



M.Sc. Thesis

Social Media as Boundary Objects in Crisis Response:

A Collective Action Perspective

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Declaration

I hereby declare that this thesis is my original work and it has been written by me in its entirety. I have duly acknowledged all the sources of information which have been used in the thesis. This thesis has also not been submitted for any degree in any university previously.

A handwritten signature in blue ink, appearing to read 'Jim Yen Ni', is written over a horizontal line.

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Summary

During a series of recent natural catastrophes, social media played an increasingly prominent and varied role in crisis response, ranging from facilitating the recruitment of volunteers during an earthquake to supporting spiritual recovery after a hurricane. In this thesis, we propose that social media, beyond the conventional role of providing information support, can also function as boundary objects, which are crucial in spanning the boundaries among involved parties that inherently restrict crisis response. Using the 2011 Thailand floods as a case study, we conceptualize the development and recognition of social media as boundary objects from the perspective of collective action. More specifically, we present a conceptual model with three distinct boundary objects enabled by three collective uses of social media, which are important in bridging the cognitive, relational and social boundaries among the various entities involved in crisis response.

Chapter 1 Introduction

In recent years, there has been a notable shift of attention among researchers from crisis prevention to crisis response (Leidner et al. 2009; Pan et al. 2012; Yang and Hsieh 2013). During crisis response, effective coordination in terms of information exchange, resource sharing and communication is of utmost importance for the crisis to be contained or controlled. While conventional media has failed to support the critical demands that arise during crises (Hjorth and Kim 2011), social media (e.g., Facebook, Twitter, YouTube, etc.) has successfully demonstrated its effectiveness in moderating critical events and mitigating the impact of crises. For example, during the October 2007 Southern California wildfires in the USA, Twitter was used to spread time-critical information about road closures, evacuations and shelter information (Hughes and Palen 2009). Additionally, in the January 2010 Haitian earthquake, Twitter became the primary communication platform for community interaction (Fraustino et al. 2012). When the 2011 tornados hit Joplin, social media was widely adopted by the communities, not only to access updated news but also to offer mutual support and to coordinate the recovery process (Fraustino et al. 2012).

From serving as a first-hand information source to facilitating volunteer recruitment, social media has demonstrated its unique potential to function as an effective crisis response platform; it is capable of spanning several boundaries among communities during crises. We argue that social media can be viewed as a boundary object, that is, an artifact that is capable of bridging perceptual and

practical differences and maintaining a common identity among communities, thus serving as the mutual foundation on which meaningful communication and effective cooperation can take place (Karsten et al. 2001; Levina and Vaast 2005; Star and Griesemer 1989). “Social media is one emerging technology with the potential to allow for the flexibility, adaptability, and boundary spanning functionality” (Yates and Paquette 2011). Specifically, social media possesses a range of capabilities that reveals the potential of a boundary object; it provides a means for individuals to represent their knowledge and communicate across boundaries (Carlile 2002); it empowers communities that are normally separated to establish a working relationship around a particular issue, idea or practice (Fox 2011).

However, we emphasize that even though social media can feasibly be identified as a potential boundary object, it cannot be deemed useful (i.e., capable of spanning every boundary) until it is positioned and recognized in practice (Levina and Vaast 2005). Social media is primarily used in routine communications with family and friends, for expression of thoughts and for gaming or entertainment (Fraustino et al. 2012). Although social media shows promise in its proof of concept, its capability to function as a boundary object has neither been recognized nor practiced. It is thus important to note that the usefulness of an object in enabling boundary spanning is not merely inherent in the object’s properties (Levina 2005; Levina and Vaast 2005). Rather, it is associated with the ways in which the object is *used* in “collective-reflection-in-action” (Gal et al.

2008, p. 292). As a participatory media, the capabilities, values and power of social media can only be derived from the action of collectivities. In other words, a full exploration of the benefits of social media requires perceiving how its role as boundary objects can be put into practice.

In line with the research gaps mentioned earlier, previous studies have also urged that it is essential to exclusively identify motivations and to uncover the mechanisms through which IT artifacts influence crisis response (Fraustino et al. 2012; Leidner et al. 2009). Therefore, in this thesis, we adopt the perspective of collective action to describe the process whereby social media is transformed from a designated IT artifact to a functional boundary object. In our literature review, we will further elaborate that it is the synthesis of crisis-triggered disruption, common demand and social media enablement that realizes the collective action and transforms social media into a boundary object. When individuals are subject to extremely stressful conditions, a series of quotidian disruptions leads to several common pursuits (e.g., information demand and feasible crisis response). Then, the technological capabilities of social media come into play and enable collective action. When social media is recognized and situated in practice, it is capable of functioning as a boundary object, to span salient boundaries in crisis response.

Using a case study of the 2011 Thailand flood, one of the worst flooding disasters in half a century that left the country severely impaired, the objectives of my

thesis is to present distinctive insights in addressing three gaps in the literature: (1) the process where a designated boundary object emerges into a boundary object in-use (Levina 2005; Levina and Vaast 2005), (2) the preceding factors that motivate (Wasko et al. 2009) and enable collective action in the context of contemporary media, and (3) the roles of boundary objects in crisis response. Accordingly, this thesis aims to cogently answer the research question: *How does social media function as boundary objects in the context of crisis response?*

The organization of the thesis is as follows. First, the conceptual background of crisis response, boundary objects and collective action was introduced in Chapter 2. Next, the details of the research methodology were elaborated in Chapter 3, and followed with the expansion of case description in Chapter 4. The analysis, framework and findings were presented in Chapter 5. Finally, the theoretical and practical contributions of the thesis, followed by the limitations and the suggestions for future research were outlined as the conclusion in Chapter 6.

Chapter 2 Literature Review

2.1 Crisis Response

In the past decade, crisis related studies have attracted the attention of researchers (e.g. Dayton 2004; Devadoss and Pan 2004; Pan et al. 2005; Pan et al. 2012; Perez- Lugo 2004; Sutton et al. 2008). To understand crisis management, it is important to first have a clear understanding of what crisis is. Among the divergent list of definitions available (e.g. Coombs 2010), crisis or disaster (used interchangeably in this paper) is utilized here to indicate an unpredictable, uncertain and often urgent event that imposes severe threats to life, well-being or the disruption of other significantly held values (Dayton 2004; Leidner et al. 2009). A crisis involves multiple stakeholders and requires close and effective collaborations between the involved parties, such as the general public, organizations, media and government. The academic literature on crisis often decomposes crisis management into several phases (such as mitigation, response and recovery (Ahmed 2011)) with each phase having different scale and focus. Among the different phases of crisis management, it is indicated that much of the literature focuses on the prevention of crises (Pan et al. 2012). While studies that focus on general preparedness are crucial in establishing solid planning for possible disasters, for crises that are unpreventable or unavoidable, an equally important aspect of crisis management, which is also the focus of this thesis, is the crisis response.

Crisis response involves “conveying ongoing crisis events to stakeholders, decision making within the crisis management team, and organizational decisions regarding whether and what amount of information to share” (Hale et al. 2005, p.113). Failure to respond effectively to crises is often cited as the main barrier that impedes successful disaster management (Brown and Chennamaneni). In this regard, this stakeholder-centric phase of crisis communications has attracted considerable attention from researchers in recent years (Leidner et al. 2009; Pan et al. 2012; Yang and Hsieh 2013). A handful of studies have presented a comprehensive historical overview of literature discussing this trend (e.g. An and Cheng 2010; Coombs 2010). However, only a minimum of the studies acknowledged the significance of social media in times of crisis. To name some of these studies, Heverin and Zach (2012) studied the use of microblogging communications (e.g. Twitter) for collective sense-making during violent crises and suggested that microblogging provides a channel for connections, and enables individuals to make sense of the chaos. Also, the potential of social media in facilitating interaction during disaster management has been investigated using a role-based segregation perspective (Ahmed 2011). Besides, the impact of rumor-triggered anxiety on communication behaviors was brought into the forefront in a study that examined the relationship between information credibility, social media (e.g. Twitter) and an extreme event (the Haiti earthquake) (Oh et al. 2010). Hjorth and Kim (2011) have delineated the role of mobile social media in establishing and maintaining intimacy in crisis management, drawing from the case of the March 2011 Japanese earthquake disaster. Scholars have also discussed some

knowledge management strategies that aim to assist organizations in using social media for crisis response (Jennex 2010).

