Red Tape: Attitudes and Issues Related to Use of Social Media by U.S. County-Level Emergency Managers

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ABSTRACT

Social media are ubiquitous in modern society. Among their uses are to provide real-time information during crisis. One might expect that emergency management agencies in the U.S. make use of social media extensively to disseminate and collect crisis information as that is where the information flows most freely and quickly; yet, these agencies are not fully exploiting the capabilities of social media. A survey of 241 U.S. emergency managers at the county level shows that only about half of these agencies use social media in any way as of 2014. Most do not have any formal policies to guide their use. Of those that do have formal policies, about one quarter actually forbid the use of social media. This study describes the barriers that impede use of social media by these emergency managers, and the ways in which they are currently used, and recommends steps to improve this use.

Keywords

Social Media, Emergency Management, crisis

INTRODUCTION

Hundreds of millions of people worldwide use social media (SM) such as Twitter and Facebook, many of whom turn to this source to share information in times of disasters. They expect that the emergency response agencies that are intended to rescue and serve them will be using these media too. An American Red Cross (2010) study, for instance, found that 75% of respondents expected help to arrive within an hour if they posted a request on an SM site. Researchers on the topic of SM use in emergency management have pointed out that valuable pictures and texts are often shared during the early stages of a disaster, that can be very useful for enhancing situational awareness (e.g., St. Denis, Palen, and Anderson, 2014), thus leading to better decisions about deployment of people and material to aid those most in need.

Despite recognized potential, emergency responders encounter socio-technical difficulties adopting SM into their practice (Tapia, Baipai, Jansen, and Yen, 2011; Tapia, Moore, and Johnson 2013; Tapia and Moore 2014). There are some potential "fixes" for technical issues related to SM use. If cell towers are down, local area networks can be created to connect the disaster area to the Internet (Liu, 2014). Problems of information overload and of evaluating trustworthiness of tweets and other SM postings can be largely solved by systems that employ combinations of computational and human judgment approaches (Hiltz and Plotnick, 2013; Imran, Castillo, Lucas, Meier, and Rogstadius, 2014). For instance, untrue rumors spread via SM are one of the untrustworthy elements that are feared. Generally these are promptly challenged by other users (Castillo, Mendoza, and Poblete, 2011); the Twitter community works like a collaborative filter of information (Vieweg et al., 2008).

Nevertheless, the expectations of the public and the potential affordances of the technology are often not met,

especially by emergency management personnel working for government disaster response agencies. What explains this? Practitioners need to know what the shared problems they face are in terms of both organizational practices and technological issues, so that they can work across agencies to remedy problems. Rather than guessing what innovations might be useful, systems designers need to know what barriers to SM use actually are most important and what types of solutions are most attractive to practitioners, so that they can focus their efforts on technological improvements that are most likely to be adopted.

Bureaucracies operate by rules and written standard operating procedures (SOPs). Therefore, they tend to be slow to adopt new technologies that would change these procedures, or to use a new technology for which there are no procedures or guidelines provided. In the U.S. government the emergency manager (EM) has traditionally been part of a top-down, "command and control" system with lots of "red tape": sources of information must be official and vetted, and written policy documents followed, in order to deal with issues of trustworthiness and security. SM sources of information are almost the opposite of "official" sources: they are unregulated, unorganized, not vetted. It is not surprising that government EMs are reluctant to take advantage of the instantaneous flow of information through SM even in crisis when information gathering and response must be rapid. This is despite the fact that EMs must routinely deal with lack of information, high levels of uncertainty and risk, and use information that is "good enough" because it is the best they can find at the time that decisions must be made (Tapia & Moore, 2014).

This study describes the current status of the use of SM by U.S. county level emergency managers through a survey we conducted with 241 respondents. The overarching goal is to identify the main barriers to use so that technologists and policy makers will be able to address the issues and make it possible for government agencies to fully exploit the potential of SM. The main research questions are:

1. What problems or barriers do these managers perceive in terms of using SM, both for disseminating (sending out) information and for collecting information that could be used for real-time disaster management?

