Chapter 85
Analyzing the Risks in Supply Chain Information System Implementations

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ABSTRACT

Organizations make considerable efforts when implementing Supply Chain Information systems (SCIS) to increase their competitiveness. This chapter attempts to identify the Risk Factors (RFs) in SCIS implementation and evaluate them. Sixteen risk factors were identified based on an extensive literature survey. A comprehensive framework is presented with three major phases to select an adequate SCIS. The risk assessment for SCIS implementation is then empirically investigated. The RFs are formulated as hierarchy structures and Fuzzy AHPs as a Multi Attribute Decision Making (MADM) tool applied to judge the viable candidates. Based on a fuzzy AHP approach, a revised risk matrix with a continuous scale is proposed to assess the RFs' classes. The result classifies the risk factors in different categories (Extreme, High, Medium and Low). The revised risk matrix with continuous scale for risk assessment in SCIS implementation is a novel approach.

1. INTRODUCTION

The supply chain is considered a network of organizations (Lambert, 2008). Lambert (2000) views Supply Chain Management (SCM) as "the management of relationships in the network of organizations, from end customers through original suppliers, using key cross-functional business processes to create value for customers and other stakeholders". A Supply Chain Information system (SCIS) basically contains various modules of supply chain planning and execution, e.g. demand planning, distribution planning, manufacturing planning and scheduling, inventory and warehouse management, supply chain

network configuration, transportation management, supply chain event management etc. To enhance the transparency of the supply chain and ensure proper dissemination of information among the supply chain members in a timely manner, more and more companies are implementing SCIS (Denolf et al., 2015). Today's Supply chains need to adopt and implement information systems more than ever to improve cooperation and integration. The supply chain information systems (SCISs) support information exchange by providing relevant information to the supply chain partners (Lau and Lee, 2000). A series of risk factors forms obstacles in the process of SCIS implementation often leading to failure. Researchers have tried to identify the risk factors that can help managers to tackle failures and implement SCIS properly. The risk factors must be properly assessed during the implementation.

Research on understanding risk factors (RF) for supply chain information system (SCIS) implementations has been scarce and fragmented. To date, very few researches presents a comprehensive system for assessing the risk factors related to supply chain information system implementation (Denolf et al., 2015). A better understanding of these risk factors might, however, allow supply chains to increase their chances of successful implementing of SCIS. Although a significant research is found to identify the risk factors in Enterprise Resource planning (ERP) system implementation, there is a dearth of work related to SCIS implementation. ERP system needs complex integration system covering a wide array of functions and departments. SCIS also faces somewhat similar complexity as different organizations in the supply chain systems may have different IT systems and organizational structures. Therefore, the risk factors involved in ERP implementation can act as a good starting point for understanding the SCIS implementation issues. This can be supported by identifying the risk factors specific to SCIS implementation. The resulting framework can be useful to both academicians and practitioners to provide a platform for proper SCIS selection and implementation and also encourage further research in the field of SCIS.

2. SUPPLY CHAIN INFORMATION SYSTEM

Christopher and Juttner (2000) argue that to develop more effective and longer-term relationships among the members of the supply chain, it is important to have better collaboration and integration among them. SCM systems have been categorized by Talluri (2000) into three domains, i.e., strategic, tactical, and operational planning systems. He applied mathematical goal programing for optimizing the solution. But the big debate remains that all the attributes may not be quantifiable. This forces the attributes to be restricted mainly to the quantitative factors, such as costs, benefits, and time factors as shown by Sarkis and Sundarraj (2000). Beach and Muhlemann (2000), Sohal et al. (2002) have adopted techniques like exploratory method, case studies, and meta-methodology to avoid such problems. A SCIS selection and implementation is a group multiple attribute decision-making (MADM) problem where some measures may not be easily quantifiable with exact numerical values. In such cases the decision makers may be more comfortable to express their ratings in natural language rather than in numbers (Chen and Hwang, 1992).

There is no dearth of articles dealing with techniques and methodologies for design and development of SCM (Tan, 2001). However, very few literatures are there to address the issue of SCIS implementation in SCM. This is despite the fact that an effective supply chain is not possible without the support of Information Technology (IT) and an integrated information system is required for sharing information along the supply chain. The proper SCIS can ensure information exchange to enable coordination and monitoring of operations. Most of the literature focuses on specific aspects of supply chain like use of certain tools and techniques (Gunasekaran and Ngai, 2004). The failure rate for software projects are

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