Taking Community-Based System to Malaysian Communities for Disaster Management

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Abstract

This study explores the efforts, Malaysia, is putting in place, using the pervasiveness of ICT in managing disasters; both naturally and man-made. These efforts had given birth to various agencies and initiatives from prediction/mitigation to control and management but yet the loss of lives and properties during such incidents, which are bound to happen, has been a call for concern. In fact records of such disasters kept growing when one curiously views recent flooding in Malaysia. A collaborative system initiative is expected to co-exist within the government agencies on disaster management where expertise, resources and information sharing will be enabled on a real time basis. The community through the institution of the mosque was brought on board into such system as they are seen to be the closest to the populace. These steps will no doubt make the perpetual efforts of government agencies to yield the required results. We thus opined that training these communities, which is expected to institute a comity of volunteers, in the science of how to gather information and make good use of same in the event of the disaster occurrence will go a long way in making the tax payer money worthwhile.

Keywords: Disaster Management, Community-Based Information System, collaborative system, Flood, Balanced Scorecard

1 Introduction

There is no doubt that organisations have recognised their dependence on information technology (IT) in order to achieve their mission and goals and to strategically position themselves for competitive advantage. Hence, IT departments have moved from a commodity service provider to strategic partner (Venkatraman, 1999) and it is therefore, understandable that IT services availability have become 'mission critical' needed especially in areas such as finance, health, defence, and environmental management. Thus IT is considered to be of great importance. Information System now assumes the bedrock of all organisations including governmental sectors; so much that today's world has become IT-based. By this, it is meant that IT is now been deployed in all aspects of government organisations and businesses and this is also the case in disaster management. The ability to use the facilities provided by this technology places a nation and any organisations for that matter, in a vantage position in decision making which is an important aspect in the day to day running of affairs.

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It is no gainsaying the fact that disaster, both natural and man-made has become a phenomenon we have to live by. Though we now explore both the ocean deep down and the sky into the firmament to the extent of thinking of having a holiday or retreat therein, yet existence on the mother land which is our habitation has been quiet challenging and daunting. Thus, it is no more news that year in and out one disaster or another hit the surface of the world. Neither the developed nor the developing nations, nor the underdeveloped nations are spared and the aftermath has been a call for concern despite the advancement in technology. Just this mid-decade the earth was greeted with the tsunami of Dec. 2004 in Indonesia, and then it was hurricane Katrina of August, 2005 in USA, and recently, one after the other, is the flood experienced in China, Australia, Malaysia and Pakistan.

While the developed nations exert their utmost in combating and investing on series of systemic way of disaster management, using the opportunity afforded by the ubiquitous of information technology, could such be said of the developing nations? The recent flooding in Pakistan brings to mind that of the 1970 that hit the country and its poor management then, which eventually led to the secession of Bangladesh in 1971. Thus the management of Disaster at times can be very daunting when one takes a look at history; "once beaten, twice shy". The recent flooding in parts of Malaysia, to this extent, is a call for concern given the spirited effort put in place by the Government; we still record a high number of loss of lives and missing people in a world where management of lives in such crucial situation has improved tremendously.

Disaster's definition is dependent on the discipline using it as a term. Turner and Pedgeon cited in (Ibrahim, et al 2003) pointed out that it; 'involves management procedures that must be maintained and management problems coped with under conditions of major technical emergency involving threats of injury and loss of life'. It is believed to be; a serious disruption of the functioning of society, causing widespread human, material or environmental losses which exceed the ability of affected society to cope with using only its own resources. They are often classified according to their cause (natural or manmade) uu(United Nations1992).

2 Statement of problem

This study explores the efforts the Malaysian government is putting in place in using the knowledge and prowess enabled by the pervasiveness of IT resources in managing disasters. This was mirrored from a perspective which intends to see what really could be done to move ahead in the nation's effort, especially when one takes into consideration the would-be effect of community participation in such a collaborative systems, in the management of the tourist prone nation. Thus we intend to know:

- How has community participation and involvement been viewed by government agencies in the efforts on disaster management?
- How has the community been integrated before and during disaster?

