

**Factors Related to Social Media Adoption and Use for  
Emergency Services Operations: The Case of the NSW SES**

Journal:	<i>20th Americas Conference on Information Systems</i>
Manuscript ID:	AMCIS-0198-2014.R1
Submission Type:	Paper
Track:	Strategic Use of IS and IT in Non-Profits and Social Enterprises < Strategic and Competitive Use of Information Technology

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# Factors Related to Social Media Adoption and Use for Emergency Services Operations: The Case of the NSW SES

*Completed Research Paper*

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## Abstract

This paper aims to provide some insights of a longitudinal case study of the adoption and use of social media technologies by the New South Wales (NSW) state emergency service (SES), with a focus on social media adoption factors. The study identifies a set of internal and external factors explaining the adoption and use of social media by the NSW SES including: the social media bandwagon effect, the effectiveness of social media use during the January 2011 Queensland floods, the NSW state strategic planning on emergency services, the opportunity offered by the upgrade of the NSW SES web site, and a strong internal management leadership toward the use of social media to support emergency operations. Finally, implications for research and practice are discussed.

## Keywords

Social media, Emergency services, Case Studies, Adoption and use, Adoption factors.

## Introduction

Social media such as Facebook, Twitter and LinkedIn are emerging as new information technology (IT) tools with a tremendous potential that can help firms to achieve competitive advantage (Steininger et al. 2013). The emerging relevant literature shows a set of evidence to this, especially the literature on social media adoption and use by large organizations such as Starbucks and Dell in the U.S., Westpac Bank Corporation in Australia (Gallaughar and Ransbotham 2011; Husin and Hanisch 2011; Sandsmark 2011). However, past technological innovations history tells us that their ubiquitous acceptance within the business community can take a very long time. Internet adoption is a classic example. First developed in the late 1960s and early 1970s, the Internet has been widely accepted by the business community only in the 1990s, mainly because of the “change in the business perceptions of value based on the advent of fast, reliable and low cost hypertext markup language applications” (Keating et al. 2010, p. 1672). In addition, prior information systems (IS) studies identified a set of factors (e.g., technological, organizational and environmental factors) that will influence the acceptance rate of any given technological innovation (Jeyaraj et al. 2006; Rogers 2003; Zhu 2006). Assessing key factors explaining why a potential adopter decides to adopt or reject a given IT technological innovation in general and social medial tools in particular is an important IS research topic. Furthermore, emergency services organizations are considered as “a unique form of organization” (Fosso Wamba et al. 2012). They are in charge of responding and providing services during extreme events such as fires, floods, hurricanes, tsunamis, and other man-made and natural disasters. Emergency services encompass emergency prevention and mitigation, preparedness, response and recovery. In addition, emergency services organizations are usually made of a large range of volunteers. So far the adoption and use of ITs in general, and of social media adoption and use in particular, by organizations delivering emergency services has not yet received much attention from scholars (Fosso Wamba et al. 2012). Consequently, the main objectives of this study is to provide some insights of a longitudinal case study of the adoption and use of social media technologies by the NSW SES, with a focus on social media adoption factors. More specifically, this study seeks to answer the following research questions:

What are the key factors related to the adoption and use of social media by an emergency services operations agency?

What is the current level of use of social media tools to support emergency services operations?

In order to address these research questions, this research draws on the extant literature on social media, diffusion of innovation theory, organizational identity, as well as the analysis of a longitudinal case study on the adoption and use of social media that was conducted within the NSW SES. Following the introduction, this paper is organized as follows. In Section 2, we provide a theoretical background to the study. Mainly, we clarify concepts related to social media, and then introduce the diffusion of innovation theory as well as the organizational identity. In Section 3, we describe the research methodology adopted for the study and which enabled us to address our research questions. Section 4 deals with the case analysis and discussion. Section 5 presents the research implications and limitations as well as some future research directions.

## Theoretical Background

### *Social media adoption and use: importance of technologies and devices*

Even if there the literature on social media is gaining ground, a clear definition of the concept is still to be made. In this study, we adopt the definition provided by Gupta R. and Brooks (2013), which seems more broad. The authors define social media as “all the devices and platforms that allow users globally to virtually create and share information with each other” (Gupta R. and Brooks 2013, p. 18). By contrast, the same authors consider that platforms refer to “virtual spaces that allow users to come together, and create and share information” (Gupta R. and Brooks 2013, p. 18), while devices are “computing technologies that enable users to access the platform” (Gupta R. and Brooks 2013, p.18). Drawing on this definition, it appears that the term “social media” encompasses a range of platforms and devices (Table 1) including: social networking, media platforms, location-based services, crowdsourcing platforms, desktop computers and laptops, gaming devices and smart television, tablets, Smartphone, “dumb phones”, vehicles, and augmented reality devices.

