Information Systems to Support Disaster Planning and Response: Problem Diagnosis and Research Gap Analysis

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ABSTRACT

There is significant gap in the literature and past research on Knowledge Management Systems (KMS) in the domain of disasters. This PhD research work is an action research to design and implement a web-based knowledge management system that aims to fill this theoretical gap in KMS for disasters and to improve the disaster planning and response efforts within an institutional context. The diagnostic stage results imply that the organisation can benefit from the implementation of an information system to support its disaster planning and response efforts. Current scenario at the State Crisis and Security Council (SCSC) in Malaysia revealed some real challenges pertaining to communication, coordination and knowledge processes between SCSC and its district level officers (DO). The proposition of this research is that a well-defined knowledge management system can successfully support disaster planning and response effort in organizations.

Keywords

Disaster, knowledge management systems, information systems, success, action research.

INTRODUCTION

Disaster planning and response (DPR) efforts require timely interaction and communication of right information and apply relevant knowledge in order to save lives and property. This calls for an information system that can support and sustain data, information and knowledge processes efficiently and effectively at a very crucial point. Information systems (IS) in the form of knowledge management systems can support timely interactions and communication in disaster management (Raman, Ryan and Olfman, 2006). Integration of knowledge management concepts into a disaster management system is still very limited. Hence, identifying and testing success factors for using KMS in disaster planning is timely.

The research will adopt a multi-methodology using an Action Research approach. The nature of this research requires the direct involvement of the researchers in the organisation studied. Hence, it takes on an action approach. Action Research seeks two goals namely to solve organisational problem(s) and simultaneously contribute to scientific knowledge within a community of practice. The KMS Success Model by Jennex and Olfman (2005) is used as the fundamental theoretical framework. The final model developed contains a new construct called 'stressors' as planning and response activity during disaster is a stressful endeavor. This model will be used as a guide to design a prototype system using an open source platform in the future. The study in its progress stage currently, aims to expand the theoretical horizons of KMS in disaster planning and response.

THE CLIENT: THE STATE CRISIS AND SECURITY COUNCIL (SCSC)

SCSC is a government body under the Prime Minister's Department and acts as the secretariat for the State level Crisis Management Committee in Malaysia. SCSC is chosen as the organisation that will benefit from this research mainly because it is the lead crisis management agency at the state level. SCSC's role of disaster management is to initiate, coordinate, communicate, disseminate, enforce, guide and implement policies, activities, trainings, reporting and public awareness on disaster at all the three levels of disaster – before, during and after disaster between the national and district levels.

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PROBLEM DIAGNOSIS RESULT

During the problem diagnosis stage, an interview was conducted with the Assistant Secretary (highest official for crisis division) of SCSC to obtain a better understanding of the current situation in the disaster planning and response. Eight interview questions were asked to clarify the issues and challenges faced by SCSC. The diagnosis questions were divided into two categories. In Category A, the questions were about the SCSC. Category B questions covered specific questions on information systems for disaster planning and response. The following are the questions and responses:

