

# Chapter 7.10

## Information Sharing and Supply Chain Performance: Understanding Complexity, Compatibility, and Processing

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### ABSTRACT

Practically all supply chains operate under conditions of uncertainty. To mitigate this uncertainty and increase performance, organizations within chains exchange information to achieve operational cohesion. However, as some researchers have noted, some supply chains benefit more from increased levels of information sharing than others (e.g. Cachon & Fisher, 2000). To assist in explaining the performance differences experienced by supply chains engaged in information-sharing activities, we introduce a new perspective of information sharing within supply chains based on organizational information processing theory (Galbraith, 1973). More specifically, our work and derived conceptual model posit that individual supply chains may be examined as single information processors and that their characteristics can induce complexities in the shared informa-

tion which subsequently influence 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 chains exist in almost every industry. When the production and consumption of a product occur in different places, a supply chain is created. 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.

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. The authors report that 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. One suggestion given for attenuating such a detrimental effect is increased information sharing throughout the supply chain (Lee et al., 1997a, 1997b).

Since Lee et al.'s (1997a, 1997b) pioneering work, other SCM researchers have recently focused on enumerating the possible outcomes associated with such information sharing within a supply chain (e.g. Cachon & Fisher, 2000; 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 (e.g. Chatfield, Kim, Harrison, & Hayya, 2004)). 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 (e.g. Cachon & Fisher, 2000; Lin, Huang, & Lin, 2002; Raghunathan, 2001; Yu, Yan, & Cheng, 2001).

Notwithstanding these results, some have argued that the benefits of information sharing may be overstated or wasteful in some instances (e.g.

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. 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 (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. It seems that supply-chain performance derived from information sharing is much more than the mere increase in the trading of interorganizational information. 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.

The goal of this paper, therefore, is to provide reasoning as to why some supply chains may experience higher performance gains from intrachain, information-sharing activities over other chains. Accordingly, we posit that supply chains should be considered as single information processors that are not all alike with respect to their information-processing needs and capabilities. We express the likely impact of supply-chain characteristics on the relationship between information sharing and supply-chain performance in a conceptual model derived from organizational information process-

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