It has been observed that the capabilities of new media in the occurrence of disaster has not received the attention it deserves among Information Systems researchers (Day et al. 2009). More specifically, we found that a more specific focus and strong theoretical reflections on social media and crisis response remain underexplored. Both theoretical and practical implications have yet to be defined as most of the studies were written as either narrative or suggestive modes and address the wider scope of crisis management or simply natural disasters. Furthermore, the underestimation of the importance of media is deemed as the typical problem of crisis response that constitutes an “avoidable failure” (Boin 2008, p. 19). Given the growing adoption of social media, it is essential to understand how new media could serve purposes that go beyond personal, discretionary use to a more serious application that could bring larger benefits to the society as a whole. Consequently, we suggest that there is a need for more gradated conceptualizations on the complex relationships between social media and crisis response. An in-depth understanding of the underlying structure and dynamics, aided by strong theoretical interpretations, is of considerable import to stakeholders and decision makers. This paper aims to break down the underlying elements of social media utilization in crisis response into two nuanced theoretical fundamentals: boundary object and collective action, which are elaborated upon in the following sections.

2.2 Boundary Objects

Boundary objects are defined as a broad range of artifacts that “are plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites” (Star and Griesemer 1989, p. 393). Artifacts that act as boundary objects are capable of “inhabit several intersecting social worlds and satisfy the information requirements of each of them” (Star and Griesemer 1989, p. 393). Reflecting on its typology, boundary objects are often ascribed with particular functions (Nicolini et al. 2012), “subject to reflection and local tailoring” (Star 2010, p. 603), and “may evolve or change as they are modified to address internal or external contingencies” (Doolin and McLeod 2012, p. 572). Furthermore, boundary objects should be shareable across different problem solving contexts, and allow the development of shared understanding, thereby enabling communication between disparate groups of individuals (Carlile 2002).

There are numerous examples of boundary objects in existing literature, ranging from prototypes, design sketches, and accounting reports to enterprise resource planning systems (Briers and Chua 2001; Carlile 2002; Levina and Vaast 2005; Pawlowski and Robey 2004). More recently, there has been a plethora of studies applying the concept of boundary object to various technological artifacts within organizational settings (e.g. Carlile 2002; Gal et al. 2008; Sapsed and Salter 2004). For instance, product visualization tools such as virtual prototyping technologies are seen as the boundary objects that aid in facilitating negotiation of revisions

between actors because of their plasticity and flexibility towards localization (Carlile 2004). In addition, Bechky (2003a) suggests that machines can serve as boundary objects that embed knowledge, convey information between groups and mobilize action. A review of existing literature (as presented in Table 1) also reveals that most of the existing studies apply the concept of boundary objects to artifacts that possess the properties of modularity, abstraction, accommodation and standardization (Star and Griesemer 1989; Wenger 1998), within organizational context.

Table 1: Selected Studies of Boundary Objects

Reference	Summary
Gal et al. (2008)	IT-based boundary objects that are embedded within information infrastructures help to shape heterogeneous organizational networks.
Yakura (2002)	Project timelines function as temporal boundary objects in information systems implementation and allow diverse groups to work together.
Nicolini et al. (2012)	Cross-disciplinary collaborations form around or mediated by boundary objects such as PowerPoint slides.
Puri (2007)	Boundary objects such as resource maps make indigenous knowledge visible to enable dialogue and shared understanding among scientists.
Barrett and Oborn (2010)	Project management tools could function as boundary objects that facilitate collaboration across knowledge boundaries at one time and constrain knowledge sharing and trigger relational conflict at other times.
Constantinides and Barrett (2006)	Boundary objects such as a common workspace or a long-term vision provide a common ground for collaboration and negotiation among professionals.

However, not every technological artifact that possesses the previously mentioned boundary spanning characteristics can function as practical boundary objects (Spee and Jarzabkowski 2009). Prior research has suggested that such “designated” boundary objects can be transformed into boundary objects-in-use only if they are meaningfully and usefully incorporated by actors in practice (Levina and Vaast 2005). Designated boundary objects are “artifacts that are designated as valuable for boundary spanning, due to their design and properties” (Levina and Vaast 2005, p.342). For instance, mobile communications tools or social media could be conceived as designated boundary objects in daily life because of their properties of facilitating information flow and connecting individuals. However, such designated boundary objects may or may not become boundary objects-in-use. Boundary objects-in-use are artifacts that are both meaningful and useful in various practices while serving as a common identity across groups (Bharosa et al. 2012; Star and Griesemer 1989). For example, during a disaster, mobile communications may not assume the responsibility of spanning informational or communication boundaries because signal loss interrupts real-time communications. Social media assists in efficient and effective communications, enabling it to function as a boundary object-in-use. In other words, it is the ongoing incorporation of an artifact within a specific context that gives rise to the “constant, reflexive, reaffirmation of what the object means in the given context” (Levina and Vaast 2005, p. 340). The boundary object-in-use emerged when designated artifacts acquired a common identity or satisfied varied local needs in the situated practices of the users.

Along these lines, we suggest that a representation is required to solidify the recognition and incorporation of social media, i.e., how it transforms from a technological artifact to a boundary object in-use. Previous studies have suggested the importance of discovering the transitions that enable different types of IT capabilities (Tanriverdi et al. 2010). Similarly, we concur that the distinction between a designated boundary object and boundary object in-use is important to understanding how technological artifacts can be properly deployed in practice. Also, while much of the literature acknowledges the flexibility and adaptability of boundary objects, the question as to how and why boundary objects function the way they do (Carlile 2004) is still an under-developed idea that it continues to be defined by scholars.

Aiming to fill the above voids in the literature, this thesis aims to solidify the motivations and mechanisms required for a designated boundary object (i.e., social media) to function as a boundary object-in-use. More specifically, we see this transformation process as a collective action, supported by a number of indirect findings from the literature. “Collective action is inherently object oriented and that the pursuit of some kind of object(ive) is what motivates collaborative work” (Nicolini et al. 2012). The object, once adapted and completed by different participants in collective action, is said to be capable of functioning as the “ideal” boundary object (Star and Griesemer 1989), i.e., it “serves as a means of communicating and cooperating symbolically – a “good enough” road map for all parties” (King and Star 1990, p. 148). In other words,

the collective optimum or “public good” (Olson Jr 1965) pursuit by a group of individuals could be a boundary object. Accordingly, we conceptualize the transformation of a boundary object by examining how collective action ascribes a function to social media, or in other words, how communities collectively enact social media as boundary objects-in-use in crisis response.

2.3 Collective Action

Collective action refers to “actions taken by two or more people in pursuit of the same collective good” (Marwell and Oliver 1993, p.4). Contrary to individual actions, collective action is used to describe the coordinated actions of groups or organizations of committed individuals who collectively pursue certain goal as a whole (Immerfall and Therborn 2010). According to this definition, collective action, commonly conceived as a relatively broad concept, has been applied to a wide range of phenomena. For instance, the collection action theory has been invoked in studying terrorism (Oberschall 2004), institutional innovation (Hargrave and Van de Ven 2006), courageous action (Quinn and Worline 2008), information systems standardization (Markus et al. 2006) and many more.

By adopting the concept of collective action, scholars have focused on explaining the motivations or determinants behind the action, i.e., *why* certain types of collective activity may occur (Loveman 1998; Wasko and Teigland 2004). On the one hand, common demand is referred to as the dominant driver of these actions. Most forms of collective actions with which we are familiar, have previously been offline (e.g. Oliver 1984). Essentially, these actions are typically tied with a

common goal, which is a collective objective that cannot be obtained by an individual acting alone (Olson Jr 1965; Wade 1987). Individuals or participating communities are then required to have tightly identified internal roles and to be formally organized in a leadership structure to achieve their common demands. In this case, selective incentives such as monetary compensation and material rewards are often deemed to be necessary in catalyzing participation and cooperation. On the other hand, breakdown or disruption of quotidian is said to be the trigger that incites collective action (Useem 1998). Quotidian is the taken-for-granted substrate of daily life, which normally keeps life stable behaviorally and cognitively (Borland and Sutton 2007). When these routines of everyday life are weakened or disrupted by war, economic crisis or disaster, social cohesion breaks down; deprivation, tensions and frustrations arise. The abrupt loss of values and functions indirectly imposes the intention to defend or reconstitute the routines, setting the stage for collective action (Borland 2013).

Against such scenarios, we see the synthesis of quotidian disruption and common demand as the necessary background condition or determinant for collective action in the context of crisis response. Put more simply, in the context of crisis response, quotidian disruption leads to the pursuit of common demand, which also serves as the motivation of collection action. Although the framing of quotidian disruption may be less important in some contexts than in others, it is particularly appropriate and essential to explain collective action that arises from disasters (Borland and Sutton 2007). Disaster is often characterized as a non-routine,

unexpected disruption or simply, an event that seriously disrupts normal activities (Perry 2007). While this societal disruption breaks down the regulatory capacity and everyday routines, it also changes the cognitive and affective contents of individuals, resulting in building up solidarity amongst a community. What follows is the adoption of unplanned courses of action to adjust to the disruption. In other words, once the routines of collective units were disrupted, it translates into a pursuit of common demand, i.e., to restore the quotidian or to construct alternative routines to meet immediate needs.