Category A: General information on SCSC
1. What are the roles of SCSC in disaster planning and response?
"I can explain the roles played by SCSC in three stages: before disaster, during disaster and post disaster. At before disaster stage, SCSC plays many vital role such as to ensure policy alignment with national policy, to coordinate logistic and temporary asset handling, to create a data bank that contains information on all assets and list of experts at state level for disaster management, to create an information and announcement channel to disseminate warnings to community and to conduct trainings for state and district level agencies." "At during disaster stage, we coordinate and disseminate needs of victims and task forces in terms of food, medicine, treatments, transportation and other urgent matters. Other roles include initiate State level Central Unit for Crisis Management and Control, establish task committee when needed/required, and ensure the enforcement of activities is effective and efficient." "At post disaster stage, we conduct research and gather information regarding potential risk of disaster at district and national level, conduct post-mortem after every crisis which discusses characteristics of the disaster, cause and effect analysis, weakness and lesson learnt, coordinate with all agencies for reports on risk prevention methods to reduce impact from disaster and produce reports on recovery and responses to victims. "
2. What are SCSC's initiatives for disaster planning and response?
"Some of our remarkable initiatives for disaster planning and response includes : • producing a guideline for disaster management at state level improve coordination between the state and district level. • publishing guidelines about contributions towards through its State Disaster Support Fund. • distributing brochures and posters containing information to create awareness about disaster management. Occasionally, we conduct training and workshops, Table-Top Exercise, and coordinate and monitor volunteers at state and district level. "
3. What are some challenges faced by SCSC in terms of disaster planning and response?
"Some of the challenges faced by SCSC in terms of disaster planning and response includes lack of experience in handling disasters at district level based on Directive 20 due to officers being transferred to other departments and no specific officers who will handle all aspects of disaster, communication and coordination problem between departments which causes inefficient order and control and lastly, lack of standard rules and policies within all departments in handling disaster. "
4. What is the future direction of SCSC?
"Briefly, SCSC's future direction is to achieve a well coordinated and organized disaster planning and response between state and district level. An integrated information system together with standard policies and guidelines will enable improved handling of disasters in the future. "
Category B: KMS for disaster planning and response
5. How information systems can support disaster planning and response?
"We perceive that information systems as the problem solver for the challenges faced by us. An information system can solve our data and knowledge processes between our stakeholders".
6. Can a web-based knowledge management system be useful for disaster planning and response in Malaysia?
"I think a web-based system is a good idea as the Internet provides wide service and capabilities for information dissemination and I think it will reduce lack of coordination among the DO and Police".
7. How can information and communication technology (ICT) solve some of the challenges?
"A good data repository on updated list of assets and resources is very much needed to support disaster planning and fast response to a disaster event. In this case, ICT can solve the problem faced at SCSC by providing an effective platform for communication and coordination within the state and district level officers. In macro level, it can serve as an important platform for all stakeholders in particular the Non-Government Organizations and disaster community to share and disseminate knowledge in regards to disaster planning and response".
8. What are the some features / functions to be considered to design a KMS to support disaster management?
"In my opinion, some features that will be useful for a good information system are updated information on disaster, online communication top between state and district level officers, database on assets and resources that are available for any disaster event and learning tool for new DO or Police".

Table 1. Diagnosis Interview Result

The problem diagnosis stage with SCSC officials implied that the organisation can benefit from the implementation of a system (ICT/web enabled) to support its disaster planning and response efforts. Largely the issues pertain to communication and coordination efforts between SCSC and its affiliate members/agencies. Given the inherent problems facing SCSC in light of its disaster management efforts, it is posited that this organisation can benefit from the implementation of a KMS. This is also evident in the context of the initial findings from the interview conducted with the official of SCSC as highlighted earlier. Recent disasters have led to a small but growing body of research focused on examining knowledge management (KM) and KMS support for disaster planning and response. Information systems in the form of KMS are being explored for its contribution towards supporting various disaster management levels. Hence, identifying success factors for

using KMS in disaster planning is timely (Jennex 2005, 2007, Raman, et al., 2005, 2006). SCSC is facing two main IS problems. Firstly, communication and coordination problem between state and district level departments which resulted in ineffective order and control and secondly, absence of data bank on assets and experts in the disaster management domain. Given the above research problem, the following research questions arise: What theory (ies) in the context of KM can guide the systems design decisions for a proposed KMS in light of SCSC? To what extent can the KMS be implemented in SCSC effectively to address the communication, coordination and data visibility challenges that the organisation is currently facing in the context of DPR? What factors should be addressed to ensure successful design and implementation of a KMS to support DPR for SCSC?

Recognition of these problem and questions, combined with the computer tools that are available to organize and handle information and knowledge, led to the development of the KMS-DPR system. Hence, the objectives of this research are twofold: Research Objective 1: To use existing theories on IS/KMS success models to guide design decision of the proposed system in an institutional context to support disaster planning and response efforts. Expected outcome of this objective is a novel extension to the KMS Success model for developing a web-based knowledge management system to aid in disasters planning and response efforts in SCSC. Research Objective 2: To develop, test and validate a web-based KMS prototype to support disaster planning and response in SCSC. Expected outcome of this objective is a prototype based on open source software to aid disaster planning and responses for SCSC.

