The Influence of Information Technology Utilization (ITU) on Supply Chain Integration (SCI)

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ABSTRACT

The key to competitiveness in most industries has moved beyond the traditionally confined single organization. In today’s global competitive business environment, competitiveness is heavily influenced by the ability of the multiple organizations in a supply chain to synchronize and integrate their business activities and processes. Supply chain integration (SCI) which links the activities, functions, processes, and systems of a firm with its customers and suppliers, can reduce uncertainty, enhance responsiveness, reduce costs, and improve customer service. Empirical studies have explored SCI and reported that information technology (IT) is a key ingredient for the success of the integrated supply chain. While the research on SCI has been reported in OM literature, empirical studies that investigate the impact of different levels of IT utilization (ITU) – strategic, operational, and infrastructural - on SCI are not available. This research also explores the impact of top management support (TMS) on the relationship between ITU and SCI. Based on data collected from 220 manufacturing firms, this study indicates that ITU will have a positive impact on the success of an integrated supply chain when top management is personally involved in the technology implementation process.

Keywords: Information Technology (IT), Information Technology Utilization (ITU), Infrastructural IT, Operational IT, Supply Chain Integration (SCI), Top Management Support (TMS)

1. INTRODUCTION

The key to competitiveness in most industries has moved beyond the confines of any single organization. In today’s business environment, competitiveness is heavily influenced by the ability of the multiple organizations in a supply chain to synchronize and integrate their business activities and processes. Supply chain integration which links the activities, functions, processes, and systems of a firm with its customers and suppliers can reduce uncertainty, enhance responsiveness, reduce costs, and improve customer service (Frohlich & Westbrook, 2002; Kim & Narasimhan, 2002; Maloni & Benton, 2000; Saeed, Malhotra, & Grover, 2005; Vickery, Jayaram, Droge, & Calantone, 2002). To take advantage of this new competitiveness, firms are applying advanced information technology (IT) to move toward ever-increasing supply chain integration both inter- and intra-organizations. IT has been found

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to rank highly as the essential ingredient and backbone for the success of SCI (Barut et al., 2002). As the concept of competing between supply chains grows more intense and widespread because of inevitable global competition, IT utilization (ITU) has changed its role from back office and operational support to strategic imperative. Firms have started to utilize IT to directly influence the processes of comprising the value chain (Rushton & Oxley 1994; Williams et al., 1997).

This empirical research is an attempt to study the phenomenon by which IT has been used for supply chain integration (SCI) purposes and how top management support helps enhance the success of SCI. In this study, ITU refers to the way that firms apply IT to support infrastructural and operational decision making, and to assist in strategic decision planning. Unlike the previous studies whose ITU has mainly focused on operational activities (Narasimhan & Kim, 2001, 2002; Kim & Narasimhan, 2002), ITU in this study is conceptualized at three distinctive levels – strategic IT (SIT), operational IT (OIT), and infrastructural IT (IIT). SIT is the extent to which a firm uses IT for formulating, justifying, and improving long-term business planning processes. OIT refers to the extent to which a firm uses IT for monitoring, justifying, and improving daily operational decision processes. IIT refers to the extent to which a firm uses IT to facilitate information sharing and data communication, to recommend standards for IT architecture, to implement security, and to coordinate work activities within firm.

This study also extended the concept of SCI which has primarily been lacking in the current literature. The existing supply chain literature have portrayed SCI mainly on tactical not strategic issues such as production planning, purchasing transactions, and delivery (Frohlich & Westbrook, 2002; Saeed, Malhotra, & Grover, 2005; Vickery, Jayaram, Droge, & Calantone, 2002). In this research, we build upon research in supply chain management to study two aspects of SCI – supplier integration (SI) and customer integration (CI).

Specifically we develop and test a conceptual model to study the relationships among the extent of top management support (TMS), IT utilization (ITU), and supply chain integration (SCI). This research makes several contributions to the literature. By studying the mediating role of ITU on the relationship between TMS and SCI, we extend the research on supply chain management. The measures for TMS, ITU, and SCI that were developed by synthesizing the information systems and supply chain management literature are more comprehensive than the previous measures which will be beneficial for both academics and practitioners. In the next section of the paper, the literature on ITU and SCI will be reviewed. Developed based on the literature, the conceptual model and research hypotheses will be discussed. The survey research method used to gather the data and methods used to test the model will be described. The results will be presented along with implications for research and for practice.

2. LITERATURE REVIEW

2.1. Information Technology Utilization (ITU)

Narasimhan and Kim (2001, 2002) and Kim and Narasimhan (2002) proposed to measure ITU using three sub-constructs including (1) IS for infrastructural support; (2) IS for value creation; and (3) IS for logistical operations. The ITU proposed by Narasimhan and Kim focuses mainly on physical and operational aspects of IS. Although these two concepts have significant implications for supply chain activities, they might lack rigor as firms try to utilize supply chain integration systems for decision making purposes. In supply chain integration context, strategic usage of IT is better suited where firms paid more attention to how well the organization uses IT for strategic reasons such as long-term planning, proactiveness, and internal and external analysis (Sabherwal & Chan, 2001). In this study, ITU refers to the extent that firms apply computer and informa-
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