



Chapter III

Information Sharing in Supply Chain Management with Demand Uncertainty

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ABSTRACT

Information sharing is a major strategy to counteract the amplification of demand fluctuation going up the supply chain, known as the bullwhip effect. However, sharing information through interorganizational channels can raise concerns for business management from both technical and commercial perspectives. The existing literature focuses on examining the value of information sharing in specific problem environments with somewhat simplified supply chain models. The present study takes a simulation approach in investigating the impact of information sharing among trading partners on supply chain performance in a comprehensive supply chain model that consists of multiple stages of trading partners and multiple players at each stage.

INTRODUCTION

During the last decade, supply chain management, collaboration, coordination, and integration have been a concern of the world of business as well as the academic community. It is generally accepted that supply chain collaboration has a major impact on an organization's ability to meet customer needs and reduce costs. A key step in supply chain collaboration is to share information among the supply chain partners.

While information sharing is also viewed as a major strategy to counter the bullwhip effect (Chen et al., 2000; Gavirneni 2002; Lee, Padmanabhan & Whang, 1997a, 1997b; Simchi-Levi, Kaminski & Simchi-Levi, 2000), the advances in information technologies make information sharing possible, and these advances actually become a key driver of supply chain integration. However, sharing information through interorganizational channels has brought about new concerns for business management. Due to the competitive and adversarial nature of the business itself, managers tend to overestimate the possible risks without seeing the potential benefits and thus are reluctant to share information with their trading partners (Lee & Whang, 1998; Whang, 1993). Under this context, evaluating the effectiveness or the value of the information sharing becomes prominent before the managers are willing to push for any IT investment on supply chain collaboration (Huang, 2004).

In this chapter, we focus on addressing the above issues by investigating the effectiveness of information sharing under several different scenarios within a comprehensive supply chain model where a supply chain is defined as follows:

multiple trading partners with suppliers/manufacturers and customers at the opposite ends with wholesalers and retailers located between them, and all entities are interconnected through the flow of materials and/or information. (Huang, 2004, p. 3)

The rest of the chapter is organized as follows. In the next section, we describe some of the relevant work, which is followed by our research methodology including the design of the simulation study, experimental results, and conclusion.

PREVIOUS WORK

In the supply chain management research literature, a phenomenon that has been observed for a long time is that the fluctuation of demand information is amplified throughout the supply chain from downstream to upstream. While Forrester (1958, 1961) and Sterman (1989) identify and study this phenomenon, Lee et al. (1997a) coined this "the bullwhip effect" using several case studies and

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