INFORMATION SYSTEMS FOR DISASTER PLANNING AND RESPONSE (DPR)

Disaster is defined as 'a social crisis situation' UN/ISDR Report (2004), 'a deadly' event (McEntire, 2007), usually unexpected and unanticipated and cause human suffering (Nelson, 2006). Miller (2004) provides a list of attributes of disaster: suddenly occurs, demand quick reactions, creates uncertainty and stress, threaten the reputation of organisation and escalates in intensity. Disaster planning and response involves activities such as mitigation, risk reduction, prevention, preparedness, response and recovery (Asghar, Alahakoon, and Churilov, 2004). Managing disaster is vital as it threatens organisational goals and permanently impairs the earning power (Cao and Zhou, 2008, Lee and Bui, 2000). Prominent issues in DPR are the need for common platform to enable seamless flow of information and lack of integrated system to support DPR activities.

Jennex (2007) affirmed that integration of KMS in DPR is a recent development. In the context of disaster, there is a need to access to wide range of real-time information and knowledge that requires coordination. He further conclude that we need KM to help organisation to make sense of what they know, to know what they know, and to effectively use what they know based on the following reasons (Jennex (2008, pg. 4): to help organisations identify, capture, store, and retrieve critical knowledge, to help us deal with the transience of knowledge workers and to help organisations manage a glut of knowledge. In this pursuit, Jennex and Olfman (2005) developed a model to test success of a knowledge management system based on DeLone and McLeans' IS Success Model (2002, 2003). The model framed all the success factors for an IS in the form of KMS. This research will use Jennex and Olfman's KMS Success model to guide the design decision of the prototype system. At this instance, this research will use this model and examine if a KMS can play a pivotal role to enhance DPR efforts that allow more use of data and faster actions.

Past literature regarded information system (IS) as key enabler of DPR (Turoff, Chumer, Walle and Yao, 2004, Jennex, 2005, 2007, Wattegama, 2007). It can highlight risk areas, vulnerabilities and potentially affected population using ICT tools such as GIS (Geographical Information Systems), EWS (Early Warning Systems) and GPS (Global Positioning Systems) (Cao and Zou, 2008). The role of IS in DPR can be seen by the emergent of various disaster management systems such as Sahana Disaster Management System for Tsunami (2004), Dynamic Emergency Response Management Information Systems - DERMIS (Turoff, et al., 2004), Sarvodaya.org during Tsunami (2004), Information Management System - IMASH for Hurricane Disasters (Iakovou and Douligeris, 2001), Digital Typhoon, a KMS to provide information for typhoon (Kitamato (2005), PeopleFinder and ShelterFinder (Murphy and Jennex, 2006, Turoff, et. al., 2004), United Nation Development Programme's (UNDP) Tsunami Resource and Result Tracking Systems (Wattegama, 2007), Case Management Systems in Singapore used during SARS (Severe Acute Respiratory Syndrome) outbreak (Devadoss, Pan, and Singh, 2005, Liedner, Pan, and Pan, 2009), NIMS (National Incident Management Systems) in USA, DesInventar System, a historical disaster database and post- disaster damage data collection tool, a project by UNDP and countries such as Latin America, Orissa and South Africa are currently using it (LA RED, 2004, 2003, Marulanda, Cardona and Barbat, 2010, DesInventar System, 2010) and the recent one is Google's Person

Finder Tool (launched in 2010) that helped in registering and locating earthquake survivors in Japan (2011), Christchurch (2011) and Haiti (2010).

KNOWLEDGE AND KMS

King (2007) referred knowledge as a 'justified personal belief' that directly linked with personal capacity of an individual to take effective action. Knowledge can appear in the form of tacit or explicit (Nonaka and Takeuchi, 1995). Managing both tacit and explicit knowledge is the challenge of knowledge management (KM). Tacit knowledge is the knowledge that cannot be expressed in words where as explicit knowledge refers to knowledge that can be expressed in words and numbers (Nonaka and Takeuchi, 1995, Alavi and Liedner, 2001). KM is defined as an activity of helping organisation to create, capture, codify, store, share and apply knowledge effectively.