Social media are considered as disruptive information technology (IT) innovations that had the capabilities of transforming the way we are currently doing business (Fosso Wamba and Carter 2014). The high interest toward social media, which is being observed in the relevant literature and within industries, is driven by many factors, including the impressive diffusion of mobile devices (e.g., mobile phones and Smartphones) to support daily operations and the pervasive use of social media tools such as Facebook and Twitter. For example, time spent on social networks began to surpass time spent with email by 2007 (Bockius 2012). Social network users surpassed the number of email users in July 2009, at which point there were 820 million social network users compared to 800 million email users (Bockius 2012). More importantly, In 2011, LinkedIn added a new member every second (Bockius 2012). At the start of the year they had about 80 million members. Today that number has risen to over 150 million—and growing by two new members every second (Bockius 2012). With less than 600 million members at the onset in 2011, Facebook attracted about 1 billion users in 2012 (Bockius 2012) and around 1,310,000,000 active users in January 2014 (Statisticbrain 2014). Globally, firm are increasing using Facebook and Twitter to co-create business value with customers (Culnan et al. 2010). Indeed, social media offer tremendous advantages as compared to traditional media. For example, social media allow spontaneous and easy multiple-way interaction with users (Gupta R. and Brooks 2013). They can combine transactional buying-experience information among friends and family members with real-time information related to purchasing activities of a buyer with their friends to improve their shopping experiences in terms of purchasing decisions (Fisher 2011). Social media provide a new channel for improved collaboration and communication among supplier chain stakeholders (Burke et al. 2010; Culnan et al. 2010). They may also serve to facilitate the identification of prospective business partners in the context of B2B selling (Michaelidou et al. 2011). All these characteristics may, therefore, be considered as persuading factors during the decision process for adopting and using social media.

Social media potentials have attracted the interest of firms of various sizes and sectors. For example, in their study on how large U.S. firms can use Twitter and other social media to gain business value, Culnan et al. (2010, p. 257) pointed out that “more and more firms are using, or plan to use, social media

platforms such as Twitter, Facebook, blogs, and client-hosted forums to communicate with their customers". The authors also report the example of Walmart's, which had been using a centralized social media portfolio including Twitter, Facebook applications and two blogs to mainly support the firm's branding and sales as well as engaging into community building. As for Hewlett-Packard, another example cited by (Culnan et al. 2010), the firm uses its social media portfolio formed by Twitter and Facebook applications, blogs, and hosted forums to interact with its business and customers, and to enhance customers service and support, firm branding and marketing. In the public sector, social media technologies have been used to promote changes in culture and practices in government (Picazo-Vela et al. 2011), facilitate improved communication, participation and dialogue with the public, all of which leads to better collaboration with citizens, improved transparency and increased e-democracy (Magnusson et al. 2012). In addition, social media can be used by emergency managers to monitor and respond in real-time to public safety issues (Kavanaugh et al. 2012).

Even if there is an increased number of articles on both IT-enabled emergency services (Scholl et al. 2012) and the use of emergency technologies (e.g., RFID) and concepts for improved emergency services operations, very little is being written not only on the co-adoption or simultaneous adoption (e.g., Facebook + Twitter) and use of social media tools.

<b>Platform types</b>	<b>Example</b>
<b><i>Social networking</i></b>	
Friends, Groups, Events	Facebook
Followers	Twitter
Circles	Google+
Connections	LinkedIn
Friends, Crush list, communities	Orkut
<b><i>Media platform</i></b>	
Video	Youtube
Photos	Flickr
Mobile photos	Instagram
Video	SocialCam
<b><i>Location-based platform</i></b>	
Check-in	Foursquare
Location of circles	Google Latitude
Location of Friends	Find my friends
Local reviews and check-ins	Yelp
Check-in, local deals	GroupOn
Check-in, friends location	Facebook places
<b><i>Crowdsourcing platform</i></b>	
Translation	Amara
Labor	Amazon's M-Turk
Geo-location labor, verification	Crisismappers
Labor	Crowdfunder
<b><i>Combination platform</i></b>	
Social networking, media and crowdsourcing	Reddit, Pinterest,
Social networking, media, location-based and crowdsourcing	Facebook
Social networking, media and location-based	Pair, Meebo
<b><i>Device types</i></b>	
Desktop computers, laptops, gaming devices, smart televisions, tablets, smartphones, "dumb phones", vehicles and augmented reality devices	

**Tables 1: Social media technologies (Gupta R. and Brooks 2013, pp. 23, 25, 26, 27, 28, 30-33)**

### ***Diffusion of innovation theory and organizational identity***

Diffusion of innovation theory and organization identity offer a useful theoretical outlook to analyse the adoption and use of social media by organizations. An innovation is "any idea, practice, or material

artifact perceived to be new by the relevant unit of adoption” (Zaltman et al. 1973, p. 10). This definition is consistent with the one proposed by Rogers (2003, p. 12), one of the fathers of the diffusion of innovation theory for whom innovation refers to “an idea, practice, or object that is perceived as new by an individual or other unit of adoption”. Innovation is considered as being at the core economic growth (Aizcorbe et al. 2009; Porter and Millar 1985). However, the adoption and use of any innovation by a given organization is contingent to many factors (e.g., related to the innovation, the adopting organization and environment in which the organization is operating) (Rogers 2003). For example, Rogers (2003) theorized that innovations that are perceived as less complex by potential adopters and that have greater compatibility, trialability, relative advantage, and observability are likely to be more quickly adopted than comparable innovations. Consequently, great attention should be paid to each of these five characteristics during the adoption process. Concerning organizational factors, early studies found that top management support, organization size, IT expertise, organization readiness, information intensity are among important enablers of innovation adoption (Rogers 2003). With regard to environment factors, prior studies revealed that the following factors play an important role during the adoption process: competitive pressure (Zhu et al. 2003), bandwagon innovation diffusion effect (Rosenkopf and Abrahamson 1999), government pressure and support (Hameed et al. 2012). Indeed, “bandwagons have a positive feedback loop in which information generated by more adoptions creates a stronger bandwagon pressure, and a stronger bandwagon pressure prompts more adoptions” (Rosenkopf and Abrahamson 1999, p. 5). For example, the changing dynamic within the public sector is putting pressure on government agencies to innovate through the adoption and use of cutting edge technologies for improved services delivery at low cost (Naranjo-Gil 2009).