2. Do the barriers to SM use vary by population size or urban vs. rural nature of the county served by the agency?

3. Do the barriers to SM use vary with the nature of agency policies?

PREVIOUS STUDIES

Work related to this paper is a pair of studies by Tapia and her colleagues, based on semi-structured interviews with employees of international humanitarian relief organizations. The sample in both cases was derived from employees within a subset of 12-13 of the 37 organizational members of NetHope, an information technology collaboration of most of the largest international NGOs, such as CARE and the Red Cross/ Red Crescent societies.

In the first study, conducted in 2010 (Tapia et. al. 2011), the researchers were generally directed to the Public Information Officer (PIO) for the 13 interviews completed. They found that as of 2010, these respondents considered the "pulling" of SM data for emergency management decisions to be like "a food they could not eat." While the largest of these organizations had adopted SM messaging as part of their Public Relations functions, few had used any form of message data originating from the public during a disaster. The data from the public contributed during disasters was generally considered to be unverifiable and untrustworthy, and thus construed as unsuitable for incorporation into established mechanisms for organizational decision-making.

In a follow-up study conducted a year later (2011), 21 interviews were conducted with one or two respondents from 12 of the 13 organizations, this time, in most cases, including one interview with individuals with technological expertise (e.g. CIO), and one with individuals from the emergency response division (Tapia, Moore, and Johnson 2013; Tapia & Moore, 2014). As in the earlier study, content analysis was done on the transcriptions, using grounded theory (inductive coding). This time they found "pockets of use" and acceptance in some organizations. In particular, they "found that microblogged data is useful to emergency officials in situations where information is limited, such as at the beginning of an emergency response effort, and when the risks of ignoring an accurate response outweigh the risks of acting on an incorrect one" (Tapia et. al., 2013, p. 770). Among the main themes identified in the analysis were:

- *"Good enough" data quality* to make a decision, fast, such as whether to deploy and what personnel and goods to send. Most of the respondents lamented that better data is not typically available, but that they often have to "make do" and use whatever information they have to make decisions in the first 48 hours (Tapia and Moore, 2014).

- *Trust in people, not in data* because the person or organizations that data came from were trusted; a network of colleagues around the world was developed over time. Thus, they "trusted" information on sources such as Twitter if it came from a person or organization that they knew.

Adapting some of the questions included in the Tapia et al. studies, as an exploratory qualitative study, semi-structured interviews were conducted with 11 U.S. government emergency managers to determine what concerns and themes related to the use of SM in EM were most on their minds (Hiltz, Kushma, and Plotnick, 2014). Inductive (grounded) coding was used to extract themes and count their frequency. The two most frequently described barriers were lack of personnel/ time to work on use of SM (13 mentions), and lack of policies and guidelines for its use (11 mentions). However, there were also seven mentions of official agency prohibitions on SM use and several mentions of barriers related to lack of appropriate technology, lack of training, and trustworthiness.

Formal policies and procedures related to the use of SM ("red tape") emerged as a very much evolving phenomenon, as illustrated by the following:

"We need to take our SOPs and go to talk to our attorney's office about what we can and cannot do."

"We struggle with the legal issues. We don't want to be liable for anything."

"I don't know if social media has ever really been addressed. As a government agency I'm not sure where that fits in."

METHOD

Survey Development and Measures

We developed a survey based upon the research questions, literature review, and results of analysis of semi-structured interviews conducted by Hiltz et al, 2014. It was approved by the University IRB, and distributed using the online survey application SurveyMonkey®. Whenever possible, semantic differential items were used so that the variables would be interval or ratio level. Single items were used to measure each barrier or type of use because emergency managers are busy, and having multi-item scales (more questions) increases the likelihood that the survey would not be completed. While multiple items (e.g. barrier of training, barrier of trust) may address the same higher order construct (e.g. barriers to use), higher order constructs are formative, not reflective. That is, the items are dimensions of the construct. It is inappropriate to use factor analysis on formative constructs. The full wording for each item is shown in the tables of results to follow.

Skip logic was used to assure that respondents were only presented with relevant questions. For example, if a respondent answered that his/her agency did not have a policy for SM uses, s/he was not presented with any questions related to issues of current agency policy. (The full survey is available on request from the first author).

