Thesis Abstract

No.	1	

Registration	□ "KOU"	□ "OTSU"	Name:	SAKURAI, Mihoko
Number:	No.	*Office use only		SAKURAI, MIIIOKU

Title of Thesis:

Design of a Resilient Information System for Disaster Response:

Lessons from municipal government systems under the Great East Japan Earthquake crisis

Summary of Thesis:

The devastating 2011 Great East Japan Earthquake showed up the vulnerability of Information and Communication Technology (ICT) for sustaining life during and soon after a disaster. This paper first addresses issues related to the design of information systems (IS) based on a field study and survey results that assess the damage inflicted upon the municipal government information system during the earthquake. Then, a set of design principles is proposed that improve the handling of similar unexpected catastrophic events in the future.

From the field study, three key IS problems are defined; (1) ICT failure due to unexpected, (2) diversity of damage situations forcing creative and autonomous responses in the field and (3) lack of compatibility among efforts in the field hindering a smooth return to normal business. It is impossible to build a system that never fails. Rather, we should design a resilient IS that quickly gains essential capabilities to perform critical post disaster missions and to smoothly return to fully stable operation thereafter. Essential for municipalities is the capability to conduct disaster relief operations. Since these problems occurred chronologically, this paper proposes a three-stage model (in advance, initial response and recovery) to design resilient IS. The notion of frugal IS (Watson et al. 2013) that emphasizes the use of minimal resources to meet preeminent goals was adopted as a foundation of design principles.

A frugal IS supports a creative response in the field by adopting open and standard technologies for our conventional systems so that data from these systems can be extracted and used by creatively developed systems in the field following a disaster. In addition, it encourages the use of residents' devices, rather than government prepared terminals as a foundation of frugal IS. This promotes the collaboration of people using materials readily available in times of disaster.

Keyword: Disaster management, Resilient, Information systems design, Municipal governments, Frugal IS