Insights about knowledge and managing knowledge have been described and discussed over the years. However, research on KMS is still limited (Alavi and Liedner, 2002). Alavi and Liedner (2002) assert that practitioners value KM as it leads to desirable organisational benefits. Fundamentally, KM is enabled by an effective information technology (IT) solution. Frank (2002) supports the notion that despite the obvious relevance of IT for KM, there has been relatively little work on the application of software to this area. KM in IS perspective refers to the effective tool to enable the knowledge management processes. In this context, a knowledge management system (KMS) is the key enabler of KM and is applied in nature. Many researches on KM/KMS defined it as IT-based systems developed to support and enhance knowledge creation, storage/retrieval, transfer and application (Alavi and Liedner, 2001, Turban, McLean, Wetherbe and Leidner, 2008, O'Brien, Hanka, Iain, and Heathfield, 2006).

KMS includes knowledge-based systems, document management systems, semantic networks, object oriented and relational database, decision support systems (DSS), expert systems and simulation tools (Gupta and Sharma, 2004). Any one or combination of these tools can be designed as effective KMS. DSS, database, groupware and intranet are among the tool of choice by many researchers. For example, DSS was used by Holsaple and Whinston (1996) and Alavi and Joachimsthaler (1992) as the overall representation of their KMS. Stenmark and Lindgren (2008), Finnegan and Sammon (2002) and O'Brien, et al (2006) used database concepts to form a KMS.

KMS is being implemented in organizations for various purposes. In business perspective, KMS predominantly helps to increase competitiveness (Von Krogh, 1998) and lead to greater innovation and responsiveness (Hackbarth, 1998). Davenport and Prusak (1998) offer three other purposes of a KMS in organizations. They are to enhance visibility of knowledge, to build knowledge sharing culture and to develop a knowledge infrastructure. Others suggested that KMS is implemented to improve the interaction of individual group, organizations, and inter-organisational knowledge (Hedlund, 1994, Nonaka and Takeuchi, 1995).

KMS FOR DISASTER PLANNING AND RESPONSE

DPR involves extensive coordination, communication, integration within dynamic and ad hoc environment (Burnell, Priest and Durrett, 2004, Wattegama, 2007, Turoff, et al., 2004, Jennex, 2007, Nelson, 2006, Wang, Cai, and Zhou, 2005). The nature of DPR warrants for a deployment of KMS to support communication, coordination and dissemination of valuable information and knowledge (Van Kirk, 2004, Jennex 2008, Kostman 2004, Jennex, 2009, Turoff, 1972, Turoff, et al., 2004, Burnell et al. 2004, Iyer, Sharda, Biros, Lucca, and Shimp, 2009, Jennex and Olfman, 2005). In the realm of DPR, KMS enable the collection, retrieval, dissemination and storing of the right knowledge to be used in the right place and at the right time. Especially in the context of disaster, at a highly turbulent environment, the integrated knowledge solution will greatly improve the effort of disaster planning and response. However, there must be an adequate coping mechanism to enable such knowledge to transform into life saving knowledge. This is evident in various KMS tools that were used for DPR during post 9/11 attacks in 2001, Hurricane Katrina in North America and during the Indian Ocean Tsunami in year 2004 (Jennex 2005, 2009, Burnell et al., 2004, Kostman 2004). Hence, the research proposition is: marrying both DPR and KMS can benefit SCSC in the effort to relief its problems.

Murphy and Jennex (2006) in their study on the use of KM in Hurricane Katrina response concluded that KM should be included in all disaster response. Disaster can happen at any time making it difficult for organizations to have the right resources where and when they are needed. Most organizations do not have experience with

real emergencies so they need to take advantage of all available experience as decisions need to be made fast and under stress and high tension circumstances. The complexity of communicating, collaborating, and decision making processes in the context of crisis response efforts cannot be undermined. This lead to difficulty in making accurate decision making as the lesson learned from past experiences are not systematically collected and stored for future retrieval. This suggests the need for a KM system. KMS can be used to capture and reuse the DPR knowledge by way of applying the knowledge from experiences to support decision making in DPR (Jennex, 2005, 2008, Raman, et al., 2005, 2006). Hence, an effective decision making can lead to organisation efficiency and effectiveness as schematized in Figure 1.