This is not to suggest, however, that determinants on their own could assure collective action. All too often, extant studies of collective action have been centered on the optimism that motivation alone, be it a disruption or common demand, could literally enable collective action. In line with the very basic argument of the collective action theory, we contend otherwise. Olson Jr (1965) proposed that a very large group of individuals would not advance their common interest adequately in the absence of coercion. Similarly, while we agree that determinants should be imposed as the very first building block of collective action, there is still a lack of *enablement* to confirm the establishment. “Even after agreeing upon a set of collective goals, however, the social unit must be *able* to effect those goals through collective action.” (Leana and Van Buren 1999). We thus proceed to suggest that specific features of technology may reshape the affordances and exert the enablement for collective action. This argument is in line with the recent emergence of technology-based collective action, which is

termed as the *contemporary* collective action (Bimber et al. 2005). It has been observed that the widespread applications of technology challenge several assumptions and restrictions of the traditional collective action theory (Flanagin et al. 2006; Lupia and Sin 2003). First, the non-rival nature of online public goods could intuitively weaken the pessimistic claim of incentives and willingness to contribute to collective action (Wasko et al. 2009). Second, given the access to technology, participation is open and available across geographical, organizational or social barriers (Wasko and Teigland 2004). This is especially likely to alter the nature of collective action since the involvement efforts have been greatly reduced.

Although existing literature recognizes that contemporary collective actions “appear to strain the explanatory capacity of the traditional collective action theory” (Bimber et al. 2005), little is known about their dynamics and emerging structures (Flanagin et al. 2006). “As contemporary technologies provide novel affordances to those seeking public goods, and as the frequency, intensity, breadth, and depth of interdependence increases, the importance of understanding the dynamics of collective action becomes greater than ever before” (Bimber et al. 2005, p. 385). Against these scenarios, we propose that not only is it important to draw attention to collective action in contemporary settings, but rather the conceptualization should also accurately reflect *why* (*determinant*) and *how* (*enablement*) individuals’ respective actions are coordinated and sustained as a collective action. Moving beyond our justification for the *why* question (the

determinant) (i.e., the crisis-triggered quotidian disruption and the pursuit of common demand), we also justify the *how* question by suggesting that social media enablement is required to realize the contemporary collective action.

In summary, this thesis aims to (1) trace the transformation of a designated boundary object to a boundary object in-use by adopting collective action as a theoretical lens, (2) conceptualize the determinants and the enablement of contemporary collective action, and (3) investigate the specific roles and functions played by social media as boundary objects in crisis response.

Chapter 3 Research Methodology

In line with our research questions, we present our analysis based on an interpretive case study of 2011 Thailand floods. The qualitative case research methodology has been adopted in this thesis for several reasons. First, it is a particularly appropriate approach for answering the “*how*” research question (Walsham 1995). In addition, because the adoption of social media in the context of crisis response is a complex, multi-faceted phenomenon, a qualitative case research methodology that is exploratory in nature enables a more pertinent understanding and interpretation (An and Cheng 2010) as it encourages “the openness to new findings not prejudiced by a priori hypotheses” (Hale et al. 2005, p. 116). Also, qualitative approach offers an opportunity for researchers to be intimately engaged with the involved subjects, building interpretive understanding in the process of enquiry and is particularly suitable for researchers to explore areas that have little prior knowledge.

Given the research agenda, the selection of the 2011 Thailand floods case was based on two primary criteria. First, it was an impactful and destructive disaster demonstrating an observable shift in the crisis response arena. Throughout the crisis, the adoption of social media increased tremendously, embracing the community, while conventional media was basically neglected. In addition, because the severe flooding lasted six months, it provided the opportunity to observe the dynamics that emerged during the event. An extended crisis response phase is generally not captured in other types of disasters and thus a crisis of this

nature provides a barometer for in-depth analysis of crisis-triggered social media employment.

Throughout the data collection and analysis, we adhere to Klein and Myers (1999) seven principles of interpretive field research as they represent one of the most comprehensive and systematic frameworks to unify interpretive field research.

3.1 Data Collection

Research access was negotiated and granted in February 2013, enabling us to conduct a total of 17 interviews and three in-depth focus group discussions with 39 students who included flood victims and volunteers at evacuation centers. Table 2 shows the list of interviewees involved. The interviews and focus group discussions were all open-ended, exploratory in nature and occasionally guided by some rudimentary questions that were structured around the interviewee's roles, involvements and experiences in social media-enabled crisis response (see Appendix A for the excerpts of interview guides). Throughout the conversations, the mirroring technique introduced by Myers and Newman (2007) was used to invite the interviewees to share their "stories" or experiences during the flood, in their own language. To ensure that the data was in accordance with our topic of interest, the participants were invited to not only recall the actions taken, decisions they made and critical events they experienced during the disaster, but they were also encouraged to pinpoint aspects relevant to social media adoption. Whenever new themes emerged during the interviews, new interview questions were formulated to elicit further information and evidence that could explain or

deny the preliminary arguments, or modify the preliminary theoretical lens. Each interview lasted an average of 90 minutes and was digitally recorded and later transcribed for data analysis. As most of the interviewees were more comfortable with expressing themselves in the Thai language, we engaged some native Thai speakers to help with the translation and transcription. The transcripts comprised 158 pages of textual data.

Table 2: List of Interviewees.

Category	Description	Number of Informants
<i>Interview</i>		
Community	Mr Vittayen Muttamara and his assistant – Directors of flood relief volunteer centres who are also the Members of Parliament (MPs) of an ex-opposition party.	2
	Roo Su! Flood (“know and fight the flood”) – Educational video series that accumulated more than one million hits on YouTube.	3
Community Project Leader	Dr. Somkid Lertpaitoon – The Thammasat University Rector and a very influential Social Media user who used Social Media for crisis response during the flood. Thammasat University was used as an evacuation centre and Dr. Somkid was the pioneer in sharing the information through this Facebook page.	1
	Parichart Village group leaders – Parichart Village (with more than 2000 households) was deeply flooded under 70cm of water. Social media was used heavily throughout the course of the flood.	4

	Dr. Teerachon Manomaiphikul – The ex-Deputy Bangkok Governor who was heading the crisis department. He created a Facebook account and posted numerous critical comments about flood management during the flood.	1
NGO	Mr. Arjarn Sasin Chalearmarp – Secretary General of Seub Nakjasathien Foundation, a very influential academic who was regularly featured on TV shows and has a large number of followers on social media, including YouTube, Facebook and Twitter.	1
	Charun community fight flood – An online group set up by the community to fight for the flood.	2
Government	Mr. Wim Rungwattanaajinda – Secretary to Prime Minister’s Office Minister who was very much involved in the government’s Flood Relief Operations Command and other flood management operations.	1
Private Corporate	Mr. Prasert – Vice President of the Corporate Communication Department, an organization that aims to secure sufficient energy during a crisis. An Emergency Management Centre was set up during the flood and social media (Facebook, Twitter and YouTube) was used as the main medium of crisis response.	1
Army Leader	Lieutenant Colonel Wanchana Sawasdee – A deputy spokesperson of the Royal Thai Army and a popular actor. The Royal Thai Army mobilized almost 4000 personnel to provide aid	1

	to flood disaster victims.	
<i>Focus Group</i>		
Victims	Two focus groups of flood victims.	11
		13
Community	Student volunteers at evacuation centre.	15
	Total	56

In addition to the primary data collection, multiple sources of data were used to complement the information obtained. A large number of flood-related data from online news reports, Facebook postings, YouTube videos, and Twitter tweets (posts) were gathered as supporting evidence for triangulation. With the help of our research collaborators in Thailand, we took advantage of the significant amount of social media data available and screened and selected influential social media communities, including posts from a few of the most popular Facebook groups and from a number of active pages and individuals on Twitter. This rich set of data enabled a finer-grained analysis of activities of the communities on social media during the crisis. Because most of the social media data was written in the Thai language, it was first translated, after which the translated data was archived and used to corroborate the collected empirical data. Appendix B lists the sources of our data.

3.2 Data Analysis

To capitalize on the flexibility of the case research methodology, data analysis was performed concurrently with data collection (Eisenhardt 1989). First, based on the review of related literature, a set of preliminary theoretical themes,

constructs and arguments potentially relevant to the adoption or roles of social media in crisis response was first identified. These themes form the basis of our theoretical lens and serve as the “sensitizing device” (Klein and Myers 1999, p. 75) to guide subsequent data collection and analysis. Temporal bracketing strategy (Langley 1999) was adopted to logically organize the empirical data and generate the skeletal structure for theory building. More specific themes emerged in the research process as researcher’s understanding of the phenomenon deepened. The unique function of social media led us to the notion of boundary objects, and our attention to the collective action lens emerged from the observation of the complex interactions within the communities.

