 2011; Kavanaugh et al. 2012; Mergel 2012a). Social media policy defines the roles and responsibilities that relate to social media communication (Mergel 2012b; Mergel 2013b). Social media policy also specifies who manages the direct communication with citizens through social media (Klang & Nolin 2011; Kavanaugh et al. 2012; Zheng 2013). Therefore, this study proposes this following hypothesis:

**H2: Social media policy positively influences disaster communication.**

Innovative organizational culture exists when an organization is externally oriented (Cameron & Freeman 1985; Denison & Spreitzer 1991; O'Reilly et al. 1991). The evolution from traditional e-government to Government 2.0 clearly shifts the direction of the government and makes it more externally oriented (Layne & Lee 2001; Andersen & Henriksen 2006; Chun et al. 2010; Bonsón et al. 2012; Lee & Kwak 2012). Organizations that support innovative culture are suppler and more open in terms of accepting new ideas, creativity, informal information exchange and encouraging experimentation (Moon & Norris 2005; Zhang & Sarker 2008; Benitez-Amado et al. 2010; Terzirovski 2010; Chen et al. 2014). Through social media, organizations receive information and new ideas from the public. Organizations that have resistance to the ideas submitted by the public will not be able to enhance communication through social media. Social media is also the platform where organizations and the public communicate through informal interaction.
Organizations with formal and rigid communication protocols will not be able to leverage communication through social media. Therefore, this study proposes this following hypothesis:

**H3: Innovative organizational culture positively influences disaster communication through social media use.**

Prior studies have recognized the important role of communication in disaster management (Kapucu 2006; Manoj & Baker 2007; Marincioni 2007; Nowell & Steelman 2013). Disaster management always involves the public and a range of organizations with different roles and authority. This is because the impact of a disaster is often beyond a single organization’s or community’s ability to tackle (Donahue & Joyce 2001). Communication enhances disaster management performance by establishing fast and accurate decision-making based on the information provided by the organizations involved in disaster management (Kapucu 2006). Successful communication in the mitigation and preparedness phase enhances actions that reduce risk or promotes both government and community capacity in dealing with future disasters. Similarly, communicating policies, goals and action plans to all stakeholders might increase the support provided to the public and may result in a more efficient disaster response. The establishment of timely, accurate and reliable communication affects coordination in disaster response and recovery phases. Poor communication contributes to failed collaborations among the government agencies, which can result in poor disaster management performance outcomes. Accordingly, the following hypothesis is posited:

**H4: Communication positively influences disaster management performance.**

Studies have found that social media use creates public values, including transparency (Chatfield & Brajawidagda 2013a; Stamati et al. 2015), trust (Warren et al. 2014; Park et al. 2015), effectiveness (Abdelsalam et al. 2013), satisfaction (Mergel 2013a) and responsiveness (Bekkers et al. 2013). Similarly, in the public administration literature, studies agree that the overall ability of a government agency to cope with a disaster event is often linked to the overall performance at the levels of the agency and the government at large (Kapucu 2006; Farazmand 2007;
Since this study observes the value creation of social media in the disaster management context, the following hypothesis is proposed:

*H5: The value creation process in disaster management positively influences public value creation.*

Social media can be a means for government to encourage greater involvement of the public in public service delivery. As mentioned earlier, the impact of a disaster is often beyond a single organization’s capability to tackle. Government is often overwhelmed by the operations needed during disaster situations (Chatfield et al. 2013). Therefore, government always seeks public resources during disaster situations. Recent studies indicate that social media is an effective means for governments to attract the public’s participation (Bertot *et al.* 2010b; Linders 2012; Mossberger *et al.* 2013).

One form of the public participation is public co-production. Co-production through social media ranges from passive to active participation. Forms of co-production include citizens consuming services, citizens requesting services, citizens providing assistance in service delivery, citizens discussing their expectations of the service with the government, citizens influencing policy formulation and citizens being involved in planning (H. Gao *et al.* 2011; Bunce *et al.* 2012; Vesnic-Alujevic 2012; Chatfield & Brajavidagda 2013a; Fredericks & Foth 2013; Hoffman *et al.* 2013; Chatfield & Brajavidagda 2014; Chatfield *et al.* 2014). The degree to which the public co-produces public services influences the degree of relationship between the value creation process and public value creation. Therefore, this study proposes this following hypothesis:

*H6: The public’s co-production moderates the relationship between the value creation process and the public value creation.*
CHAPTER 5. RESEARCH METHODOLOGY

This chapter presents the research methodology of this study. A review of the mixed methods approach is presented in Section 5.1. Following that, the selected sequential exploratory research method is discussed in Section 5.2. The overall research design is presented in Section 5.3. The next three sections discuss in detail the qualitative research (Section 5.4), instrument development (Section 5.5) and the quantitative research of this study (Section 5.6). Finally, Section 5.7 discusses the interpretation of the findings.

5.1 Overview of mixed methods

This study investigates public value creation through social media networks by governments. It does so by incorporating both internal and external organizational factors. To achieve this aim, this study employs a mixed methods research methodology. There are two main reasons for using a mixed methods approach in this study (Venkatesh et al. 2013; Zachariadis et al. 2013). The first is the developmental structure of the research: the findings of the research in the first phase influence the second phase research method. The second reason is that a mixed methods approach helps the study to achieve completeness: the findings of the first phase of the research will be compared with the results of the second phase of the research.

The terms ‘mixed methods’ and ‘multi methods’ refer to the use two or more research methods in a study. There have been studies of both information systems and e-government literature that employ mixed methods (Mingers 2001; Heeks & Bailur 2007). In a complex research context such as information systems or e-government, there are advantages in using several methods in a study (Mingers 2001; Heeks & Bailur 2007; Yildiz 2007). Mingers (2001) pointed out that there are at least two reasons for using two or more research methods in one research project. Firstly, the real world consists of a plurality of structures and events (Mingers 2001). By combining several methods in a single study, a richer understanding will be gained (Mingers 2001). Secondly, a research study is not usually a single and discrete event but consists of several phases and different tasks (Mingers 2001). Different phases
might need different methods, and it is therefore appropriate for a study to use more than one research method (Mingers 2001).

Creswell (2003) identified three types of research design: qualitative, quantitative and mixed methods. Qualitative research refers to research designs that focus on “understanding the meaning people have constructed” (Merriam 2009, p.13). When researchers use qualitative research designs, they want to understand the nature of the setting and do not necessarily predict what may happen in the future (Patton 1990). Quantitative research is for theory testing. It is used for examining the relationships between variables (Creswell 2003). Numerical measurements used to quantify the variables are analyzed by using statistical procedures (Kothari 2011). Mixed methods research is when researchers combine qualitative and quantitative approaches in the same study (Creswell 2003).

The term mixed methods is often used interchangeably with multi methods, but there are significant differences between the two (Creswell 2003; Venkatesh et al. 2013; Zachariadis et al. 2013). A multi-method study usually employs two or more methods that try to answer the research questions separately (Morse 2003). Another multi-method approach combines two or more research approaches that come from the same worldview; that is, the methods are all quantitative or all qualitative (Creswell 2003; Venkatesh et al. 2013).

A mixed methods research methodology involves multiple methods and the use of both quantitative and qualitative methods to investigate the research problem (Creswell 2003). Johnson and Onwuegbuzie (2004, p.17) defined mixed methods research as “the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study”. A mixed methods approach always involves at least two research methods, one quantitative and one qualitative. Therefore, mixed methods research can be considered as a subset of multi-methods research.

There are at least three reasons why researchers adopt mixed methods approaches (Venkatesh et al. 2013). First, mixed methods research is able to address predictive/confirmatory and exploratory research questions simultaneously. Second, mixed methods research provides stronger inferences than a single method approach.
Third, mixed method approaches offer an opportunity to apply complementary views on the subject under study. By implementing a mixed method approach, researchers expect to be able to combine each approach’s strengths to overcome the other approach’s deficiencies (Creswell 2003). When using a mixed methods approach, divergent findings from each approach might provide valuable insights.

There are various ways to mix quantitative and qualitative methods within or across different stages of research (Mingers 2001; Creswell 2003). They can be classified according to the type of time ordering used (sequential or concurrent) and the degree of dominance of each approach in the research. In a sequential mixed methods approach, researchers elaborate on or develop the findings obtained using one method with another method. A concurrent mixed methods approach provides a holistic view of the research inquiry for the researcher (Tashakkori & Teddlie 2010). Regarding the degree of dominance of the research approach, studies do not always treat qualitative and quantitative methods equally. Therefore, it is possible that one approach will dominate the other. Creswell (2003) classified the different strategies available in mixed methods research. They include: sequential explanatory, sequential exploratory, sequential transformative, concurrent triangulation, concurrent embedded, concurrent transformative.

This study employs some constructs that have not been used in previous studies in the same context. These include social media policy, communication, disaster management and public value (Kapucu 2006; Husin & Hanisch 2011a; Husin & Hanisch 2011b; Bannister & Connolly 2014; Trainor et al. 2014). Therefore, a sequential exploratory strategy is chosen to achieve the aims of the study. Sequential exploratory strategies employ qualitative data collection and analysis in the first phase and followed by quantitative data collection and analysis in the second phase (Creswell 2003). More weight is usually given to the qualitative analysis in the first phase. An example of this strategy is the use of the quantitative approach (second phase) to test the theoretical model developed in the qualitative approach (first phase) (Grimsley & Meehan 2007). Sequential exploratory research is also suitable for research that needs an instrument development in the first phase because the existing instrument is not adequate (Creswell 2003) or non-existent.
5.2 The sequential exploratory design

In general, there are two goals when using a sequential research design (Creswell 2003; Venkatesh et al. 2013). First, researchers want to use the results of the first study to influence the second study. Second, researchers want to increase the richness of a study by employing two research designs from different perspectives. Sequential exploratory research employs qualitative data collection and analysis in the first phase followed by quantitative data collection and analysis in the second phase (Creswell 2003).

A sequential exploratory design is usually employed when researchers want the results of the qualitative phase to help further develop or inform the quantitative phase (Greene et al. 1989). By implementing a sequential exploratory design, researchers will obtain benefits for: complementing the inadequate existing instruments, adding unknown variables, or exploring the possible theoretical framework for the study (Creswell & Clark 2007).

According to Creswell (2003):

[The sequential exploratory strategy] is conducted in two phases, is characterized by an initial phase of qualitative data collection and analysis, which is followed by a phase of quantitative data collection and analysis. The findings of these two phases are then integrated during the interpretation phase (p.215).

There are two variants of the exploratory design: the taxonomy development model and the instrument development model (Creswell & Clark 2007). The instrument development model is suitable for instrument development based on qualitative findings (Morse 2003; Creswell & Clark 2007). First, a qualitative study is employed with a small number of participants. Once the data collected from the qualitative study is analyzed, the results guide the development of the instrument and scales for the quantitative study in the second phase. Following the instrument development, quantitative data collection and analysis is employed. The last stage of this model is the interpretation of the findings.

In the taxonomy development model, the initial qualitative phase is used to develop an emergent theory or category/relationship systems, and the quantitative phase is employed to test the results of the first phase (Morgan 1998; Creswell & Clark 2007).
In the first phase, a qualitative study may formulate research questions or a set of hypotheses based on the qualitative findings. The set of hypotheses obtained from the first phase is then tested in the second phase. In this model, weight is given to quantitative data in the second phase. The challenge for this model is in the decision-making process for determining which findings found in the qualitative study to be further used in the quantitative study.

Of the two sequential exploratory designs, the instrument development model is chosen to achieve the aims of this study. The main argument for this selection is that there is need to develop new survey instruments for some constructs of the model such as social media use, social media policy, communication, disaster management performance and public value (Kapucu 2006; Husin & Hanisch 2011a; Husin & Hanisch 2011b; Bannister & Connolly 2014; Trainor et al. 2014).

In mixed methods research, integration of the qualitative and quantitative data can occur at various phases of the research process (Creswell & Clark 2007; Venkatesh et al. 2013). Integration can occur in the data collection, data analysis, and data interpretation, and/or in the discussion section of a study. In sequential exploratory research, the qualitative and quantitative data are connected during the instrument development phase (Creswell & Clark 2007). The steps in the instrument development model are presented in Figure 5.1. In Figure 5.1, qual (written in lower case) stands for qualitative study and the use of small letters indicates that weight is not given to this phase. In contrast, QUAN (written in capitals) stands for quantitative study and the use of capital letters indicates that weight is given to this phase. The arrow (→) represents a sequential design.

![Figure 5.1 The instrument development model stages (Creswell & Clark 2007)](image)

5.3 **The research design**

This study employs a sequential exploratory research design, specifically an instrument development model (Creswell & Clark 2007). Based on the instrument
development model stages as shown in Figure 5.1, the overall research design is shown in Figure 5.2. In Figure 5.2, more details of the phases based on the instrument development model (Creswell & Clark 2007) are grouped in the rectangle with round corners.

As shown in Figure 5.2, this study began the development of the research aims and research question. These were presented in Chapter 1. The context of this study, which is disaster management, and an overview of the Indonesian disaster management agencies were discussed in Chapter 2. Following that, the literature review and the identification of the research gap was presented in Chapter 3. This includes the exploration of the available research models for this study and the determinants of public value creation. Following that, the research model was proposed in Chapter 4.

The research design, including the selected research methodology for answering the research question, is presented in Chapter 5. As discussed in the previous sections, a sequential exploratory mixed methods approach was selected, using the instrument development model as shown in Figure 5.1. Unlike the original instrument development model (Creswell & Clark 2007), this study considers that the qualitative and quantitative approaches should have the same weight. In this study, integration of qualitative and quantitative data occurs during two phases: in the instrument development and in the interpretation of the findings as shown in Figure 5.2. Therefore, QUAL and QUAN have the same weight.
After determining the research design, approval from the Human Research Ethic Committee (HEC) of the University of Wollongong was sought (Appendix A). This approval was mandatory to ensure the rights and welfare of the participants. The HEC examination included the research design, how the participants would be approached, potential risks for participants and participant confidentiality. After approval from the HEC was granted, this study began the data collection.
The qualitative approach (QUAL) was conducted using case study research. The details of the QUAL methodology are presented in Section 5.4, while the results are presented in Chapter 6. In the case study research, two main data sources were used: participant interviews and the Twitter data of the corresponding participants. Descriptions of the participants are provided along with the procedures for contacting the participants. The analysis of case study results included within-case and cross-case analysis to develop the themes. The instrument development combined the themes identified in the QUAL and key aspects found in the literature review. The instrument development methodology is presented in Section 5.5. The results of the instrument development are discussed at the end of Chapter 6. The findings of the case study will also be compared with the Quantitative (QUAN) results through meta-inference. This is discussed in Chapter 8.

The QUAN research method used in this study is presented in Section 5.6. This includes the pre-test and the implementation of the survey. The results of the quantitative findings are presented in Chapter 7. This includes the descriptive analysis and structural equation model (SEM) analysis to test the hypotheses in the research model. The SEM analysis results will be compared with the case study results in Chapter 8.

The integrative interpretation of the QUAL and QUAN results is presented in Chapter 8. Before we conduct the meta-inference, QUAL inference and QUAN inference are presented. Meta-inference, or the integrated QUAL inference and QUAN inference, is done based on the cross-case analysis and PLS-SEM analysis results. Any disagreement between the results in QUAL and QUAN is assessed to revise the research model. Finally, the inference quality is assessed to ensure the efficacy, transferability and integrative correspondence of the results (Teddlie & Tashakkori 2009; Venkatesh et al. 2013). The method for this interpretation process is discussed in Section 5.7.

5.4 Qualitative research

5.4.1 Case study research

This study employs case study research in order to further develop the instrument needed for the quantitative study (Creswell & Clark 2007). A case study is “an
empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (Yin 2003, p.18). By using a case study approach, researchers are able to capture the meaningful characteristics of a phenomenon. The case study research method is suitable for exploratory or explanatory analysis. This study employs case study research in order to further develop the instrument needed for quantitative study and to provide completeness for the quantitative results (Creswell & Clark 2007; Venkatesh et al. 2013).

In case study research data collection processes, Yin (2003) suggested three principles: use multiple sources of evidence, create a database and maintain a chain of evidence. Using multiple sources enables researchers to address a broader range of historical and behavioral issues. This is done to achieve converging lines of inquiry, a process of triangulation and corroboration emphasized repeatedly. Various data types collected in case study research require a case study database to maintain case study artefacts including case study notes, case study documents and narratives. Lastly, researchers should create a database and maintain a chain of evidence. In this way, researchers will be able to conduct within-case or cross-case analysis effectively (Benbasat et al. 1987).

This study focuses on the public value creation through social media use by Indonesian disaster management agencies. The appropriate unit of analysis in this study is organizations’ social media use. Therefore, this study chose to collect case study artefacts through organizational social media use and interview notes/audiotapes. The organizational social media use data was gathered by observing the official social media of the selected agencies. Numerical data derived from various social media platforms, including number of posts/tweets, number of comments, number of likes, number of viewers or other metrics, has been used in the previous case studies involving social media data (Abdelsalam et al. 2013; Chatfield et al. 2013; Mossberger et al. 2013). Interview notes/audiotapes were used to record the face-to-face semi-structured interviews. Besides the two main sources of evidence, this study also examined other sources including organizational websites, flyers, brochures and related policies.
5.4.2 Sources of evidence

5.4.2.1 Social media data

There are various types of social media platforms that are suitable for different organizational purposes (Kaplan & Haenlein 2010). Previous studies on social media use by governments have shown that different types of governments in Indonesia (including disaster related agencies) have adopted and have been using various types of social media platforms, including Twitter, Facebook, YouTube, blogs and Tumblr (Rokhman 2011; Chatfield & Brajawidagda 2013a; Chatfield & Brajawidagda 2013b; Chatfield et al. 2013; Brajawidagda & Chatfield 2014).

In the disaster management context, previous studies in social media use in Indonesia during disaster situations has indicated that Twitter was the most effective platform and was widely adopted by Indonesian disaster management agencies (Chatfield & Brajawidagda 2013a; Chatfield & Brajawidagda 2013b; Chatfield et al. 2013). A study undertaken by Semiocast (2012), a Paris-based research firm, also showed that Indonesia has cities (Jakarta and Bandung) with the most active Twitter users based on the number of tweets posted. Therefore this study selected Twitter data as case study artifact.

Information was collected from each agency’s Twitter account and other social media analytic websites including Topsy.com and twbirthday.com. The information gathered included number of tweets, number of followers, the creation date of the Twitter account, tweets released from the agency and tweets mentioning the agency. Information on the number of tweets and the number of followers was collected directly from Twitter.com. Information on the account creation date was collected from twbirthday.com. The other information including all tweets released by the agency and all tweets mentioning the agency were collected from Topsy.com. The data was collected for six months (or 182 days) from 1 January to 30 June 2014.

5.4.2.2 Case study interviews

Interviews are one of the sources of evidence that can be used in case studies (Yin 2003). Interviewing is a process in which a researcher and a participant engage in a conversation focused on questions related to a research study (DeMarrais 2004).
Based on the amount of structure inherent in the interview, there are three interview types: in-depth interviews, focused interviews and structured interviews (Yin 2003).

In-depth interviews use open-ended questions that enable the researcher to receive any relevant responses from the interviewee. This type of interview is appropriate for exploring a new topic. Focused interviews are usually guided by semi-structured questions that allow the interviewee to express their knowledge on specific themes. By using this type of interview, researchers are able to corroborate facts on the theme that have been established by researchers. Finally, the structured interview consists of lines of questioning that act as survey instruments (Yin 2003).

This study employs case study research to further develop the instrument needed for the quantitative research. Salient concepts of the constructs have been developed through literature review as presented in Chapters 2, 3 and 4. Case study interviews were carried to clarify the salient concepts found in the literature review. Therefore, a focused (semi-structured) interview approach was chosen to allow the participants to express their own views about the constructs investigated by the reviewer. The interviews were guided by an interview protocol to ensure the consistency among the interviews (Eisenhardt 1989).

5.4.3 Cases selection

In this study, a multi-case study design was chosen in order to have more compelling evidence and to yield more generalizable results (Benbasat et al. 1987; Eisenhardt 1989; Yin 2003). Multi-case designs allow cross case comparisons that enable researchers to predict outcomes across cases or to contrast results with previous results.

Replication is important in multi-case design. The replication are undertaken until no new learning occurs, and saturation is achieved (Eisenhardt 1989). In other words, probability sampling is not relevant in case study research (Yin 2003) because cases are not randomly selected (Benbasat et al. 1987). Accordingly, the agencies involved in this multi-case design were purposively selected (Cavana et al. 2001).

The context of the study, which is Indonesia, provided several cases available for observation and this made it possible for there to be variety in the cases (Seawright &
Gerring 2008). Previous studies on social media use during disaster situations in Indonesia have suggested two cities with advanced social media use: Jakarta (Chatfield & Brajawidagda 2013b; Chatfield et al. 2013) and Yogyakarta (Nugroho 2011; Djalante et al. 2013). Jakarta is home to almost all national-level disaster management agencies that are popular in the Indonesian social media sphere. Yogyakarta (and its surrounding areas) was an early adopter of social media use during disasters, as indicated by the successful use of social media during the 2010 Mt. Merapi eruption (Nugroho 2011; Djalante et al. 2013). This study chose to select disaster management agencies in Jakarta and Yogyakarta as participants.

Table 5.1 The profile of agencies participating in the case study

<table>
<thead>
<tr>
<th>No</th>
<th>Case</th>
<th>Agencies’ Twitter Follower</th>
<th>Level</th>
<th>Location</th>
<th>Main Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Case1</td>
<td>More than 1 million</td>
<td>Province*</td>
<td>Jakarta</td>
<td>SAR and/or Safety</td>
</tr>
<tr>
<td>2</td>
<td>Case2</td>
<td>More than 1 million</td>
<td>National</td>
<td>Jakarta</td>
<td>Early Warning</td>
</tr>
<tr>
<td>3</td>
<td>Case3</td>
<td>Between 10,001 and 100,000</td>
<td>National</td>
<td>Yogyakarta</td>
<td>Early Warning</td>
</tr>
<tr>
<td>4</td>
<td>Case4</td>
<td>Between 10,001 and 100,000</td>
<td>National</td>
<td>Jakarta</td>
<td>Disaster Management</td>
</tr>
<tr>
<td>5</td>
<td>Case5</td>
<td>Between 10,001 and 100,000</td>
<td>National</td>
<td>Jakarta</td>
<td>SAR and/or Safety</td>
</tr>
<tr>
<td>6</td>
<td>Case6</td>
<td>Between 10,001 and 100,000</td>
<td>Province</td>
<td>Jakarta</td>
<td>Disaster Management</td>
</tr>
<tr>
<td>7</td>
<td>Case7</td>
<td>Between 1,001 and 5,000</td>
<td>Province</td>
<td>Yogyakarta</td>
<td>Disaster Management</td>
</tr>
<tr>
<td>8</td>
<td>Case8</td>
<td>Between 1,001 and 5,000</td>
<td>National</td>
<td>Jakarta</td>
<td>SAR and/or Safety</td>
</tr>
<tr>
<td>9</td>
<td>Case9</td>
<td>Less than 1,000</td>
<td>Regency</td>
<td>Yogyakarta</td>
<td>Disaster Management</td>
</tr>
<tr>
<td>10</td>
<td>Case10</td>
<td>Less than 1,000</td>
<td>Regency</td>
<td>Yogyakarta</td>
<td>Disaster Management</td>
</tr>
</tbody>
</table>

*province is equal to state level in the US

In multi-case designs, replication is undertaken until saturation is achieved. In this study, saturation was reached after 10 replications. This number of cases falls within the four to ten cases suggested by Eisenhardt (1989). Short descriptions of the ten cases are presented in Table 5.1. Of the ten agencies, six are located in Jakarta while the other four agencies are in Yogyakarta. Based on the level of organization, five agencies are at the national level, three agencies are at the provincial level and two are at city/regency level. Based on their main tasks in disaster management, two
agencies focus on early warning systems, three are mainly responsible for SAR and/or safety and five agencies are responsible for general disaster management including disaster mitigation, preparedness, response and recovery.

Based on the number of the organizational Twitter follower as of 15 July 2014, the ten agencies can be classified as follows. Two agencies are considered very influential, with more than one million followers each. One of these agencies is at the province level and one is at the national level. Two agencies had less than 1,000 followers and were very small. These two agencies are at the city/regency level. Two agencies (one at the provincial and one at the national level) had between 1,001 and 5,000 followers and were very small. The other four agencies (one provincial level and three national) had more than 10,001 followers but less than 100,001 followers.

5.4.4 Implementation of case study interview

5.4.4.1 Participants of case study interview

In qualitative research, focus is given to the participants’ understanding of certain phenomena based on their experience (Merriam 2009). Participants’ views are more important than the researchers’ views (Merriam 2009). Thus, selection of participants with knowledge on how the organization best utilizes social media to realize public value is crucially important. For this reason, we selected employees at the managerial level (or upper level) as the participants.

Cover letters containing requests to interview the chief information officer (CIO), head of information technology (IT) department and/or head of social media of the organization were sent to the ten agencies. The cover letter is shown in Appendix B. An interview participant information sheet (PIS) was attached to the cover letter, containing information about the study (purpose of the study, benefits for the participants’ organizations and information about the researcher), the method and demands on participants including: proposed time and place of the interview, potential risks for the participants, participants’ rights, the confidentiality of participants identities, sample questions and a statement saying that the study had been approved by human research ethic committee (HEC) of the University of
Wollongong. The PIS is presented in Appendix C. This information is crucially important to gain access to the organizations (Darke et al. 1998).

Table 5.2 Interviewees’ profile and recording method

<table>
<thead>
<tr>
<th>No</th>
<th>Case</th>
<th>Number of Interviewee</th>
<th>Interviewee’s Job Position</th>
<th>Recording Method</th>
<th>Duration (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Case1</td>
<td>1</td>
<td>Case1R1 SM Manager</td>
<td>Audiotaped</td>
<td>40</td>
</tr>
<tr>
<td>2</td>
<td>Case2</td>
<td>3</td>
<td>Case2R1 Head of Agency</td>
<td>Audiotaped</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Case2R2 Head of Department</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Case2R3 Acting as SM Manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Case3</td>
<td>1</td>
<td>Case3R1 Acting as Head of Agency</td>
<td>Note Taking</td>
<td>30</td>
</tr>
<tr>
<td>4</td>
<td>Case4</td>
<td>2</td>
<td>Case4R1 Head of Department</td>
<td>Audiotaped</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Case4R2 Acting as SM Manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Case5</td>
<td>1</td>
<td>Case5R1 Acting as SM Manager</td>
<td>Audiotaped</td>
<td>60</td>
</tr>
<tr>
<td>6</td>
<td>Case6</td>
<td>1</td>
<td>Case6R1 Acting as SM Manager</td>
<td>Audiotaped</td>
<td>45</td>
</tr>
<tr>
<td>7</td>
<td>Case7</td>
<td>2</td>
<td>Case7R1 Head of Department</td>
<td>Audiotaped</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Case7R2 Acting as SM Manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Case8</td>
<td>1</td>
<td>Case8R1 Head of Department</td>
<td>Audiotaped</td>
<td>40</td>
</tr>
<tr>
<td>9</td>
<td>Case9</td>
<td>2</td>
<td>Case9R1 Head of Agency</td>
<td>Audiotaped</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Case9R2 Acting as SM Manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Case10</td>
<td>1</td>
<td>Case10R1 Acting as SM Manager</td>
<td>Audiotaped</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total</td>
<td></td>
<td>470</td>
</tr>
</tbody>
</table>

From the ten agencies, fifteen interviewees agreed to participate in this study as shown in Table 5.2. The number of participants from each agency ranged from 1 to 3 and the total number is 15. Interviewees were coded in order to ensure the confidentiality of their identity as suggested in the ethics proposal. All of the participants had managerial or upper level positions that related to social media use. Thus, the participants were in the best position to describe the ways their organizations realized public value through the use of social media. Of the fifteen participants, three were heads of agencies, four were heads of IT departments and eight acted as social media (SM) managers. While the three heads of agencies acted as CIOs, the eight SM managers were persons in the agencies who did not officially
entitled have SM manager as their job title, but were responsible for managing daily social media operations that involved the social media team members. The eight SM managers’ had different official job titles, ranging from the head of section and supervisor of the social media team members. In case where there was more than one interviewee in an agency, the interviewees gathered at the same time and place and formed a small discussion group.

5.4.4.2 Interview process

Before conducting each interview, the researcher introduced himself and explained the aims of the study, including what was expected from the participant (Darke et al. 1998). Researcher also asked the interviewee whether they agreed to voluntarily participate in the study and whether researcher was allowed to audiotape the interview. If any interviewees had declined to participate then that interview would not have been conducted. If any interviewees had agreed to participate but did not want to be audiotaped, then note taking was chosen. Otherwise, the interview was undertaken and audiotaped. All interviewees agreed to participate. Of the fifteen interviewees, one interviewee preferred note taking and the other fourteen interviewees agreed to be audiotaped as presented in Table 5.2. Interviewees voluntarily signed a consent form explaining that the interviewee agreed to participate in this study of their own free will and the chosen recording method the interviewee (audiotape/note taking) was specified. The consent for the interview is presented in Appendix D.

All the interviews were undertaken in Bahasa Indonesia because all participants were more familiar with Bahasa Indonesia than other languages. The interview processes followed an interview protocol to ensure consistency among the interviews. The interview protocol is presented in Appendix E. The interview protocol was basically built on the constructs identified in the literature review (Eisenhardt 1989). All the interviews were face-to-face interviews, allowing investigator to adapt the questions if needed, clarify doubts and ensure that responses from the participants were understood (Cavana et al. 2001).

For analysis purposes, the interviews were first transcribed verbatim in Bahasa Indonesia. Second, the transcripts were translated into English for further analysis. In
doing the translation, several adjustments were made to preserve the interview context without losing its meaning (Lopez et al. 2008). For the interview with manual note taking, the interview notes were taken in English and did not need translation. The duration of the interviews ranged from 30 to 60 minutes with total 470 minutes for the ten agencies.

5.4.5 Case Study Analysis

Following Eisenhardt (1989), this study analyzed the case study artefacts in two ways: within-case analysis and cross-case patterns analysis. Within-case analysis is the first step in case study research and usually involves huge amounts of data. In this step, researchers build detailed descriptions of each case study and conduct a preliminary analysis (Eisenhardt 1989). There are, however, no standard procedures for the reporting format. Researchers might use additional data presentations such as longitudinal graphs, sequence analysis, tabular displays and so on. Furthermore, written descriptive analysis might be useful for identifying causal links between concepts observed in the case studies (Yin 2003). In this study, Twitter data and interview data are combined for within-case analysis.

Cross-case patterns analysis is undertaken by comparing case study data in divergent ways (Eisenhardt 1989). There are at least three tactics for conducting cross-case analysis: concept comparison within and across different groups of cases, comparison between two single cases or groups of cases, and case comparison based on different case study artefacts (Eisenhardt 1989). In doing cross-case pattern analysis, this study chose to look for similarities and differences between two groups of cases. The constructs proposed in the research model were used to compare the two groups and to identify salient themes within a construct. The two groups were formed based on the public value realization of each agency that was developed through the interviews.

5.5 Instrument development

In Chapter 4, the research model of this study was developed. It consists of seven constructs with six hypotheses. Following that, the operational definitions of the constructs were provided to indicate how the constructs were empirically measured (Bhattacherjee 2012). These operational definitions were based on the behavioral
dimensions, facets or properties of the constructs (Cavana et al. 2001). Furthermore, the operational definition of each construct was used to guide the interviews in the case study research and to refine salient themes for the instrument development.

This study employed an instrument development model with a sequential exploratory strategy by using case study research to further develop the instruments used in the online survey. Further instrument development was needed due to the inadequate instruments available in the literature for researching social media. Salient concepts developed from the literature review were compared with the case study interview data. Online survey instruments were developed based on the salient concepts refined from the literature review and case study results.

