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SOCIAL NETWORK REACTIONS TO A FLOOD SITUATION

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ABSTRACT

Purpose: *In 2011, Thailand faced its worst flooding of all time. The crucial issue of this disaster is how Thai people responded to the situation. This study traces the reactions to this event from Thai social network users of Twitter and Facebook.*
Design/methodology/approach: *The core data for analysis were tweets from hash tag #Thaiflood and messages posted in Thaiflood Facebook. This study constructed a content analysis platform for collecting data from each selected tweet and post during the period of flooding from September 25, 2012 to October 10, 2012.*
Findings: *The findings principally describe the reaction patterns of posts on Facebook and tweets by twitter. These reactions are presented statistically to provide debt-details in user behavior. They conclude, for example, that on Facebook females (58.4%) are more concerned than males about floods; and on tweeter, messages on flooding were tweeted by only 25.1%, of which many re-tweeted.*
Practical implications: *If possible, government should consider these social networks as a critical tool example in a disaster management plan. This would help in responding immediately to an event, and assist in reducing damage.*
Originality/value: *This study explains interaction between the social network and disaster phenomenon. Furthermore, the results help to provide a fundamental background for the next step of research in this area, such as understanding the phenomenon through the lens of theory.*

Keywords: Social network, Flooding, Disaster management, Thailand

INTRODUCTION

Increasing numbers of social networks are a part of daily life. They help to connect people around the globe via social network applications such as Facebook, Twitter, and MySpace. For instance, Thailand has around 18 million Facebook users (as of April 2013) [I], of which over 12 million are in Bangkok. This ranks Bangkok number one as having the most Facebook users worldwide (as of April 2013) [II]. Social networks have been utilized increasingly by both the public and private sector in order to extend their reach into the general public. For example, hotels in Taiwan employ Facebook as their international e-marketing tool (Hsu, 2012), while the

Chinese government has used Weibo to disseminate information and provide services to its citizens (Liu *et al.*, 2012).

In recent years, the public sector and general public have used social networks to send and receive information during disasters (e.g. Murhpy, 2013; Polen, 2008). Like other countries, Thailand has embarked on using social networks for disaster management. For example, the National Disaster Warning Center uses a website, and in some cases Facebook, and twitter, to inform people about disasters occurring in Thailand and other parts of the world. Therefore, this paper explored social network use during the 2012 flood in Thailand, with the aim to observe how social network users reacted to the event. To this end, Facebook messages and tweets of Thaiflood were examined. Thaiflood was established by a non-government organization, which provided information on floods in Thailand.

RELATED WORK

Social networks such as Facebook and twitter have become important tools for disaster management. They serve as new media for connecting people, who are affected by disaster, and guiding disaster management. Community functions are disrupted generally during a disaster (Abarquez and Murshed, 2004), when the organizations involved can employ social networks in various aspects including disseminating public safety information, sending notifications and emergency warnings, and providing a supplement to a conventional emergency channel for assistance requests (Lindsay, 2011).

As such, various accounts have been reported of Facebook and twitter use for disaster management. Flood information, deriving from government agencies, local councils and new media, was distributed to local residents and travelers via Facebook during the recent 2010/11 Queensland and Victoria floods (Bird *et al.*, 2012). Freeman (2011) examined the use of social networks in the Australian context for providing information during natural disasters. He pointed out the shortcoming of circulating information by traditional methods, i.e. television and radio broadcasts that communicate one-way to citizens, whereas social networks are more dynamic and allow for knowledge sharing. Similarly, Polen (2008) indicated the problem of one-way communication from officials to the general public, as compared to backchannel communication (peer-to-peer communication) using social media that include twitter and personal blog. More advanced use of twitter for disaster management was suggested by Sakaki *et al.* (2010). With the real-time nature of twitter, these researchers could use tweets to predict earthquakes and send notification e-mails to registered users.

According to what is written above, there is still room for investigating the relationship between social media and disaster management. Therefore, this study aimed to explore reaction to the Facebook and Twitter network during a flood situation.

RESEARCH METHODOLOGY

Tweets from hashtag #Thaiflood and messages posted in Thaiflood Facebook were the core data for analysis, collected from September 25 to October 10, 2012. In total, there were 21 Facebook messages and 748 tweets for analysis. The data derived were analyzed by means of content analysis, where the contents of the Facebook messages and tweets were categorized into groups. Statistical analysis was also performed by way of frequency and percentage.