Next, we used the techniques of open, axial and selective coding (Strauss and Corbin 1998) to map our data to the set of selected themes. The preliminary theoretical lens was modified incrementally whenever new evidence not relevant to the existing scheme emerged (Pan and Tan 2011; Walsham 1995). More specifically, the theoretical dimensions and themes would be modified with either open or axial coding (Walsham 2006) if data did not fit easily within the existing schema. Selective coding would be used when emergent data was closely aligned with the existing theme (see Table 4 for the excerpts of interview data coding). In addition, we ensured that each new finding would be verified and supported by at least two sources of data (Klein and Myers 1999). Coding exercise would be restarted whenever there was any addition, modification or deletion of the theoretical themes. Therefore, the data analysis was itself an iterative review cycle

of empirical data, relevant literature and the theoretical lens, while continuously building an explanation of the phenomenon and gradually shaping the theoretical conceptualization.

We conducted further mapping and theory building using various diagrammatic sketches or condensed tables. Narrative strategy (Langley 1999) was also adopted to condense the voluminous amount of data, to visualize unfolded events and clarify the details (Pan and Tan 2011). The process continued until we reached the state of theoretical saturation, that is, where it was possible to comprehensively explain the case research findings using the derived model and when new data could neither dispute the model nor reveal new themes. Overall, our findings revealed three distinct phases; in each phase, a unique boundary object that possesses different boundary spanning capability emerged through a specific collective action. Table 3 explicates our efforts at aligning the case methodological procedures with Klein and Myers (1999) seven principles.

Table 3: Application of Klein and Myers’s (1999) Seven Principles for Interpretive Field Research.

Principle	Evaluative criteria [as summarized from Klein and Myers (1999 p.72)]	Application of the principle in our research methodology
Fundamental Principle of the Hermeneutic Circle	“Requires that all human understanding is achieved by iterating between considering the interdependent meaning of	Interviews were conducted with the government and leaders who had a high-level strategic view and the communities and victims who

	parts and the whole that they form”.	could provide the details on the specific usage of social media in the flood (see Table 2).
Principle of Contextualization	“Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerges”.	Thailand is a country that accustomed to annual floods. Informants have witnessed the historical evolution of technology utilization in crisis response; they were able to illustrate the use of traditional media in previous floods, leading up to the introduction and adoption of social media in 2011 flood.
Principle of Interaction Between Researchers and Subjects	“Requires critical reflection on how the research materials (or ‘data’) were socially constructed through the interaction between the researchers and participants”.	An iterative interview strategy was employed; new interview questions were devised based on the findings gathered from previous interviews. Preliminary themes were incorporated into subsequent interviews to obtain informants’ feedback.
Principle of Abstraction and Generalization	“Requires relating the idiographic details revealed by the data interpretation through the application of principles one and two to theoretical, general concepts that describe the nature of human understanding and	The preconception that acted as a “sensitizing device” was mainly constructed using a set of preliminary theoretical themes, constructs and arguments potentially relevant to the adoption or roles of social media in crisis response.

	social action”.	Field notes were taken during data collection to relate unique instances to a more general ideas and concepts that describe the situations.
Principle of Dialogical Reasoning	“Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings (‘the story which the data tell’) with subsequent cycles of revision”.	Preconception was constantly confronted to the emerging data; theoretical lens and preliminary model were modified whenever contradictions were identified. By combining the subthemes emerged from the data, our initial conceptualization was soon expanded to a holistic picture of the phenomenon.
Principle of Multiple Interpretations	“Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study; similar to multiple witness accounts even if all tell it as they saw it”.	Data was gathered from multiple levels including the government (who planned and conduct strategic operations), leaders (who are knowledgeable about and actively involved in flood management) and communities (who experienced the crisis event).
Principle of Suspicion	“Requires sensitivity to possible ‘biases’ and systematic ‘distortions’ in the narratives collected from	Multiple sources of data (site visit, semi-structured interviews, focus groups, social media data including

	the participants”.	Facebook postings, YouTube videos, and Twitter tweets (posts), and secondary data such as online news reports (see Appendix B for the sources of our data)) were gathered to filter “false preconceptions” of interviewees and researchers.
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In the following chapter, a brief overview of the case study was provided by focusing on the background of the floods and the use of social media in general. The findings of the analysis, i.e., how social media functions as boundary objects to span different boundaries in each phase of the crisis response, were then presented in Chapter 5.

Chapter 4 Case Description

In 2011, Thailand experienced the worst flooding crisis of five decades and engaged the entire nation in combating the relentless water. Heavy monsoon rains started in July 2011, leading to flash floods that eventually swamped 65 of Thailand's 77 provinces, including the country's capital, Bangkok (Winijkulchai 2012). Inundation in the city forced the closure of multiple expressways, and even the Don Mueang Airport, which had previously been used as flood relief center. Flooding persisted until mid-January 2012. Over 900,000 families and seven major industrial estates were affected, and the death toll exceeded 800. The World Bank estimated a total economic damage of \$45.7 billion and the flooding crisis was placed ranked as the world's fourth most costly natural disaster in terms of the total economic loss (Bank 2011). Figure 1 presents the timeline of key events and the summary of phases that emerged during the flood.

For a country accustomed to annual floods, the overall preparation, response and management of this massive flood was however inadequate. The taken-for-granted awareness associated with everyday happenings became masked with doubts, uncertainties and confusion. Numerous voices arose from the chaos, demanding up-to-date, consistent and localized information, as well as a two-way communication system (Winijkulchai 2012). Disappointed by the slow, ambiguous news from the traditional media and the often under-managed official websites, the people in Thailand turned their attention to social media.

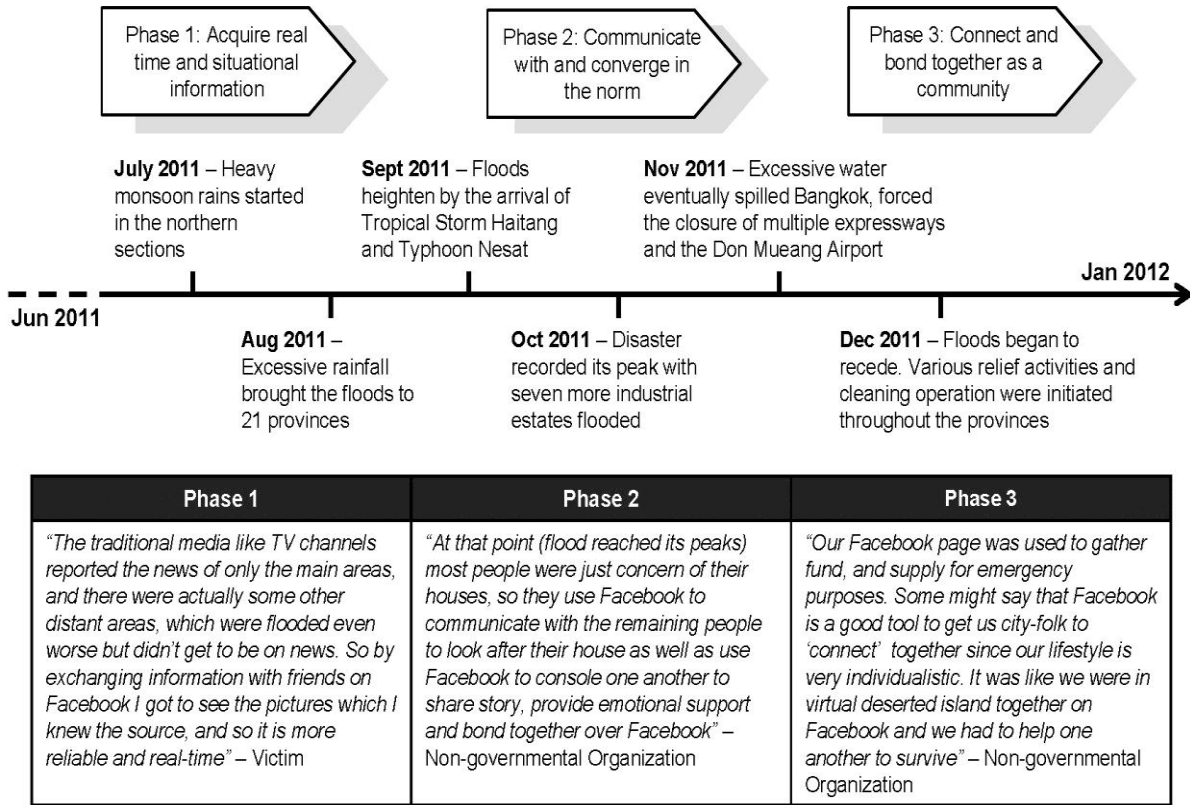


Figure 1: Timeline and Summary of Key Phases.