In this study, the online survey had five sections. Section 1 consisted of questions on the demographics of the organizations, Section 2 consisted of questions on the organizational social media use, Section 3 consisted of questions on the organizational resources and public participation through co-production, Section 4 consisted of questions on value creation and finally Section 5 consisted of questions on the demographics of the participants. The questions started with easy non-threatening questions (Bhattacherjee 2012). Questions in Section 1 and Section 5 were mostly nominal scale-type questions. Nominal scales referred to a subject of measurement such as gender, age or organization level. Section 2, Section 3 and Section 4 consisted of the main questions of the survey, which measured the constructs of the study through a set of attributes. Questions in these sections were Likert-type scale questions. Questions using Likert scales, also known as a summated scales (as shown in Figure 5.3), are questions in which respondents record the extent of their agreement or disagreement on an intensity scale for each item question (Miller & Salkind 1991). Likert-type scales are considered as reliable and are recommended for obtaining people’s attitudes, values and perceptions (Miller & Salkind 1991).
This study selected Indonesian disaster management agencies as the focus as discussed in Chapter 2. While the questionnaire was developed in English, the actual data collection was in Bahasa Indonesia because all the participants were more familiar with Bahasa Indonesia. Therefore, a translation from English to Bahasa Indonesia was needed. To ensure the equivalence between the English and Bahasa Indonesia versions, a two-way or back translation approach was employed (Cavana et al. 2001; Bailey 2008). A translator translated the original English questionnaire into Bahasa Indonesia and then a different translator translated it back to English (Bailey 2008). Two back translators were employed in this study to ensure consistency between the Bahasa Indonesia and original English versions of the instrument (Singh 1995; Bock et al. 2005).

5.6 Quantitative research

5.6.1 Survey research

This study employed a quantitative approach in order to investigate factors influencing public value creation through social media use and to test the research model. The quantitative approach was broadly based on postpositivism which aims to identify universal laws of human behavior that enable researchers to predict effects or outcomes (Cavana et al. 2001; Creswell 2003). A postpositivism lens tends to approach research based on observation and measurement of the objective reality in real world. Developing quantitative/numerical measurement for studying behavior, therefore, is a hallmark in postpositivism. The survey is a quantitative approach that is often used in postpositivism.
In order to achieve the aims of this study, survey research was employed in the quantitative research. Survey research collects data through standardized questionnaires or interviews in a systematic manner. Questionnaires or interviews capture responses from respondents through a series of questions. The results are evaluated by implementing statistical methods to test predetermined hypotheses regarding the relationships between specific variables (Creswell 2003).

Surveys can be administered in many ways and one of them is to conduct online surveys (Bhattacherjee 2012). Online surveys are a form of survey research that is administered over the Internet. Respondents are usually invited to participate through emails with a link to the designated online website that displays a set of questions. Responses from participants are recorded directly to an online database and this saves time in data entry. By using website technology, questions can be presented interactively following a certain logical flow.

This study utilized a questionnaire instrument to quantify the measurement of variables, and used statistical methods to test predetermined hypotheses regarding the relationships between constructs/variables. Specifically, model validation requires assessing construct validity and reliability at the measurement and structural model levels using structural equation modeling (SEM) techniques and tools.

5.6.2 Pre-test

After a questionnaire is developed, a pre-test is an important step before the instrument is used for actual data collection. The pre-test aims to uncover ambiguity, lack of clarity or biases in the wording of questions (Bhattacherjee 2012). Pre-testing questionnaires includes checking for face validity, content validity and conducting a pilot study (Cavana et al. 2001). Face validity deals with whether the questionnaire measure the construct being studied, content validity refers to the representativeness of the content and the pilot study uses sampling adequacy to measure whether the instrument represents the constructs (Cavana et al. 2001).

However, the context of the study did not allow researcher to conduct and ideal pre-test, which would have included content validity testing and a pilot study, because of the limited number of potential participants. The context of the study which targeted
social media operators, managers and members of top management in disaster management agencies in Indonesia, offered a limited number of participants to take part in the online survey. To deal with the limitation, we managed to conduct three-phase pre-tests involving participants from different backgrounds, including postgraduate students, academics and social media team members (Bailey 2008). All the pre-tests were conducted online through surveymonkey.com.

While the first and the second pre-tests were in English, the third pre-test was in Bahasa Indonesia. The first pre-test was intended to test the face validity of the questionnaire. This pre-test was conducted on eight postgraduate students in information systems. Some of the students had a research focus on disaster management or crisis situations. The average time to complete the pre-test was thirteen minutes. Feedback from the pre-test participants related to the wording of the questions, clarity issues and question sequencing. The feedbacks was analyzed and used to improve the questionnaire. The questionnaire was then used for the second pre-test.

The second pre-test involved six academics with various backgrounds including e-government, public administration, communication and social media. Some of these academics had expertise in social media use during disaster situation and public value realization using e-government which are highly relevant areas for this study. Overall, the six academics required fifteen minutes to finish the pre-test. The valuable feedback received from these academics related to question wording, sequencing, clarity, and construct validity. Feedback was incorporated into the final questionnaire design. Following the second pre-test, the questionnaire was translated into Bahasa Indonesia as discussed in the previous section.

The third pre-test involved six postgraduate students and two social media team members in an Indonesian university. All the participants were Indonesian and three were members of disaster management agencies who were taking postgraduate study courses. Thus, the participants had backgrounds similar to those of the actual participants. The participants took twelve minutes on average to finish the questionnaire. Feedback from the participants was mainly on the question wording. Feedback was used in the improvement of the final questionnaire.
5.6.3 Online survey implementation

This survey was conducted online through surveymonkey.com to collect data from respondents. The targeted respondents were social media operators, managers or members of top management of the disaster management organizations in Indonesia. In this study, there was no complete database about the targeted agencies, especially the agencies at the provincial and city/regency levels. This is similar to previous studies in e-government research, since it is difficult to find the exact populations of the targeted governments (Gil-Garcia et al. 2009). Therefore, the first step was to identify the potential agencies. To identify the potential agencies, the search process included two approaches: 1) through official organizational websites and 2) direct search through Google, Facebook, Twitter, YouTube and Tumblr. If an agency had an organizational website, we searched for the official link to addresses, emails and social media accounts of the targeted agencies. For direct search through Google and social media platforms, the keywords were the name of the agency and the name of the province/city. For example, keywords “BPBD Mojokerto” was used to search for the local disaster management agency of the Mojokerto regency. Following that, a careful observation of the social media content was undertaken to ensure that the social media account was an official social media account of the targeted agency. In total, the identification process yielded 674 disaster management agencies with at least one official social media account in Facebook, Twitter, Tumblr, blog or YouTube. These five social media platforms were found to be the used in previous studies on Indonesian social media use (Rokhman 2011; Chatfield & Brajawidagda 2013a; Chatfield & Brajawidagda 2013b; Chatfield et al. 2013; Brajawidagda & Chatfield 2014).

A cover message that contained an invitation letter and the link to the designated survey was sent to 674 disaster related agencies in Indonesia through email, social media accounts and fax. The invitation letter is presented in Appendix F. All invitation letters were addressed to the head of the agency. A participant information sheet (PIS) was attached to the cover letter, containing information about the study (purpose of the study, benefits for the participants’ organization and information about researchers), methods and demands on the participants, including information about tacit consent through the submission, potential risks for the participants,
participants’ rights, confidentiality of participants’ identities, sample questions and a statement that the study had been approved by human research ethic committee (HEC) of the University of Wollongong. The PIS for online survey participants is presented in Appendix G.

The targeted participants were individuals involved in official social media operations in agencies, including social media operators, managers or members of top management. As indicated in previous studies, public value is created in interactions between governments and citizens (Moore 2000; Benington 2009). Since social media is the avenue of the interactions, all the targeted participants were the best information source for this research. The participants’ demographics are presented in Chapter 7.

The questionnaire was open for 66 days from 12 January to 19 March 2015 on surveymonkey.com. Reminders were sent by facsimile in week 4 and a combination of phone reminders and Facebook messages from weeks 4 to 8. Of the 674 agencies contacted, there were 136 responses. After careful checking of the 136 responses, 12 were discarded due to the incomplete answers. Further investigation of the discarded 12 responses revealed that they did not cause systematic bias. In total, there are 124 usable responses giving an 18% response rate, which is acceptable in web surveys in e-government studies (Gil-Garcia et al. 2009). The questionnaire in Bahasa Indonesia is presented in Appendix H and the English version is presented in Appendix I.

5.6.4 Data analysis

The online survey used in this study consisted of five sections: Section 1 that with questions on the demographics of the organizations, Section 2 which consisted of questions on the organizational social media use, Section 3 which consisted of questions on the organizational resources and public participation through co-production, Section 4 which consisted of questions on value creation and finally Section 5 which consisted of questions on the demographics of the participants. The results for the questions in Section 1 and Section 5 were analyzed using descriptive statistics, while the results of the questions in Section 2, Section 3 and Section 4 were mainly analyzed using structural equation modeling (SEM) analysis.
5.6.4.1 Descriptive analysis

Descriptive statistics provided a general description of sets of quantitative data for interpretation and comparison purposes (Cavana et al. 2001). In descriptive statistics, individual data items or a summary of a single variable was usually presented in a combination of text, tabular or graphical forms. In this study, descriptive statistics were used to present the demographics of the participants and organizations involved in the online survey. IBM SPSS 22 and MS Excel were used to descriptively analyze the data. Chapter 7 presents the results of this descriptive statistical analysis.

5.6.4.2 Structural equation modeling (SEM) analysis

This study used SEM to test the hypotheses by simultaneously analyzing multiple variables of the research model (Schumacker & Lomax 2004; Kaplan 2009). SEM examines a theoretical model through the relationships of its observable variables (directly measured variables) and latent variables (variables that are not directly observed) (Schumacker & Lomax 2004; Byrne 2013). SEM is often diagrammed in path model which the constructs are viewed as latent variables (Schumacker & Lomax 2004).

SEM can be broadly classified into two forms: covariance-based SEM (CB-SEM) and partial least square SEM (PLS-SEM) (W. W. Chin 1998; Hair et al. 2014). The two forms are complementary rather than competitive statistical methods (Hair et al. 2011). CB-SEM aims to minimize the differences between the covariance of the sample and those estimated by the theoretical model using a maximum-likelihood function (Schumacker & Lomax 2004; Byrne 2013). Therefore, CB-SEM examines the extent to which the hypothesized model is supported by the sample data (Byrne 2013). If the sample data does not conform to the theoretical model, then hypotheses can be rejected. Researchers have used CB-SEM to conduct theory testing and confirmation when prior theory is strong (Schumacker & Lomax 2004).

Unlike CB-SEM, PLS-SEM employs an ordinary least square (OLS) regression-based method which is similar to multiple regression analysis (Hair et al. 2011). PLS-SEM uses the observed data to estimate the path relationships that minimize the error of the dependent variables (Hair et al. 2011). In other words, PLS-SEM
estimates path coefficients that maximize the explained variance of the dependent variables (Chin & Newsted 1999; Hair et al. 2011). Researchers use PLS-SEM when their research is predictive (Chin & Newsted 1999; Hair et al. 2011; Hair et al. 2014).

Besides the benefits of CB-SEM, researchers choose PLS-SEM for the following reasons: small sample size, non-normal data and the use of formative variables (Chin & Newsted 1999; Ringle et al. 2012). However, the selection of CB-SEM or PLS-SEM in a study should be based on the aims of the study (Chin & Newsted 1999; Hair et al. 2014). When a study aims to conduct confirmatory research, researchers select CB-SEM (Chin & Newsted 1999; Schumacker & Lomax 2004; Kaplan 2009; Hair et al. 2014). Predictive type research should employ PLS-SEM (Chin & Newsted 1999; Hair et al. 2014). To achieve the aims of this study, which is predictive in nature, PLS-SEM was chosen for data analysis (Chin & Newsted 1999; Hair et al. 2014).

5.7 Interpretation of findings

Interpretation of findings is an important part of mixed methods research (Onwuegbuzie & Teddlie 2003; Tashakkori & Teddlie 2010). The interpretation of the findings can occur in any phase of the research (Creswell & Plano Clark 2011). For example, in sequential studies, the findings of the first research method might enrich the development of new hypotheses or new instruments. Interpretation of the findings from one research strand is referred to as inference, and the integration of findings from qualitative and quantitative strands is often called as meta-inferences (Tashakkori & Teddlie 2010; Creswell & Plano Clark 2011; Venkatesh et al. 2013).

In this study there were two steps in the interpretation of findings. The first was when the inferences that were based on the qualitative findings were used to develop the survey instrument. This step has been discussed in Section 5.5. The second step occurred at the end of the study when the qualitative and quantitative results were compared. Based on the integration of the qualitative and quantitative research methods, the development of meta-inferences is discussed in Chapter 8 along with the qualitative and quantitative inferences.
To ensure the quality of the meta-inferences, this study follows the inference quality framework developed by Venkatesh et al. (2013). In general, the framework consists of two aspects of quality: design quality and explanation quality. Design quality is the degree of appropriateness of the procedure selected by the researchers. This includes design suitability, design adequacy and analytic adequacy. Design suitability is the degree to which the selected methods are appropriate for answering the research questions. Design adequacy is the degree to which both qualitative and quantitative research methods satisfy the standards for acceptable quality and rigor. Analytic adequacy is the degree to which the analytic process is adequate for answering the research questions.

Explanation quality consists of quantitative inference, qualitative inference and meta-inference. Quantitative inference and qualitative inference are the degree to which interpretation of the analysis in each strand is relevant to the findings, consistent with theory and transferable. Meta-inferences require integrative efficacy, inference transferability and integrative correspondence. Integrative efficacy is the degree to which the inferences in each strand are integrated into theoretically consistent meta-inferences (Tashakkori & Teddlie 2010; Venkatesh et al. 2013). Inference transferability is the extent to which meta-inferences are applicable and generalizable to different contexts, settings, organizations or time periods (Tashakkori & Teddlie 2010). Integrative correspondence is the degree to which meta-inferences satisfy the purpose of the study. The meta-inferences and the evaluation of the inference quality are discussed in Chapter 8.
CHAPTER 6. ANALYSIS OF QUALITATIVE DATA

This chapter presents the results of the qualitative case study research. As mentioned in the earlier chapters, the findings of the case study were used to satisfy two objectives. First was to develop the instruments for the survey. The second was to predict outcome in other similar situations. Therefore, Section 6.1 presents the within-case analysis of the 10 cases selected in this study. Section 6.2 discusses the cross-cases analysis. Finally, Section 6.3 presents the instrument development for the survey data collection.

6.1 Within-case analysis

The first step of the analysis of the case study findings was within-case analysis. By doing within-case analysis, detailed descriptions of set of each case study data were compiled for early analysis (Eisenhardt 1989). There is no standard procedure or format for reporting the within-case analysis. Therefore, this study uses the constructs of the research model as a guide to present the findings of the study. In each case, the findings are grouped into the value creation process (this includes social media use, social media policy, innovative organizational culture, communication and disaster management), the public value creation process and the public’s co-production. Two main data sources were used in the within-case analysis: case study interviews and Twitter data analysis. Case study interview data will be used for the discussion of all constructs. The Twitter data is incorporated into the value creation process and the public’s co-production constructs.

6.1.1 Case 1

6.1.1.1 Organization and interviewees

Case 1 is a search and rescue (SAR) and/or safety agency at the provincial level. Case 1 is located in Jakarta and the participant was one of its social media managers (Case1R1). In total, this agency had more than 60 staff who maintained all its communication channels (i.e. website, radio frequency, telephone, and social media).
Specifically for social media, there were nine staffs that worked in three eight-hour shifts each day.

6.1.1.2 Value creation process

The agency has a long history in the use of various communication channels to interact with citizens. The agency has a very high frequency of social media use and established its media policy as the guideline for its social media use. The high frequency of social media use and its social media policy affect its communication performance and disaster management performance.

Social media use. At this agency, social media is one of many communication channels used to support both its internal and external communication. The interviewee described their unit as the “information hub” for internal and external stakeholders. This agency had a well-established internal information exchange mechanism that allowed various types of information to be gathered through various communication channels. This information is then fed to all its media channels including social media. As the interviewee Case1R1 stated:

Our main [unit] tasks are to deliver commands, directions or policies to all our officers in the field as well as maintaining communication with the public. We also conduct internal and external communication with all of the stakeholders including local government and the public. In order to do that, we use all media channels, from handy talkies, radio, TV and so on, including social media. We collect data from various stakeholders. – Case1R1.

The agency’s Twitter account shows that this agency has used Twitter since September 2009 and can be categorized as an early adopter. The assignment of three shifts per day and its 24-hour per day social media use seems to result in a high number of posts on the agency’s Twitter account. In total, there were 42,165 posts in the agency’s official Twitter account. They consisted of 33,763 tweets (80%), 8,380 retweets (20%) and 22 replies (0%) during the 182-day observation period from 1 January 2014 to 30 June 2014. This number gives a daily average of 186.54 tweets per day, 46.3 retweets per day and 0.12 replies per day. As can be seen in Figure 6.1 that shows the time span between the first and last tweets posted in a day between 1 January 2014 and 30 June 2014, this agency operated its Twitter account nearly 24 hours a day. The density of the graph indicates that this agency has an intensive daily
social media operation. Based on the role of the information hub and the Twitter data, Case 1 provides evidence of the frequency, interactivity and duration of its social media use.

![Figure 6.1 Time between first and last tweets posted by Case 1](image)

*Figure 6.1 Time between first and last tweets posted by Case 1*

**Social media policy.** The unit that operates social media in the organization was established in 2005 to maintain various organizational communication channels. This unit had experience in interacting directly with the public on radio, TV and other media. Therefore, when social media was included as one of its communication channels, the agency brought the policies and experience it had gained in the other media channels to the social media context. Based on these policies, the unit has the authority to directly answer the public inquiries. As the interviewee pointed out:

> Social media is one of our media channels. We don't have specific guidelines for social media. We have a long history. We have interacted with the media since 2005 so we do not see that this is different from other media. – Case1R1.

**Innovative organizational culture.** During the interview, there was no evidence of an innovative organizational culture. However, based on the Twitter data findings, it can be seen that this agency was among the early social media adopters in Indonesia. This suggests that this agency accepted new ideas and technology and supports experimental activities. This indicates the existence of an innovative culture.

**Communication.** The very active social media use has enhanced the communication performance of this agency. Among the evidence derived from the interview were timely public communication and public reports. The interviewee provided an example of information dissemination by stating:
Imagine that informing the citizen in that [rural] area could otherwise take hours or days [to accomplish the information dissemination]. So yes, it [social media] increases our [communication] speed. – Case1R1.

Disaster management performance. As an information hub, the agency communicated very actively with the public in areas affected by disasters. This indicates that this agency collaborated actively with the public to enhance disaster responses during disaster situations. This is also evidence of the effect of social media use in improving disaster management performance. As the interviewee stated regarding the improved disaster responses:

That is right [that the disaster management performance is improving] ... Citizens need information including the flood status ... and we quickly provide help for the victims in the flood area. – Case1R1.

6.1.1.3 Public value creation

The interviewee did not clearly state the value of social media for this agency. However, from the extent to which this agency uses social media, there are at least two realized values: the effectiveness of its information sharing and accessibility/fairness. In addition, with the huge number of followers, this agency demonstrates the effectiveness of its services in reaching its audience through social media.

6.1.1.4 The public’s co-production

There was evidence of the public’s co-production from the interview. The interviewee believed that the agency could not achieve its goals without the active participation of the public. The intensive information exchange through social media with the public is evidence of the public’s co-production. As the interviewee stated:

You can check our social media account and identify how many postings are made by the public to us. Their participation is so high, especially in communicating the public’s aspirations to us. – Case1R1.

Consistent with the interviewee’s statements, our observations from 1 January to 30 June 2014 of tweets mentioning this agency’s Twitter account showed evidence of extremely high co-production with the public. During the 182-day observation period, this agency’s Twitter account was mentioned in 465,208 tweets or 2,556.1 times per day. This number is extremely high.
6.1.2 Case 2

6.1.2.1 Organization and interviewees

Case 2 is in an agency at the national level. The main task of the agency is to provide accurate and timely early warning of disasters. Case 2 is located in Jakarta. The interview involved three key personnel in its organizational social media use: the head of the agency (Case2R1), the head of the IT department (Case2R2) and the head of website section who also acted as social media manager (Case2R3).

6.1.2.2 Value creation process

In general, the value creation process at this agency involved active social media use, the existing media policy that provides support for social media use, an innovative organizational culture supported by top management, timely communication and enhanced disaster management performance.

*Social media use.* At this agency, social media was one of several communication channels (others were SMS, website, radio and siren) for nationally disseminating disaster-related information. Social media was used to regularly inform the public about hazards that could develop into disasters. Information was gathered from all departments in the organization and fed into the social media by the social media team which consisted of four personnel.

This agency has a well-established back office system for automatically predicting and detecting events that might lead to disasters. The detection system involved various types and huge numbers of sensors to automatically predict or simulate the impact of disasters. The simulation results were then analyzed and the decision on whether the information should be publicly disseminated is made. If the decision is to broadcast the information to the public, then the information is transmitted through SMS, website, radio, siren, and TV channels. The information could also be possibly targeted to a limited number of governments.

This agency has several social media accounts listed on its website. However Twitter was the most actively used. Social media, in this case Twitter, has been integrated
into the internal information system and it operates under the existing standard policy to provide timely information to the public. The social media manager stated:

We post information automatically to Twitter ... the same information that we publish through press conferences and other publication channels. – Case2R3

Our observation of Twitter showed that this agency started using Twitter in January 2010. The Twitter posts are dominated by tweets (not retweets or replies). In total, there were 2,609 posts in the official agency’s Twitter account. They consisted of 2,608 tweets (100%), 1 retweet (0%) and 0 replies (0%) during the 182-day observation period from 1 January 2014 to 30 June 2014. This gives an average of 14.41 tweets per day, 0.01 retweets per day and 0.00 replies per day. This proportion shows that there was almost no interaction through social media. This might be because the tweets were automatically posted. The time between the first and last tweets posted in a day between 1 January 2014 and 30 June 2014 is presented in Figure 6.2. Figure 6.2 indicates the frequent and continuous use of Twitter. To sum up, Case 2 provided evidence of the high frequency and duration of its use of social media, but did not provide evidence of high levels of interactivity.

![Figure 6.2](image)

Figure 6.2 Time between first and last tweets posted by Case 2

**Social media policy.** The existing policy on information publication affected the organization’s social media use. The rules, procedures and standards for information provision through social media followed the organization’s existing policy, which focused on information dissemination but not interaction. As the social media manager pointed out:

The same standard of five minutes for information delivery [through social media] is applied too, just like our SMS service. – Case2R3
In contrast, when there was no related procedure available, they found difficulties in utilizing social media. This happened in the use of social media to interact with the public as stated by the social media manager:

Yes, we still have homework to do on how to interact with the citizens more closely. – Case2R2.

In addition to the head of the IT department, the social media manager stated:

When we reviewed the ways we interact with the public, we found that we have no standard on how to do so. – Case2R3.

_Innovative organizational culture._ The organization realized that innovation is important for increasing the involvement of the public. Top management has set the tone for an innovative culture by underlining the importance of organization continuing to find new ways to achieve its missions through experiment. The head of the agency showed his support by stating that:

Innovation is the key to increasing the understandability and accessibility [of a disaster warning] and encouraging the public to be more involved. – Case2R1.


does not count

_Communication._ Case 2 enhanced the communication process for issuing early warnings. The enhanced communication performance obtained from social media use included timely information dissemination to the public and continuous monitoring of events through social media. The social media manager stated:

Our colleagues in other departments grab information from social media to verify their predictions. For example, they might predict an event will happen at a certain area in the afternoon. They then monitor Twitter to check whether their prediction is right or not. – Case2R3.

_Disaster management._ Social media use enhanced disaster management capability in two ways: through timely information provision to the public and effective clarification in response to false information. This is consistent with the results of previous studies which have found that social media is effective for combating false information or rumors (Ehnis & Bunker 2012; Oh et al. 2013). The improved communication enhanced disaster performance by decreasing the degree of uncertainty during disaster situations, as the head of the IT department pointed out:
People tend to look for official information after a disaster strikes. Especially when the magnitude of the disaster is huge, within an hour, there will be a lot of false information, for example rumors that different types of disasters are going to strike, or rumors that the disasters will be the same as a previous one, but stronger. When we provide official information, then that kind of problem is dealt with. – Case2R2.

6.1.2.3 Public value creation

In Case 2, the value creation process enhanced the realization of public value. At least three public values benefited from the social media use at this agency, including efficiency, effectiveness and reliability. Efficiency was improved by reducing the resources required to provide the same amount of service. In the past, there was high usage of the organization’s website when disasters struck. Since the agency began using social media, the use of its website has significantly reduced. The second value is the increased audience achieved by allowing citizens to freely subscribe to the agency’s social media channels or through the information exchange in disseminating the information released by the agency. The third public value was the increased reliability of the information channel. As the head of the IT department stated:

Previously we relied on the willingness of citizens to access our website. The website often had problems due to its high workload, so we tried to provide alternative information sources. We try to divert some of our website’s load to our social media channels. – Case2R2.

6.1.2.4 The public’s co-production

There is evidence of the public’s co-production from the interview. The interviewee believed that the public’s co-production is crucially important to the realization of public value. This is achieved by the information exchange with members of the public through social media in the form of retweets, likes and other responses. As the head of the IT department stated:

We have X [number of] followers now. Our understanding is that the actual number of Twitter users who pass on the information we provide is higher than the number of our followers. This means that X is the minimum number of the people who receive our information. The number grows significantly when a disaster situation is in unfolding. – Case2R2.
Consistent with the interviewee’s statements, our observation from 1 January to 30 June 2014 of tweets that mentioned this agency’s twitter account shows evidence for very high public co-production. During the 182-day observation period, this agency’s Twitter account was mentioned in 101,587 tweets – an average of 558.2 times per day. This number is very high.

6.1.3 Case 3

6.1.3.1 Organization and interviewees

The Case 3 is a national level agency which is assigned to deal with particular type of hazard in Yogyakarta. Its main task in disaster management is to provide accurate and timely early warnings of a particular type of hazard. Case 3 is located in Yogyakarta. The interviewee was a head of section who at that time served as the head of the agency (Case3R1). This agency assigned one staff to manage its social media channels.

6.1.3.2 Value creation process

In Case 3, the value creation process could not be observed through the interview even though there was evidence of the frequent use of social media, social media policy and an innovative organizational culture. The interviewee stated that the value creation process was achieved through other communication tools instead of social media. The value created from social media use has not been examined yet.

*Social media use.* The agency has an obligation to provide early warning to its stakeholders (local governments and its central organization), but it is not mandatory for this agency to provide the information to the public. However, this agency provides early warning disaster information to the public through several communication channels including radio, facsimiles, website, SMS, and social media. This agency had Facebook and Twitter account. As the interviewee stated:

> We also use Twitter to disseminate the information to the public. However, we still do not know how effective Twitter is for early warning. – Case3R1.

Observation on this agency’s Twitter use shows low levels of interaction and large amounts of one-way information provision. Its Twitter account has been consistently
used since April 2013. Of the 2,681 posts on its Twitter account, there were 2,246 tweets (or 84%), 7 retweets (or 0%) and 428 replies (or 16%). During the 182-day observation period from 1 January 2014 to 30 June 2014, this agency posted 12.41 tweets, 0.04 retweets and 2.36 replies per day. Considering that this agency is focusing on early warning, the amount of interaction is quite high. The time span between the first and last tweets posted in a day between 1 January 2014 and 30 June 2014 as presented in Figure 6.3 indicates that this agency has a strong social media presence. In sum, although the interviewee did not provide much evidence of social media use, the Twitter observation shows that Case 3 had a high frequency of social media use, but less on interactivity and duration.

**Figure 6.3** Duration between first and last tweets posted by Case 3

*Social media policy.* This agency has not established a social media policy, but they have internal mechanisms or rules about processing the information to be publicly available. Its existing internal mechanisms might have a relationship with its very active Twitter use. As the interviewee stated:

> Information that will be released to the public must be authorized by the organization. We have internal mechanisms to determine whether information can be released or not. – Case3R1.

*Innovative organizational culture.* The agency claimed that they supported experimentation in doing things in new ways as long as the activities did not break its internal rules. As the interviewee stated:

> As a government organization, we have rules and standards we should obey. As long as an activity is in line with our rules and standards we will support it. – Case3R1.
Communication. Based on the number of retweets and replies, it can be concluded that the organization has established interactive communication with the public. However, the interviewee still believed that social media was not an effective communication channel for achieving its main task of providing early warning about a particular type of hazard in a particular area. As the interviewee stated:

... that is because our main task is early warning and we have our specific target communities in the affected area. We do not know yet how many of them use social media. So, we still rely on the radio (HT) for communication with communities in the affected area. – Case3R1.

Disaster management. Social media use has not been considered as a factor that influences the agency’s disaster management performance. In this case, the agency uses disaster risk reduction as a measure of disaster management performance. As the interviewee stated:

When we acquire new technology or invest in certain equipment, we ask ourselves whether the new technology will reduce risk. For social media, we don’t know how to measure that. Do we have to map our audience? Maybe further study would identify social media penetration in the area of X. But … most of the villages we need to inform when Y [source of the disaster] status is increasing are mostly in remote areas, where internet access is still limited, if it exists at all. Therefore we still rely on the radio. – Case3R1.

6.1.3.3 Public value creation

In line with disaster management performance, the agency claimed that they have not identified the benefits realized from its social media use. As the interviewee stated:

We don’t know yet. We need to identify further our social media audience before we can clearly say that [benefits]. – Case3R1.

6.1.3.4 Public co-production

Our observation from 1 January to 30 June 2014 of tweets mentioning this agency’s Twitter account showed evidence of high public co-production. During the 182-day observation period, this agency’s Twitter account was mentioned in 37,601 tweets or an average of 206.6 times per day, which is very high.

In contrast to the Twitter observation, there was no evidence of public co-production provided in the interview. The interviewee argued that the agency was only targeting
a certain area and a specific audience and said that the active public participation through Twitter was considered as noise. As the interviewee stated:

I think the challenge is in the [social media] technology itself which might focus on a wider audience. Information becomes very noisy because everyone can participate. Since our focus is on early warnings, a noisy information channel can mean that our information receives less attention. – Case3R1.

6.1.4 Case 4

6.1.4.1 Organization and interviewees

The Case 4 is a national-level disaster management agency. The main tasks of the agency comprise the all disaster management phases including risk mitigation, disaster preparedness, disaster response and recovery. Case 4 is located in Jakarta and the interviewees were the head of the IT department (Case4R1) and a supervisor who acted as the social media manager (Case4R2). In total, four staff members managed the organization’s social media channels.

6.1.4.2 Value creation process

In this case, the authority for dissemination official social media messages was not clearly assigned to a particular department or staff member, and this influenced disaster communication and disaster management performance. Though improved timeliness could be achieved, value creation from social media use received a low priority from the social media team member.

*Social media use.* The aim of the social media use in this agency was twofold. The first was information dissemination and the second was interaction with the public. This agency did not focus only on Facebook and Twitter, but also intensively utilized YouTube for information dissemination. While Twitter and Facebook were used for disaster-related information dissemination, YouTube was used mainly to provide information that related to disaster mitigation activities. The information provided in the three social media platforms was also displayed on the organization’s website. As the head of the IT department stated:

Our organization now is using Facebook, Twitter and YouTube. Our main aim is to disseminate the information from our organization directly to citizens. ... By doing that, we hope that we can create interaction with the
public and that public are able to access news from our organization. – Case4R1.

