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## THESIS OUTLINE

専攻 : 経営工学  
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### Thesis Outline

**English Title: Disaster Management through the Perspective of Information Systems**

**Japanese Title: 情報システムの観点からの災害マネジメント**

#### Chapter 1 Introduction

In the first chapter, the vision of the study is set by providing the research introduction and background. Research goals, objectives, and contributions are also included in this chapter, as well as the general structure of the dissertation.

Disaster management is considered to be a complex system with limited resources, limited time, and unexpected factors. This research focuses on natural disasters. The research goal of this dissertation is to study disaster management as a system, from the perspective of information systems. The study contains the following research objectives: (1) To understand disaster management systems through the perspective of enterprise engineering; (2) To examine the information needs of people during disasters; and (3) To provide academic and practical outcomes for disaster management. Throughout this dissertation, there are three main modules: Conceptualization, Specification, and Implementation.

#### Chapter 2 Conceptual Background

The second chapter explains the conceptual background that is the foundation of this dissertation. It covers the concepts of disaster management and information systems.

#### Chapter 3 Conceptualization

The third chapter is about conceptualization. It covers the important parts of disaster management systems, including early-warning systems, response systems, and recovery and reconstruction systems.

The Conceptualization module focuses on important disaster management systems, including early-warning systems, response systems, and recovery and reconstruction systems. The enterprise

engineering methodology called *DEMO* (*Design and Engineering Methodology for Organizations*) has been used in several real disaster cases, such as the 2011 Thailand Flood, the 2011 Great East Japan Earthquake and Tsunami, and the 2013 Super Typhoon Haiyan.

#### Chapter 4 Specification

The fourth chapter is about the specification. It provides the findings from three studies on information needs from disaster mobile applications, preference for information during disasters, and disaster information and warning systems

The Specification module focuses on examining the information needs. This module considers the cases of the 2011 Thailand Flood, the 2013 Jakarta Flood, and the 2013 Super Typhoon Haiyan. Aspects include information from technological channels, such as mobile applications, as well as traditional communication channels. Disaster information and warning systems are also discussed.

#### Chapter 5 Implementation

The fifth chapter is about the implementation. The first part discusses the analysis of building damage while the second part explores the implementation of disaster mobile application.

The Implementation module focuses on the analysis of building damage, using the case of the 2004 Indian Ocean Tsunami and the development of disaster mobile applications to calculate the estimated damage to the buildings from tsunamis. The prototype application can generate the estimated damage level and collapse probability, taking the case of Kesennuma City in Japan, based on the 2011 Great East Japan Tsunami data.

#### Chapter 6 Discussion and Conclusions

The final chapter gives the conclusions of the research together with the study's limitations and future plans.

The results and findings of these three modules can contribute to both research and practice. The research provides abstract models of focused systems, together with many interesting issues, best practices, lessons learned, and problems. It also offers a framework of information needs in disasters. The practical outcomes are the statistical model to estimate the damage level of the buildings from tsunamis, and a prototype of a disaster mobile application.

*Keywords:* Disaster Management, Enterprise Engineering, Information Needs, Information Systems, Mobile Application, Natural Disasters