3 Background of study: the mosque as a Hub of Malaysian Community

We observed the presence of the mosque in an organised settings and its role in the Malaysian context cannot be overemphasised. It is a viable partner that can be positioned for the coordination of communal activities. Since the mosque is closer to the community, it can complement the government agencies efforts in rescuing and salvaging the community during disaster occurrences. Being the centre of communities, a mosque has the potential of providing critical data, information, knowledge and experience on the community. Hence, this information and experience can be made available to the visiting emergency workers and volunteers, who would have received basic training. The agency that will be studied is the Department of Irrigation and Drainage (DID) called Jabatan Pengairan dan Saliran Malaysia (JPS) which is charged with the river basin and Coastal Zone, Water Resources and Hydrology, Special Projects, Flood Management and Eco-friendly Drainage (Department of Irrigation & Drainage 2007).

4 Literature review

Disaster management, practically speaking, is to plan ahead and be effective in not falling into dis-function. It is about how best to deal with the situation when it reared its head. It involves, preparing for disaster before it occurs, disaster response e.g., emergency evacuation, quarantine, mass decontamination, etc. (Wikipedia 2010) and supporting, and rebuilding society after natural or human-made disasters have occurred. In general, any Emergency management is the continuous process by which all individuals, groups, and communities manage hazards in an effort to avoid or ameliorate the impact of disasters resulting from the hazards. Actions taken depend in part on perceptions of risk of those exposed as posited (Tatum 2010). Whenever there is a disaster, regardless of whatever effective response that is provided to rescue lives and properties, "the deed would have been done" already. Nonetheless, such action, not to talk of inaction, will not remove the fact that an irreparable loss has taken place; posited (Ye & Wen 2009) Controlling such occurrences or reducing their probability of occurrence is what is termed Risk (Disaster) Management.

Effective emergency management relies on thorough integration of emergency plans at all levels of government and non-government involvement (Wikipedia 2010).

According to Chatfield et al (2010) effective government disaster management needs to integrate technologies (such as GIS and RFID) into its e-government policy for better disaster management:

- Preparedness: prior to disaster, preparedness activities are designed to plan for the unthinkable and increase the readiness of organizations and communities to respond to a disaster timely and effectively. "Disaster plans are often developed by individual agencies, but one challenge of disasters is that they demand action from agencies and organizations that may not work closely together from day to day".
- Response: activities such as search-and-rescue efforts are undertaken immediately following a disaster "to provide emergency assistance to victims. The response phase starts with the onset of the disaster and is devoted to reducing life threatening conditions, providing life-sustaining aid, and stopping additional damage to property" (Chatfield, et al 2010).

What is witnessed today is a pointer to the effect that more still needed to be done if this world has to be habitable for us. From the Pakistan flood to the one in Oklahoma, from the Australian flood to the recent one in Sri Lanka; they all point to what (Post & Altman 1999) posited on the theme of past literatures the:

1. Need for more co-operative relationships between business, Government, and society if the environment is to be effectively protected.
2. Need for a new framework which account for environmental costs.
3. A number of "best practices" companies are creating (through) useful models for environmental improvement.

In January 2005, a 10-year plan was adopted in a UN conference in a bid to make the world safer from natural hazards at the Word Conference on Disaster Reduction, held in Kobe, Hyogo, Japan. The plan, 2005-2015 termed, Hyogo Framework for Action (HFA) is a global blueprint for disaster risk reduction efforts expected to be uphold in the next decade. Its goal is to substantially reduce disaster losses by 2015 - in lives, economical and social loss, as well as in environmental assets of the communities and the countries alike.

The Framework offers guiding principles, priorities for action, and practical means for achieving disaster resilience for vulnerable communities. Such priority for action includes, to:

1. Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation.
2. Identify, assess and monitor disaster risks and enhance early warning.
3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels.
4. Reduce the underlying risk factors and
5. Strengthen disaster preparedness for effective response at all levels as cited in (World Conference on Disaster Reduction 2005).

To this end, bearing the fifth provision in mind, with the earlier direction from the literatures so far cited, the current project will be looking at the participation of the community in disaster management. This will be with a focus on the need to engage the members of the community (Volunteers) in preparedness for the disaster so that efforts of governmental agencies in putting a smiling face on the populace would yield the anticipated results. Community-Based Disaster Management has just evolved in the recent time (Chen et al. 2006) and is now gaining currency as the reality unfolds. It is about giving the community the honour of adequate participation in decision making about the disaster that they are its major and immediate victims and then empowering them to cater for pre, during and perhaps post occurrences of such disaster. It is a far cry from the top-down approach as it takes into consideration the ownership of the processes of disaster control; the occurrence or its aftermath is first felt by the community itself; it is a bottom-up paradigm shift which is expected to yield a better result with harmony in the top-down approach.