Participants

One of the authors, with assistance from Emergency Management doctoral students, used the U.S. Census Bureau web site (www.census.gov) to develop a list of county level EMA agencies in the United States. We attempted to secure email addresses for their directors or coordinators, using State EMA websites, county websites, and general Google searches. Counties were used as the unit of analysis because they are primary implementers of emergency management programs in the U.S., and when federal declarations are made for disaster assistance they are done at the county level. Also, because disasters tend to be multijurisdictional, counties often facilitate coordination between municipalities. In the United States, there are over 3,000 county type governments (NACO 2010).

Email addresses were found for agencies and/or agency directors for 2980 of the counties identified. Invitations were sent out to the EM directors or coordinators, with a link to the survey, in four "batches," between April and September 2014. For the first three "batches" (686 emails), a reminder email with the link was also sent out after three weeks. The last and largest "batch" which was to the directors of agencies serving small counties only received one email. There were 250 responses, but nine had only one or two answers, leaving 241 useable responses. Overall, the response rate was 8% of all counties, but was higher for the larger counties (23% of large counties emailed). It should be noted that not all email addresses found in the search were valid. Thus, some emails sent did not reach the intended recipients. The survey was closed a month after the last batch of emails were sent. Table 1 shows details of numbers of email invitations sent and usable responses received, by county size. The particularly low rate for the smallest counties is understandable because for many of these there is not

a full time emergency manager. Rather, these managers also have other full time positions such as sheriff or firefighter; they have very little time to spend on their EM work. Although the response rate for the smallest counties was low, we do have over 100 responses for this category, so they are well represented.

	Small	Medium	Large	GrandTotal
Group1	2166	388	41	
Group2		457	91	
Total	**2166**	**845**	**132**	**3143**
TotalMailed1	2018	334	34	
TotalMailed2		396	76	
Total Emails Sent	**2018**	**730**	**110**	**2858**
NumberRespondents	128	86	25	239
Respondents				241
Response Rate Overall	**5.9%**	**10.2%**	**18.9%**	**7.7%**
Response Rate Per Emails	**6.3%**	**11.8%**	**22.7%**	**8.4%**

Figure 1 Response rate by county size   (Note: some participants did not answer county size question).

Methodology for Analysis

Quantitative analysis was performed using the statistical software application SPSS®. Tests of normality (Kolmogorov-Smirnoff) were made to ascertain which variables were normally distributed so that a decision could be made about whether to use parametric or nonparametric tests. Because only two of the variables were normally distributed, non-parametric statistical tests were performed, using the .05 level of significance. Means, medians, standard deviations, and skewness were then calculated for all of the variables. Frequencies of the nominal and ordinal level variables were also obtained.

To test research questions 2 and 3, Kruskal-Wallis tests were performed to see if variables significantly differed by categorical variables of interest. Those categories are: the population size of the county served by the agency; whether the county was rural, urban or both; and the nature of policies for SM use.

FINDINGS

Characteristics of the Respondents

The respondents are well educated and experienced. Only 7.4% have worked for their current EM agency for less than a year. A quarter of the respondents have been working for their agency for 6 to 10 years and 35.6% have been working there for over 10 years. Only 34.3% have Certified Emergency Manager certification. At least a bachelor's degree was earned by 52.7% of respondents.

Characteristics of Respondents' Agencies

Most of the respondents work for county agencies that serve relatively small (in terms of population) and/or rural areas. Over half of the respondents (53.3%) indicated that their agency serves a jurisdiction with a population of fewer than 50,000 people; 11.3% of the respondents' agencies serve populations of 50,000 to 99,999 people; 24.6% serve populations of 100,000 to 499,999; 6.7% serve populations of 500,000 to 1 million; 3.8% serve populations of over a million. Over 59% of the agencies serve counties that are mostly rural, 7.9% serve counties that are mostly urban, and the remaining 32.9% serve counties that are about an equal mix of rural and urban. An overwhelming majority (83.3%) of the respondents work in agencies with a small staff of from one to nine persons (paid and volunteer).

Social Media Overall Use and Policies

About half (52%) of the respondents reported that members of their agency staff use SM for job-related activities, even if not officially sanctioned. Although most of these agencies (77%) have been using SM from 1 to 5 years, few have formal policies and procedures for disseminating (26%) or gathering (16%) information. However, many do have *informal* policies and/or procedures for sending (22%) or gathering (40%) information.