This agency has been using Twitter since July 2011. During the 182-day observation period between 1 January 2014 and 30 June 2014, this agency made 1,886 posts which consisted of 1,507 tweets (or 80%), 317 retweets (or 17%) and 62 replies (or 3%). On average, this agency posted 8.33 tweets, 1.75 retweets and 0.34 replies per day. The time spans between the first and last tweet posted in a day between 1 January 2014 and 30 June 2014 as presented in Figure 6.4 indicate that this agency spent less time managing its Twitter account than did Case 1, Case 2 and Case 3. All in all, Case 4 provided evidence of the high frequency and interactivity of its social media use, but less evidence of long duration.

![Figure 6.4 Duration between first and last tweets posted by Case 4](image)

Social media policy. The interviewee claimed that their organization has a media policy. However, it seems the policy did not include the delegation of authority for using social media. There was ambiguity on whether the IT department officially had the right to run the agency’s social media accounts. In this case, the agency did not give authority to this department to officially manage their social media accounts. As a result, the team members felt that they did not have the right to manage the official social media of the organization. As the head of the IT department stated:

Right now, we manage our social media on a voluntary basis ... we know that social media is useful for our organization and we can benefit from that, so we manage our social media account. In my view, the public relations department should be the one that manages social media. But we take initiative to manage that. – Case4R1.

This agency has an internal rule to determine whether information should be released to the media, including social media.
Innovative organizational culture. There was evidence that this agency had an innovative culture. In its social media use, top management supported experimentation on the information delivery to the public through social media. As the social media manager said:

We did some experiments on how we designed the information and so on, and so far top management has supported these activities. – Case4R2.

As a result, there is an increase in the communication process between the agency and the public.

Communication and disaster management. The interviewee claimed that there was improved the timeliness of its communication with the public, but not for inter-agency communication. The absence of the formal assignment of responsibility from top management meant that social media was given a low priority. As the social media manager stated:

... during the rainy season, citizens asked the water level in the dam X. When we are busy, we just forward that information to the other agency, Y. Sometimes, the response from there [other agency] is not as fast as we expect. But we have to give our priority on our main tasks. Otherwise, we would ask about the information directly to the other agency by using telephone or other media. – Case4R2.

6.1.4.3 Public value creation

In general, benefits were realized from social media use. The public value realized through social media use in this agency was citizen satisfaction. This could be an effect of the more timely and direct communication between the agency and the public. As the head of the IT department stated:

But overall we can see two things, first that citizens are more familiar with our organization and that it seems that they are satisfied with our organization so far. – Case4R1.

6.1.4.4 The public’s co-production

From the interview, there was evidence of the public’s co-production through social media use. At this agency, two types of public’s co-production were found. First, the public requested its services through social media, for example by asking about the water level of a certain dam as discussed in the previous section. Second, the public
also promoted this agency’s social media accounts to their networks. As the social media manager stated:

The same thing happened during the disaster X. Some people suggested to others that they follow our social media account for more detailed information. At least it shows their interest in our organization. – Case4R2.

Consistent with the interviewee’s claims, the observation from 1 January to 30 June 2014 of tweets mentioning this agency’s Twitter account showed evidence of high public co-production. During the 182-day observation period, this agency’s Twitter account was mentioned in 15,406 tweets or 84.6 times per day. This number is very high.

6.1.5 Case 5

6.1.5.1 Organization and interviewees

Case 5 is a national-level agency which concerned with disaster management mainly on search and rescue (SAR) and/or safety. Case 5 is located in Jakarta and the interviewee was the social media manager (Case5R1). The social media account was maintained by the interviewee himself/herself.

6.1.5.2 Value creation process

At Case 5, value creation was achieved through active information provision and two-way communication through the use of social media. There was a social media policy which dealt with information sharing. Support from the top management was received informally. In general, this agency had successfully improved its communication and disaster management performance.

Social media use. The main aim of social media use at this agency was to promote the organization to the public through engagement. The agency has switched from Facebook to Twitter as its main social media channel. According to the interviewee, Twitter has advantages for reaching and interacting with the public. Social media has been used as a complement to the organization’s website. Information that is passively available on the website is actively communicated to the public through social media. As the interviewee stated:
That kind of information is available in our website, but social media allows us to spread that information to our audience. Of course we have to design the information to avoid the citizens being bored. – Case5R1.

This agency used social media to actively interact with the public through “conversations”. The interaction was developed through continuous responses to every inquiry received by the agency. As the interviewee stated:

For example when there is an inquiry on the requirements of the minimum height for recruitment. That kind of question comes repeatedly. I have to answer the same question from different followers. – Case5R1.

The interviewee’s statements on the agency’s social media use were in line with the findings on its Twitter account. This agency has been using Twitter since June 2012. During the 182-day observation period between 1 January 2014 and 30 June 2014, there were 7,159 posts which consisted of 2,702 tweets (or 38%), 3,418 retweets (or 48%) and 1,039 replies (or 14%). The dominance of retweets and replies indicated that social media was used interactively. On average, this agency posts 14.93 tweets, 18.88 retweets and 5.74 replies per day. The time span between the first and last tweets posted in a day between 1 January 2014 and 30 June 2014 as presented in Figure 6.5 indicated frequent and continuous social media use. All in all, Case 5 provided evidence of high social media frequency of use and interactivity, but it had lower duration.

![Figure 6.5 Duration between first and last tweets posted by Case 5](image)

*Social media policy.* Similar to Case 4, the agency did not officially assign an interviewee to manage the social media account. The interviewee stated that the existence of a link on the official organization website to the social media account he/she managed indicated that he/she had the authority to manage the official social media account. The interviewee claimed that the unofficial assignment does not
create a barrier for him/her to maximize the benefits from social media use. The interviewee stated that the organization had a rule on information sharing and he/she understood the rule.

Innovative organizational culture. The organization supported experimentation in the presentation of information published through social media channels. This is evidence that an innovative organizational culture existed.

Communication. As discussed in regard to social media use, there was evidence of timely information sharing with the public. This suggests that social media use increased the communication capability of the agency.

Disaster management. The interviewee said that social media was an effective way to clarify information during disaster/crisis situations. The agency could provide a statement to the public through social media to counter false information and to limit negative perceptions. As the interviewee stated:

We don’t expect disasters but we have to be ready for them. That is when we need a public network like we have in social media. For example, an accident occurred. One of our X fell down during a routine operation. Previously the public quickly blamed us. They assumed that we had not done maintenance properly, or we lacked skills. Now, that kind of perception is quite easy to tackle. Once we have provided information in Twitter, the negative perceptions turned into support. – Case5R1.

6.1.5.3 Public value creation

The interviewee stated that public value was realized through the use of social media. Besides the improved responsiveness discussed above, there were four other values realized from the organization’s social media use: satisfaction, accountability, openness, and effectiveness in reaching the audience. Responsiveness and two-way communication led to audience satisfaction. Accountability was achieved by showing all the organization’s activities to the public and letting the public evaluate whether these met with the required standards or not. Similarly, openness was realized by disclosing information to the public. Effectiveness in reaching the audience was achieved through information exchange among the followers. As the interviewee stated:
... It [the answer] is only 5 characters: 165cm, but it has a huge impact for the follower. The follower who posted the question feels that we treated them well. They feel that we pay attention to them. – Case5R1.

The public paid taxes to fund our operation. This is a sample of activities that is funded by the public fund. – Case5R1.

... because of a certain conditions, we transparently apologized to the public [because we did not do SAR operations due to the weather].... We avoided risk to our personnel so that they were not the next unnecessary victims. That kind of information is disclosed to the public. – Case5R1.

Now we have 24,300 followers. If 10% of them retweet our messages and they are retweeted by their friends, we can imagine how many people will get the information. – Case5R1.

6.1.5.4 The public’s co-production

As discussed in relation to the value creation process, the interviewee acknowledged that public support is very important during disaster situations. The support was developed through the interaction and information exchange during non-disaster situations that created a loyal audience. This suggests that the public co-produces by extending the agency’s service. Besides to retweeting of its messages, another form of public co-production through social media use for this agency was in requests for services and promotion. Requesting services could be done in a simple manner such as by asking a question. Requesting the organization’s service has been discussed in the value creation section. Followers who were satisfied with these services then promoted the organization to their networks. As the interviewee stated:

In return, they become loyal followers and promote our social media use. – Case5R1.

Similar to the interviewee claims, our observation from 1 January to 30 June 2014 on tweets mentioning this agency’s twitter account showed evidence of very high public co-production. During the 182-day observation period, this agency’s Twitter account was mentioned in 41,515 tweets – 228.1 times per day on average. This number is very high.
6.1.6 Case 6

6.1.6.1 Organization and interviewees

Case 6 is a provincial disaster management agency. The main tasks of the agency cover all disaster management phases including risk mitigation, disaster preparedness, disaster response and recovery. Case 6 is located in Jakarta and the interviewee was the head of the IT department (Case6R1) who also acted as social media manager. In total, there were 17 staff working 24 hours a day in shifts and they all had access to the organization’s social media channels.

6.1.6.2 Value creation process

At Case 6, the value creation process was achieved through active information provision and interaction through social media. There are several policies that support social media use at this agency. There is also evidence that this agency has an innovative culture. In this way, this agency increases its communication and disaster management performance.

Social media use. The main aim of the social media use at this agency was to enhance communication with the public in order to increase its disaster management capability. This agency has had internal prediction systems for the floods that annually inundate some of the agency’s area of jurisdiction, with serious impacts. Social media was integrated into its communication system because the residents in its area of jurisdiction were among the most active social media users in the world. As the head of the IT department stated:

In our area, we broadcast disaster-related information mostly related to floods. We have our own system to predict floods. Based on that system we have 4 to 9 hours, it depends on which river causes the flood, before the flood inundates Jakarta. So, in terms of broadcasting the warning, we still have enough time to inform the affected citizens ... so social media has become our main option. We know that the use of social media by the public is increasing significantly. – Case6R1.

The number of personnel assigned to managing the agency’s social media accounts seems to have an effect on its social media use. There were 9,702 posts which consisted of 7,977 tweets (or 82%), 654 retweets (or 7%) and 1,071 replies (or 11%) during the 182-day observation period between 1 January 2014 and 30 June 2014.
The number of retweets and replies was significant evidence of interaction through social media. In average, this agency posts 44.07 tweets, 3.61 retweets and 5.92 replies per day. The time span between the first and last tweet posted in a day between 1 January 2014 and 30 June 2014 as presented in Figure 6.6 indicates frequent and continuous social media use. This agency has been using Twitter since January 2012. All in all, Case 6 provided evidence of high social media frequency of use, interactivity and duration.

![Figure 6.6 Duration between first and last tweets posted by Case 6](image)

**Social media policy.** The existence of a team that was dedicated to maintaining social media use shows that this organization had clearly delegated the authority for social media management. For classifying information, this agency also had a clear basis, The Law on Public Information, for how to select the information that could be released to the public. As the head of the IT department pointed out:

> We base our decision [for information sharing] on the law about public information. As long as the information does not cross that line, we are allowed to post the information. – Case6R1.

For interaction with the public through social media, this agency has a simple rule for to ensure that the team monitors social media use, clarifies false information and checks information content. As the head of the IT department stated:

> Now, our team will always mention one of their supervisors when it retweets or replies to citizens’ inquiries. We use the tweet that mentions our name as part of the monitoring of how our team accomplishes its job. – Case6R1.

**Innovative organizational culture.** This agency provides support for experimentation and new ways of doing things. Innovative actions, such as a hacking competition, have been held to attract public interest to enhance its disaster management
capability. Appreciation was also provided to the winner of the competition. As the head of the IT department stated:

... this year we held hackathon .... We think hackers [the public] are potential resources. We tried to invite all of the parties to participate in increasing our capability in disaster situations. They can create tools for us. They can create software that benefits the public. – Case6R1.

*Communication.* Though interactive communication, this agency has established collaboration with the public during disaster events. This agency has also used information from the public to monitor the status of disasters. Thus, there was evidence that social media use had enhanced the communication process. As the head of the IT department stated:

We consider the public can be our eyes [during disaster events]. .... First we have to know the risks and their statuses ... Second, we have to be able to gather information. One of the tools to sense is social media. Third, we have to inform the public of the most affected areas ... we are also able to sense what is happening in the disaster-affected area through social media. For example, we will be able to find out whether the flood has inundated certain areas by monitoring social media.

*Disaster management.* The agency believed that social media can increase their disaster awareness and minimize risks to the people in the affected area. Disaster awareness can be achieved through a continuous monitoring on social media, while minimizing the disaster risk can be achieved by providing timely information to the public in the potentially affected areas. As the head of the IT department stated:

We found that social media helps us in information sharing. More importantly, social media increases our awareness of a disaster event. For example when we post a tweet and are following how the public do the information sharing through retweets and replies, we feel like we are in the field, in the area that affected by the disaster. – Case6R1.

We believe that having more informed citizens will reduce the impact or the risk of disaster … SMS, other media and social media have now become one of our main options. – Case6R1.

6.1.6.3 Public value creation

This agency has developed a network of volunteers in the disaster-affected area that can be contacted through SMS. However, this agency expanded its network by using
social media to reach otherwise unreachable networks. In other words, social media establishes accessibility/fairness. As the head of the IT department stated:

Social media is an additional means to reach those who are unreachable through mobile phone (SMS). – Case6R1.

6.1.6.4 The public’s co-production

As discussed in the value creation process, there was evidence that public co-production was occurring. The public extends the agency’s services through information exchange mechanisms such as retweets and replies. Consistent with the interviewee’s claims, our observation from 1 January to 30 June 2014 on tweets mentioning this agency’s twitter account showed evidence of the public’s co-production. During the 182-day observation period, this agency’s Twitter account was mentioned in 13,655 tweets or 75 times per day. This number is very high.

6.1.7 Case 7

6.1.7.1 Organization and interviewees

Case 7 is a provincial agency for disaster management. Its main tasks were related to all disaster management phases including risk mitigation, disaster preparedness, disaster response and recovery. Case 7 is located in Jogjakarta and the interviewees were one of the heads of department (Case7R1) and a social media manager (Case7R2). In total, there were four staff who had access to managing the organization’s social media channels.

6.1.7.2 Value creation process

At Case 7, the value creation process through social media did not exist. Less social media use, the absence of a social media policy and a lack of management support for doing new things created no support for improving communication and disaster management performance.

Social media use. This agency used social media to disseminate disaster-related information to its stakeholders which consisted of other government organizations, the public and private organizations. They claimed that they were in the early phase of interactive communication development with their stakeholders through social
media. Similar to Case 3, the interviewee argued that social media was not the agency’s main communication channel. As the interviewees explained:

We also use interactive communication channels, such as our website and social media. Social media is used in three stages of disasters: pre-disaster, disaster response and the recovery phase. Especially in the pre-disaster and disaster response phases, social media is very important because it has speed and reach. – Case7R1.

Not all of our audiences use social media. Social media provides more information channels. For example in our area, we have quite a strong community that uses radio as the main communication channel. – Case7R2.

Our observation of the organization’s Twitter account was in alignment with the interviewee’s claims that this agency had not utilized social media intensively. There were only 145 posts which consisted of 122 tweets (or 78%), 18 retweets (or 15%) and 5 replies (or 7%) during the 182-day observation period between 1 January 2014 and 30 June 2014. On average, this agency posted only 0.67 tweets, 0.1 retweets and 0.03 replies per day. The time span between the first and last tweets posted in a day between 1 January 2014 and 30 June 2014 as presented in Figure 6.7 indicated rare social media use. This agency has been using its Twitter account since August 2012. All in all, Case 7 did not provide evidence of high social media frequency of use, interactivity or duration.

Figure 6.7 Duration between first and last tweets posted by Case 7

_Social media policy_. Though this agency has been using radio for its daily operations, they had not expanded their existing media policy to cover social media. The absence of a policy hindered the ability of this agency to maximize communication through social media. As the acting social media manager stated:
... they [top management] limit our activities because we don’t have guidelines on what is allowed to be shared, what is allowed to be uploaded, what is not to be shared and so on ... this is a government institution and sometimes we just do not release certain information to the public for certain reasons. – Case7R2.

Innovative organizational culture. Similar with the social media policy, the interviewee’s statement above on the social media policy implies the absence of top management support for the social media team members to conduct experiments.

Communication. The interviewee claimed that there was evidence of communication through social media. The agency received disaster reports from non-profit organization (NPO) and volunteers through social media. As the head of department stated:

Yes, there are some [reports from the public for disaster events], but limited. The active ones are the non-profit organizations or the volunteers. Common citizens are rare. – Case7R1.

Disaster management. The weak evidence of enhanced communication through social media use affects the absence of improvements to disaster management performance through social media use. Neither interviewee provided evidence of improved disaster management performance through social media use.

6.1.7.3 Public value creation

At this agency, there was no evidence of value creation through social media use. Consequently, public value through social media use was not realized. Neither interviewee provided evidence for public value realization.

6.1.7.4 The public’s co-production

As the interviewee Case7R1 stated in relation to communication performance, there was less participation from the public through the use of social media. Our observation from 1 January to 30 June 2014 of tweets mentioning this agency’s Twitter account showed no public co-production on Twitter. During the 182-day observation period, there were no tweets mentioning this agency’s Twitter account.

6.1.8 Case 8
6.1.8.1 Organization and interviewees

Case 8 is a national level agency which is tasked with disaster management, mainly on SAR and/or safety. Case 8 is located in Jakarta and the interviewee was the head of the IT department (Case8R1). At this department, four staff had access to the organization’s social media channels.

6.1.8.2 Value creation process

At Case 8, there was no evidence of value creation through social media use. Less social media use, the absence of a social media policy and lack of innovative organizational culture suggested low communication and disaster management performance through social media.

*Social media use.* This agency was using social media to disseminate disaster related information. There were several communication channels used by this agency, including phone hotline, its website and social media. At this agency, social media channels were maintained 24 hours a day. During working hours, social media channels were maintained by the IT department and after hours they were handed to the command center. The command center consisted of inter-departmental members, including IT department members. This agency used social media channels to distribute the information to the public in one-way communications. As the interviewee stated:

> Information we post in Twitter and Facebook always has a link to our website. We only use Twitter and Facebook for one way communication. – Case8R1.

Our observation of the agency’s Twitter account was in alignment with the interviewee’s claims that this agency used social media for one-way communication. There were 574 posts that consisted of 571 tweets (or 97%), 1 retweets (or 1.5%) and 2 replies (or 1.5%) during the 182-day observation period between 1 January 2014 and 30 June 2014. On average, this agency posted only 3.15 tweets, 0.01 retweets and 0.01 replies per day. The low number of retweets and replies indicated less interaction was done through social media. The time span between the first and last tweets posted in a day between 1 January 2014 and 30 June 2014 as presented in Figure 6.8 indicated less frequent social media use. This agency has been using
Twitter since June 2010. In summary, Case 8 provides a little evidence on social media duration, but failed to establish frequency of use and interactivity.

![Figure 6.8 Duration between first and last tweets posted by Case 8](image)

Figure 6.8 Duration between first and last tweets posted by Case 8

**Social media policy.** Similar to Case 7, even though this agency had procedures for the use of existing media (e.g. phone hotline) they had not expanded their media policy to cover social media. The absence of policy hinders the ability of this agency to maximize communication through social media. As the interviewee stated:

... we have no standard operation procedure on it. I mean, receiving information from the citizens, including from social media has not been included in the SOP. Only information received through emergency X is included in the SOP. – Case8R1.

Though the IT department had the authority to manage the agency’s social media channels, they did not have the authority to determine the content of the information. However, the Public Relations Department was not interviewed due to limited access of this study approved by the agency.

**Innovative organizational culture.** During the interview, evidence on an innovative organizational culture could not be found.

**Communication.** The absence of a social media policy and an innovative organizational culture hindered the capability for organizational communication through social media. The interviewee acknowledged that social media had not enhanced the agency’s communication performance. As the interviewee stated:

Based on our experience, when citizens report emergency situations, we ask for their identification for cross checking. In social media, it is hard to verify whether the report is true or not. We don’t know whether the people who
made the report are real and available for further clarification or not. – Case8R1.

Disaster management. There was weak evidence of organizational communication performed through the use of social media. In the results, there was no evidence that the organization’s disaster management had improved through social media use. The interviewee did not provide evidence of social media use.

6.1.8.3 Public value creation

Similar with Case 7, there was no evidence of value creation through social media use at this agency. Consequently, public value through social media use was not realized. The interviewee did not provide evidence of public value creation.

6.1.8.4 The public’s co-production

The statement of the interviewee on the organization’s social media policy indicated there was evidence that the public tried to communicate with the agency. Our observation on Twitter also showed that the agency’s Twitter account was mentioned in 2,702 tweets (or 14.8 per day) by other users. This indicated that the public was promoting, asking for, or forwarding information from, the organization through social media. This shows a low level of public co-production.

6.1.9 Case 9

6.1.9.1 Organization and interviewees

Case 9 is a regency-level agency for disaster management. The tasks of the agency involve all four disaster management phases – risk mitigation, disaster preparedness, disaster response and recovery. Case 9 was located in Yogyakarta and the interviewees were the head of the agency (Case9R1) and one social media staff member (Case9R2) who also acts as the social media manager. The social media manager was the only one who has access to manage organization’s social media channels.
6.1.9.2 Value creation process

In Case 9, there was evidence of value creation through social media use. The social media use, social media policy and innovative organizational culture suggested an improvement in communication and disaster management performance through social media use.

Social media use. The aims of the social media use at this agency were twofold: information dissemination and information collection. This agency held that social media can bring benefits especially in disaster response. As the head of the agency stated:

There are two aims of our social media use, first is to disseminate information and second, to collect information related to disasters. Furthermore, we want to have effective and efficient communication in disaster situations. – Case9R1.

This agency was categorized as a newcomer to Twitter. It created its Twitter account on 30 January 2014, five months prior to the interview. Our observation of its Twitter account supported the interviewee’s statements. There were 959 posts that consisted of 450 tweets (or 47%), 421 retweets (or 43%) and 88 replies (or 9%) during the 152-day observation period between 30 January 2014 and 30 June 2014. The starting date of the observation period was on the day its Twitter account was established and this made the observation period shorter than the other cases. On average, this agency posted 2.96 tweets, 2.77 retweets and 0.58 replies per day. This number was very high for a new Twitter adopter. The time span between the first and last tweets posted in a day between 30 January 2014 and 30 June 2014 as presented in Figure 6.8 indicated continuous social media use. Only one person had access to the agency’s Twitter account and this influenced its daily operation time. In summary, Case 9 provided evidence of its social media frequency of use and interactivity, but not duration.
Social media policy. This agency has not established its social media policy. However, they have clear delegation from the head of the agency that provides authority for the social media manager to utilize social media. The head of the agency realized that its social media account could become a live information source for journalists in conventional media such as radio, newspaper and TV. As the head of the agency stated:

X [the social media manager] should be ready in the field to continuously provide updates on the event [through social media]. There are a lot of independent journalists that use our social media account as their information source. – Case9R1.

Innovative organizational culture. The above statement of the head of the agency also implies that the agency supported new ways of doing organizational activities.

Communication. Though this agency had only created its Twitter account five months before, there was evidence that the social media use had improved the organizational communication performance. First, social media allowed the public to provide timely reports of disaster events. In contrast to Case 8, this agency had the ability to verify the reports. As the head of the agency stated:

The public also provides information related to disaster situations. That is useful information for us, but we have to check whether the information is correct or not. Now the amount of information we receive through Twitter is increasing. Often when we arrived at a disaster location, the head of the sub-district has not received information yet. We are usually the first to arrive. In the past, the information chain went through the head of the sub-district, head of district, and then it reached us. Now, the public can contact us directly. – Case9R1.
Second, by using social media, this agency has established timely and informal communication through social media. In achieving this second aim, this agency was continuously observing other agencies’ social media accounts that related to its main tasks. In contrast with interviewee Case3R1’s statement that they hadn’t measured the benefits of their social media use, interviewees in this case stated that the social media use by Case 3 influenced this agency’s performance in comparison to what it would have been if they had relied on conventional media such as facsimiles and phone calls. Timely information can be obtained by observing other agencies’ social media accounts. The timely output of information also created more fluent communication in comparison to formal communication practices in the past in which inter-agency communication was undertaken on letterhead paper with a signature of the head of the agency and an official stamp on top of the signature. As the head of the agency stated:

We follow other agencies’ Twitter accounts. For example, when X’s [a hazard] level is increasing, we use Case 3’s Twitter account as our main information source. We consider that is the official information from the Case 3. – Case9R1.

If we had to wait for the conventional media such as faxes [from Case 3], then we would be very late in responding the [disaster type]. So now they provide the information via social media. When X’s status is increasing, it is hard to reach Case 3 by phone. – Case9R1.

**Disaster management.** This agency used information released by other agencies through their social media accounts to make decisions. However, there was no evidence of inter-agency collaboration during disaster events. The evidence for improved disaster management performance from social media use achieved by this agency included timely disaster response and public collaboration. Examples of timely disaster response show that this agency responded to disasters faster than before. The establishment of public collaboration was achieved through information exchange with the public and non-profit organization (NPO) when disasters started unfolding. As the head of the agency stated:

They [the public and NPO] are quite active and we exchange information with them through Twitter. But if you are asking whether we see retweeting as an information exchange, yes we do. – Case9R1.
6.1.9.3 Public value creation

This agency had an improved value creation process through its use of social media. Interviewees provided evidence that this agency realized public value from its social media use through an improved value creation process. The benefits realized from its social media were: responsiveness to public inquiries, accessibility, open and transparent processes, and trust of the public in the agency. Evidence of responsiveness has been provided in the communication example. The accessibility of the agency has increased the available communication channels for the public to reach the agency. Open and transparent communication has been achieved by providing to the public continuous and honest information about what the agency has done. Finally, as a new organization, trust from the public is very important to obtain support for a long-term relationship. As the interviewees stated:

Previously when disasters were enrolling, people were asking by phone or text. Our Twitter use reduced that kind of inquiry. – Case9R2.

Our followers are knowledgeable enough, so we have to be honest [open and transparent]. That is the most important thing. We cannot make up something unacceptable that looks good to the public. – Case9R1.

In the long term it will affect the image of the agencies. Trust is important. – Case9R2.

6.1.9.4 The public’s co-production

The interviewees stated that there was evidence that the public had informed the agency about disaster events. This suggests that the public requested service from the agency through social media. Our observation of Twitter resulted in evidence which supported this. Even though this agency was newly formed and could be categorized as a new Twitter adopter, it received a great deal of attention from the public through social media. During 152 observation days from 30 January to 30 June 2014, this agency’s Twitter account was mentioned in 2,698 tweets or an average of 17.8 times per day. This number was higher than for Case 8 that operated at a national level. However the evidence indicated low public co-production.
6.1.10 Case 10

6.1.10.1 Organization and interviewees

Similar to Case 9, Case 10 is an agency for disaster management at the regency level. The tasks of the agency encompass all disaster management phases including risk mitigation, disaster preparedness, disaster response and recovery. Case 10 is located in the Yogyakarta area and the interviewee was the social media manager (Case10R1). This agency had three staff to maintain its website and social media channels.

6.1.10.2 Value creation process

Overall, this agency had relatively low social media use and no social media policy. Though the management provided support for innovative culture, there was weak evidence of the improved communication performance through social media use. There was no evidence that its disaster management performance had improved.

*Social media use.* The aim of the social media use at this agency was to increase the agency’s communication capability including promotion, coordination, disaster-related information provision and disaster-related data collection from the public. The interviewee stated that this agency is still at the exploration stage of social media use. Similar to Case 3, this agency relied more on radio because they have established a radio audience.

This agency created its Twitter account in January 2011, more than three years before the interview was undertaken. It means that this agency should not be in the exploration phase as stated by the interviewee. Our observation of its Twitter account also suggested less social media use than for the other cases. There were only 42 posts that consisted of 40 tweets (or 95%), 1 retweet (or 2.5%) and 1 reply (or 2.5%) during the 152-day observation period between 30 January 2014 and 30 June 2014. On average, this agency posted 0.22 tweets, 0.01 retweets and 0.01 replies per day. This number was the lowest social media use of all the cases. The time span between the first and last tweets posted in a day between 1 January 2014 and 30 June 2014 as presented in Figure 6.8 indicated very infrequent social media use. All in all, Case 10 provided no evidence of social media frequency of use, interactivity or duration.
Figure 6.10 Duration between first and last tweets posted by Case 10

*Social media policy.* The interviewee stated that the social media team had the authority to interact with the public through social media. However, the interviewee acknowledged that the team members still needed further guidelines to directly communicate with the public through social media. As the interviewee stated:

> In using social media, we delegate the authority to answer citizens’ inquiries to the social media team. However it seems they need guidelines in order to answer all of them ... We know how to communicate with the disaster-related volunteers, but to deal with the public is slightly different – Case10R1.

*Innovative organizational culture.* Regarding innovative culture at this agency, the interviewee stated that the management supports experimentation in the way they interact with the public through social media.

*Communication.* The interviewee explained that there was evidence of disaster-related event reports from the public. However, the interviewee acknowledged that they had difficulty in responding to the public’s reports and inquiries. Similar to Case 8, this agency had difficulty in verifying reports from the public. It seems that the absence of a social media policy hindered the potential use of social media to improve organizational communication performance.

*Disaster management performance.* From the interview, there was no evidence that there is an improvement in the agency’s disaster management performance from using social media.
6.1.10.3 Public value creation

A value creation process for the social media use did not exist at this agency. From the interview, there was no evidence of public value creation from social media use.

6.1.10.4 The public’s co-production

From the interview, there was evidence that the public requested service from the agency by informing it of disaster events. However, our observation from 1 January to 30 June 2014 of tweets mentioning this agency’s Twitter account shows very low public co-production. During the 182-day observation period, this agency’s Twitter account was mentioned in only 55 tweets or 0.3 times per day. This number is very low.

6.2 Cross-case analysis

Cross-case analysis is needed to avoid bias in information processing by the investigators in within-case analysis (Eisenhardt 1989). In cross-case analysis, concepts can be used as dimensions to view the data in divergent ways (Benbasat et al. 1987; Eisenhardt 1989). By doing this, cross-case analysis prevents premature conclusions being drawn. In addition, cross-case analysis allows the study to yield more general results (Benbasat et al. 1987).

As discussed earlier in the research methodology, cross-case analysis was undertaken by comparing the similarities or differences between two groups of cases (Eisenhardt 1989). In this study, the ten cases were put into two groups based on whether public value was created through social media use. This information was obtained from the interview results and Twitter data analysis. The two groups were then compared based on the constructs of the research model.

The first group consisted of cases with clear evidence of public value creation through social media use. The first group comprised Case 1, Case 2, Case 3, Case 4, Case 5, Case 6 and Case 9. For Case 3, though the interviewee Case3R1 did not provide evidence of public value creation value, interviewees from Case 9 testified that there was evidence that public value was realized from Case 3’s social media
Case 9 regularly uses information released by Case 3. These two agencies are in the same area and share some of the same hazards.

According to Case9R1 and Case9R2, there has been an increase in the accessibility and reliability of Case 3 since it began to use social media. Therefore, Case 3 is grouped in the first group, which comprises the agencies that were able to realize public from their use of social media. The remaining three cases, Case 7, Case 8 and Case 10, fell into the second group with no public value created from their social media use. It should not be concluded that these three agencies do not create value – only that they do not create it through social media use.

Having these two groups established, each construct in the research model is compared between the groups. The summary of the comparison of each construct for the two groups is presented in Table 6.1 and discussed in the following subsections. In Table 6.1, the construct of value creation is not presented because this construct is a higher order construct that has been represented by its lower order constructs, including Social Media Use, Social Media Policy, Innovative Organizational Culture, Communication and Disaster Management.