RESULTS AND DISCUSSION

1 Thaiflood Facebook

Overall, 22 messages were posted on the Thaiflood Facebook from September 25 to October 10, 2012 (Table 1). Evidently, the number of messages posted was considerably small both in terms of the number/day, which ranged from zero to three messages/day, and the total number. This clearly indicated a low number of information 'providers' disseminating flood and related information on a relevant Facebook. Nevertheless, the small number of Facebook messages triggered rather wide reactions among Facebook users, who accessed Thaiflood Facebook during the study period. This reaction based on total number of Likes, Comments and Shares, was 8,590, 558, and 2,938, respectively. It was obvious that the number of Likes on the Facebook messages was higher than that of Comments and Shares, because Likes on Facebook are easy to register with just one click.

The results indicate that although there were only 22 posts on Facebook, 12,089 reactions of Likes, Comments and Shares were registered. This also implies that many people see, know, monitor and share information.

Table 1 The Likes, Comments and Shares registered on Thaiflood Facebook messages from September 25 to October 10, 2012

Date	Facebook Message	Number of Likes	Number of Comments	Number of Shares
25 September 2012	Message #1	626	74	477
	Message #2	294	14	140
26 September 2012	Message #1	624	23	39
27 September 2012	Message #1	376	54	97
28 September 2012	Message #1	694	16	174
	Message #2	412	12	65
29 September 2012	Message #1	239	15	53
	Message #2	246	28	114

	Message #3	362	30	126
30 September 2012	-	0	0	0
1 October 2012	Message #1	943	32	389
2 October 2012	Message #1	229	3	196
	Message #2	233	6	81
3 October 2012	Message #1	399	44	205
4 October 2012	Message #1	301	23	116
	Message #2	362	22	105
5 October 2012	Message #1	261	20	80
	Message #2	191	9	48
	Message #3	239	15	84
6 October 2012	Message #1	638	77	212
	Message #2	355	19	72
7 October 2012	-	0	0	0
8 October 2012	-	0	0	0
9 October 2012	-	0	0	0
10 October 2012	Message #1	566	22	65
Total	**22**	**8,590**	**558**	**2,938**

The post observed on October 1, 2012, was used as an illustrative point for analyzing more details. This post was selected, due to it gaining most attention by having 943 Likes. The picture and message from this post showed a new discovery, in that floods had less effect on rice grown on water. It should be noted that information was obtained from only 500 of 943 Facebook users, who clicked on Like, because of the technical limit set by Facebook. It was discovered that of these 500 users, 292 (58.4%) were female, 189 (37.8%) male, and gender of the remaining 19 (3.8%) was not specified (Table 2). This suggests that women were more concerned than men about floods.

Table 2 Likes on Thaiflood Facebook messages by gender

Gender	Number of Facebook users	Percentage
Male	189	37.8
Female	292	58.4
Not specified	19	3.8
Total	**500**	**100**

Contents of the comments posted on Thaiflood Facebook on October 1, 2012, were analyzed. There were 32 comments in total, of which one could not be included for analysis, due to the privacy setup used by the user. From these 31 comments, it was found that men and women posted almost equally; 15 comments made by men and the rest by women (Table 3).

Table 3 Thaiflood Facebook messages by types of comments and gender

Type of Comments	Number of comments	Percentage	Gender	
			Male Number of comments	**Female** Number of comments
Support	23	74.2	8	15
Critique	6	19.4	5	1
Suggestion	1	3.2	1	-
Argument	1	3.2	1	-
Total	**31**	**100**	**15**	**16**

The comments under question can be grouped into four types: support, critique, suggestion and argument. Comments under the support category (23, 74.2%) were positive reactions from Facebook users. Evidently, most comments fell into this group (Table 3). The users posted comments that supported or praised the Facebook messages concerned; for example, one comment read "*Thai people are excellent!*" This may indicate how users supported Facebook messages for carrying useful data to them and other people. Also, the messages may be thought to contain information that was liked or particularly important.

The six comments (19.4%) posted by Facebook users in the critique category expressed their own opinions of the messages concerned, which may or may not support the information provided. For example, one user commented, "*In the next 25 years, [we] will grow crops on water.*" This comment was a reaction to the news on 'floating' rice, which forced him/her to express an opinion on the possibility of 'floating' crops in the next 25 years. The posts and their statistics hint of people having strong positive reactions to new ways of adapting to life with flooding.