The remainder of the respondents indicated that their agency has no formal or informal SM policies. Of those that have a policy, 25% have policies preventing SM use. Although the survey had questions regarding specific policies (e.g. access to SM), answering was not required and, of the 241 analyzed responses, the number of respondents varied from only six to 33. Therefore, the frequencies are not shown as the level of response was too low to be informative.

Barriers to Using Social Media

With a focus on answering RQ1 (barriers), respondents were asked **"**Please indicate the extent to which each of the following are barriers to social media use for ***sending out/ collecting information*** for your agency." The items were scaled from 1 for not a barrier to 7 for a large barrier. An option for "Don't know" was also provided. However, the responses of "Don't know" were excluded from the analyses.

Below, (Table 2) is the table of means for the variables that represented potential barriers to using SM with a mean of 3 or over. Also shown are standard deviations and skewness statistics for each variable. For both pushing (sending out) and pulling (collecting) information, lack of sufficient staff is the most important barrier. This is not surprising since EMs are often stretched to the limit performing their usual duties - not including the use of SM. However, lack of guidance/ policy documents (the" red tape") is the second highest rated barrier to dissemination via SM. Lack of skills and of the training that could improve these skills are also important. For pulling data, trustworthiness and information overload issues are the second and third most important barriers. What is surprising is that other potential barriers are not seen as significant to the survey respondents. The following potential barriers were rated on the average under 3.0 for both disseminating and collecting information, and thus are not shown in the results displays: legal or privacy issues, lack of software, lack of hardware, and compatibility with the agency's information system. Figures 1 and 2 show the means of the most important barriers, for ease of comprehension.

Barriers to Sending Out Information			
Barrier	**Mean**	**Standard Deviation**	**Skewness**
lack of staff (quantity)	4.6	2.2	-.40
lack of guidance/policy documents	3.5	2.0	.25
lack of staff (skills)	3.3	2.0	.42
lack of training opportunities	3.2	2.0	.38
lack of experience with social media	3.2	1.9	.32
lack of support from senior management	3.1	2.3	.62
Barriers to Collecting Information			
Barrier	**Mean**	**Standard Deviation**	**Skewness**
lack of staff (quantity)	4.7	2.2	-.49
trustworthiness of public generated content	4.0	2.0	-.20
information overload	3.9	2.1	-.08
lack of staff (skills)	3.6	2.2	.25
lack of training	3.4	2.1	.18
lack of experience with social media	3.4	2.1	.29
social media limitations	3.1	1.9	.42

lack of support from senior management	3.1	2.2	.67

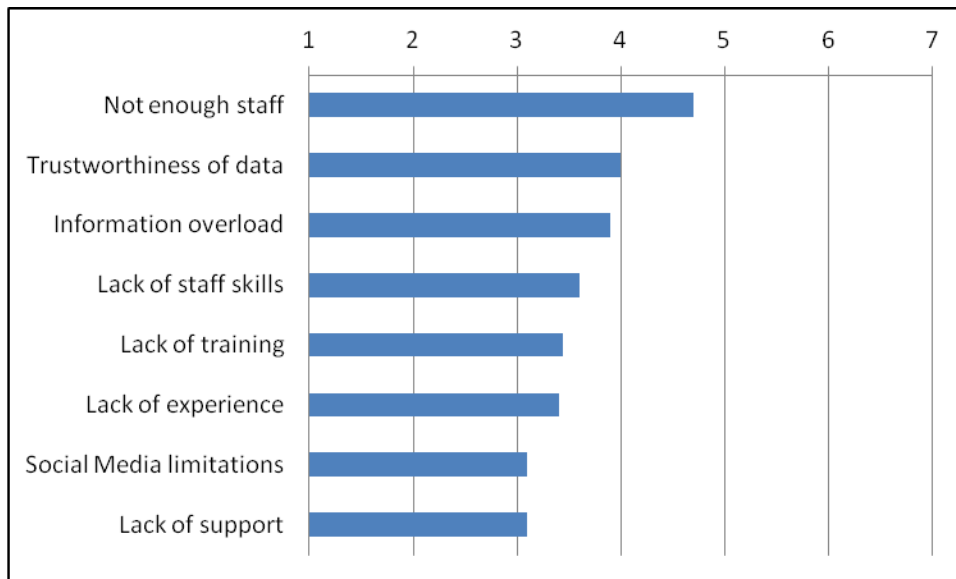**Table 2. Means of Potential Barriers to Social Media Use (μ>3; N = 108-110)**

