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Information technology, operational, and management competencies for supply chain agility: Findings from case studies

Eric W.T. Ngai, Dorothy C.K. Chau *, T.L.A. Chan

Department of Management and Marketing, The Hong Kong Polytechnic University, Hong Kong

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ABSTRACT

Given the growing emphasis on the need for supply chain agility to sustain competitive advantage, this study explores the impact of the relationship between supply chain competence and supply chain agility on firm performance. Although the influence of supply chain agility on firm performance has been acknowledged, this study further articulates the relationship from the perspective of inter-organizational collaboration. We develop a conceptual model based on the resource-based view and employ a multi-case study method in this exploratory research. Our findings highlight the importance of distinguishing the difference between supply chain agility and supply chain competence and their impact on firm performance. This study contributes to the growing body of conceptual and empirical literature on supply chain agility and adds to the understanding of the complexity of supply chain competence.

1. Introduction

Currently, business environment is characterized by pressure caused by stiff competition, constant changes (e.g., product/technological innovations, decreasing product lifecycles, and product proliferation), and a high level of market uncertainty and unpredictability (Braunscheidel and Suresh, 2009; Overby et al., 2006; Swafford et al., 2006a,b; White et al., 2005). Choi (2007) and Christopher (2000) show that demand uncertainty and limited visibility have long been a challenge to supply chain management. Such challenges require organizations to respond promptly to market changes to sustain competitive advantage and business success (Sambamurthy et al., 2003; Swafford et al., 2006a). Supply chain agility is the organization's ability to respond to unexpected market changes and convert these changes to business opportunities (Swafford et al., 2008). Thus, it is one of the most essential elements helping an organization survive a turbulent and volatile environment (Agarwal et al., 2007; Bottani, 2009; Braunscheidel and Suresh, 2009; Lin et al., 2006; Oosterhout et al., 2006; Overby et al., 2006; Sarker et al., 2009; Swafford et al., 2006a, 2008).

An emerging body of management research focuses on understanding the importance of supply chain agility in coping with the challenges in a business environment. Within the domain of research, most of the articles focus on identifying the enablers or antecedents of supply chain agility. The potential enablers or antecedents include collaborative relationships with supply chain partners (Braunscheidel and Suresh, 2009; Khan and Pillania, 2008; Lin et al., 2006; White et al., 2005), supply chain flexibility (Braunscheidel and Suresh, 2009; Swafford et al., 2006a, 2008), internal integration (i.e., information and/or process) (Braunscheidel and Suresh, 2009; Lin et al., 2006), and information technology (IT) (Braunscheidel and Suresh, 2009; Swafford et al., 2008; Sambamurthy et al., 2003; Li et al., 2006; Fink and Neumann, 2007). Despite various studies, there is no research providing a comprehensive framework for supply chain competence for enhancing supply chain

* Corresponding author. Tel.: +852 34003584.
E-mail addresses: mswtngai@polyu.edu.hk (E.W.T. Ngai), dorothy.chau@polyu.edu.hk (D.C.K. Chau), chanticklunalan@yahoo.com (T.L.A. Chan).

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agility. In contrast, existing research on supply chain agility mainly focuses on internal supply chain and its immediate entities (Braunscheidel and Suresh, 2009; Swafford et al., 2008; White et al., 2005). This gives rise to the research concern on the role of inter-organizational collaboration in the relationship between supply chain competence and agility.

With regard to the emerging business value of supply chain agility and insufficiency of research, this study aims to develop a framework for supply chain competencies, particularly for supply chain agility and firm performance. Specifically, this study aims to uncover the answers to the following research questions:

a. What are the entities that encompass supply chain competence supporting supply chain agility?
b. How do information technology, operational, and management competencies enable supply chain agility?
c. How does supply chain agility enhance firm performance?