The one comment (3.2%) from a Facebook user in the suggestion category provided ideas based on information contained in the messages under question. This user commented, "*This idea should be promoted in rice farming areas, which are also the water retaining areas; it will be very useful.*" It could be said, therefore, that this user suggested carrying out the idea in other areas, which may be of benefit to others. There was also only one comment (3.2%) in the last category; argument, which contradicted other opinions and carried a negative view. This Facebook user stated, "*We can only do rice farming on the other people's back*." 'One does rice farming on the other people's back' is a Thai proverb, which means taking advantage of other people, and this user used it to express his/her opinion of the information on 'floating' rice farming.

As mentioned above, most comments were assigned to the support category (74.2%). However, with gender taken into consideration, a marked contrast was observed, in that almost all comments posted by women fell into this category, while those submitted by men were scattered across all four categories (Table 3).

Concerning Shares of the Thaiflood Facebook messages posted on October 1, 2012, data were obtained from 161 of 389 Facebook users, due to Facebook's technical limit and users' privacy setup. It was observed that of the 161 users, 92 or 57.14% were female (Table 4). This finding is congruent with that of message Likes, which was clicked more by women than men. This may confirm that women were more concerned than men about the flood and more active in disseminating information.

Table 4 Shares of Thaiflood Facebook by gender

Gender	Number of Facebook users	Percentage
Male	63	39.13
Female	92	57.14
Not specified	6	3.73
Total	**161**	**100**

Shares of Thaiflood Facebook messages normally received comment as well, which also was analyzed. As with comments on Facebook messages, comments on Shares also could be categorized into four groups: support, critique, suggestion and argument (Table 5). It can be seen that 55 comments (43.3%) fell into the support category; and, similar to comments on Facebook messages, women provided more of them than men. Interestingly, the number of critique comments was considerably high; accounting for 52 (41.9%), and second only to support comments. The suggestion and argument comments (5 and 12, respectively) were considerably small in number when compared to the other two categories. In any case, Shares of Facebook messages drew more reactions in terms of comments than Facebook messages (cf. Table 3).

Table 5 Comments on Shares of Thaiflood Facebook messages by types of comments and gender

Type of Comments	Number of Comments	Percentage	Gender		
			Male Number of comments	Female Number of comment	Not specified Number of comments
Support	55	44.3	20	31	4
Critique	52	41.9	31	20	1
Suggestion	5	4.1	3	1	1
Argument	12	9.7	4	8	-
Total	**124**	**100**	**58**	**60**	**6**

2 Thaiflood twitter

From September 25 to October 10, 2012, a total of 748 tweets were from the hashtag #Thaiflood (Table 6). It was found that the Thaiflood twitter was most active on September 28, 2012, when there were 85 tweets and least active on October 7, 2012, with only 8 tweets. Regarding the information disseminated, the 748 tweets can be classified into four groups (Table 6), as follows; 1) tweets on a flood situation (188 tweets/25.1%), 2) tweets on news relating to flood (441 tweets/58.9%), 3) tweets making announcements or warnings (96 tweets/12.8%), and 4) tweets on the weather forecast (23 tweets/3.2%).

Table 6 Types of Thaiflood tweets

Date	Type of Tweets				
	Flood Situation/ Tweet	News relating to flood /Tweet	Announcement or Warning/Tweet	Weather Forecast/ Tweet	Total Tweets
25 September 2012	15	19	2	2	**38**
26 September 2012	17	29	14	4	**64**
27 September 2012	24	33	7	2	**66**
28 September 2012	35	33	13	4	**85**
29 September 2012	9	6	2	2	**19**
30 September 2012	8	5	1	0	**14**
1 October 2012	15	39	7	2	**63**
2 October 2012	15	36	10	2	**63**
3 October 2012	9	42	10	2	**63**

Date	Type of Tweets				
	Flood Situation/ Tweet	News relating to flood /Tweet	Announcement or Warning/Tweet	Weather Forecast/ Tweet	Total Tweets
4 October 2012	10	60	11	0	**81**
5 October 2012	5	46	8	0	**59**
6 October 2012	5	8	4	0	**17**
7 October 2012	0	7	1	0	**8**
8 October 2012	7	42	1	1	**51**
9 October 2012	8	25	1	1	**35**
10 October 2012	6	11	4	1	**22**
Total Tweets	**188**	**441**	**96**	**23**	**748**
Percentage	**25.1**	**58.9**	**12.8**	**3.2**	**100**