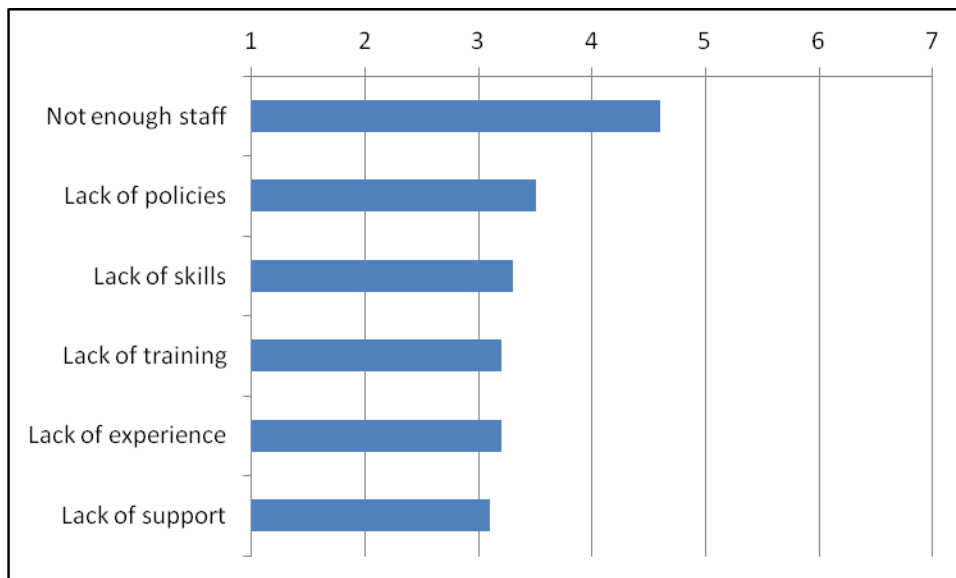**Figure 1. Means of Important Barriers to Collecting Information from SM**

Figure 2. Means of Important Barriers to Disseminating Information on SM

Usefulness of Social Media

In a related set of questions, the average of the assessment of the usefulness of SM was high (5.4 on a 7 point scale). The average rating of whether the agency was accomplishing its SM goals was notably lower (4.4). These results, along with results for barriers to use, suggest that the usefulness of SM is accepted but that technological advances need to be made to both make it easier to use (so that the staff is not overwhelmed) and provide some sort of vetting and filtering of public data to increase trustworthiness, as well as improvements to staff and advances in clear agency policies to guide SM use.

How Social Media are Currently Being Used by EM Agencies

Table 3 displays the means of the uses of SM reported by the survey respondents who used SM in any way. The scale is from 1 to 8 (1=not used; 2=not often; 8= very often). Agencies use SM primarily for public alerting or reassurance, public relations, monitoring special events, increasing situational awareness, providing specific information to the public, countering rumors, sharing information with other organizations, and sharing information on behalf of partners. These uses fall into two categories: dissemination of information and passive monitoring of information. This is consistent with the responses to items concerning barriers. That is, the primary current use of SM is for dissemination of information. When data is collected, it is not seen as trustworthy enough to use directly, but rather is seen as worthwhile as a first step (monitoring, situational awareness) in gathering the data needed for action.

Use	Mean	Std. Deviation	Skewness
provide specific information to the public	6.0	2.2	-1.12
risk communication (public alerting or reassurance)	5.8	2.3	-.81
public relations	5.8	2.2	-.90
counter rumors/misinformation	5.0	2.5	-.32
increase situational awareness	5.0	2.4	-.39
sharing information with other organizations	4.9	2.5	-.25
sharing information/ press releases with/ on behalf of partners	4.8	2.6	-.15
monitoring special events	4.4	2.4	.01
engage with mainstream media	4.0	2.5	.42
intelligence gathering	4.0	2.4	.32
identify people directly affected by an incident	4.0	2.4	.24
requesting incident information from the public	3.4	2.2	.65
update Incident Commander/ Operations	3.0	2.4	.91
identify potential eyewitnesses	2.9	2.3	1.16

Table 3. Means for Use of Social Media (N= 108-110)

Differences by Agency Characteristics

The characteristics of the agencies for which the respondents work varied by size of the county, whether urban or rural, and whether or not the agency has formal SM policies. For each of these characteristics, Kruskall-Wallis tests were performed to assess whether or not there were significant differences between respondents' answers to each of the items related to barriers and use of SM (shown in tables 2 and 3), based upon these agency characteristics.