In this article, we consider that both social media and IT adoption to support organizational operations as innovation. Therefore, social media characteristics including their possibility to allow for spontaneous and easy multiple-way interactions with users, improved purchasing experiences of a buyer, and a new channel for improved collaboration and communication among supplier chain stakeholders, all of which may be considered as influencing factors during the adoption decision process.

Since our study focuses on emergency services organizations with unique characteristics (e.g., with a large number of volunteers as employees), we believe that the organizational identity theory offers a good perspective to study social media adoption and use within such organizations. The organizational identity is defined as the “set of beliefs shared between top managers and stakeholders about the central, enduring, and distinctive characteristics of an organization” (Scott and Lane 2000, p. 44), represents “organizational members’ collective understandings of the features that are presumed to be essential, distinctive, and relatively permanent about the organization” (Gal et al. 2008, p. 292). Organizational identity is considered as a social construct that is shaped by firm goals, missions, practices, values and actions through constant interorganizational reflections and comparisons with others (Colman 2008). Thus, it is worthwhile positioning organizational identity as a powerful differentiator of a given organization as compared with others (Scott and Lane 2000). Furthermore, organizational identity provided collective meanings to questions such as “who are we” posed by firm members (Fiol 2001; Whetten 2006). Therefore, acting as a key motivator that will guide the actions of firm members (Colman 2008) during the process of internalizing the cognitive structure of the aim and direction of an organization (Albert et al. 2000). That is probably why some scholars went so far to suggest that organizational identity is a firm core competency liable to produce competitive advantage, notably through a contextualization and redesign of new adaptive behaviours (Fiol 2001). Consistent with observations made by Colman (2008) about organizational identity and business value creation during post-acquisition integration, we believe that the adoption and use of social media by emergency services offers a unique setting to understanding and examining the antecedents and consequences of identity issues.

## Methodology

The main objective of this study is to develop a deep theoretical understanding of the adoption and use of social media to support firm operations by the NSW SES. The study adopts a research design: a longitudinal case study research. This research approach is an appropriate approach to achieve our research objectives and answer our research questions. Indeed, a case study allows for the exploration and understanding of complex phenomena within real-life settings (Eisenhardt 1989), and therefore induces

theories where research and theory are still at their early and formative stages (Benbasat et al. 1987). The case study is a suitable appropriate when answering research questions such as “why” and “how” things are done (Yin 1994).

This on-going case study began in September 2011 as part of a large longitudinal study conducted within the NSW SES. This study is a result of a prior collaboration between the research team leader and the Director of ICT of the NSW SES. Indeed, the Director of ICT of the NSW SES has been acting as invited guest speaker on various topic related to enterprise systems, systems integration and innovation within a subject taught by the research team leader. Afterward, they started exploring various means of expanding their collaboration. Thus, in September 2011, they agreed on the need to formalism a research project that will explore the impacts of various IT on the NSW SES operations for improved emergency services delivery. In this study, data collection involved multiple sources of evidences including: semi-structured interviews, industrial reports, strategic planning reports, annual reports, newsletters, technical and non-technical documents, and thus allowing us to increase the validity of our constructs (Serafeimidis and Smithson 2003; Yin 1994). Each interview lasted approximately one hour and was recorded. Subsequently, all recorded interviews were transcribed by a consulting firm. Finally, open coding analysis was realized using our target constructs.

## **Case analysis and discussion**

### ***Research site: The case of the NSW SES***

The NSW SES was constituted in April 1955 by the NSW State Government to provide emergency services within the whole NSW state, an area of approximately 800 642 sq. km. This state emergency service is responsible for providing leadership and relief during tsunami, storms, floods and disasters management. In addition, the NSW SES assists various communities affected by disasters in resupplying with basic equipment and services. Furthermore, when requested, the agency may intervenes and provide assistance during road crash rescue operations, vertical rescue, land search, evidence search, logistics support, and primary industries. To achieve its operations, the agency relies on a 250 paid staffs members and large base of volunteers, about 10,000, which are divided through 229 volunteer units across the state. The NSW SES is technologically well advanced and relies on a range of IT systems to support its operations, including: about 1200 desktops & laptops, 20 servers, 800 uninterruptable power supplies, around 450 broadband modems, 246 routers & switches, 250 network sites. Also, the agency uses a vast range of telecommunication devices for emergency services access and delivery that encompasses about 2000 pagers, 2000 mobile phones, 300 Smartphones, 4200 radios and 170 satellite phones.