As tweets may be re-tweeted by users, re-tweets also were considered in the information on Thaiflood tweets. As an example, re-tweet activities on September 25, 2012, are presented in Table 7, where it can be seen that on this particular day, 11 users re-tweeted the Thaiflood tweet. Each of these users had followers ranging from 13 to 1,075; 2,539 in total. As such, after the re-tweet had started, 2,539 more people accessed the Thaiflood tweet.

Table 7 Users who re-tweeted the Thaiflood tweet and their followers (25 September, 2012)

Date	Re-tweeted Users	Followers
25 September 2012	Pomipei	648
	Bend_Ny	81
	pleng_golf	16
	Timmynokoto	17
	Chaitheguru	206
	Manovana	14
	FahCaramel	112
	PLOYozoK4	107
	peemulia_near	13
	AcinarYoko	1,075
	CityRabbit9	250
Total		**2,539**

Although Thailflood tweets on flood seemed relatively small in number (25.1%). when compared to news relating to floods (58.9%), Thaiflood twitter could still be considered as the main tweet provider in the event of flood. During the study period, Thaiflood continually provided flood information via its tweets, of which many were re-tweeted, thus helping to spread information quickly to others. This proved once again the potential value of social networks during a disaster like flood.

CONCLUSION

Thaiflood employed Facebook and twitter for circulating information in the event of flood. These social networks showed a wide reaction among the respective users, which can be observed by Likes, Comments, and Shares on Facebook messages, and re-tweets on Twitter. Thus, in the Thai context, where users of Facebook and twitter continue to rise, social networks can provide new channels of communication to the public over the course of disasters. This insight would be of crucial importance to Thai government agencies concerned with managing disasters, as a social network can become a critical tool in disaster management plans. Using a social network that distributes information quickly would help these agencies to obtain immediate responses in the event of disaster, and accordingly help to reduce the damage and loss caused.

REFERENCES

1. Abarquez, I., and Murshed, Z. (2004), *Field Practitioners' Handbook*, Asian Disaster Preparedness Center, Pathumthani, Thailand.
2. Bird, D., Ling, M., and Haynes, K. (2012), "Flooding Facebook – the use of social media during the Queensland and Victorian floods.", *Australian Journal of Emergency Management*, Vol. 27 No. 1, pp. 27-33.
3. Freeman, M. (2011), "Fire, wind, and water: social networks in natural disasters", *Journal of Cases on Information Technology*, Vol. 13 No. 2, pp. 69-79.
4. Hsu, Y.-L. (2012), "Facbook as international eMarketing strategy of Taiwan hotels", *International Journal of Hospitality Management*, Vol. 31 No.3, pp.972-980.
5. Lindsay, B. R. (2011), "Social media and disasters: current uses, future options, and policy considerations". CRS Report for Congress prepared for Members and Committees of Congress, Congressional Research Service, 6 September 2011. Available at: www.fas.org/sgp/crs/homesec/R41987.pdf
6. Liu, Y., Zhou, Y., and Liu, G. (2012), "*Chinese Government Use of Social Media: A Case of Shanghai Weibo @Shanghaicity*." in DEST 2012, Proceedings of The 6th IEEE International Conference on Digital Ecosystems and Technologies: Complex Environment Engineering, Campione d'Italia, Italy, 18-20 June 2012.
7. Murphy, M. (2013), "Social Media and the Fire Service", *Fire Technology*, Vol. 49 No 1, pp. 175-183.
8. Polen, L. (2008), "Online social media in crisis events", *Educause Quarterly*, Vol. 31 No. 3, pp. 76-78.
9. Sakaki, T., Okazaki, M., and Matsuo, Y. (2010), "Earthquake Shakes Twitter Users: Real-time Event Detection by Social Sensors" in *WWW 10 Proceedings of the 19th International Conference on World Wide Web*, Raleigh, North Carolina, USA, 26-30 April 2010, pp.851-860.

Note

[I] www.socialbakers.com/facebook-statistics (accessed 19 April 2013)
[II] www.socialbakers.com/facebook-statistics/cities (accessed 19 April 2013)

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