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Group 1. PV is Realized</th>
<th>Group 2. PV is Not Realized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social media use</td>
<td>High social media frequency of use, interactivity and/or duration</td>
<td>Low frequency of use, interactivity and duration</td>
</tr>
<tr>
<td>Social media policy</td>
<td>Existing media policy, continuous monitoring, clarify false information, knowledge to share or disclose information, delegation of authority to respond to public inquiries and clear management responsibility</td>
<td>Has existing media policy but failed to adapt to social media Less evidence on delegation of authority to directly answer inquiries</td>
</tr>
<tr>
<td>Innovative organizational culture</td>
<td>Appreciate creativity, support informal idea exchange, encourage new ideas, support experimentation and knowledge exchange</td>
<td>Less support for innovative culture</td>
</tr>
<tr>
<td>Communication</td>
<td>Timely interagency communication, informal</td>
<td>Less evidence of increased communication</td>
</tr>
<tr>
<td>Disaster management</td>
<td>Disaster awareness, disaster risk reduction, improved disaster response, collaboration with the public and effective rumor handling</td>
<td>No evidence on improved disaster management performance</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Public value</td>
<td>Economic value: responsiveness, effectiveness, reliability. Social value: trust in government, accountability, openness, fairness</td>
<td>No benefits have been realized from social media use</td>
</tr>
<tr>
<td>The public's co-production</td>
<td>The public is requesting, extending and promoting the agencies’ services</td>
<td>Very low public involvement in service co-production</td>
</tr>
</tbody>
</table>

### 6.2.1 Social media use

As discussed in Chapter 2, three dimensions were used to examine the social media use of each agency, namely frequency of social media use, interactivity and duration. Cases in Group 1 had better social media use than cases in Group 2. In Group 2, only Case 8 provided evidence of its duration, but none of the cases in this group showed evidence of social media frequency of use and interactivity. In contrast, all agencies in Group 1 at least had social media frequency of use. Some of the cases had both social media frequency of use and interactivity (Cases 1, 4, 5, 6 and 7) and some of them have only frequency of use (Cases 2 and 3). Meanwhile, Cases 1, 2 and 6 provide evidence on the social media duration.

The evidences from the agencies’ Twitter accounts are shown in Table 6.2, 6.3 and 6.4. Table 6.2 shows the number of tweets, retweets and replies for all cases. In general, the total postings of cases in Group 1 outnumbered postings by cases in Group 2. In Group 1, Case 1 has the most posts, 42,165 posts, and Case 9 had the least posts, 959 posts. The lowest number of posts in Group 1 is higher than the highest number of posts in Group 2 which belong to Case 8.
Table 6.2 Number of posts in Twitter between 1 January and 30 June 2014

<table>
<thead>
<tr>
<th>Post Type</th>
<th>Case</th>
<th>Group 1. PV is Realized</th>
<th>Group 2. PV is Not Realized</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Tweet</td>
<td>33,763</td>
<td>2,608</td>
<td>2,246</td>
</tr>
<tr>
<td>Retweet</td>
<td>8,380</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Reply</td>
<td>22</td>
<td>0</td>
<td>428</td>
</tr>
<tr>
<td>Total</td>
<td>42,165</td>
<td>2,609</td>
<td>2,681</td>
</tr>
</tbody>
</table>

The information in Table 6.2 is also presented in Figure 6.11. Figure 6.11 supports the general conclusion that the total postings of the cases in Group 1 outnumber the cases in Group 2. In Group 1, there are two SAR and/or safety agencies (Case 1 and Case 5) with larger numbers of posts. The SAR and/or safety agency with the lowest number of posts was Case 8 (in Group 2). Two agencies in disaster early warning had significant numbers of posts and were grouped in Group 1 (Case 2 and Case 3). Two of the five disaster management agencies with lower numbers of posts were grouped in Group 2 (Case 7 and Case 10), while the other three with larger numbers of posts were in Group 1 (Case 4, Case 6 and Case 9).
Figure 6.11 Number of tweets, retweets and replies posted in Twitter between 1 January and 30 June 2014

Table 6.3 shows the proportions of tweets, retweets and replies posted by each case. In general, all cases in Group 1 and Group 2 have far more tweets than retweets and replies except Cases 5 and 9. Cases 5 and 9 have more interactions with other Twitter users through retweets and replies.

<table>
<thead>
<tr>
<th>Post Type</th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
<th>Case 4</th>
<th>Case 5</th>
<th>Case 6</th>
<th>Case 7</th>
<th>Case 8</th>
<th>Case 9</th>
<th>Case 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tweets</td>
<td>0.80</td>
<td>1.00</td>
<td>0.84</td>
<td>0.80</td>
<td>0.38</td>
<td>0.82</td>
<td>0.47</td>
<td>0.78</td>
<td>0.97</td>
<td>0.69</td>
</tr>
<tr>
<td>Retweets</td>
<td>0.20</td>
<td>0.00</td>
<td>0.00</td>
<td>0.17</td>
<td>0.48</td>
<td>0.07</td>
<td>0.43</td>
<td>0.15</td>
<td>0.02</td>
<td>0.15</td>
</tr>
<tr>
<td>Replies</td>
<td>0.00</td>
<td>0.00</td>
<td>0.16</td>
<td>0.03</td>
<td>0.14</td>
<td>0.11</td>
<td>0.10</td>
<td>0.07</td>
<td>0.02</td>
<td>0.15</td>
</tr>
</tbody>
</table>

Figure 6.12 is a visual representation of Table 6.3. For agencies involved in early warning, the proportion of tweets outnumbered the proportion of retweets/replies. Of
the SAR and/or safety agencies, two agencies with significant proportions of retweets/replies are in Group 1. The other SAR and/or safety agency had a lower proportion of retweets/Replies and was in Group 2. For general management agencies, there is not much difference in the proportions of tweets between agencies in Group 1 and Group 2. Similarly, there is not much difference in the proportion of tweets between agencies in Group 1 and Group 2 based on the level of government.

![Figure 6.12 Percentage of posts type between 1 January and 30 June 2014](image)

Table 6.4 shows daily tweets, retweets and replies made by each case. The average number of daily tweets posted by Group 1 is 40 per day. Case 1 and Case 6 posted higher than the average daily tweets with 186.54 and 44.07 respectively. The average number of daily retweets in Group 1 is 10.48. Case 1 and Case 5 have higher retweet numbers than the average. Interestingly, agencies in disaster early warning, Case 2 and Case 3, have very low daily retweets posted, with 0.01 and 0.04 respectively. The average number of replies posted in Group 1 is 2.15 per day. Case 6, 5 and 3 have higher replies than the average score. In contrast, the average tweets, retweets and replies for Group 2 are far less than Group 1 with only 1.3, 0.04 and 0.01 per day.
respectively. Table 6.4 is a visual representation of Figure 6.13. In general, the pattern in Figure 6.13 is similar to Figure 6.11, except for Case 9 that has a larger number of tweets, retweets and replies per day, because this agency had only 152 observation days, while the other agencies had 182 observation days. As mentioned earlier, this is because Case 9 established its Twitter account 30 days later after the observation period had started.

Table 6.4 Number of posts per day between 1 January and 30 June 2014

<table>
<thead>
<tr>
<th>Post Type</th>
<th>Case 1. PV is Realized</th>
<th>Case 2. PV is Not Realized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tweet</td>
<td>186.54</td>
<td>14.41</td>
</tr>
<tr>
<td>Retweet</td>
<td>46.30</td>
<td>0.01</td>
</tr>
<tr>
<td>Reply</td>
<td>0.12</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Figure 6.13 Number of posts per day between 1 January and 30 June 2014

Figures 6.14 and 6.15 show the duration of use all agencies in Group 1 and Group 2 respectively. On average, the graphs for Group 1 have more density than the graphs
in Group 2, indicating longer duration of social media use in Twitter. As can be seen in Figure 6.14, in general all cases are available via their Twitter accounts from 9.00 am to 9.00 pm. Cases 1, 2 and 6 are available via their Twitter accounts almost 24 hours a day, from 12.00 midnight to 12.00 midnight the next day. The graph for Cases 3 and 5 show that these two cases are available mostly from 6.00 a.m. to midnight. Case 4’s duration is from 9 am to midnight but this agency is not continuously available. Case 9, though new to Twitter adopter, increased its duration of use throughout the observation period. In contrast, all graphs in Figure 6.15 have less density than graphs in Figure 6.14. Only Case 8 has a high density. Meanwhile, Case 7 and 10 have less duration of use in Twitter.
Figure 6.14 Time between first and last tweets posted for cases in group 1
Figure 6.15 Time between first and last tweets posted for cases in Group 2

6.2.2 Social media policy

Not all agencies had established a specific social media policy that was separate from other existing policies. Most agencies derived their policies from other existing policies, including information dissemination policies, general media policies, and information disclosure policies. Agencies in Group 1 have more policies for their social media use than agencies in Group 2. In general, all cases in Group 1 either have rules to decide whether an information is shareable or not, or delegation from top management to authorize the social media team to do so. Of the cases in Group 1, only Case 9 had no clear rule to determine whether a piece of information was shareable or not. Cases 1, 5 and 9 have clear delegation of authority from the organization to the social media team to interact with their audience through social media, while Cases 2, 3, 4, 5 and 6 did not have a clear delegation.

In Group 1, three cases clearly stated that they had media policies that could be applied to govern social media use (Case 1, 2 and 4). One case has a rule regarding continuous social media monitoring and rapid clarification of false information (Case 6). Similarly, only one case clearly indicated that the management took responsibility for the agency’s social media use.
Cases in Group 2 had fewer policies to support their social media use than cases in Group 1. Only Case 8 clearly indicated that they had a media policy that could be applied to social media use. Case 10 stated that they delegated the authority to the social media team to answer inquiries through social media. Case 7 indicated that the obstacles for increasing communication performance through social media use were the absence of rules for determining the shareable information and who had authority to directly answer inquiries on social media.

6.2.3 Innovative organizational culture

In general, cases in Group 1 provided evidence of the existence of an innovative organizational culture, while cases in Group 2 did not provide any evidence of that. The interviewees in all cases in Group 1 stated that the organization/top managements supported experimentation and new ideas for doing things. However, all agencies realized that they were government agencies that were bound to a set of rules or laws.

The key aspects of innovative organizational culture found in this study include the appreciation of creativity, supporting of new ideas and supporting of experiments. All cases stated that their organizations supported experiments as long as they did not break any rule or law. Only Case 6 clearly indicated that their organization provided sufficient appreciation of creativity. Two cases (Cases 3 and 9) provided environments that supported the organizational member to propose new ideas. Surprisingly, none of the cases clearly mentioned that they supported information exchanges or informal meetings to generate ideas.

6.2.4 Communications

There was evidence in cases in Group 1 that the communication performance was enhanced through the use of social media. Little evidence of this could be found in cases in Group 2. In Group 2, only one case (Case 7) stated that social media improved their public communication. In Group 1, one case (Case 9) provided strong evidence that social media provided timely interagency communication. Social media also allowed agencies to establish fast informal communication without a formal communication template. This is supported by the interviewees in Case 9 who
explained that their agency used Case 3’s social media channel as one of their primary information sources during disaster events.

Five cases in Group 1 (Cases 1, 2, 4, 5 and 6) agreed that social media increased the speed of information dissemination to the public. The interviewees for three cases in Group 1 stated that social media was an effective communication channel for the public to speedily reach the agency (Case 1, 6 and 9). Finally, there was evidence that agencies were intensively monitoring disaster events via social media (Cases 2 and 6). Surprisingly, there was no evidence indicating that social media improved the interoperability of various communication channels.

6.2.5 Disaster management

Cases in Group 1 provided evidence of better disaster management performance than in cases in Group 2. In Group 2, there was no evidence on improved disaster management performance through social media use. The results for communication were similar and this might indicate that the standard of an agency’s communication influenced the standard of its disaster management performance.

Of the cases in Group 1, only Case 4 did not clearly show improvement in its disaster management performance. Four cases in Group 1 indicated that social media improved their disaster response (Case 1, 3, 5 and 9). Even though the interviewee in Case 3 did not report an improvement in disaster management performance, the statement of the interviewee in Case 9 showed that Case 3’s disaster management performance had improved since after they used social media.

One case indicated that its agency’s disaster awareness had increased through live monitoring of social media during disaster situations (Case 6). The interviewee for Case 6 also clearly stated that social media reduced the risk posed by disasters. According to this interviewee, the more informed citizens are, the less their disaster risk. Two cases (Cases 5 and 9) highlighted that social media increased collaboration between the public and disaster management agencies. Social media was also an effective channel for correcting false information (rumors). Though there is evidence that the use of social media increased interagency communication (Case 9), no
evidence was found that social media influenced interagency collaboration during disaster situations.

6.2.6 The public’s co-production

For examining co-production with the public, two data sources were used: interviews and observation of tweets which mentioned the agency’s Twitter name. Interviewees of cases in Group 1 reported more evidence of higher public co-production than did the interviewees in Group 2. Group 2, interviewees for Cases 8 and 10 stated that there were a small number of requests from the public through social media.

The public’s co-production activities which arose through the use of social media mentioned by interviewees in Group 1 included: requesting the service, extending the service and promoting the service. In Group 1, only Case 3 provided no evidence of the public’s co-production. Like two cases in Group 2, Cases 1, 4, 5 and 9 provided evidence on the willingness of the public to use social media as a means to request the agencies’ services. Interviewees of Cases 1, 2, 5 and 6 also stated that the public helped the agencies in extending their services by forwarding the agency’s messages to their own social media networks. Not only that, the public was also willing to promote the service provided by the agencies to their own networks (Cases 4 and 5). Surprisingly, none of the interviewees mentioned the feedback they received from the public through social media.

Second, observation of the number of mentions of each agency’s Twitter account in tweets by the general public was undertaken. Agencies received mentions when a tweet posted by another Twitter user contained the agency’s Twitter account name in the tweet body. Whenever such a mention was made, a notification was automatically received by the agency unless the notification function was turned off. Regardless of the content of the tweet, a mention indicates that the public is trying to reach the agency through its official Twitter account.

The observation results for the number of mentions received by the agency are presented in Table 6.5. In Table 6.5, total mentions during the observation period and the average number of mentions received per day are presented. In all cases there were 182 observation days, except Case 9 which only had 152 observation days.
Except for Case 8 that had more mentions in tweets than Case 9, all cases in Group 2 received fewer mentions than cases in Group 1. Even though Case 8 had a higher total number of tweets than Case 9, the average daily mentions received by Case 8 (14.8) was less than Case 9 (17.8).

Cases 1 and 2 received more than 100,000 mentions during the observation period. This number is significantly higher than the rest of the cases in Group 1. This gives Case 1 and 2 very high average daily mentions with 2,556.1 and 558.2 respectively. Cases 3 and 5 received quite high mentions of 37,601 (or 206.6 per day) and 41,515 (or 228.1 per day). Cases 4 and 6 received 15,514 (or 84.6 per day) and 13,665 (or 75 per day). Finally, as a new agency, Case 9 received 2,698 mentions or 17.8 per day. Though this number was small, it is high for a newly established Twitter account.

In Group 2, as presented earlier, Case 8 received 2,702 mentions for 182 days (or 14.8 per day). Case 9 received very few mentions with only 55 (or 0.3 per day). Surprisingly, Case 7 received no mentions at all during the observation period. Though the analysis does not include content analysis to further investigate the details of the types of co-productions made by the public, the number of mentions received by an agency reflects the degree of the public’s co-production through Twitter.

Table 6.5 Mentioned received between 1 January and 30 June 2014

<table>
<thead>
<tr>
<th>Mention</th>
<th>Case</th>
<th>Group 1. PV is Realized</th>
<th>Group 2. PV is not Realized</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>465,208</td>
<td>101,587</td>
<td>37,601</td>
</tr>
<tr>
<td>Per day</td>
<td>2,556.1</td>
<td>558.2</td>
<td>206.6</td>
</tr>
</tbody>
</table>

Figure 6.16 is a visual representation of Table 6.5. The visualization supports the general conclusion that the numbers of tweet mentions per day received by the agencies in Group 1 were greater than the numbers of mentions for the agencies in Group 2. Among the SAR and/or safety agencies, two agencies received the highest numbers of mentions were in Group 1. The agency with smallest number of mentions
was in Group 2. Two agencies in disaster early warning received significant numbers of mentions and were in Group 1. Two of the five disaster management agencies with almost no tweet mentions from the public were in Group 2, while the other three with more mentions were in Group 1.

Figure 6.16 Mentions received in tweets between 1 January and 30 June 2014

6.2.7 Public value creation

While cases in Group 2 did not benefit from their social media use, cases in Group 1 realized public value through the use of social media. As discussed in Chapter 3, this study holds that public value consists of economic value and social value. The social values realized through social media included trust in the agency, accountability, openness and transparency, and accessibility. Surprisingly, safety was not mentioned by the interviewees. Interviewees in Cases 4 and 9 stated that the use of social media increased the trust that citizens had in their agencies. Agencies’ accountability was also increased through the use of social media (Case 5). Similarly, Cases 5 and 9 indicated that the use of social media forced their agencies to be more open and
transparent, because citizens were watching their actions through social media. Finally, Cases 1, 3 and 9 reported that social media use might increase the agencies’ accessibility by providing more information channels for citizens.

Interviewees’ responses indicated that all the economic value was realized through social media use. Interviewees in Cases 5 and 9 stated that social media use increased their agencies’ responsiveness. Four cases (Cases 1, 2, 5 and 6) strongly highlighted that social media is an effective channel for reaching an audience. Cases 4 and 5 stated that the use of social media increased their audience’s satisfaction and finally Case 2 and 3 reported that their reliability in information provision was improved through the use of social media.

6.3 Instrument development

One of the aims of the case study research in this study was to develop the survey instruments for the quantitative phase of the research. The survey instruments were developed based on the cross-case analysis and literature review. The variables and indicators for the survey instruments are presented in Table 6.6. As can be seen in Table 6.6, most of the survey instruments were self-developed. Only the survey instruments of social media use and innovative organizational culture were adapted from the literature. The other instruments were developed for this research based on the literature review and cross-case analysis.

The variable of social media use consists of three dimensions: frequency, interactivity and duration of social media use that are derived from the literature (Venkatesh et al. 2008; Abdelsalam et al. 2013; Mossberger et al. 2013; Zheng & Zheng 2014; Stamati et al. 2015). For each dimension of each variable, the study measures the level of use of the following social media platforms: Facebook, Twitter, Tumblr, YouTube and blogs. Social media policy is assessed using a set of instruments developed specifically for the context of this study. They include general media policy, continuous monitoring, clarify false information, rules for information sharing, authority to answer inquiries and management responsibility. Instruments for innovative organizational culture were adapted from the literature and include appreciation of creativity, informal meetings, support for new ideas, support for
experimentation and support for information exchange (Benitez-Amado et al. 2010; Terziovski 2010).

Table 6.6 Variables and indicators of the survey instrument

<table>
<thead>
<tr>
<th>Variables</th>
<th>Dimensions</th>
<th>Indicators</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social media use/USE (Reflective-formative HOC)</td>
<td>Frequency</td>
<td>Facebook, Twitter, Tumblr, YouTube, Blog</td>
<td>Adapted from (Venkatesh et al. 2008)</td>
</tr>
<tr>
<td></td>
<td>Interactivity</td>
<td>Facebook, Twitter, Tumblr, YouTube, Blog</td>
<td>Adapted from (Zheng &amp; Zheng 2014)</td>
</tr>
<tr>
<td></td>
<td>Duration</td>
<td>Facebook, Twitter, Tumblr, YouTube, Blog</td>
<td>Adapted from (Venkatesh et al. 2008)</td>
</tr>
<tr>
<td>Social media policy/POL (Reflective)</td>
<td>N/A</td>
<td>General media policy, continuous monitoring, clarify false information, rule for information sharing, authority to answer inquiry, management responsibility</td>
<td>Self-developed</td>
</tr>
<tr>
<td>Innovative organizational culture/CUL (Reflective)</td>
<td>N/A</td>
<td>Appreciation of creativity, informal meeting, support for new ideas, support for experiment, information exchange</td>
<td>Adapted from (Benitez-Amado et al. 2010; Terziovski 2010)</td>
</tr>
<tr>
<td>The public’s co-production (COP) (Reflective)</td>
<td>N/A</td>
<td>Requesting, extending, promoting the service and providing feedback</td>
<td>Self-developed</td>
</tr>
<tr>
<td>Communication/COM (Reflective)</td>
<td>N/A</td>
<td>Communication interoperability, interagency communication, informal communication, public communication, public report, disaster event monitoring</td>
<td>Self-developed</td>
</tr>
<tr>
<td>Disaster management/DM (reflective)</td>
<td>N/A</td>
<td>Disaster awareness, disaster risk reduction, disaster response, collaboration with public, interagency collaboration, rumor handling</td>
<td>Self-developed</td>
</tr>
<tr>
<td>Public value creation/PV (reflective-reflective HOC)</td>
<td>Economic Value (EV)</td>
<td>Responsiveness, efficiency, effectiveness, satisfaction, reliability</td>
<td>Self-developed</td>
</tr>
<tr>
<td></td>
<td>Social Value (SV)</td>
<td>Trust in the agency, accountability, openness, fairness, safety</td>
<td>Self-developed</td>
</tr>
</tbody>
</table>

Indicators for the public’s co-production were self-developed and include: requesting the service, extending the service, promoting the service and providing feedback.
Instruments to measure communication include communication interoperability, timely interagency communication, informal communication, timely public communication, timely public reporting, and disaster event monitoring. These instruments are self-developed. Instruments for disaster management are also self-developed and include disaster awareness, disaster risk reduction, disaster response, public collaboration, interagency collaboration and rumor handling. Finally, public value creation consists of two dimensions: economic value and social value. The instruments to measure economic value consist of responsiveness, efficiency, effectiveness, satisfaction and reliability. Social value instruments are: trust, accountability, openness, fairness, safety.

Responses to questions about all variables use a 7-point Likert scale (1-7) except for questions about the variable of social media use. Social media use employs a 5-point Likert scale (1-5) with an additional value of 0 for organizations that do not employ certain social media channels. Of the seven variables, two of them are higher-order constructs (HOC). In short, HOC is the abstraction of other constructs called lower-order constructs (LOC) or dimensions. The two HOCs are social media use and public value creation. As discussed in Chapter 2, social media use and public value creation consist of frequency of use, interactivity and duration of use. Meanwhile, public value creation comprises economic value and social value creation. In this case, social media use and public value creation are the abstractions of their LOCs. Further explanations of HOC, LOC, reflective and formative variable are presented in Chapter 7. Based on the indicators in Table 6.6, the questionnaire was developed.
CHAPTER 7. ANALYSIS OF QUANTITATIVE DATA

This chapter presents the results of the online survey employed in this study. In general, there are two analyses of the results: descriptive analysis and SEM analysis. Therefore, after presenting the descriptive findings in Section 7.1, SEM analysis is presented in several sections. The presentation of the SEM analysis includes an overview of the SEM analysis technique in Section 7.2, implementation of the SEM analysis in Section 7.3, data preparation in Section 7.4 and SEM testing results in Section 7.5. The results of the hypotheses testing are presented in Section 7.6.

7.1 Descriptive analysis

Descriptive statistics show quantitative data sets for interpretation and comparison purposes (Cavana et al. 2001). In this study, descriptive statistics are used to present the demographics of the participants and organizations involved in the online survey. In this descriptive analysis, missing data is treated by using a pairwise deletion approach. Therefore, the number of the cases involved in the analysis is different for each variable.

7.1.1 Demographics of participants

The overall demographic features of the participants involved in the online survey are presented in Table 7.1. The variables discussed are gender, age, education and job position. Of the 124 usable responses, there was one case that did not respond to all questions and it was therefore excluded from the data. Thus, there are 123 responses in Table 7.1.

Table 7.1 Demographics of participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job Position</td>
<td>Member of Public Relation Dept.</td>
<td>34</td>
<td>28%</td>
</tr>
<tr>
<td></td>
<td>Member of IT Dept.</td>
<td>58</td>
<td>47%</td>
</tr>
<tr>
<td></td>
<td>Member of Social Media Dept.</td>
<td>7</td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td>Head of Public Relation Dept.</td>
<td>6</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Head of IT Dept.</td>
<td>6</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Head of Social Media Dept.</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Member of Top Management</td>
<td>5</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>7</td>
<td>6%</td>
</tr>
</tbody>
</table>
Job positions

As shown in Figure 7.1, 58 participants (47%) were members of IT departments and 34 participants (28%) were members of public relations departments. Seven participants (6%) were members of social media departments, six were heads of public relation departments (5%), another six were heads of IT departments (5%), five were members of top management (4%) and seven were members of other departments (6%). The members from other departments included a geographic information system (GIS) operator, a command and control center, and a weather forecaster. This shows the range of departments in which the organizational social media accounts were operated and maintained.

Figure 7.1 Job position of the participants
Gender

The majority of the participants were male with 110 participants or 89%. Only 13 (11%) females participated in this study as shown in Figure 7.2. The proportion of the female participants is far less than in e-government research in developed countries, in which the proportion of females has ranged from 40% to 43% (Gil-Garcia et al. 2007; Ganapati & Reddick 2012).

![Figure 7.2 Gender of the participants](image)

Age

Participants were mostly 23 to 30 years old, 64 (52%) were in this age bracket, as can be seen in Figure 7.3. There were 40 participants (33%) in the 31 to 40 age group, 14 participants (11%) were in the 41 to 50 age group and three participants (2%) were older than 51. Two participants (2%) were younger than 22. This distribution indicates that the majority organizations assign the operations of their organizational social media accounts to relatively young members.
Education

As shown in Figure 7.4, participants are dominated by diploma/undergraduate degree participants (82, or 67%), followed by high school participants (29, or 24%) and post-graduate degree participants (12, or 10%). This distribution indicates that most organizations assign the operation of their social media accounts to members with higher-education backgrounds.
7.1.2 Demographics of organizations

The overall demographics of the organizations of the participants involved in the online survey are presented in Table 7.2. The information collected for the demographics of the organizations include: level of the organization, main tasks of the organization in disaster management, types of disasters faced in the organization’s jurisdiction, total number of employees, number of social media employees, year of social media establishment, number of Twitter followers and number of Facebook friends (or likes for Facebook page). Of the 124 usable responses, there was one case that did not respond to questions on the demographics of the organization. Thus, there are 123 responses presented in Table 7.2. The response with unanswered questions was not the same response that had unanswered questions for the demographics of the participant.

Table 7.2 Demographics of organizations

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level</td>
<td>City/regency</td>
<td>68</td>
<td>55%</td>
</tr>
<tr>
<td></td>
<td>Province</td>
<td>42</td>
<td>34%</td>
</tr>
<tr>
<td></td>
<td>National/central government</td>
<td>14</td>
<td>11%</td>
</tr>
<tr>
<td>Main Tasks</td>
<td>Early warning</td>
<td>67</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>Evacuation</td>
<td>88</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>Search and rescue</td>
<td>86</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>Mitigation</td>
<td>61</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>Logistics and shelter</td>
<td>64</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>Public kitchen</td>
<td>59</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>Social rehabilitation</td>
<td>60</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>Debris removal</td>
<td>52</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>Infrastructure development</td>
<td>50</td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td>Disaster preparedness</td>
<td>73</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>Disaster response</td>
<td>79</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Disaster recovery</td>
<td>53</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>7</td>
<td>1%</td>
</tr>
<tr>
<td>Types of Disasters in Organizational Jurisdiction</td>
<td>Typhoon</td>
<td>33</td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td>Tornado</td>
<td>23</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td>Flood</td>
<td>107</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>Drought</td>
<td>69</td>
<td>12%</td>
</tr>
<tr>
<td></td>
<td>Landslide</td>
<td>77</td>
<td>13%</td>
</tr>
<tr>
<td></td>
<td>Tsunami</td>
<td>47</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>Earthquake</td>
<td>75</td>
<td>13%</td>
</tr>
<tr>
<td></td>
<td>Volcano eruption</td>
<td>55</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>Fire</td>
<td>88</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>14</td>
<td>2%</td>
</tr>
<tr>
<td>Employee - Total</td>
<td>Average</td>
<td>5,013</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td>400,000</td>
<td></td>
</tr>
</tbody>
</table>
**Employee Minimum**

**Employee - Social Media Employee Average**

**Employee - Social Media Employee Maximum**

**Employee - Social Media Employee Minimum**

**Year of First Social Media Account Establishment**

<table>
<thead>
<tr>
<th>Year</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>2008</td>
<td>6</td>
<td>5%</td>
</tr>
<tr>
<td>2010</td>
<td>5</td>
<td>4%</td>
</tr>
<tr>
<td>2011</td>
<td>30</td>
<td>24%</td>
</tr>
<tr>
<td>2012</td>
<td>58</td>
<td>47%</td>
</tr>
<tr>
<td>2013</td>
<td>20</td>
<td>16%</td>
</tr>
<tr>
<td>2014</td>
<td>3</td>
<td>2%</td>
</tr>
</tbody>
</table>

**Number of Twitter Follower**

<table>
<thead>
<tr>
<th>Number of Twitter Follower</th>
<th>No Twitter account</th>
<th>500 or less</th>
<th>501 to 1,000</th>
<th>1,001 to 10,000</th>
<th>10,001 to 100,000</th>
<th>more than 100,001</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>39</td>
<td>14</td>
<td>22</td>
<td>28</td>
<td>12</td>
<td>8</td>
</tr>
</tbody>
</table>

**Number of Facebook Friends (like for page)**

<table>
<thead>
<tr>
<th>Number of Facebook Friends (like for page)</th>
<th>No Facebook account</th>
<th>500 or less</th>
<th>501 to 1,000</th>
<th>1,001 to 10,000</th>
<th>10,001 to 100,000</th>
<th>more than 100,001</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>15</td>
<td>23</td>
<td>68</td>
<td>8</td>
<td>7</td>
</tr>
</tbody>
</table>

**Level**

Most of the participants were from organizations at the city/regency level – 68 participants (55%) as shown in Figure 7.5. Following that, participants were from organizations at the provincial level – 42 participants (34%) and central government 14 participants (11%). This profile is consistent with the general profile of Indonesian governmental organizations, in which the number of organizations in the higher level is less than the number of agencies in the lower levels.

![Figure 7.5 Level of organizations](image-url)
Main tasks of the organizations

Participants were asked about their organizations’ main tasks through a multiple-choice type question and were allowed to select two or more answers. The main tasks of the organizations were evacuation (11%), search and rescue (11%), disaster response (10%), disaster preparedness (9%), early warning (8%), logistics and shelter (8%), mitigation (8%), social rehabilitation (8%), public kitchen (7%), disaster recovery (7%), debris removal (7%), infrastructure development (6%) and others (1%). Tasks in the “other” category included maintaining security, organizing volunteers and dealing with refugees. This profile indicates that the organizations’ activities and more often in disaster response and preparedness activities than in disaster recovery and mitigation.

![Figure 7.6 Main tasks of the organizations](image)

Types of disasters faced in organizational jurisdiction

Participants were asked about disasters faced in their organizational jurisdictions. A multiple-choice type question was used to allow participants to select one or more answers. As shown in Figure 7.7, floods dominated participants’ answers, with 18%. Following that, the disaster types faced by organizations were: fire (15%), landslide (13%), earthquake (13%), drought (12%), volcano eruption (9%), tsunami (8%), typhoon (6%), tornado (4%) and others (2%). Among answers in the “others” category were social conflicts, floods caused by high seas, contagious diseases and transportation accidents. This profile includes all the major disasters in Indonesia.
Employees

It was not easy to determine the number of employees, because the boundaries of the organizations were sometimes not clear. This happens when organizations are large and operate at more than one organizational level (national, provincial and city/regency). Respondents at the central level could claim that the provincial and city/regency level units are also part of their organization. Similarly, respondents in a small unit could also claim that their organization has national coverage. Therefore, conclusions based on the number of employees need careful examination.

Of the 124 participants, there were three who left both questions on total employee and social media employee numbers unanswered. There was also one participant who did not answer the question on total employee numbers and one participant who left the social media employee number question blank. Therefore, there were 120 cases in this analysis. In general, the average number of total employees was 5,013. The largest number of employees was 400,000 and the smallest number was 12. For social media employee question, on average organizations had five social media employees. The highest number of employees in social media was 45 and the lowest was one.