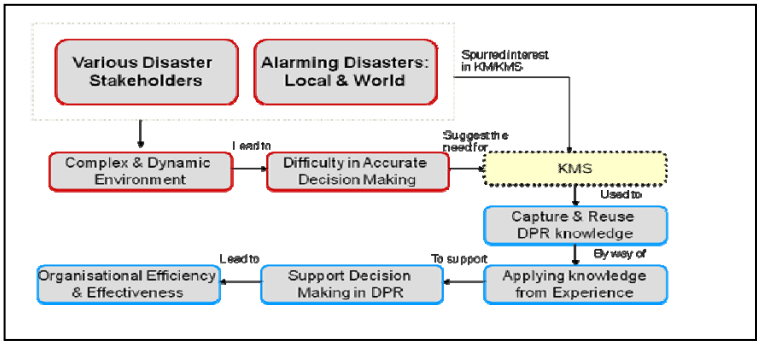

Figure 1. Role of KMS in DPR

The role of KMS in DPR is to aid the activities in disaster planning and response. Firstly, KMS can play a role for DPR during the KMS-DPR system design by incorporating lessons learned into team training, interface and display designs. Past disaster knowledge can be used to design communication and information needed for the system. Next, KMS ease communication and coordination issues in DPR (Turoff, et al., 2004). This is by disseminating the right knowledge and information at the right time, enhances interaction of disaster stakeholders, the knowledge-base that is generated can be used for emergency response actions by the responders (Turoff et al., 2004), and eventually creates avenue for knowledge evolution. Murphy and Jennex (2006) acknowledged the role of KMS for data dissemination and retrieval. This can be accomplished by capturing protocols and templates, capturing emergency response knowledge in procedures and protocols, record lessons learned for disasters, create experience knowledge bases that crisis responder can use and create asset and expertise knowledge base (Comfort, Sungu, Johnson and Dunn, 2001).

RESEARCH GAP

Given the above literature backdrop, this study aims to fill the gap in the body of knowledge in the dimension of KMS applied and KMS for DPR. An analysis of about 100 journal papers and conference proceedings published during year 1990 till 2010 revealed the gap in the area of KMS applied and KMS for DPR.

Method: One hundred journal papers and conference proceedings published in twenty years period from 1990 till 2010 were searched in six major online databases which include MIS Quarterly, Emerald, Proquest, ScienceDirect, Web of Science and Google Scholar. The papers collected and categorized based on the KM literature categories provided by Holsaple and Joshi (2004) who have divided KM research into three main dimensions: KM influences, KM activities, and KM resources. KM influences refers to the influencing factors towards outcomes. KM activities include KM processes such as knowledge transfer, knowledge evolution and so on. Lastly, KM resources include components of KM. In order to reflect the gap, another three more distinct categories were added to these three categories. They are KMS, KMS applied and KMS for disaster. KMS category contains all papers that were researched on KM systems. This included only conceptual papers without any real KM system developed or applied in various domains. KMS applied included these KM systems that were actually developed and applied in real situation to solve a real world problem. Finally, KMS in disaster collected all the papers that had developed a KMS and were applied in a disaster context. A total of 100 papers were analysed using Microsoft Excel spreadsheet software.

Result: Figure 2 shows that majority of the research journal papers and conference proceedings for KM were on KM influences (58 papers) focusing on models and theoretical framework developments. Other papers are on KM resources (39) and KM activities (37) respectively. There were about 33 papers that fell into KM systems category. These are papers which discusses KMS conceptually. About 10 papers out of 33 were papers that

stemmed from an analysis of design and development of a real KMS which is applied in nature. However, the literature analysis shows only 8 papers fell under KMS for disaster dimension out of a total of 100 papers.

