Chapter 4

An Analysis of the Interactions among the Enablers of Information Communication Technology in Humanitarian Supply Chain Management:
A Fuzzy-Based Relationship Modelling Approach

Gaurav Kabra
Indian Institute of Technology Roorkee, India

A Ramesh
Indian Institute of Technology Roorkee, India

ABSTRACT

The rise in the occurrence of disasters has hampered the development of many countries. Practitioners and academicians are making continuous demands to enhance the utilization of information communication technologies (ICTs) in humanitarian supply chain management (HSCM) in order to continue or enhance the pace of economic growth and development of countries, as well as to reduce the impact of disaster on society. Identifying and analysing key decision variables improving the utilization of ICT in HSCM is essential in trying to improve overall performance. Therefore, to assist the organizations involved in HSCM, this study explores eleven enablers to enhancing the utilization of ICTs, with a focus on the mutual relationship among them using an integrated interpretive structural modeling (ISM) and fuzzy cross-impact matrix multiplication applied to classification (F-MICMAC) analysis. This study seeks to advance the understanding on enablers of ICTs in HSCM and to classify them, on the basis of driving and dependence power.

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1. INTRODUCTION

The application of information technology has been widely recognized in the area of humanitarian supply chain management (HSCM). The information is the key and foremost important resource for any successful relief operations. The application of IT such as information systems has been acknowledged in several disasters such as 9/11 and the London 7/7 bombing as cited by (Prasanna & Huggins, 2016). To effectively manage the relief operations, the end users’ should have the prior knowledge of the ways to manage different disasters. “Access to information is critical to successful disaster risk management. You cannot manage what you cannot measure.” Thus, the relief activities are mainly guided by the information coming from the disaster site, clarity of the situation and the management of information (Long & Wood, 1995; Perry, 2007; Simchi-Levi, Kaminsky, & Simchi-Levi, 2003). Thus, it is vital to develop such information technology based systems which provide the critical information rapidly to the decision makers’ so they can make decisions quickly and accurately.

There has been substantive research that examines the factors affecting the information technology acceptance and utilization among end-users in commercial context. For example, online purchasing tickets (Rodríguez, Busco, & Flores, 2014), mobile-RFID services (Jeong, Yoo, & Heo, 2009). Many researchers have highlighted the potential of IT in emergency management (Rao, 2007; Marcus Vogt, Hertweck, & Hales, 2011). These research have resulted in several barriers and enablers to improve the performance of HSCM. Several studies have explored the technologies for first line responder to the disasters. For example, knowledge management system (KMS) to support disaster response (Dorasamy, Raman, & Kaliannan, 2013), information management system such as IMASH (Iakovou & Douligeris, 2001); and PeopleFinder (Murphy & Jennex, 2006). In addition, many studies focuses on the design and development aspects of emergency management information system. However, there has been comparatively limited research that examines the enablers of information technology in humanitarian supply chain management in Indian context. Therefore, this study is an attempt to address the critical research gap. In nutshell, the objectives of this paper are as follows:

- Identifying and ranking the enablers to the IT enablement of HSCM;
- Establishing the relationships between the enablers to the IT enablement of HSCM; and
- Classification of the identified enablers into various categories; and to derive key managerial insights.

The rest of the paper is organized as follows: Section 2 discusses the enablers to the IT enablement of HSCM. Section 3 explains the methodology adopted for this study. Section 4 explain the results and findings of this study. Finally, Section 6 presents the conclusion of the study.

2. LITERATURE REVIEW

During the 1990s, organizations tended to implement IT in their internal SC processes. However, numerous studies suggest that since the year 2000, many organizations have shifted towards the implementation of IT in their SC (Chou, Tan, & Yen, 2004). Beynon-Davis (2009) defined IT as “any technology used to support information gathering, processing, distribution and use and is composed of hardware, software, data and communication technology.” The use of IT in HSC has become fundamental to enhancing