Chapter 7
Efficient Deployment of ICT Tools in Disaster Management Process

Aysu Sagun
Anglia Ruskin University, UK

ABSTRACT

This chapter will emphasize that efficient integration of Information and Communication Technology (ICT) in disaster management process can help mitigation of impacts of disasters on people and the environment, minimizing the failures and maximizing the collaboration. It summarizes the nature of information flow and management processes during disasters and the potential of recent ICT at three stages of disaster management. The requirements and problems faced during their deployment at different stages of disaster management process are stated. The solutions for common constraints are discussed as well as the critical factors that should be considered in efficient deployment of ICT in the disaster management process.

INTRODUCTION

Millions of people suffer from natural or man-induced disasters around the world. As unexpected and sudden events, disasters make serious impacts on people, causing death and damage to the built and the natural environment. There is a significant need to focus on mitigation of disasters because the increase in population and built assets make the needs and requirements of the response and relief activities more expensive and complex (Oberoi and Thakur, 2005). Mitigation refers to those activities conducted to decrease the vulnerability of society by reducing the residual destructive effects of disasters. This can be achieved by a systematic disaster management approach that uses sufficient resources and technologies at preparedness, response and recovery stages. Disaster management is a cyclic and collaborative process in which the gathering, organization and dissemination of information and data are critical. Information and Communication Technology (ICT) has a vital role in management and mitigation of disasters by supporting data...
collection, decision making, communication and collaboration. The challenges of ICT are more related to the effective management of technology and its appropriate application than their capacity. Therefore, a focus on emerging ICT is necessary to employ the appropriate technology and tools in the disaster management process.

This chapter focuses on deployment of ICT in the disaster management process to mitigate the impacts of disasters on people and their environment. The nature of information flow during disaster management process will be explained in more detail giving examples from various natural and man induced disasters. The chapter will clarify how the role of advanced ICT at preparedness, response and recovery phases changes and explain the capabilities of recent ICT tools integrated in disaster management process. The chapter emphasize that the experts, collaboration patterns and appropriate ICT tools used vary regarding the nature of the disaster. Similar ICT tools are used in most types of disasters, but they may be used for different purposes. The constraints in efficient deployment of ICT in disaster management are also discussed by proposing solutions to common problems.

**BACKGROUND**

Disaster management can be defined as the collaborative process and the set of actions of the relevant organizations/agencies and government to minimize and inhibit the crushing effects of disasters (Scalem, et. al., 2005; Rajabifard, et. al., 2004). This collaboration process involves the sharing of decision making as well as data and resources (Popp, et.al., 2004). Various bodies are involved in the process such as governments, disaster management organizations, responders, the construction sector and the general public. ICT plays an important role in management and mitigation of disasters by facilitating information flow as well as enhancing data collection and decision making in disaster planning, mitigation and management. ICT products include any product that can receive, disseminate, communicate, edit, recover, manipulate and store information electronically in a digital form. The deployment of advanced ICT at the pre-, during and post-disaster stages of disaster management enhances communication and collaboration. However, being prepared for a potential threat of a disaster does not mean to provide high technology information and communication tools at response stage of a disaster. The important point is to provide the appropriate technologies which are reliable, resilient and flexible to adapt to changes caused by the impacts of the extreme event. Use of sophisticated means of communication systems can cause failure in communication and collaboration.

It is important to reduce the problems in organization of disaster information in order to minimize the challenges in disaster management. McEntire (2002) claimed that the information challenges and lack of communication between the field and the operation centre during the post disaster operations of Fort Worth Tornado were as a result of inaccurate, incomplete or too much information that caused delays in decision making as well as insufficient amount of information in some cases. Therefore, providing the information flow is not enough in disaster management but there is the need for the systems that can help evaluating, filtering and integrating information for the responders so that the rapid decision making process is enhanced and expedited. Moreover, there is a need to set up common semantics for clear information flow because different expressions or different definitions used by different collaborators at various levels can cause chaos and delays in collaboration. Generating standards can solve this problem but they should be flexible to be changed with the new emerging situations. As Midkiff and Bostian (2002) stated, the communication infrastructure should be flexible to respond to different situations in different types of disasters. Michalowski et. al. (1991) also stated
Related Content

Soft Computing Modeling of Wild Fire Risk Indices: The Risk Profile of Peloponnesus Region in Greece
www.igi-global.com/chapter/soft-computing-modeling-of-wild-fire-risk-indices/90765?camid=4v1a

Examining the Implications of Process and Choice for Strategic Decision Making Effectiveness
www.igi-global.com/chapter/examining-the-implications-of-process-and-choice-for-strategic-decision-making-effectiveness/90723?camid=4v1a

Public-Private Partnerships in Support of Critical Infrastructure and Key Resources
www.igi-global.com/chapter/public-private-partnerships-in-support-of-critical-infrastructure-and-key-resources/124662?camid=4v1a

A Distributed Scenario-Based Decision Support System for Robust Decision-Making in Complex Situations
www.igi-global.com/article/distributed-scenario-based-decision-support/60613?camid=4v1a