

Chapter VIII

RFID in Emergency Management

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ABSTRACT

This chapter introduces an activity-based framework for the adoption of radio frequency identification (RFID) in emergency management. The framework is based on a rather loose interpretation of the task-technology fit (TTF) theory. The chapter provides an overview of emergency management, a description of RFID characteristics and a scheme for classifying emergency management activities. It also reports literature survey on emergency management models, the use of RFID and RFID adoption models. Last but not least, it outlines the perceived benefits associated with the use of RFID in emergency management. It is hoped that the proposed framework can serve as a useful guidance for RFID adoption in emergency management.

INTRODUCTION

In this chapter, we extend the use of technologies from fulfilling secondary needs in society, such as to bring convenience, comfort and gratification, to primary needs for safe, rescue and survival. In ensuring the effective use of the new technologies, the adoption process must be planned carefully. In the past few decades, researchers have introduced various adoption models, such as technology acceptance model (TAM), diffusion of innovation and task-technology fit (TTF) model. These

models provide theoretical guidelines for adoption process, and suitable for some specific domains. The aim of this study is to propose a framework for adopting RFID in emergency management based on TTF model.

Technology adoption is a non-trivial process that requires many questions to be answered. For example, what is the most suitable technology to adopt for a particular domain? Which activities can be better facilitated by the technology? How can the technology be utilized to leverage productivity? This chapter is structured into three

sections. Section one highlights the nature of emergency situations, its impacts on the society, as well as literature review on emergency management models. Section two emphasizes on RFID and highlights the use of this technology in the context of emergency management. This section

also provides an overview of other technologies which can potentially be used in emergency management. Section three discusses the adoption process. A guideline to adopt RFID in emergency management is also presented in this section.

Table 1. Major categories of emergencies

CATEGORY	TYPE	DESCRIPTION
Manmade	Biological Threat	A biological attack is the deliberate release of germs or other biological substances that can make someone sick, like the smallpox virus, can result in diseases one can catch from other people.
	Chemical Threat	A chemical attack is the deliberate release of a toxic gas, liquid or solid that can poison people and the environment.
	Nuclear Threat	A nuclear blast is an explosion with intense light and heat, a damaging pressure wave and widespread radioactive material that can contaminate the air, water and ground surfaces for miles around.
	Radiation threat	A radiation threat, commonly referred to as a “dirty bomb” or “radiological dispersion device (RDD)”, is the use of common explosives to spread radioactive materials over a targeted area.
Natural	Earthquakes	An earthquake is a sudden movement of the earth, caused by the abrupt release of strain that has accumulated over a long time.
	Extreme heat	Heat kills by pushing the human body beyond its limits. In extreme heat and high humidity, evaporation is slowed and the body must work extra hard to maintain a normal temperature.
	Fires	Fire produces poisonous gases that make you disoriented and drowsy. Heat and smoke from fire can be more dangerous than the flames. Asphyxiation is the leading cause of fire deaths, exceeding burns by a three-to-one ratio.
	Floods	Floods are one of the most common natural hazards. Floods can occur due to excessive rain, broken rivers’ bank or dam brakeage.
	Hurricane	A hurricane is a type of tropical cyclone, the generic term for a low pressure system that generally forms in the tropics. Hurricanes can cause catastrophic damage to coastlines and several hundred miles inland. Winds can exceed 155 miles per hour.
	Landslides and Debris Flow	In a landslide, masses of rock, earth, or debris move down a slope. Landslides may be small or large, slow or rapid. They are activated by storms, earthquakes, volcanic eruptions, fires, and human modification of land.
	Thunderstorms	All thunderstorms are dangerous. Every thunderstorm produces lightning. Although most lightning victims survive, people struck by lightning often report a variety of long-term, debilitating symptoms.
	Tornados	Tornados are nature’s most violent storms. Spawned from powerful thunderstorms, tornados can cause fatalities and devastate a neighbourhood in seconds. A tornado appears as a rotating, funnel-shaped cloud that extends from a thunderstorm to the ground with whirling winds that can reach 300 miles per hour.
	Tsunamis	Tsunamis (pronounced soo-ná-meas), also known as seismic sea waves (mistakenly called “tidal waves”), are a series of enormous waves created by an underwater disturbance such as an earthquake, landslide, volcanic eruption, or meteorite.
	Volcanos	A volcano is a vent through which molten rock escapes to the earth’s surface. When pressure from gases within the molten rock becomes too great, an eruption occurs. Eruptions can be quiet or explosive. There may be lava flows, flattened landscapes, poisonous gases, and flying rock and ash.
Winter storm and extreme cold	Heavy snowfall and extreme cold can immobilize an entire region. Even areas that normally experience mild winters can be hit with a major snowstorm or extreme cold. Winter storms can result in flooding, storm surge, closed highways, blocked roads, downed power lines and hypothermia.	

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