First, social media was employed by the people in Thailand to acquire informational support. One of the most popular sources of information, the Roo Su! Flood (“know and fight the flood”) educational video series, accumulated more than one million hits on YouTube (Krutern 2012). The illustrations provided by well-designed animated videos were easily understood and effectively conveyed an awareness of the flood conditions. In addition, more than 50 Facebook groups emerged as people became increasingly discouraged by the slow and ineffective actions of the government (Kaewkitipong et al. 2013). Several flood-related experts started to disseminate information through their Facebook pages or Twitter posts, which enabled communities to access first-hand, critical announcements during the flood crisis (Winijkulchai 2012). Another practical

example was demonstrated by the use of Google Doc named “Bangkok Flood Info”, which was created and maintained by public to crowdsource important information related to the flood, such as the address of evacuation centers or volunteers contact information.

As the floods continued to persist in Thailand, the communication barriers increasingly restricted coordination and connectedness among the people (Smolka 2006). Despite the geographical isolation, the disruptions of telecommunication infrastructure further exaggerated the chaos. Since existing communication channels could not provide the availability and reachability required during the crisis, communities resorted to the emerging alternative, i.e., the social media. The rapid increase in the adoption of social media was observed as a “snowballing effect” in which the online social media community continued to grow along with each successful example of social media application (Kaewkitipong et al. 2013). For instance, one of the largest community pages on Facebook, the “Nam Kuen Hai Reeb Bok” (“When water rises, we post”), accumulated more than 200,000 “likes” in October 2011 (Krutern 2012). The use of Twitter was increased by 20%, recorded a total of 720,000 users (Perry 2011). Around 225,000 flood-related messages were sent in October 2011 (Turner 2011), the majority under the #Thaiflood hash tag.

Beyond the communication support, social media provided mental support by exemplifying that “we are all in this together.” During this period of uncertainty,

the disruption of the daily order of things caused a sense of being under threat, and surfaced unsettling thoughts and dissociation. Individuals started to base their actions, as was the norm, by turning to existing social networks that were recommended or ascribed as useful (Liu et al. 2013; Spiro et al. 2012). This was the stage in which social media started to be widely recognized by people in Thailand; massive participation was driven by the usefulness of the social media content and the desire to maintain “the sense of community” (Fraustino et al. 2012). Additionally, in an attempt to preserve the influence of social media, communities started to act collectively and provide mutual support for one another. For example, SiamArsa, one of the crucial and well-established volunteer networks, with 144,000 Facebook members, effectively coordinated a large number of volunteers through social media (Pornwasin 2011). At that point, the awareness and demand for long-term support led to continuous, active social media adoption. This regular use of social media demonstrates an imperative adaptation that further strengthens the distribution of situational updates, coordination of aid or recovery efforts and, eventually, the connections that bring communities together (Eton 2012).

Table 4 summarizes the dimensions and themes that emerged from our analysis, along with their supporting data. Overall, we observed that the dominant activities throughout the duration of the flood ranged from information seeking to communication pursuit and eventually to connection establishment. In each phase, we identified the key constituent part of *quotidian* that was disrupted by the crisis

and the *boundaries* emerging from the disruption. Our analysis and interpretation further revealed that the corresponding common *demands* and social media *enablement* subsequently enabled collective actions, which allow social media to span the boundary and emerged into a *boundary object in-use*. Each dimension outlined in the table, along with its interpretations, will be elaborated on in the following chapter.

Table 4: Excerpts of Coding Categories

Phase 1 Acquisitive Collective Action
<p>Information quotidian disruption</p> <p>a) <i>“Once the flood move closer to Bangkok, a lot of people panic and don’t know what to do”- Lieutenant Colonel</i></p> <p>b) <i>“This (information on social media) is quite helpful, because people, in that situation everyone was nervous. Every people think about their own house, they wanted to know what will happen to them” – University Rector</i></p>
<p>Cognitive boundary</p> <p>a) <i>“We perceived social media as a very good channel that we can receive news and information from local people. This is important because we can’t physically go to everywhere. In some distant districts or villages people can send us their status via social media using their mobile phones. This allowed us to have a far reach to information on the far-away areas” – Director of flood relief centre</i></p> <p>b) <i>“During the crisis, people get confused; some people talked about the water the big (sand) bag and so on. What I tried to do was I used the YouTube to explain things about what should have been done, what happened and how to prepare, how to get to know when the water will be in front your house” – ex-Deputy Bangkok Governor</i></p> <p>c) <i>“Before the flood, there were a lot of news that these and those areas were flooded and I got confused and worried that the water would come to my area” – Victim</i></p>
<p>Information demand</p> <p>a) <i>“At the flood, when I post the photo of the Building A, some students who live in the Building B, they “Facebook” me and ask: “Can you take the photo of Building B that I live, I would like to see the Building B” – University Rector</i></p> <p>b) <i>“I followed a lot of people but during the flood my followers increased about ten times. It wasn’t expected because I just twitted whatever I see but I think the followers liked to see the real situation” – Victim</i></p>

<p>c) <i>“I want the information that the water will really come or not” – Victim</i></p> <p>d) <i>“I want the information on everyday life, for example I am a student, so I want the information of the University” – Victim</i></p>
<p>Information enablement</p> <p>a) <i>“The way we can do is to use the Facebook to explain. Because it is the fact that many newspaper have been supported by some politicians. When we send the information to them, they just don’t put it in the newspaper. This is why I utilize my Facebook” – ex-Deputy Bangkok Governor</i></p> <p>b) <i>“It’s (Twitter) fast and it distributes the information to our groups/troops easily. People can send out very fast and receive very fast” – Lieutenant Colonel</i></p> <p>c) <i>“Information from a friend who lived in a nearby area would be more helpful to me than from general news in TV” – Victim</i></p>
<p>Compendium of Information</p> <p>a) <i>“I think because Facebook was real-time and there were a lot of people in there so we can get a lot of data or opinions from Facebook” – Victim</i></p> <p>b) <i>“What I can do is I explained in the Facebook, set some examples, pilot model, and explained to the public using my Facebook. So this (showing his YouTube video) is the way that I tried to make it easy to understand. People without any knowledge would not understand why the governor put the sand bag into the drainage” – ex-Deputy Bangkok Governor</i></p> <p>c) <i>“Yes through Facebook I got to know where was flooded and where was safe. It came from friends who I know so it was the real situation from where they stayed.” – Victim</i></p>
<p>Phase 2 Accordable Collective Action</p>
<p>Communication quotidian disruption</p> <p>a) <i>“In the army, we usually use radio and cell phone as a major tool to communicate with one another. Once the flood hit, the army need to look for something new that can reach the citizen so we start using social media to communicate with the flood victim. Social media was deemed as a critical tool for the army during the flood.” – Lieutenant Colonel</i></p> <p>b) <i>“So because of the difficulty to travel from place to place, you mainly chatted with friends and exchanged information about traffic only on Facebook? Yes, just Facebook” – Victim</i></p>
<p>Relational boundary</p> <p>a) <i>“For example, your house is in Ayudhaya and I lived elsewhere, so you have to contact me via Facebook and twitter to let me know that your house was flooded and cannot get out” – Government</i></p> <p>b) <i>“I used social media a lot. It allowed me to contact with friends who lived in</i></p>

<p><i>Bang Bua Tong. Because Bang Bua Tong was flooded first, they would let me know when the water came and how much. And during the flood, I relied on social media to check if bus departure time. During that time, only big bus and boat can run thru water, but there were very few and came irregularly. If we missed one, we might have to wait for another two or three hours” – Victim</i></p>
<p>Communication demand</p> <p>a) <i>“Social media is actually one communication tool which was useful for the crisis because its features matched well with our communication needs. It allowed us to have two-ways communication and be able to gather helps and resources. During the crisis, monitoring situation and always having updated information are essential, and Facebook allowed us to communicate those information quickly” – Private Corporation</i></p> <p>b) <i>“Some areas near my house were flooded. During the flood, we were there by ourselves for more than two weeks, before helps from the government arrived. I listened (to news) mainly from TV. They said my area would be fine. But areas around my house got affected since that time, and TV knew that later” – Victim</i></p>
<p>Communication enablement</p> <p>a) <i>“This (social media) is very active because you can know everything immediately, you don’t have to wait for the reporter to go to the sites and report on the television or the newspaper or radio station. If people need help, they can use the iPad or iPhone to send a message to ask for help.” – ex-Deputy Bangkok Governor</i></p> <p>b) <i>“We didn’t have social media during tsunami 2006, but we have it now and it’s a good tool to communicate with the society” – Lieutenant Colonel</i></p> <p>c) <i>“Well social media was a good tool. Post once, seen by a lot of people. So it was quick and more widespread, especially it can be shared or retweeted. I think it’s faster than telephone calls.” – Victim</i></p>
<p>Channel of intercommunications</p> <p>a) <i>“We did use a lot of social media internally to communicate with one another. It was the easiest and most effective tool” – Lieutenant Colonel</i></p> <p>b) <i>“We actually form a lot of mini group via social media by having integrative efforts from various government related departments helping one another” – Lieutenant Colonel</i></p>
<p>Phase 3 Affiliative Collective Action</p>
<p>Connection quotidian disruption</p> <p>a) <i>“We felt that a lot of people were really stressed with the flood, so we wanted to produce the ‘emotional support video’ to lighten up the community</i></p>