### ***Social media adoption and use: key drivers and levels of usage***

#### **The exploration phase: key drivers**

The NSW SES started investigating the potential of social media for emergency service delivery in the early July 2008 mainly because of the joint effects of internal and external factors. External factors include the social media bandwagon effect, the effectiveness of social media use during the January 2011 Queensland floods and the NSW state strategic planning on emergency services (NSW Government 2011). Indeed, in this planning the NSW state government has among its top priorities the need to increase volunteering and prepare the state to be ready to deal with major emergencies and natural disasters. Thus, the state is promoting the use of cutting edge technologies to achieve these objectives. In addition, the management board of the NSW SES was aware of the successful use of social media (e.g., Twitter and Facebook) by key Queensland emergency service agencies during the January floods, as they really helped to provide real-time information to citizens and therefore contributed to saving lives and locating survivors. Indeed, as stated by Hamm (2012, p. 1), “of all social media platforms, Twitter and Facebook have been identified as the most prolific source of immediate information throughout the Queensland floods. Facebook’s role was also significant, with the Queensland Police Service’s Facebook page exploding from 16,000 likes to a staggering 165,000 during the peak of the crisis. Between 10 January and 16 January 2011, more than 35,000 tweets tagged #qldfloods were posted by more than 15,000 individual users. Peak activity occurred around noon on 11 January 2011 with approximately 1,100 tweets per hour being sent as the Brisbane River overflowed its banks. On 12 January, nearly 7,000 twitter users either

posted original or retweeted information. Of the information shared, 50-60% were retweets while 30-40% consisted of web links to further information.”

The main internal factors were the opportunity offered by the upgrade of the NSW SES web site and a strong internal management leadership toward the use of IT including social media to support emergency operations. Indeed, in October 2008, the agency decided to upgrade its entire web site infrastructure. At that time, the management board started discussing with various service providers about the opportunities to integrate emerging social media platforms into the new web site. However, the discussion was unsuccessful for many reasons including the lack of understanding of the real business value of social media for the agency, the lack of strategic direction from the NSW State Government, the parent organization, the lack of social media policy at the agency and state levels, as well as scarce resources to support its initiative. This is illustrated by the NSW SES Director of ICT comments:

*“We were doing an upgrade to our website in that October. And this is our old website as well. And as part of that we were discussing with the service providers then about opportunities to integrate social media into the website because there were actually not a lot of people doing it at that point in time. So do you remember doing any of that? That is what we commonly see now on every website is just having a little bar that is in there with a drop down – whatever – whatever you wanted to. And there weren’t that many social media sites running around as there is today. But for one reason or another we actually decided at that point in time that we didn’t want to go anywhere near social media because it was just too much of a scary beast and we didn’t understand what it meant for the organization. In fact looking outside the organization I think that was at that point in time, particularly in government, where government was not going to, or didn’t want to engage in anything to do with social media because they didn’t understand it or know what it actually meant.”*

Clearly, the exploration of the business value related to social media for emergency service delivery by the NSW SES is line with these internal and external drivers.

With regard to the internal management leadership, the NSW SES board is aware of the high strategic and operational potential of social media in managing emergency operations. Thus, it has taken a couple of actions toward the materialization of the adoption and effective use of social media within the agency, including (see Table 3): the creation of a social media group to explore, amongst other things, the potential of social media and the elaboration of policies that will guide their use within the agency. This is consistent with prior studies on IT adoption and use which highlight the importance of strong management leadership during the IT adoption process. Emerging literature on social media adoption and use also found similar patterns. In a recent survey study by (Kiron et al. 2012, p. 55) about what managers really think about social business, they found that “70% of CEOs (along with presidents and managing directors) and CIOs in our survey believe that social business will be important to their organization in three years”. In addition, the authors found that: (i) “clear vision for how social media supports business strategy”, and (ii) “senior management support” were the top two facilitating factors of the adoption of social software in within organization. Also, they identified that the “lack of management understanding” was the top internal barrier of the adoption of social media by organization. This therefore translates the importance of highlighting the strong management leadership toward the adoption and effective use of social media within organizations.

### **The early adoption and use phase: Focus on Facebook for community engagement**

After this initial investigation, the agency conducted a thorough analysis of its ability to start a robust social media portfolio implementation for emergency service delivery as well as required resources to run it. Subsequently, a group of the NSW SES members started conducting research about what firm internal and external key stakeholders were saying about social media. The same group also attended meetings and conferences organized by other state emergency services agencies on the adoption and use of social media in order to understand how other emergency services agencies were using social media and capitalize on key lessons that they had learned and identified from their used. Afterward, in December 2009, the NSW SES started working on a Social Networking Policy that will govern the use of social media by all the agency’s key stakeholders.

As result, the agency decides to focus mainly on Facebook for community engagement (e.g., general community safety information, talking about activities that might be going across – going across the

organization at a state level) (see Table 2 and Table 3) as well as Youtube (Table 2). For the NSW SES, “social media is about: community engagement, volunteers recruitment and firm differentiation as we engage our staffs and volunteers around technology” highlights the NSW SES Director of ICT. This observation is shared by the Website & Corporate Profiling Coordinator who adds, for a given community, “we focus on when we know something is definitely going to impact them mentioning them specifically just so they know that we know they exist.”

### **Extending the exploitation of social media tools: Consolidating the Facebook use and link to Twitter**

In early 2010, the agency Facebook account was linked to its Twitter account to allow automatic post of Tweets to firm Facebook wall. Later in February 2011, the NSW SES Social Networking Policy was born. The document provides guidelines on social media use within the agency including (NSW SES 2011): acceptable work-related uses of social networks, members privacy management, use of photography and audio visual materials, and types of social networking that may be relevant for the NSW SES (e.g., Facebook, Twitter, Youtube/Flickr, LinkedIn, Blogs/Forums). For example, it was acceptable to use social media for the following work-related purposes: use of public social networks for (i) recruiting purposes, (ii) to monitor public opinion about the NSW SES, its products and services, (iii) to create affinity groups to support agency marketing and communication goals, or to obtain testimonials, and (iv) for professionals networking processes (see Table 3 for more details).