Differences by County Size

Significant differences were found only for two of the barriers to disseminate information: lack of hardware (X^2 = 11.083, p = .026) and lack of software (X^2 = 11.515, p = .021). The results for these two variables are shown in Figure 3, which illustrate that the Mean Ranks are somewhat higher for these two items for the smallest counties, though the differences are not large. It is likely that the agencies serving the counties with small populations do not have the funds to invest in SM infrastructure or staff to handle it.
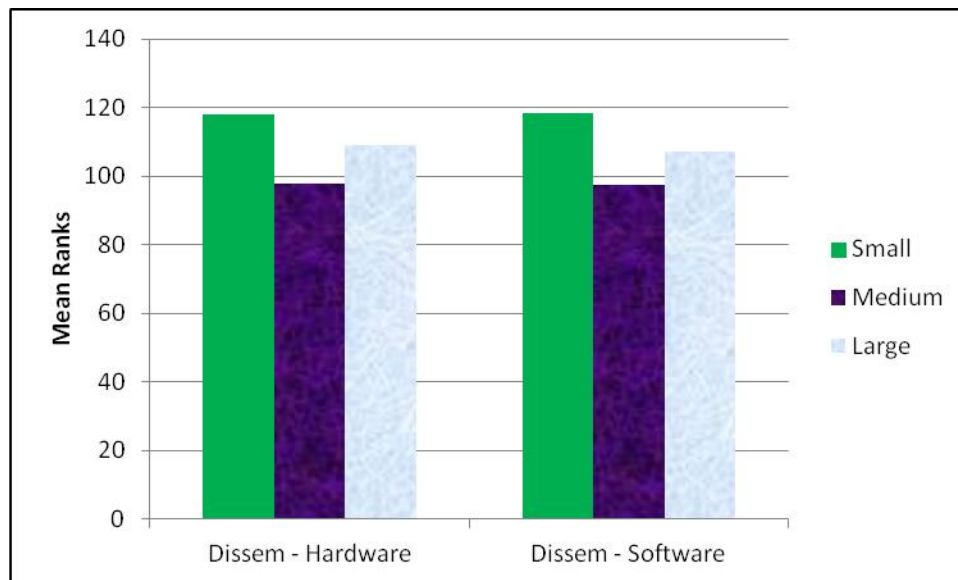

Figure 3. Barriers to Disseminate with Significant Differences by County Size

Significant differences by county population were not found for any other barriers to using SM, for perceptions of the usefulness of SM, for the level that the agency was meeting its SM goals, or for how SM is currently used by the agency. This is important since our sample over-represented areas with large populations; if there were many differences by county size, our overall results would not be valid without weighting for different response rates.

Differences by Urban vs. Rural Nature of Counties

The same variables were again tested by Kruskall-Wallis tests to ascertain if there were differences by whether the county was mostly rural, mostly urban, or about an equal mix of both. Of the respondents who answered those questions, 70 were from mostly rural counties, 7 were from mostly urban counties, and 32 were from counties that are about an equal mix of urban and rural areas.

Only three variables showed a significant difference by county characteristic: the use of SM to counter rumors (X^2 = 6.142, p = .046), the use of SM to engage with mainstream media (X^2 = 10.366, p = .006), and the level at which the SM goals of the agency are being achieved (X^2 = 6.982, p = .030). Mostly rural and mixed rural and urban counties use SM significantly more frequently to dispel rumors than do agencies servicing mostly urban areas. Those agencies serving mixed areas use SM significantly more frequently than do agencies serving either mostly rural or mostly urban areas, and respondents from mostly urban counties believe that their agencies have achieved agency SM goals to a lesser degree than those respondents in either mostly rural or mixed counties. No barriers were significantly different by this categorization of counties served.

In sum, the results for RQ2 indicate that there are few differences in SM use or perceived barriers associated with county characteristics of population size or urban vs. rural composition.