<p><i>and we had great success with the video. People watched a lot of our video because they felt the inspiration message from it” – Private Corporation</i></p> <p>b) <i>“During that time, I didn’t go anywhere. I just stayed home and monitored social network, like Facebook, and asked Facebook friends about areas nearby my house, so I can prepare” – Victim</i></p>
<p>Social boundary</p> <p>a) <i>“Social media allow everyone to reach the government and can contact the government. During that time, the Prime Minister alone cannot help everyone, we can’t just use helicopter to fly to help everyone or to give boats to everyone. We needed to contact the volunteer groups and this can be done through social media as well” – Government</i></p> <p>b) <i>“During the flood everyone was using social media and it definitely help our society to ‘come together’ without any differences in opinion or no matter which political party they are affiliated with” – Private Corporation</i></p>
<p>Connection demand</p> <p>a) <i>“I think encouraging messages were the most important. Also, the (mainstream) media should provide data like water level, traffic, situation updates and more importantly, details about hospitals” – Victim</i></p> <p>b) <i>“To me social media was use to relief some tension. A lot of people were stressed during the flood” – Victim</i></p>
<p>Connection enablement</p> <p>a) <i>“Yes social media did bring a lot of people together during the flood” – Lieutenant Colonel</i></p> <p>b) <i>“We exchanged information and knowledge on what to do, how to deal with the flood and I can encourage them, make them feel more comfortable and more relax” – Victim</i></p> <p>c) <i>“A good thing of using Facebook in the beginning is once we made a post that we need supply, there were an army of supply to us” – Student volunteer</i></p>
<p>Catalyst of immersion</p> <p>a) <i>“First as a citizen. It probably was the first time that enable regular person to do some type of social innovation and help others in the society. Anyone who has the will can do it without being a rich corporation. Like our group, we were regular citizen but got together via social media” - Roo Su! Flood</i></p> <p>b) <i>“We had a lot more connection (on social media), direct connection with the people, and those connection help us even today” – Lieutenant Colonel</i></p> <p>c) <i>“During the flood I tweeted a lot and also monitored twitter like checked it every ten minutes. And also checked if there was any useful news/information to retweet (share)” – Victim</i></p>

Chapter 5 Discussion

In presenting our findings, we focus on illustrating the use of social media as boundary object for crisis response, from a collective action perspective. We delineated our observations and framed the discussions in a model (illustrated in Figure 2). Three distinct phases were identified from our analysis, with each phase defined by a collective action that enabled social media to function as a boundary object. The phases were arranged in chronological order as we observed that the types of demands, the nature of activities among the communities and the roles of social media varied over time as the flood situations worsen.

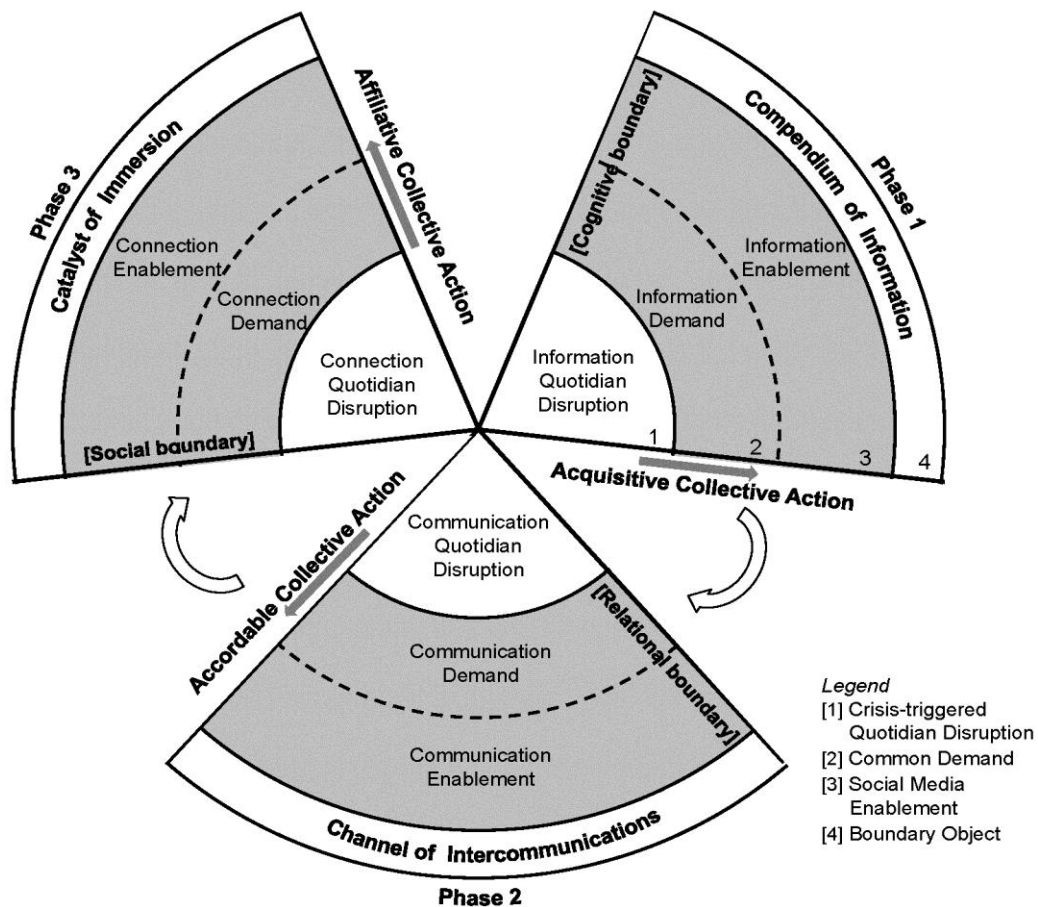


Figure 2: A Phasal Model – Social Media as Boundary Objects.

5.1 Phase 1 – Acquisitive Collective Action

When a flood occurs, access to information is as essential as access to food and water. Information sharing has long been recognized as critical for effective crisis responses (Chen et al. 2013; Wakolbinger et al. 2013). Seamless sharing of information is essential for prevention, mitigation and coordination measures. However, communities often find themselves struggling in information vacuums following the onset of a disaster. As we stressed previously, in such a period of uncertainty, the mainstream media generally fails to supply critical information or to keep the community informed. The taken-for-granted apprehension of day-to-day incidents is no longer the custom. We observed that, at such times, *information quotidian disruption* emerged as the dominant trigger of acquisitive actions. Quotidian disruption was adopted to describe the breakdown or interruption of everyday practices, routines, and expectations, which leads to a heightened likelihood of the emergence of collective action.

In the case study, the unpredictable and unfamiliar crisis situation quickly renders the day-to-day routine practices that sustain some level of normalized interaction and norm. In other words, the habitual “tuned-in” and informed states are threatened at this phase and subsequently, a *cognitive boundary* emerges. “A ‘boundary’ is a demarcation or a sphere of activities that marks the limits of an area, which may include knowledge, tasks, as well as hierarchical, physical, geographical, social, cognitive, relational, cultural, temporal, spatial, divisional, occupational, and disciplinary boundaries” (Hsiao et al. 2012, p. 463). In defining

a cognitive boundary, we refer to the differences between each individual in terms of awareness, understanding and knowledge of the situation. The tardiness of information flow creates an unbearable cognitive barrier, which in turn reshapes individual and collective consciousness to demand greater accessibility. The alteration in the subsistence informational habits and expectancies due to the disconnection of information resources is an impetus for the subsequent *information demand*. Information is required to recognize the impending hazards, to conduct critical preparations and even to establish mental readiness.

While individuals are seeking ways to access and contribute information, their behaviors depend heavily on the type and amount of information available, or in other words, the existing resources or constraints. Previously, only the authorities were responsible for gleaning and presenting relevant information. By contrast, self-organization enabled in the new media era affords opportunities unfeasible in the analogue past (Pan et al. 2012). Capitalizing on its diversity and growing availability, we found that people turned to social media to access rich, real-time and situational information that would otherwise not be easily obtained (Lindsay 2011; Velve and Zlateva 2012). This concentrated form of information flow results in a centralized engagement network, with the information providers serving as the central focus that connects the information consumers. The intensive knowledge sharing and simultaneous accumulation of crisis-related news and information from numerous experts are particularly enabled by social media, which is inherently flexible to the changing needs yet permits a robust

knowledge structure that strengthens the information flows (Yates and Paquette 2011).