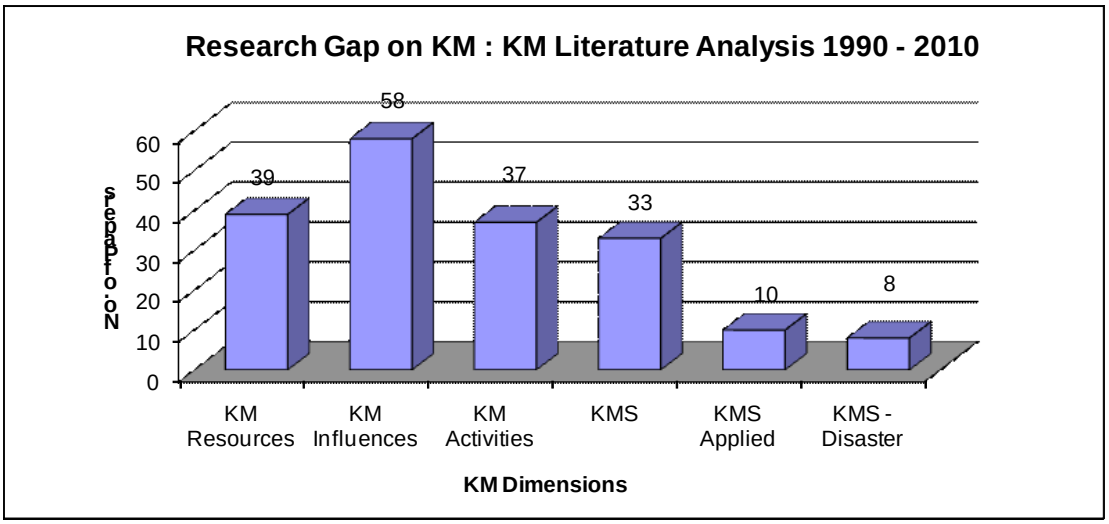

Figure 2. Research gap analysis

The eight papers that were grouped into KMS for disaster category are: Mohanty, et al., (2008), Jennex (2007), Murphy and Jennex (2006), Shaluf and Ahmadun (2006), Raman, et al., (2006), Turoff, et. al., (2004), Mistilis and Sheldon (2005) and Lee and Bui (2000). Of the 8 papers that examined, we found that only four of these (Turoff, et al., 2004, Mohanty, et al., 2008, Shaluf and Ahmadun, 2006, Raman, et al., 2006) actually apply the design of KM systems to the context of disaster management in terms of actual system. The remaining four papers (Jennex, 2007, Mistilis and Sheldon, 2005, Murphy and Jennex 2006, and Lee and Bui, 2000) focus more on providing a conceptual and procedural perspective of using KM systems in light of disaster/emergency situations. Each of the eight papers is described in the following paragraphs.

The four papers that stemmed from actual design and development of a KMS for disaster discuss how information systems in the form of a KMS can support various stages of disaster/emergency management in managing of communication, coordination and information/knowledge challenges. For example, Raman, et al., (2006) presented a web-based KMS for emergency preparedness from an institutional context using an action research approach. Using Wiki technology, Raman et al., (2006) developed a prototype to support communication and organization of information/knowledge for emergency preparedness of the Claremont University Consortium (CUC), USA. Mohanty, et al., (2008) documented a KMS for disaster risk reduction. This was an initiative under the Government of India and United Nations' Development Programmes (GOI-UNDP). They argued that KM is not only about capturing best practices and experiences of people and store it in a database for later use, instead, KM is "all about getting the right knowledge, in the right place, at the right time" (Mohanty, et al, 2008, p. 3). In order to get the right knowledge, they further proposed that a KMS for disaster should be a network with various tools that connects the government, institutions and people. In order to support this notion, A knowledge portal was developed to support collective and individual sharing of expert know-how's. The crux of this paper is KM principles can assist for situational awareness, sensitization and decision-making in disaster management. Shaluf and Ahmadun (2006) designed and developed a KM system in the form of expert system, called TEES (Technological Emergencies Expert System). TEES which was developed using open source expert system software, CLIPS, aimed to support technological disasters involving Major Hazards Installations (MHI is industrial storage of hazardous substances and energy). The system involves collecting, eliciting, organizing, analyzing and interpreting processes known as knowledge acquisition. They claimed that TEES can be used to control technological disaster at MHIs.