This approach has been in use in the developed nation and it is now gaining currency in the academia. The case of Taiwanese village of Shang-An was vividly illustrated in (Chen et al. 2006), which gives a detail account of how such collaboration could be very effective. In Malaysia, it is worth noting that focus is now geared towards this direction as the Malaysia's National Security Council (NSC) and Asian Disaster Reduction Center (ADRC) recently conducted a workshop in Kuala Lumpur as part of a Community-Based disaster risk management project (ADRC 2011). The attention of the world may have to turn to this aspect as a way to harness the potentials of the stakeholders, the direct victims of hazards; in capacity utilization, towards a better management of disaster and a cultural evolution of keeping the environment safe for living. Change is the most common thing that researchers have taken time to study especially when it involved the acceptance and use of a new technology.

The introduction of a community-based management system require the buy-in from the stakeholders as its adoption will have an effect on the overall way of doing things. According to Leavitt as quoted in (Marchewka 2010), changes involve people, technology, task, and organisational structure whereby each influences or impact on the other. He suggested that a change in one can result in a change in the others. This study took into consideration how the proposed technology will affect the psyche of the people especially members of the communities who has always been at the receiving end during and after the occurrence of disasters. At the same time is the agencies who may have to re-think in regards of sharing what they might have hitherto treated as something confidential with not only other agencies but with the community alike. The fact remains that in such can there be learning and growth which forms the bedrock of all efforts.

5 Methodology

We proposed a linking up of the back-end system of Department of Irrigation and Drainage (DID), with that of the local mosques whereby instant exchange of information will be enabled. A visit was carried out to the DID office and based on an unstructured interview, it was gathered that the idea of community participation, to the extent of this proposal, is novel to the organisation. It is our hope that DID, through a Memorandum of Agreement, will link up with other agencies' databases in a bid to enable real time information and resources sharing.

6 Proposed Solution

It is believed that the community-based management system will no doubt place the community at the centre of the whole disaster management efforts as they will have to take their own fate in their own hands with logistic support from the government agencies and proper training. What is thus expected from the study is:

- Promptness to disaster threats once the system is alerted
- Reduction in loss of lives, in one hand and perhaps a possibility in the reduction in damages or loss of property on the other hand, and
- Highlighting the roles Muslims can be ready to take up in helping others.

We explored the Sahana software system; a Free Open Source System (FOSS). The software was a child of a project borne out of the need for an application to address disaster management, collaboration and coordination in the aftermath of the 2004 tsunami (Careem et al. 2007). We see this software, which has gained widespread attention from developers and humanitarian consultants worldwide, as a handy tool to prove the need for the community-based management system thus proposed. A major reason for Sahana's success is that the FOSS ethos and humanitarian requirements bond well together. (Careemet al. 2007). The system amongst other things should have the following features:

6.1 Business Initiative:

Online information systems made available for prompt collaboration between the community and the DID for information sharing, decision making and preparedness.

6.2 Business Driver:

To develop a system that can store information about the communities' incidents on real-time basis. Such information will be made available to DID on a real-time. Such a system should at an overall analysis, saves time, money and lives of the residents in the disaster area. (Careem et al. 2006) reasoned that "In many cases, there will be a need for import of data that has been collected by individuals or organizations that did not use the system. Some support must be provided to facilitate the quality of the imported data"

6.3 Business Strategy:

To automate the collaboration between the community and the agencies in a manner that is much convenient to all stakeholders and result oriented. According to (Careem et al. 2006), GIS capability adds value to the system and attracts a lot of attention in a disaster. Customizations might be required to change the initial GIS map to the location of the disaster and to upload map files of the affected areas. Localization is a required feature for most deployments. The customization can be in the translation of sentences in the interface to the native language.