Type of Policy

Fifty respondents indicated that their agency has no SM policy or procedures for collecting data, 46 reported that the agency has informal policies and/or procedures for collecting data, and only 19 reported that their agency has formal policies and procedures for collecting data. The reported frequency for having policies and/or procedures for disseminating information was higher (52 informal, 30 formal, 33 no formal or informal policy or procedures). As the agencies use SM more for disseminating information than for collecting it, this is not surprising.

Kruskall-Wallis tests were performed to see if having a policy/procedure for using SM (informal or formal) to disseminate information results in a difference between agencies. While there was not a significant difference for the perception of the adequacy of the policies, there was for the level to which the agency was achieving its goals ($X^2 = 9.87$, p = .007) such that the respondents from agencies with formal or informal policies and procedures reported a higher degree of goal attainment than did those from agencies that did not have any policies or procedures. Figure 4 diagrams the significant differences by policy type.

Figure 4. Variables Which Differ Significantly by Agency Policy Type
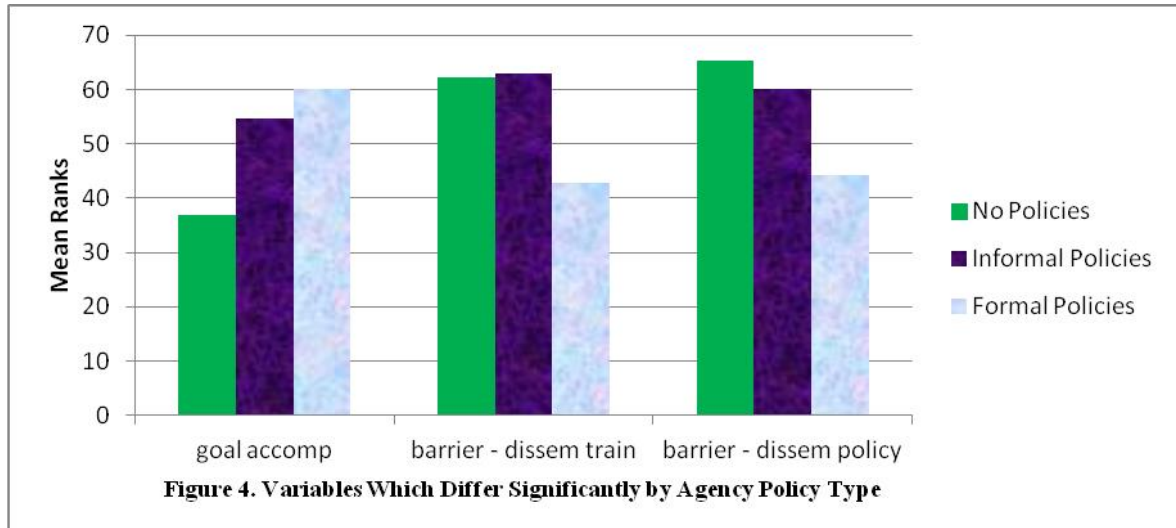
Kruskall-Wallis tests were also performed to assess whether having a policy/procedure for using SM to collect information results in differences between agencies. There were significant differences for the perception of adequacy of policies to gather information during a crisis ($X^2 = 7.11$, p = .029) and for the level of SM goal attainment ($X^2 = 10.92$, p = .004). Policies for collecting information in a crisis are perceived as significantly more adequate when the policies were formal than when they are informal, and significantly better when informal than when nonexistent. Goals for SM use are significantly more highly rated as being reached when there are policies and procedures (formal or informal) for disseminating information than where there are no policies or procedures. The only barriers to collecting data that differs by policy type are the lack of sufficient number of staff ($X^2 = 7.08$, p = .029) and the potential for information overload ($X^2 = 6.68$, p = .035) such that the both are bigger barriers when there are no or only informal policies for the collection of data than when there are formal policies.

Thus, the result for RQ3 is that in most cases whether or not there are policies does not affect the variables being examined, but when there are significant differences, having some policy is better than none, and having formal policies tends to be better than having informal policies.