One key issue faced by the agency was the level of interaction with the public using social media, especially Facebook. This preoccupation is expressed into the NSW SES Director of ICT, “we looked at – just didn’t do it as a one-way communication site which would defeat the purpose of social media. Do we have some limited interaction with the public or do we go fully fledged out there and let’s put stuff out there, take comments back in. We kind of ended up with a hybrid model from those various recommendations.” Indeed, prior studies on social media interactions with firm key stakeholders have identified various possible patterns of interactions. For example, Gallagher and Ransbotham (2011) conceptualize an interaction between firms and customers using social media in terms of a (3-M) framework: megaphone or a firm-to-customer communication, magnet that represents the customer-to-firm communication, and monitor or the customer-to-customer interaction. For example, for Facebook-enabled emergency delivery services at the NSW SES, for a given disaster event, the agency opened up a Facebook page that anybody could put anything on. More specifically, the social media group can post and people can comment but they can’t start a new thread themselves. People can also add images in relation to the event. The agency was also using social media for operation purposes including: providing relevant information about jobs on the field to volunteers, locations of jobs, visits of VIP authorities on the fields of operations. As stated by Website & Corporate Profiling Coordinator, “we were telling them (volunteers) where there were locations of jobs that they could get images or some vision of any description. (... as) if we were having VIPs visiting the area that was going up. Numbers of jobs coming through, the statistics, so the types of jobs, how many had been completed, how many were outstanding, most impacted areas and, you know, just weather outlooks like when the situation is likely to clear, what the Bureau of Meteorology is advising; how many volunteers we have got out and about and where they are coming from and crews from other areas.”

When adopting social media, decisions related to the choice of the best infrastructure and related governance responsibilities are considered as fundamental. Indeed, “governance is an essential component of an organization’s social media strategy and deserves considerable attention” (Candace Deans 2011, p. 189). For example, Culnan et al. (2010) suggest that in order to capture full business value from social media, firms need to develop implementation strategies based on three elements: mindful adoption, community building, and absorptive capacity. Among mindful adoption decisions, they identified the five following critical elements: making a good decision about which platform(s) to adopt and how they should be used, assigning responsibility for governance and identifying metrics to measure value, making sure all applications are readily accessible and managing risks.

With regard to the NSW SES, the decision has been clearly to focus on Facebook at the early stage, and then consolidate with the use of others social media tools including Twitter (Table 2). Also, the NSW SES opts for a centralized infrastructure that is managed from the firm headquarters by a dedicated team of six members led by a Web and Social Media Coordinator. However, an authority is given to specific people



also called administrators within the 229 volunteer units across the state to manage social media content related to their specific unit; so they are empowered (see Table 3). The Web and Social Media Coordinator proudly states: *“That is SES-related. (...) other people are allocated to actually take control of it and they have the full responsibility of that page to, you know, do the content, you know, make sure it is spelled correctly; all that type of stuff”*. For example, a Facebook group was created to ensure the coordination between various administrators of the NSW SES Facebook pages across the state with the aim of facilitating knowledge acquisition and sharing among them (Table 3). The platform is also used to solve potential issues related to the use of social media within their unit. Talking about this Facebook group, the Web and Social Media Coordinator emphasized that, *“if a comment comes up or if something that they [administrators] have an issue with and they [administrators] want to talk about it, they [administrators] put it up there and then everyone puts their input and we just work out a way to resolve it. And it mostly sometimes they say: oh I found this post, should I put it up. And I have a look at it and then everyone is like: yes, no, depending on it, we come to a decision”*. The choice of a centralized infrastructure to manage its social media portfolio is in line with the NSW SES organizational identity. Indeed, the agency manages its core emergency processes from its headquarters with a strong support of its network of volunteers units across the state.

This governance mechanism ensures that the agency is meeting its objectives in terms of social media use. For example, the NSW SES Deputy Commissioner requires that the social media group posts a minimum number of two posts (one in the morning and another one in the afternoon) on the Facebook and some tweets as well during a general day-to-day business. With an average of one post per hour and then further updates as required during operational time (e.g., floods, storms). Usually, during high operational time there will be a dedicated person at the headquarters working on social media and website in order to update these platforms in real-time, and thus ensuring a constant interaction with key stakeholders (Table 3). These intense activities can be viewed in the number of statistics captured during normal day-to-day activities and operational periods. More importantly, the agency now has the ability to share and update in real-time all weather information obtained from the Weather Bureau, and thus improving inter-agency information flow and sharing during emergency response. It is not surprising that the NSW SES Director of ICT posits: *“We would only post information from the weather bureau directly from briefings that we had in front of us. We did sit in the briefings and we were tweeting during the briefings as we found out new information because traditionally you have to wait until the end of the briefing; then you write a web story and send it out, so we thought we will try doing it - plus you know, with the press conferences just straight from. There wasn't a huge amount of interest in what we were putting out.”*

Tables 2 provides an overview of key social media technologies that are currently in used within the NSW SES. It also presents the firm level of awareness of the most important media platforms, social networking tools and location-based platform as defined by (Gupta R. and Brooks 2013). The table confirms the intensive use by the NSW SES of two social networking tools: Facebook and Twitter and one media platform: Youtube. The agency also has a limited use of LinkedIn and Facebook Places. While the NSW SES doesn't have, but is aware of much of the location-based platforms, it isn't aware of any of the major existing crowdsourcing platforms. Table 3 provides the overall contribution of social media tools in support of emergency operations within the NSW SES.