Year that social media account was established

One participant left this question unanswered. Of the 123 cases, a small number of participants answered that their organizations started using social media before 2010,
including on 2006 (1%) and 2008 (5%) as shown in Figure 7.8. The largest group of organizations adopted social media in 2012 (47%); 24% of organizations adopted social media on 2011; 16% in 2013; 4% in 2010 and 2% in 2014. This profile is consistent with the adoption of social media by Australian local government (Williamson & Parolin 2013). Social media adoption began in 2006, at about the same as it did in local government in Australia, but there is one-year lag for the peak of the adoption in comparison to Australian local government.

Figure 7.8 Year of social media establishment

Number of Twitter followers

Participants were asked about the number of Twitter account followers their organizations had because Indonesia is among the countries with the most Twitter users in the world (Semiocast 2012). One participant left this question unanswered and therefore there were 123 cases for analysis. As shown in Figure 7.9, 32% of participants stated their organizations had no official Twitter account. The largest group of participants (23%) answered that their organizations had between 1,001 and 10,000 followers; 18% of organizations had between 501 and 1,000 Twitter followers, 11% had 500 or less, 10% had between 10,001 and 100,000, and only 7% had more than 100,001 followers. This profile is different to the profile of the organizations participating in the case study research, as shown in Table 5.1, in which 6 out of 10 had more than 10,000 followers.
Number of Facebook friends (or likes for Facebook page)

Participants were asked about their organization’s number of Facebook friends because Indonesia is among the countries with most Facebook users in the world (Wikipedia 2013). One participant left this question unanswered and therefore there were 123 cases for analysis. This was the same respondent who did not answer the question on the number of Twitter followers. There were 2% of the organizations with no official Facebook account. The majority of organizations had between 1,001 and 10,000 Facebook followers (55%). This was followed by organizations with between 501 and 1,000 friends (19%), less than 500 followers (12%), between 10,001 and 100,000 (7%) and more than 100,001 (6%). This is consistent with the statistics on Indonesian Facebook and Twitter users which is dominated by Facebook users (Semiocast 2012; Wikipedia 2013).
7.1.3 Descriptive statistics of the measurement model

The descriptive statistics of the responses of questions related to the constructs of this study are presented in Table 7.3. Indicators are grouped according to their corresponding variables/dimensions. However the descriptive statistics provide a general overview of the data. The descriptive statistics of the measurement model as presented in Table 7.3 consist of means, standard deviations (Std. Dev), minimums (Min), maximums (Max) and kurtosis. As presented in Table 7.3, some items in the social media use (USE3, USE5, USE8, USE10, USE13 and USE14) have very low means and small standard deviation in comparison to the other items in the same variable/dimension. In contrast, other items have high means with small standard deviation (POL2, CUL1, CUL2, COP1, COP2 and COM3). These two conditions indicate the narrow distribution of the responses.

As mentioned earlier in Section 6.3, items in Social Media Use employ 5-point Likert scale (1-5) with an additional value of 0 for organizations with no social media channels and thus offers response ranged from 0 to 5. In the rest of the constructs, all items are 7-point Likert scale (1-7) and allow responses ranged from 1 to 7. As shown in Table 7.3, some items have higher minimum value (COP1, COP2, COP3, COP4, COM2, COM3, DM1, DM2, DM3, DM4, PV3 and PV7) than the possible minimum value, while others have lower maximum value (USE3, USE5, USE10 and USE10) than the possible maximum value. Even though this study employs PLS-SEM that is non-parametric and normally distributed data is not required, the different value of means, standard deviation, minimum and maximum of the responses affect the kurtosis value which is important in PLS-SEM. The discussion and the assessment of the kurtosis are presented in Section 7.2.2 and Section 7.3.

<table>
<thead>
<tr>
<th>Variables (Dimensions)</th>
<th>Indicators</th>
<th>Means</th>
<th>Std. Dev.</th>
<th>Min.</th>
<th>Max.</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Media Use (Frequency)</td>
<td>USE1 Facebook</td>
<td>2.80</td>
<td>1.06</td>
<td>0</td>
<td>5</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>USE2 Twitter</td>
<td>1.90</td>
<td>1.59</td>
<td>0</td>
<td>5</td>
<td>-1.20</td>
</tr>
<tr>
<td></td>
<td>USE3 Tumblr</td>
<td>0.18</td>
<td>0.71</td>
<td>0</td>
<td>4</td>
<td>18.02</td>
</tr>
<tr>
<td></td>
<td>USE4 Blog</td>
<td>1.25</td>
<td>1.64</td>
<td>0</td>
<td>5</td>
<td>-0.30</td>
</tr>
<tr>
<td></td>
<td>USE5</td>
<td>YouTube</td>
<td>0.82</td>
<td>0.95</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------</td>
<td>---------</td>
<td>------</td>
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<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Social Media Use</strong></td>
<td>USE6</td>
<td>Facebook</td>
<td>3.20</td>
<td>1.30</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td><strong>(Interactivity)</strong></td>
<td>USE7</td>
<td>Twitter</td>
<td>2.19</td>
<td>1.75</td>
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<td>5</td>
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<tr>
<td></td>
<td>USE8</td>
<td>Tumblr</td>
<td>0.19</td>
<td>0.68</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>USE9</td>
<td>Blog</td>
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<td>1.06</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
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<td>USE10</td>
<td>YouTube</td>
<td>0.66</td>
<td>0.81</td>
<td>0</td>
<td>4</td>
</tr>
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<td>Facebook</td>
<td>3.13</td>
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<td>0</td>
<td>5</td>
</tr>
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<td><strong>(Duration)</strong></td>
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<td>Twitter</td>
<td>2.27</td>
<td>1.87</td>
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<td>5</td>
</tr>
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<td>USE13</td>
<td>Tumblr</td>
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<td>1.11</td>
<td>0</td>
<td>5</td>
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<td>0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>USE15</td>
<td>YouTube</td>
<td>1.04</td>
<td>1.15</td>
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<td><strong>Social Media Policy</strong></td>
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<td>Media policy</td>
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<td>1.44</td>
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<td>7</td>
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<tr>
<td></td>
<td>POL2</td>
<td>Continuous monitoring</td>
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<td>1.12</td>
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<td>7</td>
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<tr>
<td></td>
<td>POL3</td>
<td>Clarify false information</td>
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<td>1.24</td>
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<td>7</td>
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<tr>
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<td>Rule to share/not share</td>
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<td>1.54</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
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<td>1.77</td>
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<td>7</td>
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<td>1.36</td>
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<td>7</td>
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<td><strong>Innovative Organizational Culture</strong></td>
<td>CUL1</td>
<td>Appreciation to creativity</td>
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<td>1.21</td>
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<td>1.15</td>
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<td>7</td>
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<tr>
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<td>COP4</td>
<td>Provide feedback</td>
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<td>0.94</td>
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<td>7</td>
</tr>
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<td><strong>Communication</strong></td>
<td>COM1</td>
<td>Interoperability</td>
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<td>COM2</td>
<td>Timely interagency communication</td>
<td>5.76</td>
<td>1.05</td>
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<td>COM3</td>
<td>Informal interagency communication</td>
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<td>7</td>
</tr>
<tr>
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<td>COM4</td>
<td>Timely public communication</td>
<td>4.64</td>
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<td>7</td>
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<tr>
<td></td>
<td>COM5</td>
<td>Timely public report</td>
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<td>1.48</td>
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</tr>
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<td>Disaster event monitoring</td>
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<td>1.38</td>
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<tr>
<td>---------------------</td>
<td>------</td>
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<td>------</td>
<td>------</td>
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<td>---</td>
</tr>
<tr>
<td>DM1</td>
<td>Disaster awareness</td>
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<td>1.01</td>
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<td>7</td>
<td>0.73</td>
</tr>
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<td>Disaster response</td>
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<td>1.19</td>
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<td>0.43</td>
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<td>DM4</td>
<td>Collaboration with public</td>
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<td>1.13</td>
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<td>7</td>
<td>0.70</td>
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<td>Interagency collaboration</td>
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<td>1.54</td>
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<td>-0.51</td>
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<td>DM6</td>
<td>Rumor handling</td>
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<td>7</td>
<td>-0.20</td>
</tr>
<tr>
<td>Public Value (Economic Value)</td>
<td>PV4</td>
<td>Responsiveness</td>
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<td>1.62</td>
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<td>7</td>
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<tr>
<td></td>
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<td>Efficiency</td>
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<td>.99</td>
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<td>Satisfaction</td>
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<td>.92</td>
<td>1</td>
<td>7</td>
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<td>1.57</td>
<td>1</td>
<td>7</td>
</tr>
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<td>Public Value (Social Value)</td>
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<td>0.96</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
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<td>PV2</td>
<td>Accountability</td>
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<td>1.68</td>
<td>1</td>
<td>7</td>
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<td>0.80</td>
<td>2</td>
<td>7</td>
</tr>
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<td></td>
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<td>Fairness</td>
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<td>1.70</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>PV10</td>
<td>Safety</td>
<td>5.81</td>
<td>.90</td>
<td>1</td>
<td>7</td>
</tr>
</tbody>
</table>

### 7.2 Steps required for SEM analysis

The primary aim of this study is predictive in nature and therefore PLS-SEM was chosen for data analysis (Chin & Newsted 1999; Hair et al. 2014). In doing the PLS-SEM, this study is following steps used in previous studies, including specifying the structural and measurement models, data collection and examination, assessment of the measurement model and finally assessment of the structural model (Hulland 1999; Hair et al. 2014; Lowry & Gaskin 2014; Sarstedt et al. 2014). Each step is discussed in this section.

#### 7.2.1 Step 1: Specifying the structural and measurement models

The first two steps of the PLS-SEM analysis are specifying the structural model (or inner model) and the measurement model (or outer model) (Hair et al. 2014). The structural model is presented in a path diagram that consists of variables linked by
sets of hypotheses (Schumacker & Lomax 2004; Hair et al. 2014). The relationships of the constructs in the structural model include mediation, moderation and higher-order construct (HOC) or hierarchical component model (HCM) relationships (Wetzels et al. 2009; Hair et al. 2014). Mediation exists when the third construct intervenes in the relationship between two other constructs. Moderation occurs when the third construct influences the strength of the relationship between the two other related constructs. HCM exists when a construct becomes an abstraction of some other constructs in a different modelling layer or dimension (Wetzels et al. 2009; Hair et al. 2014).

Measurement models comprise the relationships between constructs and their respective indicator variables (or outer models) (Hair et al. 2014). There are two types of measurement models: reflective and formative (Diamantopoulos & Siguaw 2006; Petter et al. 2007; Coltman et al. 2008). In reflective measurement models, an observed variable is regarded as an effect of a latent construct. The underlying construct is assumed to cause the values that manifest in the observed variable (Jarvis et al. 2003; Diamantopoulos & Siguaw 2006; Lowry & Gaskin 2014). In contrast, in a formative model, a latent variable is considered as a function of its observed indicators (Bollen & Lennox 1991; Coltman et al. 2008; Lowry & Gaskin 2014).

7.2.2 Step 2: Data preparation

The second step is data preparation. Data was collected through an online survey as discussed in previous sections. Many studies have used PLS-SEM because of small sample sizes, however, Hair et al. (2014) strongly suggested that researchers follow Cohen’s (1992) recommendation in determining the minimum sample size to ensure an acceptable quality. For example, this study has 124 usable responses and the maximum number of arrows pointing to a construct is five. Therefore, according to Cohen’s table, if this study aims to achieve the statistical power of 80% at a significance level of 5% and the $R^2$ of the model tested in this research is larger than 0.25, then the number in the sample (124) is adequate since it exceeds the minimum of 75 (Cohen 1992).

The data collection process often raises several issues, including missing data, suspicious response patterns, outliers and data distribution (Cavanaugh et al. 2001; Hair
et al. 2006; Byrne 2013; Hair et al. 2014). Missing data is data in which valid values on one or more variables are not available for analysis (Hair et al. 2006). Missing data is one of the commonly occurring problems in social and behavioral science research. Missing data can be caused due to several factors, including: failure to answer certain questions, refusal to answer sensitive questions, equipment failure, and so on (Byrne 2013). Regardless of the reasons for the missing data, it must be addressed prior to the SEM analysis to avoid bias (Kaplan 2009).

In dealing with missing data, Byrne (2013) identifies three distinct approaches: listwise deletion, pairwise deletion and imputation. In listwise deletion, all cases containing missing data are excluded from the analysis. This approach is simple but it reduces the statistical power due to the deletion (Schumacker & Lomax 2004). Slightly different from listwise deletion, missing data are excluded from particular analyses in pairwise deletion. One case might be computed in an analysis while excluded from other analyses due to the missing data. This approach keeps the number of usable cases high, but it is hard to compare the results due to the use of different samples in each analysis. In the imputation approach, the missing value is substituted with other value (Schumacker & Lomax 2004; Byrne 2013).

The assessment of suspicious response patterns involves detecting unengaged participants (Hair et al. 2014). Suspicious response pattern include straight lining answers and inconsistency. Straight lining is when a respondent marks the same response for the majority of the questions. If a respondent answers all Likert type questions with 7 (or strongly agree), this might indicate straight lining responses. Inconsistency assessment is to make sure that respondents are aware of logically related questions. Suspicious response patterns need to be removed (Cavana et al. 2001).

A response becomes an outlier when the value of the response is too extreme (Hair et al. 2014). Statistical tools, such as SPSS, can help a researcher in identifying outliers. The first option in dealing with outliers is to remove the data if the number of outliers is small. If the number is large, researchers might create a new group which represents the outliers (Hair et al. 2014).
There are three issues in data distribution, including whether data is normally distributed, skewness and kurtosis. Skewness is the extent to which data has a symmetrical distribution. Kurtosis is the extent to which data is too narrow (or too peaked) in its distribution. Unlike CB-SEM, PLS-SEM is a non-parametric statistical method, thus normally distributed data is not required (Hair et al. 2014). Since a bootstrapping procedure performs well on non-normally distributed data, Hair et al. (2014) recommended examining skewness and kurtosis rather than focusing on normality tests. Skewness impacts on means and kurtosis affects the variance and covariance (DeCarlo 1997; Byrne 2013). Based on the fact that SEM deals with variance and covariance, researchers should be more concerned with kurtosis (Kline 2005; Byrne 2013). While there is no clear consensus on the threshold value of kurtosis (Kline 2005; Byrne 2013), West et al. (1995) proposed a kurtosis value threshold of (absolute) 7.

7.2.3 Step 3: Assessment of the measurement model

As mentioned earlier in Step 2, there are two types of measurement models: reflective and formative instrument (Diamantopoulos & Siguaw 2006; Petter et al. 2007; Coltman et al. 2008). The assessment of the measurement model is undertaken on each type of measurement model.

7.2.3.1 Assessment of the reflective measurement model

If a research model contains a reflective measurement model, then the next step includes examining the instrument reliability (outer loadings), internal consistency/construct reliability (composite reliability), convergent validity (average variance extracted-AVE) and discriminant validity (Hulland 1999; Chin 2010; Götz et al. 2010; Hair et al. 2014; Sarstedt et al. 2014). A summary of the criteria and threshold values of the reflective measurement model is presented in Table 7.4.

*Instrument reliability* indicates the proportion of an instrument’s variance explained by the underlying latent variable (Hair et al. 2014). In PLS, instrument reliability is assessed by examining the loading of an instrument to its latent variable. Hair et al. (2014) set the threshold at 0.708. Newly developed instruments are often experience low loadings (Hulland 1999). There are reasons why a low loading occurs, including:
1) the use of poor wording on an instrument; 2) inappropriate items; or 3) inappropriate adoption of existing items to a new context (Hulland 1999). Poor wording of the instruments reduces reliability. Inappropriate items affect the construct validity and inappropriate adoption to the new context jolts the generalizability of the indicators. For newly developed instruments, Hulland (1999) suggested an instrument reliability of between 0.4 and 0.7 should be considered for removal if this increases the composite reliability.

Table 7.4 Reflective measurement model assessment criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Measurements</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument reliability</td>
<td>Outer Loading</td>
<td>&lt;0.4</td>
<td>Not acceptable, remove instrument</td>
</tr>
<tr>
<td></td>
<td>(Hulland 1999; Hair et al. 2014)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.4-0.7</td>
<td></td>
<td>Considered for removal, delete instruments if increase AVE and CR</td>
</tr>
<tr>
<td></td>
<td>&gt; 0.7</td>
<td></td>
<td>Acceptable, retain instruments</td>
</tr>
<tr>
<td>Internal Consistency</td>
<td>Composite Reliability</td>
<td>&lt;0.6</td>
<td>Lack of consistency, check instruments</td>
</tr>
<tr>
<td></td>
<td>(Hulland 1999; Hair et al. 2014)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.6-0.7</td>
<td></td>
<td>Accept value</td>
</tr>
<tr>
<td></td>
<td>0.7-0.95</td>
<td></td>
<td>Satisfactory to good</td>
</tr>
<tr>
<td></td>
<td>&gt;0.95</td>
<td></td>
<td>Problematic, check redundant instruments</td>
</tr>
<tr>
<td>Convergent Validity</td>
<td>AVE</td>
<td>&gt; 0.5</td>
<td>Acceptable</td>
</tr>
<tr>
<td></td>
<td>(Hulland 1999; Hair et al. 2014)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discriminant Validity</td>
<td>Cross loading comparison</td>
<td>No threshold value</td>
<td>An indicator’s outer loading should be higher than all its cross loadings with other constructs</td>
</tr>
<tr>
<td></td>
<td>(Hulland 1999; Hair et al. 2014)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fornell-Larcker Criterion</td>
<td>No threshold value</td>
<td>The squared root of each construct’s AVE should be higher than its correlation with any other construct</td>
</tr>
<tr>
<td></td>
<td>(Fornell &amp; Larcker 1981; Hair et al. 2014)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HTMT Criterion</td>
<td>HTMT &lt; 0.85</td>
<td>Acceptable</td>
</tr>
<tr>
<td></td>
<td>(Henseler et al. 2015)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Internal consistency or construct reliability indicates how well the instruments are able to adequately measure the latent variable (Hair et al. 2014). In PLS, construct reliability is typically assessed using composite reliability. Composite reliability (CR) indicates how well the latent variable can be measured by the instruments. According to Hair et al. (2014, p.102), the composite reliability value of 0.6-0.7 is
considered “acceptable in exploratory research”. Values between 0.7 and 0.95 are “satisfactory to good”, whereas values of more than 0.95 are considered problematic because they indicate redundant instruments.

Convergent validity shows the extent to which a latent variable converges in its instruments by explaining their variance. According to Fornell and Larcker (1981), convergent validity can be measured through the average variance extracted (AVE), which “includes the variance of its instruments captured by the construct relative to the total amount of variance, including the variance due to measurement error” (Götz et al. 2010’, p.696). An AVE value of greater than 0.5 shows that the construct explains more than 0.5 of the variance of its instruments (Hulland 1999; Hair et al. 2014).

Discriminant validity is broadly defined as the dissimilarity of a construct from other constructs (Hulland 1999; Hair et al. 2014). Discriminant validity determines the extent to which a latent variable is distinct from other latent variables in the model. There are three ways of assessing the discriminant validity: through cross loading, the Fornell-Larcker criterion and heterotrait-monotrait (HTMT) (Hair et al. 2014; Henseler et al. 2015). First, discriminant validity can be based on its cross loading result. The instrument loading value to its construct should be greater than to any other constructs in the structural model (Hulland 1999). Second, Fornell and Larcker (1981) recommend evaluating discriminant validity by comparing the squared root of each construct’s AVE with the correlation of that construct with all other constructs in the structural model. The AVE’s score for all constructs in the model have been obtained in the convergent validity. Third, a recent study suggests the use of the HTMT matrix in order to establish more sensitive discriminant validity (Henseler et al. 2015). The HTMT value should be less than 0.85 and the HTMT inference is less than 1 (Henseler et al. 2015).

7.2.3.2 Assessment of the formative measurement model

If the research model has formative instruments, then the next step is assessing the PLS-SEM results of the formative measurement model. Slightly different from reflective model assessments, the formative measurement model assessments include assessing convergent validity, collinearity and statistical significance, and relevance.
of the instrument weight. A summary of the criteria and threshold values of the formative measurement model is presented in Table 7.5.

Table 7.5 Formative measurement model assessment criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Measurements</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convergent Validity</td>
<td>Path Coefficient (Sarstedt et al. 2014)</td>
<td>&gt;0.7</td>
<td>Acceptable</td>
</tr>
<tr>
<td>Collinearity</td>
<td>VIF (Hair et al. 2014)</td>
<td>VIF&lt;5</td>
<td>Acceptable</td>
</tr>
<tr>
<td>Statistical significant and relevance of the instrument weight</td>
<td>Outer weight and outer loading (Hair et al. 2014)</td>
<td>Outer weight is significant</td>
<td>Retain the instrument</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outer weight is not significant and outer loading is 0.5 or higher</td>
<td>Retain the instrument</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outer weight is not significant and outer loading is less than 0.5</td>
<td>Consider removing the instrument</td>
</tr>
</tbody>
</table>

Convergent validity is the extent to which a formative construct correlates with the same construct but reflectively measured. To do this assessment, three steps are needed. First, the formative construct is built. Second, the first construct is duplicated to build the second construct and then the second construct is changed to be a reflective construct. Finally, we analyze the path coefficient linking the first and the second constructs. This kind of assessment is also called redundancy analysis (Wynne W Chin 1998). A path coefficient of 0.8 or 0.9 suggests that the formatively measured construct explains $R^2$ value of 0.64 or 0.81 (Hair et al. 2014). However, a path coefficient of 0.7 (or explain $R^2$ value of 0.5) would be acceptable (Sarstedt et al. 2014).

Collinearity represents a high correlation between two formative indicators. In assessing the collinearity among the formative indicators, each indicator’s variance inflation factor (VIF) should be computed. When there are more than two formative indicators, multi-collinearity is said to exist. To assess for collinearity, two steps are needed. First, tolerance (TOL) should be computed ($TOL=1−R^2$). Tolerance is the extent to which variance of one formative indicator is not explained by other indicators. As VIF is defined as the reciprocal of the tolerance, then $VIF = 1/TOL$. High collinearity is indicated by a VIF value of 5 or higher (Hair et al. 2014).
In assessing the statistical significance and relevance of the instrument weight, two steps are undertaken. First, the outer weight is assessed (Hair et al. 2014). Outer weight is the result of multiple regressions between the latent variable scores and the formative indicators. Since the latent variables are formed by all the formative indicators, then the multiple regression analysis yields $R^2$ of 1.0 (Hair et al. 2014). Second, we need to assess whether the formative indicators contribute to the latent variable. To do this, a bootstrapping procedure was undertaken. In a bootstrapping procedure, “a large number of subsamples (typically 5000) from the original data (with replacement) and re-estimates the model for each subsample” (Sarstedt et al. 2014, p.109). Based on the results of the first and second steps, a decision is made. If the outer weight is statistically significant, the indicator is retained (Hair et al. 2014; Sarstedt et al. 2014). A commonly accepted critical value for two tailed-tests is 1.65 (significance level 10%), 1.96 (significance level 5%) and 2.57 (significance level 1%) (Hair et al. 2014). If the outer weight is not significant but the indicator’s loading is 0.5 or higher, the indicator is still retained. If the outer weight is not significant and the outer loading is less than 0.5 then researchers should remove the indicator. However, a careful assessment on the theoretical impact of the removal should be undertaken.

7.2.4 Step 4: Assessment of the structural models

After the assessment of the measurement models has been done, the next step is the assessment of the structural model. Unlike CB-SEM, PLS-SEM does not have a standard goodness-of-fit test. In PLS-SEM, assessment of the quality of the model is based on the ability to predict the endogenous constructs. Hair et al. (2014) suggested five steps in the PLS-SEM structural model assessment including collinearity assessment, structural model path coefficients, coefficient of determination ($R^2$ value), effect size $f^2$, and predictive relevance $Q^2$. A summary of the criteria and threshold values of the structural model is presented in Table 7.6.

The collinearity assessment is conducted in the same way as the collinearity assessment in the formative construct. The aim of this assessment is to ensure that there is no collinearity issue among the latent variables that would affect regression analysis in SEM PLS (Sarstedt et al. 2014). Similar to the assessment in the formative measurement model, VIF is used to determine the acceptance level. A VIF
value of less than 5 is considered to be acceptable. When the VIF value is greater than 5, the plausible decisions include: removal of the construct, merging with other constructs or developing a high order construct.

Table 7.6 Structural model assessment criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Measurements</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collinearity</td>
<td>VIF (Hair et al. 2014)</td>
<td>VIF&lt;5</td>
<td>Acceptable</td>
</tr>
</tbody>
</table>
| Structural model path coefficient| Path coefficient (Hair et al. 2014)               | -1 < path coefficient < 1 | Close to 1 indicates strong (+) relationship  
Close to -1 indicates strong (-) relationship |
|                                 | Significance of the path (Hair et al. 2014)      | > 1.65               | Significant level at 10%               |
|                                 |                                                   | >1.96                | Significant level at 5%                |
|                                 |                                                   | >2.57                | Significant level at 1%                |
| The coefficient of determination| $R^2$ (Hair et al. 2014)                         | 0.75 or higher       | Substantial                            |
|                                 |                                                   | 0.5<=$R^2<$0.75      | Moderate                               |
|                                 |                                                   | 0.25<=$R^2<$0.5      | Weak                                   |
| The effect size                 | $f^2$(Hair et al. 2014)                          | 0.35 or higher       | Large                                  |
|                                 |                                                   | 0.15<=$f^2<$0.35     | Medium                                 |
|                                 |                                                   | 0.02<=$f^2<$0.15     | Small                                  |
| The predictive relevance        | $Q^2$(Hair et al. 2014)                          | >0                   | Acceptable                             |

The assessment of the *structural model path coefficients* includes analyzing the path coefficient of the hypothesized relationships among the constructs. The value of the path coefficient ranges between -1 (strong negative relationship) to 1 (strong positive relationship). A path coefficient value of close to 0 shows a weak relationship between constructs. The significance of a path coefficient can be obtained by a bootstrapping procedure. Similar to the assessment of formative measurement model, the significance value follows the critical value for two tailed-tests, consisting of 1.65 (significance level 10%), 1.96 (significance level 5%) and 2.57 (significance level 1%) (Hair et al. 2014).
The $R^2$ value of the endogenous construct, or coefficient of determination, represents the variance explained by the combined effect of its corresponding exogenous variables. Thus, the $R^2$ value shows the accuracy of the predictive model (Sarstedt et al. 2014). The $R^2$ value ranges from 0 to 1. The greater $R^2$ value the higher predictive accuracy level. As a rule of thumb, $R^2$ values of 0.75, 0.5 and 0.25 have been considered as substantial, moderate and weak respectively (Hair et al. 2014; Sarstedt et al. 2014).

The effect size $f^2$ is the extent to which the impact of an exogenous variable on an endogenous variable is substantial (Hair et al. 2014; Sarstedt et al. 2014). It measures the change in the $R^2$ value if an exogenous variable is removed from the model. Therefore, the $f^2$ is used to evaluate whether the removed endogenous variable has a substantive impact on the $R^2$ value of an endogenous variable. Following Hair et al. (2014), $f^2$ values of 0.35, 0.15 and 0.02 have been considered as large, medium and small respectively (Hair et al. 2014; Sarstedt et al. 2014).

In addition to the $R^2$ values, predictive relevance $Q^2$ is also used to measure the accuracy of the data point of indicators in reflective measurement models of endogenous variables (Hair et al. 2014). This value is not applicable for endogenous variables in the formative measurement model. The $Q^2$ value is obtained through a blindfolding procedure which eliminates a part of the data points, estimates the model parameters and predicts the eliminated part using the previously computed estimates (Sarstedt et al. 2014). A $Q^2$ value of larger than zero is considered acceptable (Hair et al. 2014; Sarstedt et al. 2014).

### 7.3 Data preparation

This study collected 124 usable responses at an 18% response rate. Before analyzing the data, several issues including missing data, suspicious response patterns, outliers and data distribution should be carefully examined (Cavana et al. 2001; Hair et al. 2006; Byrne 2013; Hair et al. 2014). In this study, all the missing data were due to respondents failing to provide answers to certain questions. There were no patterns to the missing data, indicating that the missing data are not caused by systematic faults.

In addressing missing data, as the missing data was random and less than 10%, this study conducted imputation by replacing the missing data with appropriate values.
(Hair et al. 2006; Kaplan 2009). In this study, missing data for SEM analysis was less than 10% as presented in Section 7.1.3. Therefore in this case imputation was appropriate and the missing values were replaced by the median values (Hair et al. 2006; Kaplan 2009).

Examination of suspicious response patterns showed that all responses were from engaged respondents. The questionnaire used interval and Likert scales, the range of the responses from respondents could be controlled and therefore there were no outliers. For the data distribution assessment, kurtosis of the data was examined. Following West et al. (1995), a kurtosis threshold was set at the value of 7. Based on this threshold, there were five items with a kurtosis value of greater than absolute (7) as shown in Table 7.3. Therefore USE3, USE8, USE13, POL2 and CUL2 were dropped from further analysis.

7.4 HCM and moderations

One of the aims of this study was to test the structural model of the proposed framework. The research model was developed and discussed in Chapter 4. Before the assessment of the research model, two key relationships for the assessment for the structural model in this study are discussed: the hierarchical component model (HCM) and continuous moderation effect.

7.4.1 The hierarchical component model (HCM)

HCM exists when a construct becomes an abstraction of some other constructs, and has several layers or dimensions (Wetzels et al. 2009; Hair et al. 2014). HCM is used in at least in two situations (Law et al. 1998; Edwards 2001; Wetzels et al. 2009; Hair et al. 2014). First, HCM is used when the researchers want to reduce complexity and increase parsimony of the research model by providing a meaningful theoretical abstraction that conceptually captures the overall sub-dimensions (Law et al. 1998; Edwards 2001; Wetzels et al. 2009). Second, HCM is used in situations when collinearity among constructs exists that might be solved by establishing a new second-order construct (Hair et al. 2014). HCM consists of a higher-order construct (HOC) and several lower-order constructs (LOCs) (Ringle et al. 2012; Hair et al. 2014). HOC is the construct that captures the abstraction of the entity and LOCs are the sub-dimensions of the abstract entity (Hair et al. 2014).
In this study, HCM was used in three parts of the research model: the construct of social media use (USE), the value creation process (PROC) and public value creation (PV). USE consists of three sub-dimensions including frequency, interactivity and duration of social media use. USE is conceptually defined as a formative second-order construct with three sub-dimensions because frequency, interactivity and duration of the social media use make their own contributions to the USE. Meanwhile, the social media platforms as the instruments for each sub-dimension are interchangeable and therefore the instruments are reflective. USE is conceptualized as a reflective-formative HCM.

The second HCM is for the representation of value creation process (PROC) and tests the hypothesis $H5$. In the original Melville et al. (2004) model, the value generation process is conceptually defined as the higher abstraction of IT and Non-IT resources, business process and process performance that influence the firm performance. Previous studies have tested these factors in various ways which have usually consisted of two or more constructs but have never involved all the components at once (Mata et al. 1995; Melville et al. 2004; Zhu et al. 2004; Bhatt & Grover 2005; Ray et al. 2005; Zhu & Kraemer 2005). Following the original Melville et al. (2004) model, the value creation process (PROC) is conceptualized as a formative abstraction of the USE, social media policy (POL), innovative organizational culture (CUL), communication (COM) and disaster management performance (DM).

Finally, the third HCM is applied for public value (PV) to represent economic value (EV) and social value (SV). PV involves trade-offs among the economic and social values (Benington 2009). The levels of economic value and social value are determined by the overall public value and the context of the value creation. Hence public value is conceptualized as a reflective-endogenous HCM.