DISCUSSION, CONTRIBUTIONS, AND CONCLUSION

As technology advances are made in SM and tools to support the use of SM, technologists and users want to provide the best fit for effective use of SM. This study contributes to that effort by uncovering the major barriers to use of SM by government emergency management agencies in the U.S. It is the first study of its kind, using a large sample of U.S. county-level emergency managers. This research is an important contribution to the field— providing information about some of the assumptions and increased knowledge about barriers to SM adoption among emergency managers. By quantifying some of these issues, we now have an effective resource for communicating how important certain issues are to emergency responders-- for instance, that yes, perceived trustworthiness of information on SM is a major barrier to collecting information.

The findings of this study suggest that while most county level emergency managers accept the inevitability of the use of SM and see it as useful, the agencies and their representatives are not yet ready to embrace SM and use it to its fullest potential. For the most part, current SM use is for dissemination of information, not the collection of it. The results suggest that in addition to technological advances, policy and management changes are needed as well, to remove the "red tape" (lack of guidelines or even prohibitions against use) that impedes the effective use of SM for gathering data. A large barrier to SM use in general is the lack of staff in the agencies. Emergency management professionals are stretched thin and this is exacerbated during times of crisis

- precisely when SM has a potential to be most beneficial. A related barrier to using SM is the threat of information overload. While filtering and other technologies now being explored may be quite helpful to mitigate this barrier, having too few staff will keep it as an issue despite technological advances.

For collection of data, the trustworthiness of the data is a major concern. While this is a concern no matter what means of collecting data from the public is used, it is a barrier that does prevent the use of SM for information collection at this time. This may be because SM use is a relatively new phenomenon and/or because of the much larger quantity of data that can be collected via SM. According to Tapia et. al. (2014) trust in people trumps trust in information. This echoes what is found in this study. We encourage developers to improve an emergency manager's ability to quickly trust people within a network. We encourage the development of systems that clearly require and show networks and affiliations to responders scanning and employing SM in their practice.

Especially in light of the agency staffing issues, the results of this study suggest that technologists should focus a large effort on finding ways to vet data collected and reduce information overload. Studies are underway in this area (e.g Hiltz and Plotnick 2013; Imran, Castillo, Elbassuoni, Diaz and Meier, 2013; Starbird, Muzny, and Palen, 2012) and should, eventually, provide some relief in this area as they become available for operational use. Other barriers are felt to be important as well, but if appropriate technological and policy advances are made, many of those barriers will reduce in strength. Although some differences were found by county characteristics in terms of barriers and use, they were few in number. Thus, the issues are fairly pervasive.

As with any study, there are limitations. Although the survey was disseminated to every county EM in the U.S. for whom a current email address was available, and the response rate was acceptable, it was not as high as we would have liked. It over-represented large counties. However, we had a large number of responses from the smallest counties, and our analyses show that there are practically no significant differences in perceptions of barriers and reports of use, by county size. Thus, the overall results can be considered representative of the population of counties. Also, this study focused on only county level government agencies. This raises a question of generalizability to other agencies at other levels of government in the U.S. We suspect that the issues will be similar if not the same at other levels of government, but we cannot, at this time, conclude that. Finally, this study is only applicable to government agencies in the U.S. While there are likely to be barriers to use in other countries as well, the level of barriers and specifics of what issues there are may differ due to many factors such as differences in agency funding and staffing and national government policies.

The field of emergency management already makes decisions based on incomplete data, often from second-hand sources. The inherently complex and uncertain nature of any disaster limits responders' ability to both gather and assess the quality of information from traditional sources. SM data can serve as an additional source of information. We find that emergency managers lack practical guidance as to how to judge SM, evaluate it, categorize it and make it useful. Because of a lack of understanding and experience, response organizations offer blanket rejections of SM.

One implication of our findings is the need to open up channels of communication among emergency managers, software developers and communities of practice, where new techniques and devices are being tried to solve some of the issues identified. Though many research systems to deal with information overload or trustworthiness have been demonstrated, it is time for large scale field studies of their use in actual emergency management. Such studies need to employ "action research" which requires the presence of the researchers in the field settings, and their recognition of and work with practitioners to develop appropriate regulations and policies for the use of SM in their agencies.

In conclusion, this study has explicated what barriers to full social media use (for collecting as well as disseminating information) by county level emergency management agencies in the U.S. are most significant. It has, through the literature review and survey, confirmed the importance of mitigating these barriers. Finally, we have provided, based on the study, recommendations for how to do that.

ACKNOWLEDGMENTS

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