### **Future of social media within the NSW SES**

The NSW SES board is already exploring future use of social media tools within the agency for emergency service delivery. In addition to connecting the social media portfolio to firm existing IT infrastructure for improved emergency delivery, the agency is currently working toward developing services that can delivered to various types of devices (e.g., laptops, tablets, and smartphones). Also, the agency is currently exploring the way of developing internal analytic capabilities in order deal with the urge of social media data. The agency is also exploring how the improved integrated IT-infrastructure will facilitate internal decision making process with regard to the management of key disaster management phases. Finally, the NSW SES is exploring how social media use at the agency level can contribute to overall NSW state government objective of promoting a transparent and open government.

## Implications and future research directions

Prior to the discussion of the implications of this study, some of the limitations need to be acknowledged. Although the case study approach is appropriate when exploring emerging concepts (e.g., adoption and use of social media to support emergency operations) for theory development, the approach holds some limits including: difficulties in generalizing research findings, the subjectivity of the data collection as well as analysis processes (Darke et al. 1998).

	Not aware of this	Do not have, but aware	Have but do not regularly use	Have and regularly use to support our operation
<b>Social networking</b>				
Facebook				X
Twitter				X
Google+		X		
LinkedIn			X	
<b>Media platform</b>				
Youtube				X
Flickr		X		
Instagram		X		
SocialCam	X			
<b>Location-Based platform</b>				
Foursquare		X		
Google Latitude		X		
Find my friends		X		
Yelp		X		
GroupOn		X		
Facebook places			X	
<b>Crowdsourcing platform</b>				
Amara	X			
Amazon's M-Turk	X			
Crisismappers	X			
Crowdfunder	X			

**Table 2 The NSW SES technological developments within the social media landscape**

In this study, we have adapted the diffusion of innovation theory and organizational identity to study the adoption and use of social media tools for emergency services delivery. We have conducted a longitudinal case study of social media adoption and use by the NSW SES by focus on the identification of the set of internal and external factors explaining the adoption and use of social media within the agency. Among external factors, the social media bandwagon effect, the effectiveness of social media use during the January 2011 Queensland floods and the NSW state strategic planning on emergency services were identified as key enabling factors. While the opportunity offers by the upgrade of the NSW SES web site and a strong internal management leadership toward the use of social media to support emergency operations are considered as key internal level toward social media adoption and use by the NSW SES. Also, the analysis of this longitudinal case study has identified the NSW SES technological developments within the social media landscape. For example, the NSW SES is currently intensively using two social networking tools: Facebook and Twitter and one media platform: Youtube. The agency has a limited use of LinkedIn and Facebook Places. While the NSW SES doesn't have, but is aware of much of the location-based platforms, it isn't aware of any of the major existing crowdsourcing platforms. The results of this case study contribute to the stream of research of the diffusion of innovation theory and constitute an application of organizational identity concept during the adoption and use of social media. Indeed, by looking at the specific organization identity when choosing the appropriate IT infrastructure that will support social media selected portfolios as well as a governance mechanism to ensure it successful adoption and use.

Phases	Contributions of social media at the NSW SES
Prevention & Mitigation	<ul style="list-style-type: none"> <li>• Community engagement:</li> <li>✓ Important information to citizens on how to prepare for the potential disaster</li> <li>✓ Push important safety messages</li> <li>• Deliver community service announcements</li> <li>• Improved brand recognition and acknowledgement of volunteer workforce (e.g. showcase volunteers)</li> <li>• Detailed information on localized community engagement events (e.g. School visits, agriculture fairs, conference presentations)</li> <li>• Coordinate all NSW SES Social Media Administrators</li> <li>• Engage in online discussions and polls</li> </ul>
Preparedness	<ul style="list-style-type: none"> <li>• Share information from warning messages:</li> <li>• Important information to citizens on how to prepare for the potential disaster</li> <li>• Links to other related information on social media or other websites</li> <li>• Push important safety messages</li> </ul>
Response	<ul style="list-style-type: none"> <li>• Provide media information on significant jobs to direct enquiries</li> <li>• Real-time sharing of operational information:</li> <li>✓ Information about the number of jobs in terms of <ul style="list-style-type: none"> <li>○ What needs to be done, What has to been done and What still need to be done</li> </ul> </li> <li>✓ Information about the number of volunteers the agency has in the field for the event.</li> <li>• Push important safety messages</li> <li>• Provide links to important information:</li> <li>✓ Roads to avoid because of bad traffic conditions</li> <li>✓ Information from the Bureau of Meteorology</li> <li>• Provide direct information concerning evacuations or isolations</li> <li>• Provide visualisation of response activities through Maps, Images and video on a 7 day, 24hrs or 3 hrs rotation depending on the severity of the disaster</li> <li>• Engage in intelligence gathering from the community on the scope of the disaster by using discussions and imagery</li> <li>• Communicate directly with the community to dispel myths and rumours concerning the disaster</li> </ul>
Recovery	<ul style="list-style-type: none"> <li>• Provide links on recovery information:</li> <li>✓ Recovery centres</li> <li>✓ Where to get help</li> <li>✓ How to help yourself</li> <li>✓ How to better prepare for next time</li> <li>• Push important safety messages</li> </ul>