The first and the second HCM (USE and PROC) involve formative relationships between the HOC and LOCs. The third HCM (PV) is a reflective-endogenous construct. These two types of HCM are best examined through a two-stage approach (Becker et al. 2012; Ringle et al. 2012; Hair et al. 2014; Lowry & Gaskin 2014) because the existence of the endogenous HOC often causes all other predecessors of the HOC other than the LOCs to have non-significant effects on the HOC (Ringle et
The use of a two-stage assessment approach is based on the variable scores of the LOCs that are used as the manifest variables for the HOC. First, replication of instruments is used to obtain the latent variable scores of the LOCs. Second, the latent variable scores obtained in the first stage are used as the manifest variables of the HOC as shown if Figure 7.11.
7.4.2 The continuous moderating effect

Moderation or interaction is one of six types of relationships in causal models (Jaccard & Turrisi 2003). As shown in Figure 7.12, moderation exists when the variation of a variable M (called the moderator) influences the direction or strength of a relationship between an exogenous variable X and endogenous variable Y (Chin et al. 2003; Henseler & Fassott 2010). In behavioral science, the ability to detect the moderation or interaction effect is of interest (Chin et al. 2003).

Figure 7.11 A-two stage approach for HCM (Ringle et al. 2012)
This study employs moderation to examine the influence of the public’s co-production (COP) on the relationship between the value creation process (PROC) and public value (PV). As discussed in the Section 7.3.1, PROC is conceptually defined as formative HCM and in this examination serves as an exogenous variable. Since there is one formative variable involved, a two-stage approach is required to examine the interaction effect (Chin et al. 2003; Henseler & Fassott 2010; Hair et al. 2014).

The two-stage approach is used when a formative variable is involved in the interaction effect (Henseler & Fassott 2010). As shown in Figure 7.13, the two-stage approach consists of two sequential stages. The first stage is intended to compute the latent variable scores for the moderator and exogenous variable. The product of the latent variable scores of the moderator and exogenous variable then serves as the interaction between the two variables. All other latent variables are represented by the single item of their latent variable scores.

7.5 SEM testing and results

As discussed in Section 7.2, there are four steps for SEM analysis: specifying the structural and measurement models, data collection and examination, assessment of the measurement model and finally assessment of the structural model (Hulland
SEM analysis is applicable for unidimensional models (Hulland 1999; Hair et al. 2014; Lowry & Gaskin 2014; Sarstedt et al. 2014). If the research model consists of several layers, disaggregation into unidimensional models is needed. To achieve the disaggregation, the research model is broken down into two models: a value creation process model and a public value creation model. The value creation process model is shown in Figure 7.14. This model comprises the relationships between social media use (USE), social media policy (POL), innovative organizational culture (CUL), communication (COM) and disaster management (DM). They are linked by $H1$, $H2$, $H3$ and $H4$.

Figure 7.14 Value creation process model

Figure 7.15 Public value creation model
The second model, the public value creation model, involves all the constructs in the model and is considered to be the public value creation model as shown in Figure 7.15. The five previous constructs in the value creation process model are now acting as the lower order constructs (LOCs) of the value creation process (PROC) in order to predict public value creation (PV). The relationship between PROC and PV is assessed through $H5$. Finally, the moderating effect of the public’s co-production on the relationship between PROC and PV is assessed by $H6$.

The two models consist of one or more HCM and therefore two or more steps are needed to conduct the SEM analysis. The procedure for the assessment and results of each model are presented in the remaining sub-sections.

7.5.2 Assessment of the value creation process model

7.5.2.1 Assessment procedure

Value creation process model is used to assess $H1$, $H2$, $H3$, and $H4$. There are four reflective constructs (POL, CUL, COM and DM) and one reflective-formative HCM construct (USE) in the model. USE is an HCM and therefore a two-stage approach was employed to examine this construct. In the first stage, as shown in Figure 7.16, the five constructs (USE, POL, CUL, COM and DM) were built. Three sub-dimensions of USE (FREQ, INT and DUR) were then created and formatively linked to USE. All the instruments were reflectively assigned to each construct and sub-dimension. At this point, USE had no instruments and therefore all instruments of the FREQ, INT and DUR were replicated to USE as presented in Figure 7.16. By using this model, the latent variable scores for the FREQ, INT and DUR were computed.
The second stage of the two-stage approach was conducted by replacing the three sub-dimensions of the FREQ, INT and DUR with the latent variable scores computed in the first stage. As shown in Figure 7.17, the path model was ready for the assessment of measurement and structural model in order to test the $H1$, $H2$, $H3$ and $H4$. 

Figure 7.16 Stage 1 of the value creation process model

Figure 7.17 Stage 2 of the value creation process model
7.5.2.2 Assessment of the measurement model

Assessment of the reflective instruments

Four constructs with reflective instruments are assessed through the examination of their instrument reliability, internal consistency, convergent validity and discriminant validity. The first three assessment results are presented in Table 7.7. All the loading of the instruments was greater than the threshold value of 0.7, indicating instrument reliability (Hulland 1999; Hair et al. 2014). The composite reliability (CR) values of the four constructs fall between 0.7 and 0.95, satisfactory to good (Hulland 1999; Hair et al. 2014), indicating that instruments are able to adequately measure the latent variable (Hair et al. 2014). The average variance extracted (AVE) value of the four constructs are above the threshold value of 0.5, indicating convergent validity.

Table 7.7 Instrument reliability, internal consistency and convergent validity of the value creation process model

<table>
<thead>
<tr>
<th>Construct</th>
<th>Instruments</th>
<th>Loading</th>
<th>Composite Reliability (CR)</th>
<th>Average Variance Extracted (AVE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM</td>
<td>COM1</td>
<td>0.839</td>
<td>0.882</td>
<td>0.652</td>
</tr>
<tr>
<td></td>
<td>COM4</td>
<td>0.825</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>COM5</td>
<td>0.787</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>COM6</td>
<td>0.777</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CUL</td>
<td>CUL3</td>
<td>0.851</td>
<td>0.913</td>
<td>0.777</td>
</tr>
<tr>
<td></td>
<td>CUL4</td>
<td>0.892</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CUL5</td>
<td>0.901</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DM</td>
<td>DM2</td>
<td>0.786</td>
<td>0.899</td>
<td>0.690</td>
</tr>
<tr>
<td></td>
<td>DM3</td>
<td>0.871</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DM4</td>
<td>0.809</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DM6</td>
<td>0.855</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POL</td>
<td>POL1</td>
<td>0.881</td>
<td>0.880</td>
<td>0.709</td>
</tr>
<tr>
<td></td>
<td>POL3</td>
<td>0.847</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>POL4</td>
<td>0.796</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The last examination of the reflective instruments is on the discriminant validity by using three assessments: cross-loading, Fornell-Larcker criterion and HTMT criterion (Fornell & Larcker 1981; Hulland 1999; Hair et al. 2014; Henseler et al. 2015). As shown in Table 7.8, the outer loading values the instruments to their constructs were higher than the cross loading values to other constructs. The Fornell-
Larcker matrix, as presented in Table 7.9, shows that the squared AVE of each construct was higher than the correlation values with other constructs. The HTMT matrix as shown in Table 7.10 also satisfies the threshold value of less than 0.85. The HTMT_{inference} value of less than 1 was computed through a bootstrap procedure. All in all, the three assessment results provide evidence of discriminant validity.

Table 7.8 Cross loadings of the value creation process model

<table>
<thead>
<tr>
<th></th>
<th>COM</th>
<th>CUL</th>
<th>DM</th>
<th>POL</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM1</td>
<td>0.839</td>
<td>0.417</td>
<td>0.580</td>
<td>0.479</td>
</tr>
<tr>
<td>COM4</td>
<td>0.825</td>
<td>0.406</td>
<td>0.526</td>
<td>0.439</td>
</tr>
<tr>
<td>COM5</td>
<td>0.787</td>
<td>0.318</td>
<td>0.473</td>
<td>0.404</td>
</tr>
<tr>
<td>COM6</td>
<td>0.777</td>
<td>0.243</td>
<td>0.425</td>
<td>0.540</td>
</tr>
<tr>
<td>CUL3</td>
<td>0.374</td>
<td>0.851</td>
<td>0.184</td>
<td>0.415</td>
</tr>
<tr>
<td>CUL4</td>
<td>0.410</td>
<td>0.892</td>
<td>0.412</td>
<td>0.431</td>
</tr>
<tr>
<td>CUL5</td>
<td>0.362</td>
<td>0.901</td>
<td>0.369</td>
<td>0.384</td>
</tr>
<tr>
<td>DM2</td>
<td>0.536</td>
<td>0.298</td>
<td>0.786</td>
<td>0.445</td>
</tr>
<tr>
<td>DM3</td>
<td>0.540</td>
<td>0.333</td>
<td>0.871</td>
<td>0.470</td>
</tr>
<tr>
<td>DM4</td>
<td>0.489</td>
<td>0.276</td>
<td>0.809</td>
<td>0.402</td>
</tr>
<tr>
<td>DM6</td>
<td>0.505</td>
<td>0.312</td>
<td>0.855</td>
<td>0.529</td>
</tr>
<tr>
<td>POL1</td>
<td>0.534</td>
<td>0.378</td>
<td>0.482</td>
<td>0.881</td>
</tr>
<tr>
<td>POL3</td>
<td>0.499</td>
<td>0.418</td>
<td>0.470</td>
<td>0.847</td>
</tr>
<tr>
<td>POL4</td>
<td>0.404</td>
<td>0.387</td>
<td>0.454</td>
<td>0.796</td>
</tr>
</tbody>
</table>

Table 7.9 Fornell-larcker matrix of the value creation process model

<table>
<thead>
<tr>
<th></th>
<th>COM</th>
<th>CUL</th>
<th>DM</th>
<th>POL</th>
<th>USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM</td>
<td>0.807</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CUL</td>
<td>0.435</td>
<td>0.882</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DM</td>
<td>0.625</td>
<td>0.368</td>
<td>0.831</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POL</td>
<td>0.574</td>
<td>0.466</td>
<td>0.556</td>
<td>0.842</td>
<td></td>
</tr>
<tr>
<td>USE</td>
<td>0.589</td>
<td>0.385</td>
<td>0.604</td>
<td>0.431</td>
<td>Formative</td>
</tr>
</tbody>
</table>

Table 7.10 HTMT matrix of the value creation process model

<table>
<thead>
<tr>
<th></th>
<th>COM</th>
<th>CUL</th>
<th>DM</th>
<th>POL</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CUL</td>
<td>0.509</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DM</td>
<td>0.742</td>
<td>0.427</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POL</td>
<td>0.706</td>
<td>0.565</td>
<td>0.676</td>
<td></td>
</tr>
</tbody>
</table>

During the assessment, several instruments were eliminated due to reliability and validity issues: COM3, COM4, CUL1, DM1, POL2, POL3 and POL5.
Assessment of the formative instruments

The assessment of formative instruments includes convergent validity, collinearity and statistical/relevance of the instruments weight. The only construct with a formative instrument was the USE construct. This construct is a formative HCM and there is no reflective instrument designed to measure this construct. Therefore, the assessment on the convergent validity was not undertaken. The examinations of the constructs include collinearity, statistical significance and relevance of the outer weight.

As shown in Table 7.11, because the variance inflation factor (VIF) values of the three formative instruments that were all less than 5, there was no collinearity issue (Hair et al. 2014). The t-statistic tests on instruments’ weights showed significant results for frequency of use (Freq) but not for the other two: interactivity of use (Int) and duration of use (Dur). However, the loadings of the Dur and Int were greater than 0.5, suggesting these two instruments should be retained (Hair et al. 2014).

Table 7.11 Assessment results of formative instruments of the value creation process model

<table>
<thead>
<tr>
<th></th>
<th>VIF</th>
<th>Weight</th>
<th>t-statistic of weight</th>
<th>Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dur</td>
<td>3.085</td>
<td>0.293</td>
<td>1.435</td>
<td>0.906</td>
</tr>
<tr>
<td>Int</td>
<td>3.216</td>
<td>0.279</td>
<td>1.496</td>
<td>0.907</td>
</tr>
<tr>
<td>Freq</td>
<td>3.961</td>
<td>0.499</td>
<td>2.023</td>
<td>0.963</td>
</tr>
</tbody>
</table>

7.5.2.3 Assessment of the structural model

Since the results of the measurement model assessment satisfied the reliability and validity requirements, the next step was the assessment of the structural model. The assessment of the structural model included assessing the collinearity of the exogenous variables, measuring the paths coefficient and their significance, assessing the coefficient of determination $R^2$, effect size $f^2$ and finally assessing the model’s predictive relevance $Q^2$ (Hulland 1999; Hair et al. 2014; Sarstedt et al. 2014).

The overall results of the assessment are presented in Table 7.12 and Figure 7.18. As shown in Table 7.12, the structural model is not affected by collinearity issues of the exogenous variables as the VIF value are less than 5 (Hair et al. 2014). The bootstrap
t-statistic of the path coefficient (124 cases, 5000 samples and no sign changes option) showed that the relationship between CUL and COM was not significant at 0.05, while the other three relationships were significant at 0.01. The effect size $f^2$ CUL→COM value of 0.021 (small), POL→COM value of 0.167 (medium), USE→COM value of 0.231 (medium) and COM→DM value of 0.640 (large) show the contribution of the exogenous variable to the variance explained.

The $R^2$ of COM shows that this endogenous variable explains 0.484 of the variance of the USE, POL and CUL. Slightly lower than that, the $R^2$ of DM describes 0.390 variance of the COM. The values of both $R^2$s suggest weak coefficients of determination. Finally, the $Q^2$ values for COM and DM are above 0, indicating that predictive relevance is established. The evidence suggests that $H1$, $H2$ and $H4$ are accepted while $H3$ is rejected as shown in Figure 7.18.

Table 7.12 Collinearity, path coefficient and effect size of the value creation process model

<table>
<thead>
<tr>
<th></th>
<th>COM ($R^2$=0.484, $Q^2$=0.3)</th>
<th>DM ($R^2$=0.390, $Q^2$=0.257)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VIF</td>
<td>Path Coefficient</td>
</tr>
<tr>
<td>COM</td>
<td></td>
<td>1.000</td>
</tr>
<tr>
<td>CUL</td>
<td>1.350</td>
<td>0.121</td>
</tr>
<tr>
<td>DM</td>
<td></td>
<td>1.412</td>
</tr>
<tr>
<td>USE</td>
<td>1.297</td>
<td>0.393</td>
</tr>
</tbody>
</table>

Note: ***p<0.001; ns: not significant

Figure 7.18 Results of structural model testing of the value creation process model
7.5.3 Assessment of the public value creation model

7.5.3.1 Assessment procedure

The assessment of the public value creation model involved two two-stage approaches. The first two-stage approach was to assess the relationship between USE, POL, CUL, COM, DM, PROC and public value (PV) as shown in Figure 7.19. As discussed in Section 7.4.1, a second two-stage approach was appropriate to examine these two constructs. The first two-stage approach consisted of stage 1 and stage 2.

Stage 1 involved computing the latent variable scores by drawing two HCMs (PROC and PV) and their respective LOCs. The LOCs of PROC are USE, POL, CUL, COM and DM. All the corresponding instruments were assigned to these LOCs and then replicated to PROC. The LOCs of PV were economic value (EV) and social value (SV). All the respective instruments were assigned to EV and SV, and then replicated to PV. However the replicated instruments in PROC and PV are not shown in Figure 7.19.

During the assessment in the first stage, the following instruments are eliminated due to reliability and validity issues: PV1, PV7, PV8 and PV10. To avoid biased loadings/weighting of the LOCs on the HOC, the number of instruments of the LOCs should be equal (Chin et al. 2003; Becker et al. 2012). Thus, even though COM6 and DM2 had no reliability and validity issues, they had the smallest outer loadings among the instruments in their constructs. Therefore these two instruments were excluded in the HCM examination. After excluding the COM6 and DM2, the latent variable scores for this model were computed and assigned to stage 2 as shown in Figure 7.20. Stage 2 is a temporary model for the assessment in stage 3 and stage 4.
The second two-stage approach was conducted to assess the relationship between PROC, PV and public’s co-production (COP) for the assessment of \( H5 \) and \( H6 \). As discussed in Section 7.4.2, COP serves as a moderator in the relationship between PROC and PV. COP is a reflective continuous moderator and PROC is formative HCM latent variable. Therefore a two-stage approach was appropriate for the examination of the moderation effect (Chin et al. 2003; Henseler & Fassott 2010; Hair et al. 2014). The second two-stage approach consisted of stage 3 and stage 4.

Stage 3 was developed based on the model in stage 2 with additional COP. Stage 3 was conducted to obtain the latent variable scores for the exogenous variables (PROC) and moderator (COP). This was achieved by constructing PROC and COP.
as exogenous variables while PV serves as an endogenous variable as shown in Figure 7.21. The latent variable scores for PROC and COP were then computed.

Stage 4 was conducted to assess the moderating effect between PROC and COP by examining the path coefficient of the product between PROC and COP as shown in Figure 7.22. Based on this final model, H5 was assessed based on the path coefficient and the bootstrap t-statistic of the relationship between PROC and PV. Meanwhile the path coefficient and the bootstrap t-statistic of the product between PROC and COP were used to assess H6.
7.5.3.2 Assessment of the measurement model

Assessment of reflective instruments

The reflective instruments in the public value creation model exist in public value (PV) and the public’s co-production (COP) construct. As shown in Table 7.13, the loadings of the instruments were greater than 0.70, indicating the instrument’s reliability. The internal consistency is satisfactory to good, supported by the CR value of 0.795. The AVE is greater than the threshold value of 0.5, indicating convergent validity.

Table 7.13 Instrument reliability, internal consistency and convergent validity of the public value creation model

<table>
<thead>
<tr>
<th>Construct</th>
<th>Instruments</th>
<th>Loading</th>
<th>Composite Reliability (CR)</th>
<th>Average Variance Extracted (AVE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV</td>
<td>BV</td>
<td>0.886</td>
<td>0.805</td>
<td>0.675</td>
</tr>
<tr>
<td></td>
<td>SV</td>
<td>0.752</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COP</td>
<td>COP2</td>
<td>0.844</td>
<td>0.898</td>
<td>0.745</td>
</tr>
<tr>
<td></td>
<td>COP3</td>
<td>0.903</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>COP4</td>
<td>0.841</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7.14 Cross loadings of the public value creation model

<table>
<thead>
<tr>
<th>PV</th>
<th>COP</th>
</tr>
</thead>
<tbody>
<tr>
<td>BV</td>
<td>0.886</td>
</tr>
<tr>
<td>SV</td>
<td>0.752</td>
</tr>
<tr>
<td>COP2</td>
<td>0.530</td>
</tr>
<tr>
<td>COP3</td>
<td>0.593</td>
</tr>
<tr>
<td>COP4</td>
<td>0.551</td>
</tr>
</tbody>
</table>

Table 7.15 Fornell-larcker matrix of the public value creation model

<table>
<thead>
<tr>
<th>COP</th>
<th>Moderating Effect 1</th>
<th>PROC</th>
<th>PV</th>
</tr>
</thead>
<tbody>
<tr>
<td>COP</td>
<td>0.841</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderating Effect 1</td>
<td>-0.565</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>PROC</td>
<td>0.605</td>
<td>-0.481</td>
<td>Formative</td>
</tr>
<tr>
<td>PV</td>
<td>0.610</td>
<td>-0.359</td>
<td>0.635</td>
</tr>
</tbody>
</table>

Table 7.16 HTMT matrix of the public value creation model

<table>
<thead>
<tr>
<th>COP</th>
<th>Moderating Effect 1</th>
<th>PV</th>
</tr>
</thead>
<tbody>
<tr>
<td>COP</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The assessment on cross loading, Fornell-Larcker and the HTMT matrix indicate discriminant validity. As shown in Table 7.14, the loading of an instrument to its respective construct is greater than the cross loading value to other constructs. In Table 7.15, the diagonal value that shows the square root of AVE is greater than its correlation value to other constructs. Finally, Table 7.16 shows that the HTMT matrix values are less than 0.85 and the upper confidence intervals are less than 1, indicating discriminant validity.

**Assessment of formative instruments**

There is only one construct, PROC, with a formative instrument in this model. The VIF values between 1.408 and 2.036 show that there is no collinearity issue among the instruments as presented in Table 7.17. Only DM and CUL satisfy the significance test of the outer weight, but all instruments are retained because all loading values are above 0.5.

Table 7.17 Assessment results of formative instruments of the public value creation model

<table>
<thead>
<tr>
<th></th>
<th>VIF</th>
<th>Weight</th>
<th>t-statistic of weight</th>
<th>Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM</td>
<td>2.036</td>
<td>0.230</td>
<td>1.333</td>
<td>0.810</td>
</tr>
<tr>
<td>CUL</td>
<td>1.408</td>
<td>0.228</td>
<td>1.654</td>
<td>0.658</td>
</tr>
<tr>
<td>DM</td>
<td>1.895</td>
<td>0.418</td>
<td>2.933</td>
<td>0.860</td>
</tr>
<tr>
<td>POL</td>
<td>1.675</td>
<td>0.217</td>
<td>1.423</td>
<td>0.750</td>
</tr>
<tr>
<td>USE</td>
<td>1.781</td>
<td>0.189</td>
<td>1.292</td>
<td>0.748</td>
</tr>
</tbody>
</table>

7.5.3.3 Assessment of the structural model

Since the results of the two measurement model assessments showed the reliability and validity of the instruments, the next step was the assessment of the structural model. As shown in Table 7.18, the VIF value of less than 5 suggested that the structural model had no collinearity issues (Hair et al. 2014). The bootstrap t-statistic of the path coefficient results (124 cases, 5000 samples and no sign changes option)
showed that the relationship between PROC and PV (H5) was significant at 0.001, the relationship between Moderating Effect 1 and PV (H6) was not significant at 0.05 and the relationship between PROC and PV was significant at 0.001. The effect size $f^2$ of both COP and PROC on PV were intermediate, while the moderating effect was generally very weak.

The $R^2$ value shows that PV explains 0.474 of the variance in PROC, COP and Moderating Effect 1. This $R^2$ value suggests a weak coefficient of determination. Finally, the $Q^2$ value of 0.384 is greater than 0, indicating that predictive relevance is established. All in all, the evidences suggested that H5 was supported but not H6.

Table 7.18 Collinearity, path coefficient and effect size of the public value creation model

<table>
<thead>
<tr>
<th></th>
<th>PV ($R^2$=0.474, $Q^2$=0.384)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VIF</td>
</tr>
<tr>
<td>COP</td>
<td>1.864</td>
</tr>
<tr>
<td>Moderating Effect 1</td>
<td>1.538</td>
</tr>
<tr>
<td>PROC</td>
<td>1.650</td>
</tr>
</tbody>
</table>

Note: ***p<0.001; ns: not significant

Figure 7.23 Results of structural model testing of the public value creation model

7.6 Overall assessment of the model
Section 7.5 described the examination of the value creation process and public value creation model in order to test the hypotheses. The results of the examination are summarized and presented in Table 7.19 and Figure 7.24. Of the six hypotheses, the evidence supported the acceptance of $H1$, $H2$, $H4$ and $H5$. The two hypotheses, $H3$ and $H6$, are rejected due to the non-significant bootstrap $t$-statistics. The $R^2$ value, 0.474, suggests weak coefficient of determination.

Table 7.19 Summary of hypotheses testing

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Path Coefficient</th>
<th>Bootstrap $t$-statistics</th>
<th>Significance</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>$H1$</td>
<td>0.393</td>
<td>6.46</td>
<td>***</td>
<td>Accepted</td>
</tr>
<tr>
<td>$H2$</td>
<td>0.349</td>
<td>4.279</td>
<td>***</td>
<td>Accepted</td>
</tr>
<tr>
<td>$H3$</td>
<td>0.121</td>
<td>1.284</td>
<td>ns</td>
<td>Rejected</td>
</tr>
<tr>
<td>$H4$</td>
<td>0.625</td>
<td>9.713</td>
<td>***</td>
<td>Accepted</td>
</tr>
<tr>
<td>$H5$</td>
<td>0.435</td>
<td>10.581</td>
<td>***</td>
<td>Accepted</td>
</tr>
<tr>
<td>$H6$</td>
<td>0.046</td>
<td>0.936</td>
<td>ns</td>
<td>Rejected</td>
</tr>
</tbody>
</table>

Note: ***$p<0.001$; ns: not significant

Figure 7.24 Overall hypotheses testing results
CHAPTER 8. DISCUSSION

In mixed methods research, meta-inferences are the integrative interpretation of the qualitative findings and quantitative results. Therefore, the first two sections of this chapter present qualitative and quantitative inferences. Meta-inferences are presented in Section 8.3 by comparing the inferences from the two research approaches. The agreements and disagreements between the findings from the two research strands are discussed. Revisions of the research model are presented in Section 8.3.2 and Section 8.3.3. The integrative interpretation is discussed in Section 8.3.4 based on the revised model. Finally, inference quality is discussed in Section 8.4 to assess the suitability and adequacy of the meta-inferences.

8.1 Qualitative inference

As presented in Chapter 5, the second aim of the case study research is to predict public value creation through social media use. A multi-case study approach was employed in this study to provide more compelling evidence and yield more general results (Benbasat et al. 1987; Eisenhardt 1989; Yin 2003). Using a multi-case design allows cross-case comparison that enables researchers to predict similar outcomes across cases, or to contrast results with previous results. In this qualitative inference, the discussion of hypotheses in the research model is based on the cross-case analysis in Section 6.2.

Social media use

Based on the interview results and Twitter data analysis, there are differences in the social media use between organizations that realize public value and organizations that do not. Differences in the main tasks undertaken by organizations influence their social media use. For example, organizations involved in disaster early warnings are likely to have high frequency of use but low interactivity. On the other hand, organizations involved in SAR and/or safety and national/local disaster management have significant interactivity of use. Regardless of the level of interactivity, organizations with high frequency of social media use tend to be able to realize public value. Similarly, organizations that spent large amounts of time monitoring
social media are able to realize public value. In sum, organizations that realize public value have high social media use.

Similarly, there is a gap in communication performance between organizations that realize public value and organizations that do not. Organizations that have good communication performance tend to have high social media use. Based on this, it can be inferred that high social media use corresponds with high communication performance. This result is consistent with previous studies in e-government and information systems (Mergel 2013a; Miller & Tucker 2013; Trainor et al. 2014; Bonsón et al. 2015).

**Social media policy**

In this study, social media policy specifically refers to guidelines for organizational social media use. Thus, social media policy relates to existing policies and guidelines for the operation of an organization’s social media account. In contrast to developed countries (Klang & Nolin 2011), the Indonesian disaster management agencies that participated in this study have not developed formal social media policies. Even though the agencies involved in this study had not established social media policies, they did have policies that could be applied to organizational social media use (Mergel 2012a). These policies were derived from other existing policies, including information dissemination policies, general media policies and information disclosure policies. Essential aspects of organizational social media policy such as guidelines for decision-making about whether to share information, authority delegation to social media teams for responding to inquiries through social media and organizational responsibilities for social media use were found in the agencies that realized public value. Some of the agencies adopted existing media policies for guiding the daily organizational social media use. This indicates the extent to which organizations have provided guidelines for organizational social media use. These features are not found in the organizations that have not realized public value.

This study found that agencies that have guidelines for social media use have enhanced their organizational communication performance. In contrast, organizations without policies on social media have low communication performance. This indicates that there is a positive relationship between social media policy and

**Innovative organizational culture**

As indicated in the cross-case analysis results, organizations that are able to realize public value have attributes that are essential for innovative organizational culture. This includes the appreciation of creativity, support for new ideas and support for experimentation. These attributes were not found in the organizations that did not realize public value. Organizations with essential attributes for innovative organizational culture have high communication performance. In contrast, organizations without these attributes have low communication performance. This indicates that there is a relationship between an innovative organizational culture and communication performance. Consistent with previous studies, this study found that an innovative culture enables organizations to be suppler to new ideas and feedback from the public, and this increases communication with the public (Schein 1996; Ehnis & Bunker 2012).

**Communication**

The cross-case analysis results indicate that the organizations that realize public value show good communication performance. In contrast, organizations that do not realize public value have poor organizational communication performance. The features of communication performances promoted through social media include timely interagency communication, informal interagency communication, timely public communication, timely reports from the public and disaster event monitoring.

The cross-case analysis results also indicate that organizations that have good communication also have high disaster management performance. In contrast, organizations with low communication performance have low disaster management performance. This suggests that there is a positive relationship between good communication and disaster management performance. This is consistent with previous studies on the importance of communication in disaster management. Disaster management involves various agencies from different levels and jurisdictions. The provision of timely and accurate communication affects disaster
management performance by establishing better collaboration between organizations or between organizations and the public (Kapucu 2006; Manoj & Baker 2007; Marincioni 2007; Nowell & Steelman 2013).

Disaster management

As mentioned earlier, there is a gap between the performances of organizations with good disaster management performance and those with poor disaster management performance. Cross-case analysis classifies organizations with high disaster management performance as organizations that realize public value. Meanwhile, organizations that have poor disaster management performance are in the group of organizations that do not realize public value. Among the key attributes of good disaster management performance found in the cross-case analysis are disaster risk reduction, improved public collaboration, effective false information clarification and improved disaster responses (Donahue & Joyce 2001; Comfort 2007; Haddow et al. 2007).

Public value creation

In cross-case analysis, this factor is used to classify the cases. As mentioned in Chapter 2, public value can be categorized into social value and economic value. Social values realized from social media use included trust in government, accountability, openness and transparency, and accessibility. Surprisingly, safety was not mentioned by the interviewees. Meanwhile, economic values realized included responsiveness, effectiveness, efficiency, satisfaction and reliability.

As previously discussed, organizations that realize public value tend to have high social media use, established policies for organizational social media use, innovative organizational cultures, and good communication and disaster management performance. This indicates that public value creation is positively influenced by all these factors. All these factors are part of the value creation process, and the value creation process has a positive relationship with public value creation.
The public’s co-production

The public’s co-production was observed through interview and Twitter data. Findings from Twitter clearly show that organizations that realized public value are more frequently mentioned in Twitter. Even though further examination of the content of the tweets mentioning the agencies Twitter account is needed to determine the co-production type, the Twitter mentions can be generally interpreted as co-production efforts. Consistent with the Twitter assessment results, interview findings suggest that organizations that realize public value, except Case 3, had high public co-production. In contrast, organizations that did not realize public value had low public’s co-production. The public’s co-production included service requests, service extension and service promotion. Surprisingly, none of the interviewees mentioned the feedback received through social media.

Our model proposes that the public’s co-production moderates the relationship between the value creation process and public value creation. Both the findings from Twitter analysis and the interview data indicate that higher public co-production is related with high social media use, high social media policy, high innovative organizational culture, high communication, high disaster management performance and high public value creation. However the qualitative findings could not assess this hypothesis.

8.2 Quantitative inference

Quantitative analysis includes descriptive and SEM analysis. Descriptive analysis has been discussed in Chapter 7, and this section focuses on SEM analysis results. Unlike qualitative inferences, the findings of the SEM analysis provide straightforward examinations of the hypotheses. The examination method and SEM analysis results of the research model have been presented in Chapter 7. The research model was divided into two models: the value creation process model and the public value creation model. The data preparation for SEM analysis and the SEM analysis results are discussed in this section.
Data preparation

In general, there was no significant issue in the data, except the kurtosis issue. Descriptive statistics of the measurement model (Table 7.3) suggest that the kurtosis values for some instruments were higher than the threshold value of 7 (West et al. 1995). This applied to USE3, USE8, USE13, POL2 and CUL2. USE3, USE8 and USE13 are measures for frequency of, interactivity through, and duration for Tumblr use. These three instruments had mean values of 0.18 (Std. Dev. 0.71), 0.19 (Std. Dev. 0.68) and 0.37 (Std. Dev. 1.11), indicating that Tumblr is less used by Indonesian disaster management agencies than other social media platforms. This is in contrast with a previous study that suggests Tumblr is an effective medium for the citizen-initiated crowdsourcing in Indonesia (Brajawidagda & Chatfield 2014).