With reference to resource-based view (RBV), this study develops a conceptual model and derives strategic implications for the use of competencies as strategy for managing supply chain agility. This study hopes to provide organizations with guidelines for understanding the competencies crucial to sustaining competitive advantages and surviving in a hyper-competitive environment. This paper proceeds as follows. In the theoretical background, the concepts of supply chain agility and supply chain competence are discussed. Supply chain competence is conceptualized as having three conceptual components: IT competence (IT integration and flexibility), operational competence (supply chain integration, flexibility and learning orientation), and management competence (top management role and vision and employee competence). A conceptual framework that explains the causal relationship among supply chain competence, supply chain agility, and firm performance is then presented. Subsequently, three case studies on the textile and fashion industry are presented to validate the proposed research model using a case study approach. This research builds a theoretical foundation for instrument development and tests the individual causal relationship among the above-mentioned constructs.

2. Supply chain agility

The concept of agility was introduced by researchers of the Iacocca Institute of Lehigh University in 1991 (Bottani, 2009). It was first introduced within the field of manufacturing and in the concept of flexible manufacturing systems (Sarker et al., 2009; Sarker and Sarker, 2009; White et al., 2005). Since then, it has received increasing attention from both academic and commercial fields. In the field of management information system, supply chain agility is a relatively new concept (Braunscheidel and Suresh, 2009). Researchers conceptualize supply chain agility as a broad and multi-dimensional construct. In the most general sense, supply chain agility is defined as the capability of supply chain functions to provide a strategic advantage by converting unexpected market uncertainties and potential and actual disruptions into competitive opportunities through assembling requisite assets, knowledge, and relationships with speed and surprise (Bottani, 2009; Braunscheidel and Suresh, 2009; Christopher, 2000; Khan and Pillania, 2008; Sambamurthy et al., 2003; Swafford et al., 2006a). On one hand, supply chain agility encompasses the exploration and exploitation of market opportunities. On the other hand, it encompasses the ability to deliver innovative products and services in a timely and cost-effective manner (Overby et al., 2006; Sambamurthy et al., 2003; Sarker et al., 2009; Swafford et al., 2006a; Zhang and Sharifi, 2000). Supply chain agility requires an organization to supervise closely the legally separate but operationally interdependent parties, such as suppliers, manufacturers, and distribution, to maintain a close and coordinating relationship (Lin et al., 2006; Yusuf et al., 2004). It enables an organization to reduce manufacturing costs, enhance customer satisfaction, remove non-value added activities, and therefore maintain a competitive position in a competitive environment (Bottani, 2009; Braunscheidel and Suresh, 2009; Lin et al., 2006; Narasimhan et al., 2006; Swafford et al., 2006a).

RBV has been used to understand the conditions for sustaining competitive advantages (Ray et al., 2005). It posits that the organizational resources are the predictors of organizational performance (Kearns and Lederer, 2003). RBV provides a robust framework for analyzing the relationship between supply chain competence and firm performance. To compete amid the uncertainty and changes in a business environment, an organization should develop core competencies and capabilities that may help it survive the competitive environment. Zhang et al. (2003, p. 176) posits that "competence emphasizes technological and production expertise at specific points along the value chain while capabilities are broadly based and encompass the entire value chain." They argue that capabilities are visible to the customers, whereas competencies are internal and support these capabilities. Following the above argument, this study proposes that supply chain agility is the capability of an organization to respond to market changes visible to customers using a set of supply chain competencies that enable such capability.

This study argues that supply chain agility is rare, valuable, and imperfectly imitable, and may therefore result in superior, long-term performance. Supply chain agility is not about rules and procedures, which can be easily implemented or imitated; rather, it is about a complex philosophy of coordination and integration among different parties and functions along the value chain. Supply chain agility helps sustain competitive advantage by continually sensing market changes and quickly responding to these changes. In relation to RBV, this study argues that supply chain agility is an organizational capability that enables an organization to sustain competitive advantages. Therefore, this study proposes the following:

Proposition 1. *Supply chain agility is positively associated with firm performance.*