**Table 3: Social media technologies usage for emergency services delivery at the NSW SES**

Future research should look at how to integrate social media portfolio into existing intra-and inter-agencies IT infrastructure for improved inter-agencies information sharing, collaboration and coordination during disaster events. Ansell et al. (2010) found that inter-jurisdictional coordination (e.g., between cities, between different government agencies levels-state vs. national) and inter-sectoral coordination are the two most important coordination challenges in organizing a response during disaster events. Therefore, exploring how social media tools can enhance these two types of coordination should also be included into future research directions. Indeed, emergency service response using involves “multiple organisations collecting, collating and communicating data and information that support resource allocation decisions to minimise social and economic impacts. In order to act in a coordinated and effective way, organisations require access to information characterising the disaster’s intensity, location and related damages, as well as the availability of human and physical resources. Such information can originate from multiple organisations.” (Dantas and Seville 2006). Therefore, developing mechanisms to facilitate information sharing from social media across emergency services should be included into future research direction. How to analyse big data generated by social media tools for

improved decision making should also be included into future research direction. Solving important concerns by citizens regarding security and privacy related to social media use for emergency service delivery should also be included into future research direction.

## REFERENCES

- Aizcorbe, A.M., Moylan, C.E., and Robbins, C.A. 2009. "Toward Better Measurement of Innovation and Intangibles," *Bureau of Economic Analysis* (89:1), pp. 10-23.
- Albert, S., Ashforth, B.E., and Dutton, J.E. 2000. "Organizational Identity and Identification: Charting New Waters and Building New Bridges," *Academy of Management Review* (25:1), pp. 13-17.
- Ansell, C., Boin, A., and Keller, A. 2010. "Managing Transboundary Crises: Identifying the Building Blocks of an Effective Response System," *Journal of Contingencies and Crisis Management* (18:4), pp. 195-207.
- Benbasat, I., Goldstein, D.K., and Mead, M. 1987. "The Case Research Strategy in Studies of Information Systems," *MIS Quarterly* (11:3), pp. 369-386.
- Bockius, C. 2012. "2012 Is the Year for Firm-Wide Adoption of Social Media".
- Burke, W.Q., Fields, D.A., and Kafai, Y.B. 2010. "Entering the Clubhouse: Case Studies of Young Programmers Joining the Online Scratch Communities," in: *Journal of Organizational and End User Computing*, p. 21+.
- Candace Deans, P. 2011. "The Impact of Social Media on C-Level," *MIS Quarterly Executive* (10:4), pp. 187-200.
- Colman, H.L. 2008. "Organizational Identity and Value Creation in Post-Acquisition Integration: The Spiralling Interaction of the Target's Contributive and the Acquirer's Absorptive Capacities," in: *Strategy and Logistics*. Oslo: BI Norwegian School of Management, p. 260.
- Culnan, M.J., McHugh, P.J., and Zubillaga, J.I. 2010. "How Large U.S. Companies Can Use Twitter and Other Social Media to Gain Business Value," *MIS Quarterly Executive* (9:4), pp. 243-259.
- Dantas, A., and Seville, E. 2006. "Organisational Issues in Implementing an Information Sharing Framework: Lessons from the Matata Flooding Events in New Zealand," *Journal of Contingencies and Crisis Management* (14:1), pp. 38-52.
- Darke, P., Shanks, G., and Broadbent, M. 1998. "Successfully Completing Case Study Research: Combining Rigour, Relevance and Pragmatism," *Information Systems Journal* (8:4), pp. 273-289.
- Eisenhardt, K.M. 1989. "Building Theories from Case Study Research," *Academy of Management Review* (14:4), pp. 532-550.
- Fiol, C.M. 2001. "Revisiting an Identity-Based View of Sustainable Competitive Advantage," *Journal of Management* (27:6), December 1, 2001, pp. 691-699.
- Fisher, L. 2011. "The Key Trends in Social Commerce." Retrieved June 27, 2011, from <http://thenextweb.com/socialmedia/2011/03/08/the-key-trends-in-social-commerce/>
- Fosso Wamba, S., and Carter, L. 2014. "Social Media Tools Adoption and Use by Smes: An Empirical Study," *Journal of End User and Organizational Computing* (XX:XX), pp. XX-XX.
- Fosso Wamba, S., Edwards, A., and Sharma, R. 2012. " 'Big Data' as a Strategic Enabler of Superior Emergency Service Management: Lessons from the New South Wales State Emergency Service," in: *ICIS 2012 MIS Quarterly Executive Workshop*. Orlando, USA.
- Gal, U., Lyytinen, K., and Yoo, Y. 2008. "The Dynamics of It Boundary Objects, Information Infrastructures, and Organisational Identities: The Introduction of 3d Modelling Technologies into the Architecture, Engineering, and Construction Industry," *European Journal of Information Systems* (17), pp. 290-304.
- Gallaughar, J., and Ransbotham, S. 2011. "Social Media and Customer Dialog Management at Starbucks," *MIS Quarterly Executive* (4), pp. 197-212.
- Gupta R., and Brooks, H. 2013. *Using Social Media for Global Security*. Indianapolis: John Wiley & Sons, Inc. .
- Hameed, M.A., Counsell, S., and Swift, S. 2012. "A Conceptual Model for the Process of It Innovation Adoption in Organizations," *Journal of Engineering and Technology Management* (29:3), pp. 358-390.
- Hamm, B. 2012. "The Police, Social Media and the Queensland Floods." Retrieved June 1, 2013, from <http://www.smk.net.au/article/the-police-social-media-and-the-queensland-floods>
- Husin, M.H., and Hanisch, J. 2011. "Utilising the Social Media and Organisation Policy (Someop) Framework: An Example of Organisational Policy Development within a Public Sector Entity," *19th European Conference on Information Systems V*. Tuunainen, J. Nandhakumar, M. Rossi and W. Soliman (eds.), Helsinki, Finland, pp. 3096-3107.
- Jeyaraj, A., Rottman, J.W., and Lacity, M.C. 2006. "A Review of the Predictors, Linkages, and Biases in It Innovation Adoption Research," *Journal of Information Technology* (21:1), pp. 1-23.