Through the pursuit of information demand and *information enablement* provided by social media, the cognitive boundary that restricts a common understanding and shared awareness among communities was spanned. We observed that social media is now recognized as a boundary object in-use, specifically, a *compendium of information*; and has become practically employed as a crowdsourced information that is accessible, up-to-date (Bechky 2003b; Carlile 2002; Henderson 1991) and sufficiently comprehensive to fulfill information demands (Sutton et al. 2008). By having individuals as information nodes, a network that covers and captures every relevant detail was established on social media. This inter-communal property of social media delineates its boundary object capability, i.e., it is agreed and shared between communities, yet satisfies the information demands of each individual (Star and Griesemer 1989). By functioning as a boundary object that embeds knowledge and conveys information between different groups (Bechky 2003b), the new media undermines the cognitive constraints imposed among individuals or simply, “what people can learn about each other” (Lupia and Sin 2003). Since the collective network is mainly formed and shaped by the strong acquisition of information, we refer to the collective action in this phase as *acquisitive collective action*.

5.2 Phase 2 – Affordable Collective Action

When functioning efficiently, a community's infrastructure is often taken for granted. Unfortunately, as floods in Thailand continued to heighten, it had either damaged or destroyed the conventional means of landline communication (Kaewkitipong et al. 2013). Needless to say, the status of infrastructure, such as telecommunications, is of utmost importance during a crisis. When the routine communication channel is disrupted, it incurs a dramatic alternation in subsistence routines. We observed that this *communication quotidian disruption* has led to a relational tension where interactions are restricted. In other words, a *relational boundary* emerges. A relational boundary refers to the communication limitations faced by individuals during a disaster (e.g., geographical separation or restricted means of connection). When the disruption of communication triggers the relational restrictions, it indirectly assigns specific obligations and demands which individuals are expected to pursue. Because no one could afford to be left out during a crisis, we suggest that communication quotidian disruption makes explicit the importance of converging to the norm. It is the awareness of the barriers to communication that has led to a quest for solutions, that is, the *communication demand* has increased. This is particularly observed when people who may not have even known about social media (e.g., Twitter) before, start to engage in it during a crisis (Perry 2011).

Moreover, the rapid spread of social media has attracted ever-increasing attention. It is seen as the new quotidian that presents opportunities for individuals to

interact with each other. The richness of the social network facilitates clustered engagement, enables communities to build their own responses and focus on the formation of coalitions. In other words, relational disruption triggers the communication demand, while the connectivity and reachability of social media facilitates a *communication enablement* that allows communities to blend in with the norm. Researchers have acknowledged the importance of collective norms for supporting collective action (Coleman and Coleman 1994; Dickey et al. 2006). A norm can be seen as a type of insurance that enables individuals to coordinate activities and also to provide stability (Reisman 1990). In this context, the connectivity enabled by social media establishes a virtual communal norm, which in turn promotes relational linkages and strengthens the engagement network among communities. Furthermore, we emphasize that this collective action is of a mutually reinforcing nature because the participation and interaction contribute to the growing recognition of social media.

By facilitating relational linkage and building the reach among communities, social media is now a commonly accepted and acknowledged communication platform. Accordingly to Star (2010), a boundary object is an object that resides between ill-structured social worlds, and when necessary, this object is worked on by communities to achieve a goal. In our context, the crisis-triggered communication disruption has led to the segregation of community. Social media, possessing the capability to span relational boundaries, to integrate a society and mobilize it for action (Mark et al. 2007), is now capable of functioning as the

boundary object. In this regard, social media has become the key linkage within the crisis response community by enabling different constituencies to coordinate for a shared purpose (Star and Griesemer 1989). We posit that social media has emerged by means of *an accordable collective action* to an effective and prominent boundary object-in-use, i.e., a *channel of intercommunication* that people are now in accord with.

5.3 Phase 3 – Affiliative Collective Action

A crisis triggers alienation, deprivation, status inconsistency and social psychological disintegration. Routines and the natural attitudes associated with everyday practices are now matters of doubt and uncertainty. In this phase, the *connection quotidian disruption*, including the collapse of resilience and the changes in structures of social control accumulated prior to the crisis, is associated with the emergence of a *social boundary*. A social boundary is adopted to describe the various barriers that restrict individuals from engaging in communal living. These barriers may include “temporal interruption of some sort of social interaction, or the sparse interpersonal ties” (Tilly 2005, p. 134), which often result in restrictions in opportunities, access, collaboration, and social relations (Lamont and Molnar 2002).

Driven by the extended abandonment or necessary alteration of daily routines, people begin to realize the importance of having a sustainable connection as a path to long-term awareness, to maintain collaboration with the public, to attain mutual emotional support, and more. Identification with the collective and

affiliation are factors that lead to a *connective demand*, which subsequently influences collective action. “These affective factors support collective action because individuals are more likely to suppress self-interest when there are strong, positive associations between individuals and the collective (Leana and Van Buren 1999).” Groups with strong affiliation will exhibit collectivist tendencies, which serve as a pre-requisite to the pursuit of a common goal.

To establish this coherence, individuals begin committing to continuous interactions. The main distinctive behavior that arises at this stage is the transformation from being social media followers to influential social media creators. This reinforcing collective action serves as the main catalyst for sustained participation and, subsequently, an enduring connection (Coopman 2011). The voluntary or free-riding assumptions are waived off as people begin to participate proactively and realize a synergic engagement. The calculative rationality, i.e., the assessment of the incentives and disincentives for participation (Loveman 1998; Melucci 1996) that commonly restrict collective action has been transcended and replaced with a sense of “oughtness” (Coleman and Coleman 1994). In this phase, we see that the connected nature of social media acts as a social tie, which grants a *connection enablement* within the segmented communities in a way not previously possible.

By functioning as a *catalyst for immersion*, social media has become an adopted, shared and widespread practice, deeply affiliated to the communities. It serves as

the locus for new relationships of solidarity, which allows communities of practice to organize their interconnections (Wenger 1999). Also, it evokes high levels of connectivity and positive emotive responses across the community. As a boundary object-in-use, it supports the emergence of social worlds by converging and reconciling portions of communities (Jaeger and Burnett 2010). We refer to this process as *affiliative collective action* in which sustainable and contributive collective actions trigger the accustomization of social media and, consequently, enable it to function as a catalyst for immersion that results in an allied community. This creation and management of boundary objects is the key process in constituting and maintaining coherence across intersecting communities (Bowker and Star 2000).

Chapter 6 Conclusion

6.1 Theoretical and Practical Contributions

This dissertation set out to investigate the emergence of social media as boundary objects from a collective action perspective in the context of crisis response. The following are the main research and practical contributions of this dissertation. First, we introduced three types of boundary objects that emerged from the collective use of social media: the *compendium of information*, the *channel of intercommunications* and the *catalyst of immersion*. Each boundary object is realized by the practical application of social media and demonstrates the ability to span three prominent boundaries in crisis response: the *cognitive*, *relational* and *social boundaries*. Based on the defined research question, we proposed and discussed three different types of collective actions that enable social media to be recognized and practiced as different types of boundary objects: the *acquisitive collective action*, the *accordable collective action* and the *affiliative collective action*. Each collective action was triggered by the synthesis of *quodidian disruption* and *common demand*, and subsequently catalyzed by specific *social media enablement*.

From a theoretical perspective, our research is possibly among the first attempts to (1) conceptualize the process whereby a designated boundary object emerges into a boundary object in-use, (2) theorize collective action in a contemporary setting, i.e., in the social media context, and (3) discuss both the determinant and

enablement of collective action, particularly in the context of social media-enabled crisis response. In addressing the research gaps in the literature (Levina 2005; Levina and Vaast 2005), we conceptualized the transformation of a designated boundary object (i.e., social media) into a boundary object in-use, from a collective action perspective. In doing so, we shed light on a mechanism with which IT artifacts could be usefully incorporated in practice (Hsiao et al. 2012); and more importantly, on how boundary spanning competence emerged into practical use (Levina and Vaast 2005). While much of the literature acknowledges the flexibility and adaptability of boundary objects, it is surprising to find that a concrete understanding of boundary objects' dynamics is still largely absent in the extant literature (Gal et al. 2008). Our findings extend extant literature that has been primarily concerned with the types of boundary objects (Bechky 2003b; Carlile 2002; Pawlowski and Robey 2004) and their characteristics (Star and Griesemer 1989), to further explore how the object could be effectively used in practice. We emphasize that the attributes of boundary objects are only defined and built upon communities' actions. While assessing the characteristics of boundary objects is useful in revealing how an artifact may afford certain boundary-spanning competence, this role-based discussion obscures the dynamics that emerge when boundary objects are recognized and positioned in practice. Furthermore, the incorporation of new media as boundary objects in the context of disaster is inevitably a complex phenomenon that deserves more research attention. In particular, the emergence of social media has generated complex dynamics that are "propelling organizations in unexpected directions,

redrawing boundaries and shifting relationships” (Scott and Orlikowski 2012, p. 26). Our analysis of the integration between the use of social media and boundary spanning is of considerable importance and has yet to be undertaken in existing boundary object literature.