POL2 and CUL2 are about continuous social media monitoring policy and the support of organizations for informal meetings. In contrast to Tumblr use, these two instruments have very high means, with 6.08 (Std Dev. 1.12) and 5.97 (Std Dev. 1.15) respectively. The first reason for the high kurtosis value is because the survey instruments are newly-developed. Another plausible explanation for the high kurtosis value is that the respondents feel that their organizations provide high support for these two matters. The public use social media to report unfolding disaster events and this requires organizations to continuously monitor social media (H. Gao et al. 2011; Chatfield & Brajawidagda 2014). Similarly, even though Indonesian government agencies are constrained by red-tape, Indonesia is characterized as a collectivist society (The Hofstede Centre 2015) in which social cohesion is achieved through informal meetings.

SEM analysis results

The research model was divided into two component models: value creation process model and public value creation model. The value creation process model consists of the relationship between social media use (USE), social media policy (POL), innovative organizational culture (CUL), communication (COM) and disaster management (DM). They are linked by $H1$, $H2$, $H3$ and $H4$. This model is focused on the value creation at the process level. The public value creation model involves all the constructs in the model to assess $H5$ and $H6$. The public value creation model
is used to assess the value creation at the organizational level. The five previous constructs in the value creation process model are considered to be lower order constructs (LOCs) of the value creation process (PROC) in order to predict public value creation (PV). Based on the relationship between PROC and PV, H5 is assessed. Finally, the moderating effect of the public’s co-production on the relationship between PROC and PV is assessed by H6.

In general, there are six hypotheses in the model with four hypotheses (H1, H2, H4 and H5) are statistically supported and the other two hypotheses (H3 and H6) are rejected. H1 is the relationship between social media use and communication. The assessment results show the path coefficient value of 0.393 with p<0.001. The result suggests that social media use improves disaster communication. This result is consistent with previous studies in e-government and information systems literature (Bonsón et al. 2012; Abdelsalam et al. 2013; Miller & Tucker 2013; Trainor et al. 2014). In addition, the conception of social media use that consists of frequency of use, interactivity of use and duration of use are useful in capturing the organizational resources allocated for operating social media.

H2 predicts a positive relationship between social media policy and communication. The H2 has a path coefficient value of 0.349 with p<0.001. The result indicates that there is a positive relationship between social media policy and disaster communicational performance (Klang & Nolin 2011; Kavanaugh et al. 2012; Mergel 2012a). H3 predicts a positive relationship between innovative organizational culture and communication. The result shows a path coefficient value of 0.121 with non-significant statistical support. The result is different from previous studies that suggest there is an important role played by innovative organizational culture in value creation during disaster situations (Yates & Paquette 2011; Ehnis & Bunker 2012; Houston et al. 2015).

H4 predicts a relationship between communication and disaster management performance. The resulting path coefficient value of 0.625 with p<0.001, suggests that there is a strong relationship between communication and organization performance. This result is consistent with previous studies (Kapucu 2006; Manoj & Baker 2007; Marincioni 2007; Nowell & Steelman 2013). The $R^2$ value of 0.390 is the variance explained by the combined effect of its corresponding exogenous
variables and indicates weak predictive accuracy (Hair et al. 2014). In comparison to other studies on social media at the process level, this $R^2$ value is higher (Trainor et al. 2014).

$H5$ predicts that the value creation process has a positive influence on public value creation. The value creation process consists of social media use, social media policy, innovative organizational culture, communication and disaster management performance. All these constructs are considered to be lower order constructs (LOCs) of the value creation process. The path coefficient of 0.435 and $p<0.001$, provides statistical support for this hypothesis. This result suggests a positive influence of the value creation process on public value creation. The assessment of the public value creation model also suggests that innovative organizational culture is an important part of the value creation process. This indicates that even though innovative organizational culture has no significant effect on communication, it is still an important part of the value creation process.

Finally, the $H6$ predicts that the public’s co-production has a moderating effect on the relationship between the value creation process and public value creation. The statistical analysis shows a path coefficient of 0.046 which is not significant. Hence the moderating effect is not supported. The conclusion is that the public’s co-production does not moderate the positive influence of the value creation process on public value creation. The $R^2$ value of 0.474 is the variance explained by the combined effect of its corresponding exogenous variables and indicates weak predictive accuracy (Hair et al. 2014).

8.3 Meta-inferences

Meta-inferences are crucial part in mixed methods study and it is needed to provide a comprehensive view of the results from the qualitative and quantitative findings. This study was a sequential exploratory mixed methods project with equal weight given to the qualitative and quantitative approaches. The findings of the qualitative analysis were incorporated into the quantitative research in two phases. First, the qualitative findings were used for instrument development for the online survey. Second, the results of the cross-case analysis were compared with the survey results. This comparison is possible because this study employed a multi-case approach that
enabled prediction of similar outcomes (Yin 2003). This section discusses the comparison between the results of the cross-case analysis and the survey results.

8.3.1 Comparison between qualitative and quantitative inferences

The inferences of the qualitative findings and quantitative results in the hypotheses testing are summarized in Figure 8.1. Findings from the multi-case study research and the online survey are mapped into the research model of this study. In Figure 8.1, QUAL represents qualitative and QUAN stands for quantitative. Thus, QUAL and QUAN in Figure 8.1 represent the case study analysis and SEM analysis of survey results respectively. In general, there are more agreements between the results of the two research strands that there are disagreements. This is shown in $H1$, $H2$, $H4$ and $H5$. There is disagreement between the two in $H3$. For $H6$, the QUAL could not assess the moderation effect and therefore is not presented in Figure 8.1.

![Figure 8.1 Comparison between qualitative inference and quantitative inference results](image)

$H1$ predicts a relationship between social media use and organizational communication performance. The qualitative findings indicate that the level of frequency of use, interactivity and duration of social media use positively correspond to the level of communication performance. Similarly, the results of the quantitative analysis provide evidence on the relationship between social media use and
communication performance. Thus, the results of the two research approaches are consistent.

Similarly, the assessment of $H2$ the qualitative findings and the quantitative results are consistent. In the qualitative research, social media policy effectively provides guidance for the social media team members and affects communication performance. The results of the quantitative analysis support the existence of a significant relationship between social media policy and communication performance.

There is disagreement on $H3$ between the qualitative and quantitative findings. The qualitative results indicate a positive relationship between innovative organizational culture and communication. In contrast, the SEM analysis results do not provide statistical support for this hypothesis. The different findings might be affected by two things: participants’ job positions and the context of the study.

The different compositions of the participants in the two studies might have affected the results. As presented in Chapter 5, the participants of the case study research were dominated by the managerial level of ten disaster management agencies in Indonesia. In contrast, managerial level respondents only accounted for 14% of the total survey participants. As suggested by Schein (1996), management level influences the type of culture evolved among the participants in relation to the need for innovativeness. In the results, it can be argued that that social team members and managers have different attitudes towards innovation. The second plausible explanation could be that a focus on disasters can be a constraint on innovation. In disaster situations, hierarchical organizations often break down. Thus, organizations have to deal with limited information and this becomes a major constraint for innovation (Comfort 1999).

There is agreement between the qualitative and quantitative results in $H4$. In the case study research, good organizational communication seems to be associated with good disaster management performance. Similarly, SEM analysis showed a significant connection between communication and disaster management performance.


$H5$ focuses on the relationship between the value creation process and public value creation. The value creation process conceptually consists of social media use, social media policy, innovative organizational culture, communication and disaster management performance. Cross-case analysis results suggest that organizations with high social media use, social media policies, an innovative organizational culture, improved communication and improved disaster management performance have high public value creation. This indicates a positive relationship between the two constructs. In the quantitative research, SEM analysis results suggest a strong effect of the value creation process on public value creation.

$H6$ examines the moderating effect of the public’s co-production on the relationship between the value creation process and public value creation. Case study research results indicate that organizations with high public co-production have good value creation processes and high levels of public value creation. However, this should not be interpreted as an indication of the moderating effect of the public’s co-production. SEM analysis in the quantitative research offers a clear assessment of the moderating effect. The results show that the public’s co-production has no significant effect on the relationship between the value creation process and public value creation.

The disagreement between QUAL and QUAN on $H3$ has been discussed. Even though having an innovative organizational culture does not positively influence the communication process, it has a positive influence on the value creation process. Meanwhile the assessment of the $H6$ results means the rejection of the hypothesis in SEM analysis without further explanation by the qualitative results. This leads to the need of further assessment of the role of the public’s co-production in the research model. One of the possible roles for the public’s co-production in the model is in a mediating role which is discussed in Section 8.3.2.

8.3.2 Revision of the research model

8.3.2.1 Mediating effect

A mediating role exists when a predictor indirectly affects a dependent variable through one or more intervening variable (or mediator) (Preacher & Hayes 2008; Hair et al. 2014). As shown in Figure 8.2, the value creation process (PROC) has a
direct effect $p_{13}$ on public value creation (PV). At the same time, PROC also has an indirect effect ($p_{12}$ and $p_{23}$) on PV through the public’s co-production (COP). In this context, COP is the mediator of the indirect effect of PROC on PV.

Adopting Preacher and Hayes’ (2008) work, Hair et al. (2014) suggested a three-step examination process. The first step is the assessment of the significance of the direct effect ($p_{13}$) without the moderator in the model. If the result shows an insignificant result, then there is no mediation. If there is a significant effect of $p_{13}$, then the second step should be undertaken. The second step is the assessment of the significance of the indirect effects ($p_{12}$ and $p_{23}$) with moderator variable in the path model. If the indirect effects are not significant then there is no mediation effect. If the indirect effects are significant, examination proceeds to the third step. The third step is to measure the mediation strength by examining the variance accounted for (VAF) value, formulated as $\text{VAF} = (p_{12}.p_{23})/(p_{12}.p_{23}+p_{13})$. A VAF of less than 20% means that there is no mediation. Mediation exists if the VAF value is more than 80% (full mediation) or between 20% and 80% (partial mediation).

### 8.3.2.2 Mediation results

The examination of the mediating effect results path coefficient and the bootstrap t-statistics is shown in Table 8.1 and Figure 8.3. As presented in Table 8.1, both direct effects ($p_{13}$) and indirect effects ($p_{12}$ and $p_{23}$) are significant. The VAF computation results in the value of 84%, suggesting that full mediation exists.
### Table 8.1 Mediating effect test

<table>
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<th>Path</th>
<th>Path Coefficient</th>
<th>t-statistics</th>
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<tr>
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<td>4.059</td>
<td>***</td>
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<tr>
<td>P₁₁₃</td>
<td>0.619</td>
<td>10.055</td>
<td>***</td>
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<tr>
<td>P₂₃₃</td>
<td>0.356</td>
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<td>CUL</td>
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Figure 8.3 Results of mediating role of public’s co-production

#### 8.3.3 Revised model

The assessment of the mediating effect of the public’s co-production suggests that the public’s co-production mediates the effect of the value creation process on the public value creation. Prior studies suggest the important role of the social media in public value creation by providing two-way communication channels for governments to interact with public through dialogue (Meijer 2011; Lee & Kwak 2012; Linders 2012; Magro 2012; Chatfield et al. 2013). This result provides evidence of the important role of the public in the public value creation.

Social media use by government is expected to be the advanced phase of the e-government in order to attract more participation from the public (Bonsón et al. 2012; Lee & Kwak 2012; Medaglia 2012; Fredericks & Foth 2013). In this way, government leverage resources reside in the public through various forms including feedback, consultation, dialogue, crowdsourcing and co-production (Linders 2012; Chatfield et al. 2013; Chatfield & Brajawidagda 2014; Chatfield et al. 2014; Lampe et al. 2014). Based on the SEM results, the revised research model is shown in Figure 8.4.
8.3.4 Integrative inference

This study raised a central research question: How does the government create public value through social media use? To answer this question, this study examined the existing literature to identify the salient factors influencing public value creation. Previous studies suggested both internal and external organizational factors influence the public value creation of social media. The internal factors of public value creation include social media policy and innovative organizational culture (Bertot et al. 2012b; Kavanaugh et al. 2012; Lee & Kwak 2012; Zheng 2013). The salient external factor in public value creation is the public’s co-production (Chatfield et al. 2013; Meijer & Thaens 2013; Mergel 2013a; Mossberger et al. 2013).

A research model has been developed to explain public value creation. The research model comprises the salient internal and external organizational factors and is drawn from the Integrative Model of IT Business Value developed by Melville et al. (2004). The model posits that IT impacts both process and organizational performance. In public organizations, the overarching organizational performance is the public value creation (Moore 1995; Alford & O’Flynn 2009; Benington 2009). Six hypotheses were proposed in the model to explain the value creation at process and organizational levels.
Sequential exploratory mixed methods, in which qualitative research leads quantitative research, was chosen for two main reasons: developmental reasons and completeness (Venkatesh et al. 2013; Zachariadis et al. 2013). This study employs qualitative case study research and a quantitative online survey. Both were conducted on disaster management agencies in Indonesia. This study is developmental because it employs an instrument development model of mixed method research in which the instrument development for the online survey is undertaken based on the case study research findings. This study offers completeness because the case study findings are compared with the SEM analysis of survey results to have comprehensive view on public value creation.

Interview and Twitter data analysis were the two main data sources for the case study research. Interviews were conducted on fifteen managers/members of top management of ten disaster management agencies in Indonesia. Twitter data was collected to analyze social media use of the ten disaster management agencies. An online survey collected 124 usable responses from social media team members of the disaster management agencies.

The case study findings were presented in Chapter 6, while SEM analysis of the online survey results was presented in Chapter 7. Qualitative inference and quantitative inference have been discussed in Section 8.1 and Section 8.2. Similarly, the comparison between the qualitative findings and quantitative results has been discussed in Section 8.3.1. One of the results of the comparison suggests the need for revision of the research model. The revised research model was discussed to draw an integrative inference/meta-inference. The discussion is based on the implications of the results and the Integrative Model of IT Business Value (Melville et al. 2004).

As suggested by the revised model, social media use positively influences disaster management performance and public value creation. This is consistent with previous studies in the information systems literature which indicate that IT resources, including social media, influence organizational performance (Ray et al. 2005; Trainor et al. 2014). This study also suggests that the influence of IT resources on process performance is indirect through the enhancement of business processes. Communication, as the core of business process in disaster management, is selected for observation. This result is consistent with previous studies and highlights the
important role of the business process in the value creation process (Albadvi et al. 2007).

Two complementary organizational factors are included in the model: social media policy and innovative organizational culture. The qualitative findings and quantitative results on social media policy provide solid conclusions on the complementary role of the social media policy in social media use. This is consistent with the results of previous studies on the role of complementary organizational factors on the impact of IT on process and organizational performance (Ray et al. 2005; Trainor et al. 2014). In contrast, there is disagreement between the qualitative findings and quantitative results on the impact of innovative organizational culture on performance. Two plausible explanations have been discussed in Section 8.3.1. Innovative organizational culture is retained in the model because even though it does not positively influence the communication and disaster performance at the process level, it is an important determinant of the public value creation at the organizational level.

As suggested by the revised model, communication positively influences disaster management performance. This is consistent with previous studies in disaster management (Kapucu 2006; Manoj & Baker 2007; Marincioni 2007; Nowell & Steelman 2013). This also suggests the important role of the business process in the value creation process through information technology (Albadvi et al. 2007).

The revised model provides evidence of the positive influence of the value creation process on public value creation. The conception of the value creation process of this study is different from previous studies on the impact of information technology on organizational performance. Previous studies observed the direct impact of IT on process performance or organizational performance (Barua et al. 1995; Ray et al. 2005). The original Integrative Model of IT Business Value (Melville et al. 2004) considers the existence of a value creation process layer in which the IT impact is best observed. The layer consists of IT resources, complementary organizational resources, business processes and business process performance. The overall performance of this value creation process impacts the organizational performance.
Finally, the research model suggests the mediating effect of the public’s co-production on the influence of the value creation process on public value creation. This indicates that public value creation does not merely depend on internal organizational factors, and that external factors also influence public value creation. The results also suggest that organizational factors (social media use, social media policy, innovative organizational culture, communication, and disaster management) positively affect the public’s co-production level. An organization that has a good social media value creation process is likely to have higher levels of public co-production. This result also confirms the citizen-centric view of e-government that suggests the public has a role in realizing the value of e-government (Reddick 2005; Chatfield et al. 2013). This is also consistent with previous results on the role of business partner support in organizational performance in the information systems literature (Dong et al. 2009; Thrasher et al. 2010).

8.4 Inference quality

With the qualitative inferences, quantitative inferences and meta-inferences having been presented in the earlier sections, it is worthwhile discussing the inference quality. As mentioned in Chapter 5, the assessment of the inference quality of this study follows the framework developed by Venkatesh et al. (2013) that is adapted from the work of Teddlie and Tashakkori (2009). In general, the framework consists of two aspects of quality: design quality and explanation quality. Both design quality and explanation quality have several assessment components.

The first component of design quality is design suitability. Design suitability is the degree to which the selected methods are appropriate for answering the research questions. In this study, a mixed methods approach that consists of case study research and survey research is appropriate to answer the research question. The selection of a mixed methods approach is appropriate to address the research question that requires a combination of the research strengths (Creswell 2003; Venkatesh et al. 2013). “How” research questions are best answered with case study research (Benbasat et al. 1987; Eisenhardt 1989; Yin 2003). Case study is appropriate for exploring new phenomena and for both exploratory and explanatory research. Case study findings are used to develop the instrument for the online
survey. The SEM analysis of the online survey results is appropriate for examining the proposed research model. Case study findings and the online survey results are also compared to provide a comprehensive view of the studied phenomenon. In sum, this study has established the suitability of its design.

Next, design adequacy is assessed to determine the degree to which both qualitative and quantitative research methods satisfy the quality and rigor requirements. Both the case study and survey research undertaken in this study follow acceptable practices to satisfy quality and rigor. In the case study research, construct validity was established by the use of multiple sources, including interviews and Twitter data (Flick 1992; Peräkylä 1997). Interviews were transcribed verbatim for further assessment of construct validity (Hirschman 1986). Within-case analysis and the use of a diagram to display the results enhanced the internal validity (Miles & Huberman 1994). The use of multi-case study is part of the effort to establish external validity (Eisenhardt 1989). Finally, the interviews were recorded and guided by a structured protocol to ensure reliability (LeCompte & Goetz 1982; Yin 2003). In the SEM analysis of the survey results, this study statistically assessed the instrument reliability, internal consistency, convergent validity and discriminant validity (Hulland 1999; Chin 2010; Götz et al. 2010; Hair et al. 2014; Sarstedt et al. 2014). In addition, the sample and data collection procedure followed the norms for case study and survey research (Eisenhardt 1989; Hair et al. 2014). The design adequacy was discussed in Chapter 5. All in all, this study has established its design adequacy.

The third component of design quality is analytic adequacy. Analytic adequacy is the degree to which the analytic process is sufficient to answer the research questions. Within-case and cross-case analysis was conducted to examine the case study results in order to ensure the adequacy of the analysis process and to answer the research question. Both analyses are presented in Chapter 6. In examining the research model, PLS-SEM analysis was employed to assess the survey results. The PLS-SEM analysis followed well accepted steps of statistical evaluation to ensure the reliability and validity for the hypothesis testing (Hulland 1999; Chin 2010; Götz et al. 2010; Hair et al. 2014; Sarstedt et al. 2014). Detailed steps of the analysis have been presented in Chapter 7. In sum, this study has established analytic adequacy.
The first and the second aspects of explanation quality are qualitative inference and quantitative inference. They are the degree to which interpretation of the analysis in each strand is relevant, consistent with theory and transferable. Qualitative inference and quantitative inference have been presented in earlier sections in this chapter. Both qualitative inference and quantitative inference were based on the findings that have been adequately analyzed as presented in the section on design quality. The discussion was based on the research model and comparisons with previous studies are made to ensure the consistency with the knowledge of the field. Thus, this study has established the quality of its qualitative and quantitative inferences.

The third aspect of explanation quality is meta-inferences which consist of three sub-aspects: integrative efficacy, inference transferability and integrative correspondence. Integrative efficacy is the degree to which inferences in each strand are integrated into theoretically consistent meta-inferences (Tashakkori & Teddlie 2010; Venkatesh et al. 2013). This study ensures integrative efficacy through direct comparison between qualitative inferences and quantitative inferences guided by the research model as discussed in the early part of this section. The result of the comparison suggests the need for a revision of the research model and therefore a revised research model is used for the integrative inference.

Inference transferability is the extent to which meta-inferences are applicable and generalizable in different contexts, settings, organizations or time periods (Tashakkori & Teddlie 2010). Even though this study is in the context of disaster management agencies, inference transferability exists. First, in the integrative inference section, the results of each construct used in this model are discussed along with its corresponding construct in the Integrative Model of IT Business Value (Melville et al. 2004). Second, while some instruments in this study are specifically developed in the disaster management context, other instruments are applicable in the other contexts, especially e-government. These include instruments in social media use, innovative organizational culture, public value creation and public co-production.

Integrative correspondence is the degree to which meta-inferences satisfy the initial purpose of the study. This study raised a central research question: How does the government create public value through social media use? The primary research aim
of this study was to investigate public value creation through social networks by governments by incorporating both internal and external organizational factors in the public value creation process. The meta-inferences is based on qualitative inferences and quantitative inferences that satisfy design suitability, design adequacy and analytic adequacy.
CHAPTER 9. CONCLUSIONS

This chapter consists of concluding remarks for this study. A summary of this study is presented in Section 9.1. Following that, the contributions of this study are presented in Section 9.2. The limitations of this study are discussed in Section 9.3. Finally, the implications of the study for future research directions are discussed in Section 9.4.

9.1 Overview of the study

This study raised a central research question: How does the government create public value through social media use? The primary research aim of this study is to investigate the public value creation through social networks by governments by incorporating both internal and external organizational factors in the public value creation process. To answer the research question and achieve the aim of this study, an extensive literature review was undertaken on the public value creation of social media. Following that, a review of disasters and disaster management agencies was conducted. Based on that, a research model was developed to explain public value creation through social media use. The research model comprised salient internal and external organizational factors.

Sequential mixed methods research was selected to allow the survey instrument development. Two research methods employed in this study were: case study research and online survey research. These two research methods are integrated in two phases. First, the results of the within-case and cross-case analysis of the case study were used to develop the survey instruments. Second, meta-inferences were conducted through the comparison of the case study findings and SEM analysis of survey results.

9.2 Research contributions

9.2.1 Theoretical contributions

The theoretical contribution of this study is twofold. First, this study tests the Integrative Model of IT Business Value developed by Melville et al. (2004).
Previous study that tested the Integrative Model of IT Business Value only focuses on the value generation process context and therefore neglected the existing layers in the Integrative Model of IT Business Value that reflects the external factors of the organization (Trainor et al. 2014). In the rapid changing environment, the impact of IT deployed by the organization is not only a function of its internal factors but also affected by its external factors, as Melville (2004, p. 292) asserted, “if the right IT is applied within the right business process, improved processes and organizational performance result, conditional upon appropriate complementary investments in workplace practices and organizational structure and shaped by the competitive environment”. By including internal and external factors, therefore, this study, to my best knowledge, has the most comprehensive test of the Integrative Model of IT Business Value.

Second, this study contributes to the information systems literature by examining the value creation of social media use (Aral et al. 2013; Schryen 2013). The information systems literature provides only a few frameworks available for analyzing the value creation through social media networks (Miller & Tucker 2013; Trainor et al. 2014). As mentioned earlier, Trainor et al. (2013) also adapted the Integrative Model of IT Business value (Melville et al. 2004) to analyze customer relationship performance ($R^2=0.15$). Meanwhile Miller (2013) did not propose any framework to analyze the value creation process when they observe the influence of social media use on customer participation. While social media has been acknowledged as an effective tool for government to collaborate with the public and gain benefits from the resource outside of the organization boundary (Bertot et al. 2010a; Bertot et al. 2012b; Kavanaugh et al. 2012; Bekkers et al. 2013; Zheng 2013), previous studies did not incorporate internal and external organizational factors simultaneously and therefore failed to explain comprehensively value creation through social media networks. To my best knowledge, this study is the first study that integrates internal and external factors to assess value creation through the use of social media.

9.2.2 Methodological contributions

Methodologically, this study makes three contributions. First, this study provides a cross-case analysis of ten disaster management agencies that does not rely only on data from the interviews, but also combining with Twitter data. Cross case analysis
has been used extensively in prior studies (Benbasat et al. 1987; Eisenhardt 1989; Yin 2003). However, to my best knowledge, the application of cross case analysis that involves data from interviews and social media is in absence. Therefore, this study might be beneficial for future studies by providing an example for combining the two different data.

Second, PLS SEM analysis conducted in this study involves several layers/dimensions with formative and reflective instruments, and provides rich discussions on how the assessment was undertaken. To my best knowledge, previous researches did not provide details on how to analyze HCM with mixed formative and reflective construct (Lowry & Gaskin 2014). Future study might benefit from the steps explained in this study in Chapter 7.

Third, meta-inferences that are based on qualitative findings and quantitative results is developed to enrich the e-government research literature. As indicated by prior studies, there is a lack of examples in building meta-inferences of mixed methods (Tashakkori & Teddlie 2010; Creswell & Plano Clark 2011). To my best knowledge, there is no prior research in e-government literature that provides detail steps undertaken in building their meta-inferences based on two positivist approaches in qualitative and quantitative research. This study provides a good example for future study in the same context.

9.2.3 Practical contributions

The findings of this study make a practical contribution to public organizations by providing frameworks to examine public value creation through social media. In particular, this study provides feedback for the ten agencies involved in the case study research and Indonesian disaster management agencies at large on the current state of their social media use. At least there are five practical contributions identified from this study.

First, both of the case study and survey research results clearly show that the frequency, interactivity and duration of social media use matter to the communication performance, disaster management performance and the realization of public value. To gain benefits from social media use, agencies need to provide
resources to establish the frequency, interactivity and duration of social media use. Particularly, this study found that interactivity of Early Warning agencies are considerably low in comparison to that of other agencies. The Early Warning agencies might want to dedicate their social media use for disaster early warning. However, this study suggests those agencies to establish additional social media accounts dedicated for interactivity. This practice is common in the private sector, for example Apple has several Twitter accounts for different purposes: @AppleSupport, @AppStore, and @MacWorld.

Second, the findings of this study suggest that the establishment of comprehensive social media policy to support the daily activity of organizational social media use is crucially important. The nature of the interaction with the public through social media requires policy that not only guides the social media team in managing day to day social media operation but also avoids misuse and drawbacks for the organization. Private sectors provide examples on how social media can create negative impact on the organization that will require huge efforts and time to restore organizational reputation (Jarvenpaa & Tuunainen 2013; Seijts 2014).

Third, the findings on innovative organizational culture suggest that governments need to be externally oriented in order to realize public value. Government should open up their organizational boundary to attract and involve active participation from the citizens, but not in the context of disaster communication. In the specific context of disaster communication, our findings suggest that innovative organizational culture does not contribute to the effective disaster communication. This can be interpreted that governments need to follow their communication policy guidelines in order to establish effective disaster communications.

Fourth, our findings suggest the full mediating role of citizen co-production for the relationship between the organizational value creation process and the realization of public value. This finding can be interpreted that even though an organization has active social media use, good social media policy, innovative organizational culture, effective disaster communication and disaster management performance, the degree to which the organization is able to realize the public value largely depends on the level of the active participant of the public. Thus, government should always seek a way to actively enhance and attract the active participation from the public.
9.3 Research limitations

Despite its important contributions, this study has at least five limitations. First, the population of this study is in a developing country and does not study the population of a developed country. As with any developing country, agencies in Indonesia inherit infrastructure and organizational capability gaps in comparison with their counterparts in developed countries. As Schupan (2009) argued, developed and developing countries are different in many areas such as the institutional and cultural administration, the capacity of the government, staff capability, the effectiveness of the government and the client/public orientation. Moreover, the environment factors are different in terms of political administrative system, infrastructure, demographic and social factors and economic development. These internal and external factors may limit the generalizability of this study to developed countries.

Second, although this study conducted pre-tests and statistical validation for the online survey instruments, it did not conduct a pilot test to assess the newly developed instrument (Straub 1989). Third, due to the absence of a pilot test, some instruments were discarded due to high kurtosis. Fourth, the participants of the case study research were purposively selected and this might affect the replication of the case study research process. Five, the use of questionnaire for the quantitative study and interviews to capture the respondents’ perceptions on the constructs employed in this study might introduce bias and could not precisely capture the phenomenon observed of this study.

9.4 Implications for future study

Based on the contributions and limitations of this study, some directions are suggested for future research. First, this study specifically chooses disaster management agencies as the research population. Future research on public value creation might focus on the local government to provide a comprehensive picture of public value creation by governments. Second, the context of this study which is a developing country might introduce a generalizability issue. Therefore it opens up another research opportunity in the future to test the research model in a developed country to increase the generalizability of this study.
Third, the survey instruments for assessing social media policy, communication, disaster management and public value creation are less developed in the e-government or public administration literature. Therefore, future study might focus on this development research avenue. Fourth, even though some studies in the e-government literature use multi methods and mixed methods, there is limited guidance on how the research should be conducted (Mingers 2001; Venkatesh et al. 2013). This offers opportunity for the future researchers to demonstrate rigorous examples of multi methods and mixed methods.

Fifth, the mediating role of citizen co-production implies a need for a continuous effort for the government to explore more innovative ways to increase the active engagement of the public in public services. However the e-government literature remains silent on the factors influencing citizen co-production. This, in turn, offers opportunity for future research. Finally, the Integrative Model of IT Business Value offers several constructs and layers to explore. This study only focuses on the focal organizational factors and business partner resources. Therefore, there are opportunities for the future studies to examine the role of industry characteristics and country characteristics on the value creation of social media.
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APPENDIX A THE HUMAN RESEARCH ETHICS COMMITTEE APPROVAL
APPROVAL after review
In reply please quote: HE14/073
Further Enquiries Phone: 4221 3386

22 April 2014

Dr Akemi Takeoka Chatfield
Faculty of Engineering and Information Sciences
39.225

Dear Dr Chatfield

Thank you for your letter responding to the HREC review letter. I am pleased to advise that the Human Research Ethics application referred to below has been approved.

Ethics Number: HE14/073
Project Title: Public value creation through social media networks: Multi-methods research on Indonesia’s government organisations
Researchers: Dr Akemi Takeoka Chatfield, Mr Uuf Brajwidagda
Approval Date: 17 April 2014
Expiry Date: 16 April 2015

The University of Wollongong/Illawarra Shoalhaven Local Health District Social Sciences HREC is constituted and functions in accordance with the NHMRC National Statement on Ethical Conduct in Human Research. The HREC has reviewed the research proposal for compliance with the National Statement and approval of this project is conditional upon your continuing compliance with this document.

A condition of approval by the HREC is the submission of a progress report annually and a final report on completion of your project. The progress report template is available at http://www.uow.edu.au/research/rao/ethics/UOW009385.html. This report must be completed, signed by the appropriate Head of School, and returned to the Research Services Office prior to the expiry date.

As evidence of continuing compliance, the Human Research Ethics Committee also requires that researchers immediately report:

- proposed changes to the protocol including changes to investigators involved
- serious or unexpected adverse effects on participants
- unforeseen events that might affect continued ethical acceptability of the project.
Please note that approvals are granted for a twelve month period. Further extension will be considered on receipt of a progress report prior to expiry date. If you have any queries regarding the HREC review process, please contact the Ethics Unit on phone 4221 3386 or email rso-ethics@uow.edu.au.