- Kavanaugh, A.L., Fox, E.A., Sheetz, S.D., Yang, S., Li, L.T., Shoemaker, D.J., Natsev, A., and Xie, L. 2012. "Social Media Use by Government: From the Routine to the Critical," *Government Information Quarterly* (29:4), pp. 480-491.
- Keating, B.W., Coltman, T.R., Fosso-Wamba, S., and Baker, V. 2010. "Unpacking the Rfid Investment Decision," *Proceedings of the IEEE* (98:9), pp. 1672-1680.
- Kiron, D., Palmer, D., Phillips, A.N., and Kruschwitz, N. 2012. "What Managers Really Think About Social Business," *MIT Sloan Management Review* (53:4), pp. 51-59.
- Magnusson, M., Bellström, P., and Thoren, C. 2012. "Facebook Usage in Government – a Case Study of Information Content," *18th Americas Conference on Information Systems (AMCIS 2012)*, Seattle, Washington, USA, pp. 1-10.
- Michaelidou, N., Siamagka, N.T., and Christodoulides, G. 2011. "Usage, Barriers and Measurement of Social Media Marketing: An Exploratory Investigation of Small and Medium B2b Brands," *Industrial Marketing Management* (40:7), pp. 1153-1159.
- Naranjo-Gil, D. 2009. "The Influence of Environmental and Organizational Factors on Innovation Adoptions: Consequences for Performance in Public Sector Organizations," *Technovation* (29:12), pp. 810-818.
- NSW Government. 2011. "Nsw 2012: A Plan to Make Nsw Number One," Department of Premier and Cabinet (ed.).
- NSW SES. 2011. "Social Networking Policy." Wollongong, Australia.
- Picazo-Vela, S., Gutiérrez-Martinez, I., and Luna-Reyes, L.F. 2011. "Social Media in the Public Sector: Perceived Benefits, Costs and Strategic Alternatives," *12th Annual International Conference on Digital Government Research (dg.o 2011)*, College Park, MD, USA: ACM, pp. 198-203.
- Porter, M.E., and Millar, V.E. 1985. "How Information Gives You Competitive Advantage," *Harvard Business Review* (63:4), pp. 149-160.
- Rogers, E.M. 2003. *Diffusion of Innovation*. New York: Free Press.
- Rosenkopf, L., and Abrahamson, E. 1999. "Modeling Reputational and Informational Influences in Threshold Models of Bandwagon Innovation Diffusion," *Computational & Mathematical Organization Theory* (5:4), 1999/12/01, pp. 361-384.
- Sandsmark, F. 2011. "From Social Media to Social Commerce." *Digital marketing*
- Scholl, H.J., Patin, B.J., and Chatfield, A.T. 2012. "Ict-Enabled City Government Field Operations: Resiliency During Extreme Events," *45th Hawaii International Conference on System Sciences (HICSS-45)*, Maui, HI, USA: IEEE, pp. 2346-2356.
- Scott, S.G., and Lane, V.R. 2000. "A Stakeholder Approach to Organizational Identity," *The Academy of Management Review* (25:1), pp. 43-62.
- Serafeimidis, V., and Smithson, S. 2003. "Information Systems Evaluation as an Organizational Institution – Experience from a Case Study," *Information Systems Journal* (13:3), pp. 251-274.
- Statisticbrain. 2014. "Facebook Statistics." Retrieved April 12, 2014, from <http://www.statisticbrain.com/facebook-statistics/>
- Steininger, D.M., Wunderlich, P., and Pohl, F. 2013. "Exploring Competitive Advantage of Social Networking Sites: A Business Model Perspective," in: *21st European Conference on Information Systems*. Utrecht, Netherlands.
- Whetten, D.A. 2006. "Albert and Whetten Revisited: Strengthening the Concept of Organizational Identity," *Journal of Management Inquiry* (15:3), September 1, 2006, pp. 219-234.
- Yin, R.K. 1994. *Case Study Research: Design and Methods*. Newbury Park, CA: Sage.
- Zaltman, G., Duncan, R., and Holbeck, J. 1973. *Innovations and Organizations*. New York: Wiley.
- Zhu, K., Dong, S., Xu, S. X., Kraemer, K. L. . 2006. "Innovation Diffusion in Global Contexts: Determinants of Post-Adoption Digital Transformation of European Companies," *European Journal of Information Systems* (15), pp. 601-616.
- Zhu, K., Kraemer, K., and Xu, S. 2003. "Electronic Business Adoption by European Firms: A Cross-Country Assessment of the Facilitators and Inhibitors," *European Journal of Information Systems* (12:4), pp. 251-268.