Second, by considering the concept of collective action along with the adoption of social media, this thesis attempts to provide some important contemporary insights into the theory of collective action, an important contribution which has been constantly suggested in previous studies (Bimber 2003; Bimber et al. 2005; Lupia and Sin 2003). We suggest that the conventional restrictions of collective actions can be overcome by contemporary technology, i.e., the need for small and formal organizations is undermined, while large-group collective action is encouraged to promote the noticeability of new media. Also, the interactions and contributions are currently continuously reinforced by the norms of social media users (Lupia and Sin 2003). All of these essentially challenged the long-held assumptions of collective action, such as the free-rider problem and individuals’ calculative rationalities. More importantly, we postulate that motivation or common goal is insufficient to realize collective action. Previous studies have implicitly assumed that the intention or willingness to participate or contribute is the only preceding condition required for collective action (e.g. Adger 2010; Oliver 1984). In other words, they focused on identifying factors that motivate collective action, (i.e., the *why* question) (Loveman 1998; Wasko and Teigland 2004). However, we contend that, despite focusing on the determinant such as the

common demand, *enablement* is required for the realization of collective action. This thesis adheres to addressing the *how* question and proposes that emerging technology (or specifically, social media) is capable of enabling contemporary collective action.

Our findings could also add insights to a particular relevant stream of IS research. More recently, there has been a growing interest among researchers to examine the intentions or willingness for knowledge sharing and contribution in electronic networks (e.g. Bock et al. 2005; Chiu et al. 2006; Toubia and Stephen 2012; Wasko and Teigland 2004; Wasko et al. 2009). Knowledge exchange is inherently a type of collective action. Our framework contributes to this stream of research by introducing a unique theoretical intersection of routine disruption, motivations, and the new media capabilities, pertaining to the collective knowledge contribution. Furthermore, by considering the context of a disaster, we propose a novel integration between quotidian disruption and common demand to illustrate how the breakdown of day-to-day routines and practices could undermine the calculative rationalities among individuals and lead to the pursuit of collective action.

In navigating back to our context, we offered a rich understanding of the use of social media in crisis response, thereby documented its social innovative potential in facilitating the resolution of societal problems. In the past decade, the role of ICT-enabled social innovation in inhibiting complex societal problems has

attracted the attention of researchers (e.g. Majchrzak et al. 2012). Nevertheless, as previously discussed, we observed that research on ICT-enabled social innovation has remained in its nascent phase. In this thesis, we conceptualized the process through which social innovation (i.e., social media) emerge, diffuse and succeed in augmenting and catalyzing solutions for complex social problem (i.e., crisis response). Overall, this thesis pointed out that significant impacts of social media come through the collective actions among the communities. In other words, we emphasized that the roles of social media go beyond the capabilities that were granted by its designated properties; it is capable of enabling collective actions and span prominent boundaries that inherently restrict crisis response.

For practitioners, the findings of the thesis contribute to significant interventions in crisis response by proposing a comprehensive and empirically supported model for the incorporation of social media as boundary objects in crisis response. The findings presented in this dissertation demonstrate the dynamics of new media in assisting crisis response. It is important for policymakers to be aware of the effects that media exert and understand how to work with the media (Boin 2008), particularly on its largely underexplored capabilities in fulfilling functional needs in disaster management. More specifically, our model identified and categorized several key demands that need to be fulfilled in different phases of crisis response. In this regard, we highlighted the behaviors, roles and expected outcomes of social media incorporation. We described crisis response activities as part of a complex interdependence among routines' disruptions, common demands and the

capabilities granted by social media to the involved communities. These findings can be included in an agenda for crisis response strategies. Governments and people in positions of authority can construct better plans and be responsive to the real, critical needs by considering the three phases of the distinct demands of communities. If risk assessment and collaboration strategies can be accurately mapped to meet a potential crisis, social media can be adopted as an effective crisis response platform to support different needs that arise during different stages of a disaster (Kaewkitipong et al. 2013).

6.2 Limitations and Future Research

The implications of this thesis should be viewed within the context of its limitations. First, the findings of the research are by no means exhaustive. We suggested three types of boundaries, as well as three collective actions and boundary objects within the context of crisis response. While these findings provide novel and important insights into the context of the present study, the model can be further developed in other relevant contexts, such as with emergency response organizations. Examining the incorporation of social media in different contexts of crisis response and identifying different sets of boundaries and boundary objects could be a fruitful direction for future research. Second, our findings are most relevant to crises of a considerable duration. For disasters of short duration (e.g., earthquakes and tsunamis), the dominant phase will be the aftermath of the catastrophe and the dynamics and nature of each phase might not be as distinctive and observable. Future research may consider performing a comparative analysis across different crisis events to expose the differences.

Above all, this thesis is among the earliest to address the gaps in the study of the transformation of a boundary object, of the determinants and enablement of contemporary collective action, and of the role of social media in crisis response. These findings yield several important areas for future inquiry. Using our framework as a point of departure, researchers could explore the potential negative impacts of social media in crisis response (e.g. Oh et al. 2010) in order to further discover the dynamics of boundaries and boundary objects. Contemporary collective action also deserves further attention from researchers, due in part to the growing functionalities and adoptions of the new media. The relationship between technology and society is often complex. Researchers were encouraged to move beyond a simple cause-and-effect explanation in order to shed light on the underlying factors and to develop a more nuanced conceptualization for contemporary collective actions.

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Appendices

Appendix A

Excerpts of Interview Topic Guides

General questions for interviewees

- Please tell us about your background.
- How did the flood affect you? How do you cope with it?
- Please share your experience (crisis response activities) with us.
- Why did you choose social media?
- How did you use social media during the flood?
- How it is different (or same) compared to crisis response in the past?
- During the crisis response, which portion did you consider to be the most difficult? How were the problems resolved?
- Is there any incident that has left a deep impression to you?

General questions for leaders, organizers and volunteers

- Please tell us about your background.
- How was the flooding situation? What are the challenges in crisis response?
- Please describe your crisis response efforts (who initiated the response, the objective, who was involved?)
- Why did you choose social media?
- How did you (your organizations or your communities) use social media during the flood?
- How it is different (or same) compared to crisis response in the past?
- What are the reactions of the communities? (How many people joined/participate? Why did they join? How were the online and/or offline communities formed during crisis response? How did their participation changes over time? What role did social media play in this?)
- What are some of the things you have learned from this experience?

Appendix B

Archival Data and Sources

Facebook and Twitter pages (Retrieved at May 2012)

Facebook Pages		
Page URL	Page Name	“Likes”
https://www.facebook.com/room2680	น้ำขึ้น ใหรับบอ	271,474
https://www.facebook.com/SiamArsa	อาสาสมัครฟื้นฟูประเทศไทย	111,935
https://www.facebook.com/k.sharing	พระจอมเกล้าลาดกระบัง ปันน้ำใจช่วยภัยน้ำท่วม	99,379
https://www.facebook.com/thaiflood	ThaiFlood ศูนย์ข้อมูลช่วยเหลือผู้ประสบภัยน้ำท่วม	60,998
https://www.facebook.com/1111No5	ศปท.ศูนย์ปฏิบัติการช่วยเหลือผู้ประสบอุทกภัย	56,480
https://www.facebook.com/ThaiFlood.2554	Thai Flood รายงานน้ำท่วมใหญ่	44,368
https://www.facebook.com/FloodConnect	FloodConnect	31,231
https://www.facebook.com/AsaThai	อาสาคนไทยช่วยน้ำท่วม	30,014
https://www.facebook.com/bkk.best	ศูนย์ป้องกันน้ำท่วม กรุงเทพมหานคร @BKK_BEST	28,469
https://www.facebook.com/SiamFloodAdmin	Siam Flood	11,396
https://www.facebook.com/HelpSharing	น้ำท่วม จังรีบอ	11,258
https://www.facebook.com/SOS.Animals.Thailand	SOS ANIMALS Thailand	10,621
https://www.facebook.com/bkkflood	Live!! น้ำท่วม กรุงเทพ	5,085
https://www.facebook.com/PakkretRescueTeam	งานป้องกันและบรรเทาสาธารณภัย เทศบาลนครปากเกร็ด	4,106
Twitter Pages		
Page URL	Page Name	Followers
https://twitter.com/Rawangpai	สถานีข่าวระวังภัย @Rawangpai	90,064
https://twitter.com/SiamArsa	SiamArsa Volunteer	34,199

	@SiamArsa	
https://twitter.com/bkk_best	ศูนย์ป้องกันน้ำท่วม @BKK_BEST	31,630
https://twitter.com/floodcenter	ศูนย์ คชอ. @floodcenter	13,303
https://twitter.com/Aormortor	องค์การนศ.ธรรมศาสตร์ @Aormortor	10,171
https://twitter.com/Asa_Thai	อาสาคนไทย @Asa_Thai	4,727

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