Chapter 16
Using Organizational Information Processing Theory to Examine the Relationship between Information Sharing and Supply Chain Performance

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ABSTRACT

Supply chains operate under conditions of uncertainty, and chain members exchange information as a means to mitigate such uncertainty within the chain. While these exchanges have largely been viewed as a positive method of achieving operational cohesion, some supply chains appear to benefit more from increased levels of information sharing than others. To assist in explaining the performance differences experienced by supply chains engaged in information-sharing activities, a new perspective of information sharing within supply chains based on organizational information processing theory (Galbraith, 1973) is introduced. More specifically, it is posited that individual supply chains may be examined as single information processors and that their characteristics can induce complexities in the shared information—ultimately an issue that affects how supply chains process this information. Furthermore, the degree to which supply-chain members' information systems are compatible with each other is posited to also play a significant role in information-processing capabilities.

INTRODUCTION

Supply chain management (SCM) has received much attention over the past few years particularly in the manufacturing and retailing industries. The profitability of an enterprise in these industries may well depend on the efficiency and effectiveness of the enterprise's supply chain which functions entail: (i) the coordination of the activities of each member to facilitate efficient flow of goods and services; and (ii) the matching of supply with demand. Accordingly, researchers have attempted to identify the factors that assist chain members in

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achieving such efficiency and effectiveness from a collective standpoint.

Among these interests, information flow among the supply-chain members is considered an important mechanism for accomplishing the above objectives. Lee, Padmanabhan, and Whang (1997a, 1997b) state that these information flows directly impact production scheduling, inventory control, and delivery plans of the members in the supply chain. Time delays in order and material movement, order batching, as well as a lack in the sharing of production information and market demand among members result in higher amplification of order and inventory fluctuations, a phenomenon commonly referred to as the bullwhip effect (Chen & Lee, 2009). One suggestion given for attenuating such a detrimental effect is increased information sharing throughout the entire supply chain (Lee et al., 1997a, 1997b).

Since the pioneering work on the bullwhip effect, other SCM researchers have focused on enumerating the possible positive outcomes associated with such information sharing within a supply chain (Cachon & Fisher, 2000; Klein & Rai, 2009; Lee, So, & Tang, 2000; Li, 2002; Huang, Lau, & Mak, 2003; Thonemann, 2002). For example, studies have shown support that information sharing within supply chains mitigates imbalances in information (i.e. information asymmetries) among members (Chatfield, Kim, Harrison, & Hayya, 2004; Ren, Cohen, Ho, & Terwiesch, 2010). Empirical studies have also indicated that effective information sharing can significantly enhance supply chain performance through lead time reduction and improved inventory performance (Zhou & Benton Jr., 2007; Shah & Shin, 2007; Ward & Zhou, 2006). Other studies show that information sharing may also be linked to considerable cost savings in other ways (Cachon & Fisher, 2000; Lin, Huang, & Lin, 2002; Raghunathan, 2001; Yu, Yan, & Cheng, 2001).

Notwithstanding these results, some researchers have argued that the benefits of information sharing may be overstated or wasteful in some instances (Raghunathan, 2001; Steckel, Gupta, & Banerji, 2004). Thonemann (2002) stated that the benefits obtained from the sharing of advance demand information depends on supply-chain characteristics and that this sharing can, in some instances, actually increase the bullwhip effect. Likewise, researchers have argued that sufficient information to meet SCM objectives may be obtained through already-available sources such as retailer's ordering policies (Cachon & Fisher, 2000) and entire order histories (Raghunathan, 2001) thereby rendering further information sharing wasteful to the point of information overload (Larson & Kulchitsky, 2008).

It is also argued that information sharing alone does not result in superior performance as the types and volume of information shared as well as the processing and utilization of the information for decision making are also critical for an efficient supply chain (Anand & Goyal, 2009; Kulp, Lee, & Ofek, 2004; Li and Tan, 2004; Chen 1999; Chen, Drezner, Ryan, & Simchi-Levi, 2000). These findings, including the daunting task of integrating different types of information technologies and their associated systems for interorganizational communication, have placed information sharing in a different light. Thus, deriving supply-chain performance from information sharing is much more than merely increasing the amount ofof interorganizational information traded among firms (Choi, Blocher, & Gavirneni, 2009; Mishra, Raghunathan,& Yue, 2009). Rather, information sharing and its possible benefits or drawbacks should be systematically evaluated with respect to how supply chains are able to process this shared resource (Ha & Tong, 2008).

The goal of this paper is to help explain why some supply chains may experience higher performance gains from intrachain, information-sharing activities over others. Accordingly, it is posited that supply chains should be considered as single information processors that are not all alike with respect to their information-processing needs and capabilities. A conceptual model de-