Finally, among the four applied KMS papers, Turoff, et al. (2004) presented complete design principles and guidelines for developing an EMIS (emergency management information systems). These design principles were identified based on the use for the EMISARI (Emergency Management Information System and Reference Index). Originally in 1970, a prototype was designed and developed by Turoff (1972) to enable exchange of knowledge between dispersed experts on complex problems. This system later was modified and called EMISARI in 1971 to support new emergency, Wage Price Freeze (Turoff, 1972). Turoff (1972, p.6) claimed

that "EMISARI incorporated many of the features called for today under the current rubric of knowledge systems". The crux of this paper is 9 design premises, 5 components of DERMIS conceptual design, 8 general design principles and specification and 3 supporting design considerations and classifications. Fundamentally, one would agree that Turoff's papers have significant effect and contribution to many other recent researches and literatures in this domain.

On the other hand, the four papers that are more conceptual and procedural in nature, contributes in terms of suitable system architecture (Mistilis and Sheldon, 2005), fusion of KMS into EMIS (Murphy and Jennex, 2006) input/output presentations (Lee and Bui, 2000) and overarching model (Mistilis and Sheldon, 2005). For example, Lee and Bui (2000) proposed a template-based method for disaster IS. This method was illustrated using Kobe's earthquake (1995) situation. The information related to the case was documented by filling the template suggested by Lee and Bui (2000). They asserted that this method is useful to archive past disaster relief operations, to describe advanced preparedness and to assist fast execution of assistance operations. However, they did not develop a prototype to test and validate the usefulness of this template-based method in real application. Murphy and Jennex's (2006) paper presented two EMIS called PeopleFinder and ShelterFinder. The core of this paper is fusion of EMIS with KMS can improve the decision making process involved in emergency situations. They asserted that the decision making process during emergency situation is unique as it involves time stress and demands for quick information/knowledge retrieval and simple display that is straightforward, effortless, and uncomplicated to emergency managers and responders. The fusion of KM concept into EMIS was exemplified by these two systems in resolving the problems that a traditional EMIS could not solve. Mistilis and Sheldon (2005) developed a comprehensive framework of KM system for disasters in tourist destinations. The focus of this initiative was on preventative planning and management of disasters. The framework depicts three stages of crisis. Knowledge processes were interweaved based on disaster stages that ultimately creates a knowledge base for preventative and management plan. One of the important points that they raised was "KM requires moving beyond simplistic models of information technology exchange to more challenging problems of leveraging social interactions to the advantage of the enterprise" (Mistilis and Sheldon, 2005, p. 11). Jennex (2007) focused on developing an expanded model for Emergency Response Systems (ERS) with KM. The model was developed based on lessons learned from Hurricane Katrina responses. Jennex assert that a complete ERS model should include four other components besides database, data analysis, normative models and interface as proposed by Bellardo, Karwan, and Wallace (1984). The four additional components are (1) trained users, (2) dynamic, integrated, and collaborative methods to communicate between users and between users and data sources, (3) protocols to facilitate communication, and (4) processes and procedures used to guide the respond to and improve decision making during emergency (Jennex, 2007, p. 5).

CONCLUSION

Based on the above literatures, one could also suggest that the designers of a particular system aimed at supporting disaster management, may not necessarily use the terms and theories in the context of KMS. The inherent features of such systems do in real fact support the goals of a KMS for managing emergencies/disasters. A case in point would be the seminal work by Turoff et al., (2002, 2004) who clearly demonstrate that both the ERMIS and the subsequently developed DERMIS were in fact driven by KM dimensions and considerations.

In the realm of disaster/emergency management information system, Turoff, et al.'s, (1972, 2002, 2004, 2008) papers and researches seem to be instrumental to all other research. In this regard, there is scope for more work that examines the role of EMIS and how these systems impact and/or are guided by KM imperatives.

In conclusion, research gap in the area of KMS applied (Ginsberg and Kambil, 1999, Raman, Ryan, Jennex, and Olfman, 2010, Lee and Bui, 2000, Mohanty, et. al., 2008) and KMS for disaster (Raman et al., 2005, 2006, Murphy and Jennex, 2006) is evident from this paper. Hence, this paper is timely to inform the research community within the realm of KMS research to fill this gap. This paper presented problem diagnosis results through an action research process and highlighted the gap felt within KMS for disaster as well as KMS applied especially using action research approach.

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