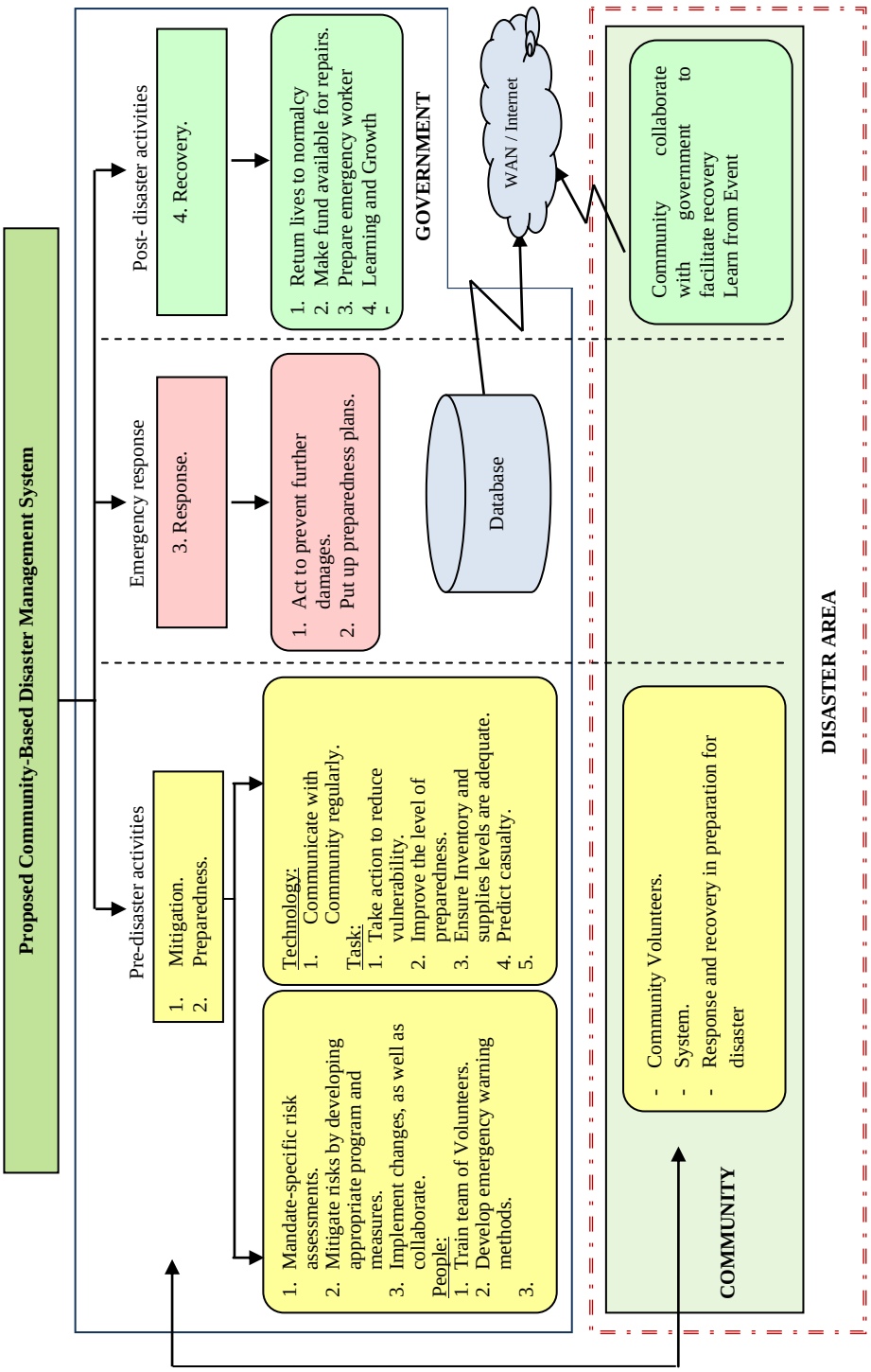

Figure 1: Proposed Community-Based Disaster Management Framework

6.4 Functional Scope:

Real time triggering of alert from the government system appreciated by prompt preparedness and response by the community volunteers. Online feedback to the agency on the need of time and the situation at hand backed with an enabled online donation to the affected community.

6.5 Performance Metric:

Strength of the connecting signal is 90% on and 5 seconds response period upon the request and the ability to allow for the evolving granularity of the data. Sophisticated systems sometimes fail if they cannot accommodate the lack of precise data collection in a disaster. (Careem et al. 2006) reasoned that a disaster management solution should work even when there is a lack of a communication infrastructure. Adequate preparation must be made to support disconnected operation and the lack of immediate data synchronization should also be handled. Further, all solutions should work on commodity hardware where ever possible.