Yours sincerely

K. Clapham
Professor Kathleen Clapham
Chair, Social Sciences
Human Research Ethics Committee

cc: Dr Akemi Takeoka Chatfield
APPENDIX B REQUEST LETTER FOR INTERVIEW
May 30, 2014

Our ref : 07/Interview/2014
Attachment : Interview Participant Information Sheet
Subject : Request for Interview

To:
Head of National Agency for Search and Rescue
Basarnas Indonesia
Jl. Angkasa Blok B.15 Kav 2-3 Kemayoran Jakarta Pusat 10720

Dear Sir,

We would like to invite two or three (Chief Information Officer, Head of IT Department and/or Head of Social Media Unit) of your employees to participate in a research project conducted by the School of Information Systems and Technology (SISAT) at the University of Wollongong. The project is entitled Public value creation through social media networks: Multi-methods research on Indonesia’s government organizations. We seek your approval and assistance to conduct research. The purpose of the research is to investigate the factors influencing value creation through social media use and identify the challenges that may be faced by the organizations.

Approval is sought to visit your organization for one hour or longer. During this visit a researcher would like to interview the Chief Information Officer, Head of IT Department and/or Head of Social Media Unit. The investigator will ask about how the social media may be used in your organization in order to realize the benefits. Please find attached to this letter the Participant Information Sheet for the interview participant.

The findings of this research will provide a basis for future decisions on social media use by government organizations. If there are any ethical concerns you can contact the Ethics Officer, University of Wollongong on (02) 4221 3386 or email rso-ethics@uow.edu.au.

Should you require any further information please do not hesitate to contact members of the research team.

Yours sincerely,

[Signature]

Ulf Braja widagda (Researcher)
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APPENDIX C INTERVIEW PARTICIPANT INFORMATION SHEET
INTERVIEW PARTICIPANT INFORMATION SHEET

RESEARCH TITLE
Public value creation through social media networks: Multi-methods research on Indonesia’s government organizations

PURPOSE OF THE RESEARCH
I am conducting this research as part of my Ph.D thesis at the School of Information Systems and Technology (SISAT) at the University of Wollongong. I am an Indonesian citizen and awardee of Ministry of Education and Culture of Indonesia scholarship.

This research examines how government uses social media technologies to improve public service delivery. Specifically, it investigates both enabling and inhibiting technological and organizational factors that might influence government’s capability to realize the potential benefits of social media use.

You have been specially selected and are cordially invited to participate in this interview conducted by myself, Uuf Brajawidagda and supervised by Dr Akemi T. Chatfield. We invite you based on your experience and/or knowledge of using social media technologies related to your government work roles/position. We suggest that the interview will be conducted at your office on Thursday, 12 June 2014 09.00 a.m., however you can decide the time and the location of the interview according to your best interest.

METHOD AND DEMANDS ON PARTICIPANTS
If you choose to participate in this interview to share your experience and views with us, you will be asked to answer questions, which will take about 30 minutes.

We can foresee no risks for you. While we have obtained your employer’s approval to conduct this research project, your participation is voluntary. This means that you may decide not to answer any question and you may withdraw your participation at any time during the interview. If you need to assess whether the questions might be potentially harmful to you, here are some of the questions you might be asked:

- To what extent do social media policies affect your unit’s communication process?
- Overall, did the use of social media improve your unit’s performance? What evidence is there to support this?

If you agree to participate in the interview, confidentiality is absolutely assured. Your personal information, such as your name and affiliation, will not be revealed in any part of my project report or in future research publications.

This study has been reviewed by the Human Research Ethics Committee, University of Wollongong. If you have any concern or complaint regarding the way this research has been conducted, you can contact the Ethics Officer, Human Research Ethics Committee, Office of Research, University of Wollongong on 4221 3336 or email rso-ethics@uow.edu.au.
Should you require any further information please do not hesitate to contact either of the research team.

Thank you in advance for your participation in this study.

Sincerely,

Uuf Brajawidagda (Researcher)
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APPENDIX D INTERVIEW CONSENT FORM
INTERVIEW CONSENT FORM FOR PARTICIPANTS

RESEARCH TITLE:
Public value creation through social media networks: multi-methods research on Indonesia’s government organizations

INVESTIGATORS:
Dr. Akemi T. Chatfield (Supervisor)  
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Uuf Brajavidagda (Researcher)  
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School of Information Systems and Technology (SISAT)  
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ub375@uowmail.edu.au

I have been given information about the research study, “Public value creation through social media networks: Multi-methods research on Indonesia’s government organizations”. The investigator, Uuf Brajavidagda, is conducting this research as part of his Ph.D. thesis. He is supervised by Akemi Takeoka Chatfield, MBA, Ph.D at the School of Information Systems and Technology (SISAT) at the University of Wollongong. This research examines how government uses social media technologies to improve public service delivery. Specifically, it investigates both enabling and inhibiting technological and organizational factors that might influence government’s capability to realize the potential benefits of social media use.

I understand that I was selected to participate in this research because of my experience and/or knowledge of using social media technologies related to my government work roles/position.

I understand that my participation in this research is voluntary. I understand that I will not be paid for my participation. I am free to refuse to participate and I am free to withdraw at any time. My refusal to participate will not affect me in any way. If, however, I feel uncomfortable in any way during the interview session, I have the right to decline to answer or to end the interview.

Moreover, I understand that I can decide the time and the location of the interview according to my best interest.

I understand that the researcher will not identify me by name in any reports using information obtained from this interview and that my confidentiality as a participant in this study will remain secure.

I have read and understand the explanation provided to me. I have had all my questions answered to my satisfaction, and I voluntarily agree to participate in this study. Also, I have been given a copy of this consent form.
The interview will last about 30 minutes. I have the right to refuse the investigator’s request to audiotape this interview. In that case, notes will be taken during the interview. My choice is to allow the investigator to:

☐ audiotape  ☐ take notes

If I have any enquiries about the research, I can contact Uuf Brajawidagda (+62 8127038340 or ub976@uowmail.edu.au) and Dr. Akemi T. Chatfield (akemi@uow.edu.au) or if I have any concerns or complaints regarding the way the research is or has been conducted, I can contact the Ethics Officer, Human Research Ethics Committee, Office of Research, University of Wollongong on 4221 3385 or email rso-ethics@uow.edu.au.

By signing my name below, I am indicating my consent to participate in the research. I understand that the data collected from my participation will be used primarily for a PhD thesis, and may be used in summary form for research publication, and I consent for it to be used in that manner.

Signed  Date

.................................................................  ................./........../......................

Name (please print)
APPENDIX E INTERVIEW PROTOCOL
General Questions for Interview

1. What are the aims of the social media use in your organization?
2. To what extent your organization uses social media?
3. To what extent your organization has policy on social media or related to the organizational social media use?
4. To what extent your organization has culture that support for innovation, creativity or experiment?
5. To what extent have social media influenced (or failed to influence) communication process in your organization? How?
6. Overall, by using social media, is your disaster management improved? What evidence is there to support this?
7. How do you measure the improvement of your disaster management?
8. If your disaster management improved, does this affect your organizational performance? What benefits were received by the public?
9. To what extent your organizations interact with the public through social media? How do they respond?
APPENDIX F COVER LETTER FOR SURVEY PARTICIPATION
Kepada Yth.
«Tujuan»
Di tempat

Perihal : Permohonan Partisipasi Survey
Nomor : «No»/APPR/PV//2015
Lampiran : Lembar Informasi Peserta

Dengan Hormat,
Kami ingin mengundang seluruh personel (pimpinan dan anggota) yang aktif terlibat dalam pengelolaan akun resmi media sosial organisasi yang Bapak/Ibu pimpin untuk berpartisipasi dalam survey sebagai bagian dari tesis doktoral saya di School of Information Systems and Technology (SISAT) University of Wollongong, Australia. Thesis saya berjudul Public value creation through social media networks: Multi-methods research on Indonesia’s government organizations. Surat ini sebagai permohonan kami untuk meminta persetujuan agar kami dapat melakukan penelitian ini dengan melibatkan personel di instansi yang Bapak/Ibu pimpin. Tujuan dari penelitian ini adalah untuk mengkoordinasi faktor-faktor yang mempengaruhi realisasi manfaat dari penggunaan media sosial di organisasi pemerintah, terutama di organisasi terkait penanganan situasi darurat/bencana.


Hasil penelitian ini berguna bagi organisasi terkait penanganan situasi darurat/bencana untuk merealisasi manfaat penggunaan media sosial. Penelitian ini telah direview dan disetujui oleh Human Research Ethics Committee, University of Wollongong, jika Bapak/Ibu/Saudara memiliki keluhan tentang pelaksanaan penelitian ini, Bapak/Ibu/Saudara dapat menghubungi Ethics Officer, Human Research Ethics Committee, Office of Research, University of Wollongong di +61 4221 3386 atau email rso-ethics@uow.edu.au.

Jika Bapak/Ibu membutuhkan informasi lebih lanjut mengenai survey ini, kami dengan senang akan menjawab pertanyaan Bapak/Ibu sekalai.

Termakasih kami ucapkan atas bantuan dan dukungan yang Bapak/Ibu berikan.

Hormat Kami,


\[
\text{Uuf Brajawidagda}
\]
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ub976@uowmail.edu.au
APPENDIX G SURVEY PARTICIPANT INFORMATION SHEET
LEMBAR INFORMASI PESERTA

JUDUL PENELITIAN
Public value creation through social media networks: Multi-methods research on Indonesia's disaster management agencies

MAKSUD PENELITIAN
Penelitian ini adalah bagian dari tesis Ph.D saya di School of Information Systems and Technology (SISAT), University of Wollongong in Australia. Saya warga Negara Indonesia dan melaksanakan studi atas sponsor Direktorat Jenderal Pendidikan Tinggi Kementrian Riset, Teknologi dan Pendidikan Tinggi Republik Indonesia.

Penelitian ini secara umum mengkaji tentang bagaimana organisasi pemerintah menggunakan media sosial untuk meningkatkan layanan masyarakat. Secara khusus, penelitian ini melakukan investigasi factor-faktor yang mempengaruhi kemampuan pemerintah untuk merealisasikan manfaat dari penggunaan media sosial, terutama untuk organisasi terkait penanganan darurat/bencana.

Bapak/ibu/Saudara diundang untuk berpartisipasi dalam survey ini, yang dilakukan oleh saya sendiri, Uuf Brajawidagda dan disupervisi oleh Dr Akeni T. Chatfield, karena pengalaman Bapak/ibu/Saudara dalam penggunaan media sosial. Survey dilakukan secara online.

METODE DAN HAL YANG DILAKUKAN PARTISIPAN
Jika Bapak/ibu/Saudara memilih untuk berbagi pandangan dan pengalaman dengan berpartisipasi dalam survey ini, Bapak/ibu/Saudara akan diminta menjawab pertanyaan yang membutuhkan waktu kurang lebih 10-15 menit.


13. Manajerunt/organisasi kami...

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Penelitian ini telah direview dan disetujui oleh Human Research Ethics Committee, University of Wollongong. Jika Bapak/ibu/Saudara memiliki keluhan tentang pelaksanaan penelitian ini, Bapak/ibu/Saudara dapat menghubungi Ethics Officer, Human Research Ethics Committee, Office of Research, University of Wollongong di +61 4221 3386 atau email rso-ethics@uow.edu.au.
Jika Bapak/ibu/Saudara membutuhkan informasi lebih lanjut mengenai survey ini, jangan sungkan untuk menghubungi kami.

Termakasih kami ucapkan atas partisipasi dalam penelitian ini.

Hormat Kami,

Uuf Brajavidagda (Peneliti)
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akemi@uow.edu.au
Penciptaan Nilai bagi Publik Melalui Jejaring Media Sosial

Introduction

Bapak/Ibu/Saudara yang saya hormati.


Partisipasi Bapak/Ibu/Saudara dalam survei ini sangat penting mengingat hasil survei ini dapat digunakan sebagai masukan untuk meningkatkan realisasi manfaat dari penggunaan media sosial di organisasi pemerintah, termasuk yang terkait penanganan situasi darurat/bencana di Indonesia.

Tidak ada jawaban benar atau salah dalam survei ini, silakan jawab pertanyaan sesuai pandangan dan pengalaman Bapak/Ibu/Saudara masing-masing.

Jika Bapak/Ibu/Saudara setuju untuk berpartisipasi, mohon pengisian dapat dilakukan sebelum tanggal 9 Maret 2015.

Lembar informasi bagi partisipan dapat diunduh di tautan berikut: PIS

Terima kasih atas partisipasi Bapak/Ibu/Saudara.

Hormat kami,

Uuf Bajarmidya
School of Information Systems and Technology (SiSAT)
Faculty of Engineering and Information Sciences (EIS)
University of Wollongong, Australia
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Next
Penciptaan Nilai bagi Publik Melalui Jejaring Media Sosial

BAGIAN I – PERTANYAAN UMUM TENTANG ORGANISASI

2/6

Berikan jawaban untuk pertanyaan berikut dengan memilih pilihan yang sesuatu atau tuliskan jawaban kamu tempat yang disediakan:

1. Organisasi anda berada di tingkat:
   - Kota/Kabupaten
   - Propinsi
   - Nasional/Pusat
   - Lainnya (sebutkan)

2. Pada kejadian terkait darurat/bencana, berikut adalah tugas utama organisasi saya (boleh memilih lebih dari 1 pilihan):
   - Retinggat dini
   - Evaluasi
   - Search and rescue (SAR)
   - Mitigasi (pengurangan) resiko bencana
   - Logistik dan penanganan
   - Dapur umum
   - Lainnya (sebutkan)

3. Di wilayah yang menjadi tanggungjawab organisasi anda, kejadian bencana berikut memiliki dampak serius (boleh memilih lebih dari 1 pilihan):
   - Angin topan
   - Tornado
   - Banjir
   - Kekeringan
   - Tanah longsor
   - Lainnya (sebutkan)
Penciptaan Nilai bagi Publik Melalui Jejaring Media Sosial

BAGIAN II – PERTANYAAN TENTANG PENGGUNAAN MEDIA SOSIAL

Berikan jawaban untuk pertanyaan berikut dengan memilih pilihan yang sesuai atau tuliskan jawaban di tempat yang disediakan:

4. Ukuran organisasi dan tim pengelola media sosial, dalam konteks jumlah karyawan:
   - Jumlah seluruh pegawai
   - Jumlah anggota tim pengelola media sosial

5. Organisasi anda menggunakan media sosial sejak:

   Tahun / Bulan

   Tahun: [ ]
   Bulan: [ ]

6. Berapa jumlah follower yang dimiliki akun resmi organisasi anda di Twitter?
   - [ ] Organisasi kami tidak memiliki akun Twitter
   - [ ] 500 atau kurang
   - [ ] 501 sampai 1,000
   - [ ] 1,001 sampai 10,000
   - [ ] 10,001 sampai 100,000
   - [ ] Lebih dari 100,000
7. Berapa jumlah friends (atau likes untuk page) yang dimiliki akun resmi organisasi anda di Facebook?

- Organisasi kami tidak memiliki akun Facebook
- 500 atau kurang
- 501 sampai 1,000
- 1,001 sampai 10,000
- 10,001 sampai 100,000
- Lebih dari 100,000

8. Jumlah status, tweet atau post yang diposting melalui akun resmi organisasi di media sosial berikut (PER HARI):

<table>
<thead>
<tr>
<th>Media Sosial</th>
<th>tidak memiliki</th>
<th>tidak sama sekali</th>
<th>1 sampai 3</th>
<th>4 sampai 6</th>
<th>7 sampai 9</th>
<th>lebih dari 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook (status)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Twitter (tweet)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tumblr (post)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. Jumlah artikel atau video yang diposting melalui akun resmi organisasi di media sosial berikut (PER BULAN):

<table>
<thead>
<tr>
<th>Media Sosial</th>
<th>tidak memiliki</th>
<th>tidak sama sekali</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>lebih dari 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blog (artikel)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>YouTube (video)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. Jumlah interaksi (melalui komentar, retweet, reply, like, atau reblog) yang dilakukan/diberikan melalui akun resmi organisasi PER HARI:

<table>
<thead>
<tr>
<th>Media Sosial</th>
<th>tidak memiliki</th>
<th>tidak sama sekali</th>
<th>1 sampai 2</th>
<th>3 sampai 4</th>
<th>5 sampai 6</th>
<th>lebih dari 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook (like/komentar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Twitter (retweet, reply)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tumblr (reblog, like)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blog (komentar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>YouTube (komentar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11. Berapa lama (jam) akun resmi media sosial organisasi anda dikelola per hari:

<table>
<thead>
<tr>
<th>Media Sosial</th>
<th>tidak memiliki</th>
<th>tidak sama sekali</th>
<th>1 sampai 2</th>
<th>3 sampai 4</th>
<th>5 sampai 6</th>
<th>lebih dari 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Twitter</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Tumblr</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Blog</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>YouTube</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Nyatakan seberapa setuju/tidak setuju anda terhadap pernyataan-pernyataan berikut:

### 12. Kami memiliki kebijakan/panduan/prosedur......

<table>
<thead>
<tr>
<th>Sangat tidak setuju</th>
<th>Tidak setuju</th>
<th>Agak tidak setuju</th>
<th>Netral</th>
<th>Agak setuju</th>
<th>Setuju</th>
<th>Sangat setuju</th>
</tr>
</thead>
<tbody>
<tr>
<td>tentang bagaimana berinteraksi dengan media konvensional (misalnya: TV, radio, surat kabar, radio, frequency, sirene dan lainnya).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>untuk terus menekan memantau kejadian terkait darurat/bencana di media sosial.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>untuk secara cepat mengklarifikasi informasi yang tidak benar atau rumor terkait bencana.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mengenal informasi apa yang boleh dibagikan/dibagi kepada publik melalui media sosial.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yang memberikan dorong kepada kami untuk menjawab pertanyaan yang disampaikan publik melalui media sosial.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yang menyatakan bahwa manajemen bertanggung jawab terhadap apa yang kami posting melalui akun resmi media sosial organisasi kami.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 13. Manajer/unit/organisasi kami.....

<table>
<thead>
<tr>
<th>Sangat tidak setuju</th>
<th>Tidak setuju</th>
<th>Agak tidak setuju</th>
<th>Netral</th>
<th>Agak setuju</th>
<th>Setuju</th>
<th>Sangat setuju</th>
</tr>
</thead>
<tbody>
<tr>
<td>menghargai perilaku pegawai yang mendukung kreativitas dan inovasi.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mendorong pertukaran gagasan melalui pertemuan dan interaksi informal.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mendorong pegawai untuk menyampaikan gagasan baru.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mendorong kami untuk terus-menerus bekerjasama dengan gagasan atau cara baru dalam melakukan sebuah penelitian.</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mendorong pegawai untuk bertukar data, informasi atau pengetahuan.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 14. Publik/masyarakat ....

<table>
<thead>
<tr>
<th>Sangat tidak setuju</th>
<th>Tidak setuju</th>
<th>Agak tidak setuju</th>
<th>Netral</th>
<th>Agak setuju</th>
<th>Setuju</th>
<th>Sangat setuju</th>
</tr>
</thead>
<tbody>
<tr>
<td>meminta layanan kami melalui media sosial.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>menetuk penanganan kami kepada jejaring media sosial mereka.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mempromosikan akun media sosial kami kepada jejaring media sosial mereka.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>menyampaikan umpan balik yang bermanfaat melalui media sosial.</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
BAGIAN IV – PERTANYAAN TENTANG KREASI NILAI PUBLIK

Nyatakan seberapa setuju/tidak setuju anda terhadap pernyataan-pernyataan berikut:

15. Semenjak organisasi kami menggunakan media sosial……

<table>
<thead>
<tr>
<th>Pernyataan</th>
<th>Sangat setuju</th>
<th>Tidak setuju</th>
<th>Agak tidak setuju</th>
<th>Netral</th>
<th>Agak setuju</th>
<th>Setuju</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kami tidak memiliki masalah interoperabilitas teknologi (kecuali karena perbedaan teknologi) untuk bertukar informasi dengan organisasi lainnya.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kami berbagi informasi dengan organisasi lain lebih cepat.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kami bisa berbagi informasi dengan organisasi lain tanpa menggunakan protokol resmi (misal: tanpa template surat, dll).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kami berbagi informasi dengan publik/masyarakat lebih cepat.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publik/masyarakat lebih cepat melaporkan kejadian darurat/bencana kepada kami.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saat ini kami lebih mudah mengamati situasi terkini kejadian darurat/bencana melalui percakapan di media sosial.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16. Semenjak organisasi kami menggunakan media sosial……

<table>
<thead>
<tr>
<th>Pernyataan</th>
<th>Sangat setuju</th>
<th>Tidak setuju</th>
<th>Agak tidak setuju</th>
<th>Netral</th>
<th>Agak setuju</th>
<th>Setuju</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kami memiliki kesadaran yang lebih tinggi terhadap tanda-tanda kejadian darurat/bencana.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kami mengurangi resiko yang ditimbulkan kejadian darurat/bencana terhadap masyarakat.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kami memiliki repons yang lebih cepat terhadap kejadian darurat/bencana.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kami berkolaborasi lebih efektif dengan publik pada saat kejadian darurat/bencana melanda.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kami berkolaborasi lebih efektif dengan organisasi lain pada saat kejadian darurat/bencana melanda.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kami lebih cepat dalam menangkal/meluruskan informasi palsu atau rumor terkait situasi darurat/bencana.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
17. Semenjak kami menggunakan media sosial......

<table>
<thead>
<tr>
<th>Perubahan yang terjadi</th>
<th>Sangat setuju</th>
<th>Tidak setuju</th>
<th>Agak tidak setuju</th>
<th>Netral</th>
<th>Agak setuju</th>
<th>Sangat setuju</th>
</tr>
</thead>
<tbody>
<tr>
<td>kepercayaan publik kepada organisasi kami meningkat pesat.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>organisasi kami lebih akuntabel (bertanggungjawab) dalam menggunakan dana publik.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>organisasi kami menjadi lebih terbuka dan transparan kepada publik.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>organisasi kami menjadi lebih tanggap (responsif) kepada publik.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>organisasi kami menjadi lebih efisien (hemat) dalam menggunakan dana publik.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>publik memiliki pilihan akses yang efektif untuk menghubungi kami.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>kami menjaring lebih banyak audiens ketika menyediakan informasi terkait bencana</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>kami lebih baik dalam memenuhi harapan publik.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>layanan kami lebih relatable (dapat diandalkan).</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>kami membuat publik merasa lebih aman dari ancaman bencana.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Penciptaan Nilai bagi Publik Melalui Jejaring Media Sosial

Bagian V - Pertanyaan Umum Tentang Responden

Silahkan jawab pertanyaan-pertanyaan berikut dengan pilihan yang sesuai:

18. Sebutkan kedudukan anda di organisasi:
   - Anggota bagian Media Sosial
   - Anggota bagian IT
   - Anggota bagian Hubungan Masyarakat (Humas)
   - Pimpinan bagian Media Sosial
   - Pimpinan bagian IT
   - Pimpinan bagian Humas
   - Anggota manajemen puncak
   - Lainnya (sebutkan)

19. Jenis kelamin anda:
   - Wanita
   - Pria

20. Usia anda termasuk pada rentang:
   - 22 tahun atau lebih muda
   - 23 sampai 30 tahun
   - 31 sampai 40 tahun
   - 41 sampai 50 tahun
   - 51 tahun atau lebih

21. Apakah jenjang pendidikan terakhir anda?
   - Sekolah menengah
   - Diploma/Sarjana
   - Pasca sarjana
   - Lainnya (sebutkan)

Terimakasih atas partisipasi Bapak/Ibu/Saudara dalam survey ini.

Prev  Done
APPENDIX I QUESTIONNAIRE (ENGLISH)
Dear Colleague,

I would like to invite you to participate in the survey as part of my doctoral thesis entitled "Public value creation through social media networks: Multi-methods research on Indonesia's disaster management agencies". In this thesis, I examine how disaster management agencies use social media technologies to improve public service delivery and realize public value (e.g., benefits). The participants of this survey are manager and social media team members in Indonesia disaster-related organizations. You have been selected for the pre-testing task based on your known expertise and/or practical experience in disaster management or social media. I am very aware of your busy schedule and your voluntary participation in this survey would be greatly appreciated.

Your participation in this survey is crucially important because the results of this survey could be used as a feedback to enhance the benefits realization of social media for government organizations, especially for the disaster-related agencies.

There are no right or wrong answers, so please choose the survey responses that best describe your own view and experience.

If you agree to participate, please finish the questionnaire on or before 9 March 2015.

Thank you very much for your generous time and help.

Sincerely,
Ulf Brojovsdagya (Researcher)
Faculty of Engineering and Information Sciences (EIS)
School of Information Systems and Technology (SISAT)
+61 400038811 (Aus) or +62 8127038340 (Indonesia)
Email: ulf976@uowmail.edu.au
Section I – General Questions about Organization

Please give your response to all the questions under this section by selecting the choice that describes the question asked or by writing on the space provided:

1. Your organization is at:
   - City/Regency level
   - Province level
   - National level

2. In emergency/disaster situation, among your organization’s main tasks are focusing on (more than one choice is allowed):
   - Early disaster warning
   - Evacuation
   - Search and rescue
   - Risk mitigation
   - Logistics and shelter
   - Public kitchen
   - Other (please specify)
   - Social rehabilitation
   - Debris removal
   - Rebuilding the infrastructure
   - Preparedness
   - Response
   - Recovery

3. In your organizational jurisdiction, the following disasters have serious impact (more than one choice is allowed):
   - Typhoon
   - Flood
   - Drought
   - Landslide
   - Other (please specify)
   - Tsunami
   - Earthquake
   - Volcano
   - Fire
**Public Value Creation through Social Media Networks**

**Section II – Questions about Social Media Use**

Please give your response to all the questions under this section by selecting the choice that describes the question asked or by writing on the space provided:

4. Write in the space provided the size of organization and social media team, in term of number of employees:
   - Number of organization employees
   - Number of social media team member

5. Your organization have used social media since:
   ![Year and Month selection](image)

6. How many followers does your organization's official Twitter account have?
   - We don't have organizational Twitter account
   - 500 or less
   - 501 to 1,000
   - 1,001 to 10,000
   - 10,001 to 100,000
   - more than 100,000
7. How many friends (or like for page) does your organizational Facebook account/page have?
- [ ] We don’t have organizational Facebook account
- [ ] 500 or less
- [ ] 501 to 1,000
- [ ] 1,001 to 10,000
- [ ] 10,001 to 100,000
- [ ] more than 100,000

8. Number of status, tweet or post posted through these following organizational social media account (PER DAY):

<table>
<thead>
<tr>
<th></th>
<th>we don’t have account</th>
<th>not at all</th>
<th>1 to 3</th>
<th>4 to 6</th>
<th>7 to 9</th>
<th>more than 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook (statuses)</td>
<td></td>
<td></td>
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<tr>
<td>Twitter (tweets)</td>
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<tr>
<td>Tumblr (posts)</td>
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</tr>
</tbody>
</table>

9. Number of articles or videos posted through these following organizational social media account (PER MONTH):

<table>
<thead>
<tr>
<th></th>
<th>we don’t have account</th>
<th>not at all</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>more than 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blog (articles)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>YouTube (videos)</td>
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</tbody>
</table>

10. How many interactions (through comments, retweets, replies, likes or reblogs) does your organization make through organizational social media account PER DAY:

<table>
<thead>
<tr>
<th></th>
<th>we don’t have account</th>
<th>not at all</th>
<th>1 to 2</th>
<th>3 to 4</th>
<th>5 to 6</th>
<th>more than 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook (likes/comments)</td>
<td></td>
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</tr>
<tr>
<td>Twitter (retweets, replies)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tumblr (reblogs, like)</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Blog (comments)</td>
<td></td>
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<td></td>
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<tr>
<td>YouTube (comments)</td>
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</tr>
</tbody>
</table>

11. Indicate how many hours PER DAY were spent for organizational social media account operation/management:

<table>
<thead>
<tr>
<th></th>
<th>we don’t have account</th>
<th>not at all</th>
<th>1 to 2</th>
<th>3 to 4</th>
<th>6 to 8</th>
<th>more than 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook</td>
<td></td>
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<tr>
<td>Twitter</td>
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<tr>
<td>Tumblr</td>
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<tr>
<td>Blog</td>
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<td></td>
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<tr>
<td>YouTube</td>
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</tbody>
</table>
### Public Value Creation through Social Media Networks

**Section III: Questions about Organizational Resources and Public Participation through Co-Production**

Please rate how strongly you agree or disagree with each of the following statements:

12. Our organization has policy/guideline/procedure......

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Neutral</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>on how to interact with traditional media (for example: TV, radio, newspaper, radio frequency, sirens etc.)</td>
<td></td>
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<tr>
<td>to continuously monitor what is on social media that relates to emergency/disaster event.</td>
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<tr>
<td>to provide immediate clarification on false information or rumors related to emergency/disaster event.</td>
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<tr>
<td>on what can be disclosed to the public through social media.</td>
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<tr>
<td>that provides us autonomy in responding to citizens’ inquiry through social media.</td>
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<tr>
<td>that the management is responsible on what we post on the official social media account.</td>
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</tbody>
</table>

13. Our manager/department/organisation ....

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Neutral</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>rewards behaviours that support creativity and innovation.</td>
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<tr>
<td>encourages informal meetings and interactions for idea exchange.</td>
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<tr>
<td>encourages employees to submit new ideas.</td>
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<tr>
<td>encourages us to continuously experiment with new ways/ideas of doing things.</td>
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<tr>
<td>encourages employees to share data, information or knowledge.</td>
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</table>

14. The public ....

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Neutral</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>request for our services through social media.</td>
<td></td>
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<tr>
<td>forward our information to their social media networks.</td>
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<tr>
<td>promote our social media account to their social media networks.</td>
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<tr>
<td>provide helpful feedback to our organization through social media.</td>
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</tbody>
</table>
## Section IV Questions about Value Creation

### 15. Since our organization used social media........

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Neutral</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>we have no technological interoperability problem for information sharing with other agencies.</td>
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<tr>
<td>information sharing with other agencies is faster.</td>
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<tr>
<td>we can share information with other agencies without official protocol.</td>
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<tr>
<td>information sharing with the public is faster.</td>
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<tr>
<td>the public report emergency/disaster information more timely to us.</td>
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<tr>
<td>it is now easier for us to observe the current emergency/disaster event status through shared citizens' conversation in social media.</td>
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</tbody>
</table>

### 16. Since our organization used social media........

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Neutral</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>we have higher awareness of emergency/disaster alert.</td>
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<tr>
<td>we reduce the risks associated with an emergency/disaster event communities face.</td>
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<tr>
<td>we have faster response to an emergency/disaster event.</td>
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<tr>
<td>we have more effective collaboration with the public when disaster is unfolding.</td>
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<tr>
<td>we have more effective collaboration with other agencies when disaster is unfolding.</td>
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<tr>
<td>we are able to &quot;bust&quot; false information or rumors faster.</td>
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</tbody>
</table>
17. Since our organization used social media ......

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Somewhat Agree</th>
<th>Neutral</th>
<th>Somewhat Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>public’s trust in our organization is developed greatly</td>
<td></td>
<td></td>
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<td>our organization is more accountable in using public funds</td>
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<tr>
<td>our organization is more open and transparent to the public</td>
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<td>our organization is more responsive to the public</td>
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<tr>
<td>our organization is more efficient in using public funds</td>
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<tr>
<td>the public has more effective means to reach us</td>
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<tr>
<td>we reach more audience in providing disaster related information</td>
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<tr>
<td>we meet the needs of the public better</td>
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<tr>
<td>we have more reliable services</td>
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<tr>
<td>we make public feel safer from disaster hazards</td>
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</tbody>
</table>

18. What is your position in the organization?

- Member of social media department
- Member of IT department
- Member of public relations department
- Head of social media department
- Head of IT department
- Head of public relations department
- Member of top management
- Other (please specify)

19. What is your gender?

- Female
- Male

20. Which of these groups are you in?

- 22 years old or younger
- 23 to 30 years old
- 31 to 40 years old
- 41 to 50 years old
- 51 or older
21. What is your educational level?

- [ ] School
- [ ] Diploma/Undergraduate degree
- [ ] Post graduate degree
- [ ] Other (please specify) 

You have finished the questionnaire.

Thank you for your participation.