6.6 Organizational Impact:

Pleasant environment, assurance of safety and reduction of loss of life and properties thereby saving government's capital expenditure as well as their image before the citizens at large. (Careem et al. 2006) posited that "Organizations and governments apply different measures to guarantee the protection of data. In some cases, it is required to apply security controls at the level of specific fields of the database. In most cases, the requirements are more generic."

6.7 KEY PERFORMANCE INDICATORS USING THE BALANCED SCORECARD

In a bid to achieve the goal of fair disaster management the agencies must avail itself of the opportunities to get to the desired business goal by taking spirited steps in institutionalization of a community-based management system that is integrated into the agencies system. Such system must provide the needed satisfaction, for the stakeholders financial investment and contributions, the end users i.e. the community and its citizens. And learning from the balanced scorecard metric framework initiated by Dr Kaplan and Dr Norton, which provides such intangible evaluation, and from the extensive proposal of (Moe T.L. 2007) we adapt the Zachman's framework to suggest what our expectation on such system should look like.

Perspectives	OBJECTIVES	MEASURES	TARGETS	INITIATIVES
Financial / Donor	Promote Community's consciousness on disaster	Provides infrastructures and logistics	Produce Volunteers with First Aid skills	Develop an integrated distributed database
	Instil the participatory culture in community	Provides adequate training	Develop workers who are 99% trigger ready	Develop Web Service for Client on Network
	Equip Volunteers with adequate expertise	Reduce loss of life and properties	Contribute to growth and stability of nation	Ensure compliance to information sharing
Customer / Communities	How the Community see Agency services	Increased Communities participation relation	Commitment to Agency's objectives	Ensures CBMS runs 99% up time
	Partnership	Increased rate of information sharing	Quality performance at a 90% rating	Regular induction on disaster management
	Being a responsive Agency		Willing Community aiding Agency effort	Enforcement through an ensured compliance
Internal Business Process	Packages that sprout competitive advantage	Identify and rewards outstanding mosques	Secured, good cycle time system with 99% performance yields	Put up a service-oriented architecture
	Integrated system that will share information with all other agencies	Enter into MOA with other agencies because of information sharing	Develop secured and recoverable database	Encourage monitoring and evaluation efforts on a regular basis
	Instant spontaneous alert system	Enter into SLA with communities because of information sharing	response to requests from community with 3% down time	Put up a security enabled system
Learning and Growth	Create job/training for would be Volunteers	Build team spirit within the communities	A duty-bound work-force in Community	Periodically assessment of teams' preparedness
	Ensure the security and reliability of the CBMS	Training and workshop for Community Management Centers	Reliable, Incorruptible Lifeline focused Volunteers	Award of Excellence Emergency workers, Volunteers and Mosque
	Improving expertise via learning from experience	Put up standards in all efforts and adhere to proper documentation	Ensure sharing of Knowledge to afford Learning and Growth	Measure the impact in Disaster Management in the nation.

Table 1 – KPI for the proposed system using the Zachman's Framework idea

7 Conclusion

Leadership is believed to be a responsibility: a famous tradition goes thus: "Each one of you is a shepherd. And each of you will be asked about your flock. A ruler also is a shepherd and he will be asked about his flock. And every man is a shepherd to his family. And every woman is the custodian of her husband's house and his children. Thus each one of you is a shepherd and each one will be asked about his flock (Khan 1994). That explained why the un-seemingly inaction of any leadership is really frowned at in the context of religious obligation by the spirit and letter of Islamic faith, for example. Given the would be effect of taking one's fate in one's hand, the community volunteers, enabled with availability of information, adequate communication and proper emergency training, will place the community in a better position to collaborate with the efforts the government is putting in place in making Malaysia a disaster manageable zone.

Our exploration at the DID shows that the government could still do better given the "INFOBANJIR" system that is currently available; and that explains the choice of "Sahana"; an open source disaster management system. In the event of successful adoption and the comparison of overall situation before and after such adoption one would expect then that other agencies would be incorporated into the show so that a holistic view of disaster management is enabled. This will no doubt give a better assurance on good governance which the present government strives to attain.

8 Contact Information

The first three authors involved in the study are Master students in Information systems while the last is a lecturer in the department of Information Systems, Kulliyyah of Information and Communication Technology, International Islamic University, Gombak Campus, Selangor, Malaysia. They are carrying out this study as part of requirement for System Development Methodologies Course which was aimed at bringing up a system that will be of benefit to the hosting community in particular and humanity at large.

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