ARTICLE IN PRESS

Int. J. Production Economics ∎ (∎∎∎∎) ∎∎∎–∎∎∎

Contents lists available at SciVerse ScienceDirect

Int. J. Production Economics

journal homepage: www.elsevier.com/locate/ijpe

Supply chain information systems strategy: Impacts on supply chain performance and firm performance

Sufian Qrunfleh [a,1], Monideepa Tarafdar [b,*]

[a] Department of Operations and Information Management, Kania School of Management, 320 Madison Avenue, The University of Scranton, Scranton, PA 18510, USA
[b] College of Business and Innovation, The University of Toledo, 2801W. Bancroft Street, MS# 103, Toledo, OH 43606, USA

ARTICLE INFO

Article history:
Received 26 March 2012
Accepted 25 September 2012

Keywords:
Supply chain strategy
Information systems strategy
Supply chain performance
Information processing theory
Survey research

ABSTRACT

This paper examines the relationship between supply chain (SC) strategy and supply chain information systems (IS) strategy, and its impact on supply chain performance and firm performance. Theorizing from the supply chain and IS literatures within an overarching framework of the information processing theory (IPT), we develop hypotheses proposing a positive moderating effect of two supply chain IS strategies – IS for Efficiency and IS for Flexibility – on the respective relationships between two SC strategies – Lean and Agile, and supply chain performance. Based on confirmatory analysis and structural equation modeling of survey data from members of senior and executive management in the purchase/materials management/logistics/supply chain functions, from 205 firms, we validate these hypotheses and show that the IS for Efficiency (IS for Flexibility) IS strategy enhances the relationship between Lean (Agile) SC strategy and supply chain performance. We also show a positive association between supply chain performance and firm performance, and a full (partial) mediation effect of supply chain performance on the relation between Agile (Lean) SC strategy and firm performance. The paper contributes to the supply chain literature by providing theoretical understanding and empirical support of how SC strategies and IS strategies can work together to boost supply chain performance. In doing so, it identifies particular types of supply chain IS application portfolios that can enhance the benefits from specific SC strategies. The paper also develops and validates instruments for measuring two types of SC strategies and supply chain IS strategies. For practice, the paper offers guidance in making investment decisions for adopting and deploying IS appropriate to particular SC strategies and analyzing possible lack of alignment between applications that the firm deploys in its supply chain, and the information processing needs of its SC strategy.

© 2012 Elsevier B.V. All rights reserved.

1. Introduction

A critical aspect of successfully managing the supply chain lies in measuring and monitoring information about its key operational and performance parameters (e.g. inventory, delivery schedules and lead times) (Gunasekaran and Ngai, 2004). It is therefore important for a firm to adopt information systems (IS) that are aligned to its supply chain, that is, adopt IS that facilitate the particular processes of its supply chain and provide information about parameters that assess specific goals of its particular supply chain (SC) strategy. Practice-based commentary provides instances of both success and failure of firms in achieving such alignment. For example, Wal-Mart's adoption of IS for materials management, ordering, and RFID-based inventory-tracking has enabled real-time demand forecasting and inventory management, leading to higher inventory turnover and reduced inventory costs. These applications have thus supported the company's low cost SC strategy. On the other hand, Nike's $100 million deployment of supply chain software failed to prevent significant inventory shortages and excesses in its supply chain (McLaren et al., 2004), largely as a consequence of lack of fit of the application with its supply chain objectives. Examples such as these clearly suggest the importance of aligning information systems that are deployed in the supply chain with the goals and objectives of the supply chain itself (Shah et al., 2002).

Why are some firms successful at such alignment whereas others are not? One important reason is lack of adequate analysis regarding whether benefits from a particular application address the specific information processing and management control needs of the supply chain (Gunasekaran and Ngai, 2004; Richmond et al., 1998). For instance, if minimizing inventory or achieving leanness is a key objective of the supply chain, what kind of applications should be adopted by a supply chain member

* Corresponding author. Tel.: +1 419 530 2442.
E-mail addresses: sufian.qrunfleh@scranton.edu (S. Qrunfleh), monideepa.tarafdar@utoledo.edu (M. Tarafdar).
[1] Tel.: +1 570 941 7407.

0925-5273/$ - see front matter © 2012 Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.ijpe.2012.09.018

Please cite this article as: Qrunfleh, S., Tarafdar, M., Supply chain information systems strategy: Impacts on supply chain performance and firm performance. International Journal of Production Economics (2012), http://dx.doi.org/10.1016/j.ijpe.2012.09.018

firm to support leanness in its processes? Or, which applications are required for effectively addressing the information processing requirements emanating from the objective of inventory minimization? Appropriate fit between supply chain and IS thus requires a basis for analyzing how information processing needs of particular types of supply chains can be supported by specific IS applications.

We examine the moderating relationships between SC strategies (i.e. particular types of strategic goals and objectives that supply chains can have) and supply chain IS strategies (i.e. particular IS applications portfolio profiles for the supply chain), and their associated effects on the supply chain performance (i.e. supply chain flexibility, integration and customer responsiveness) and firm performance (i.e. how well a firm achieves its market-oriented and financial goals). In particular, theorizing from the supply chain and IS literatures, we develop hypotheses proposing that positive moderating relationships between two distinct SC strategies (Lean and Agile) and two respective supply chain IS strategies (IS for Efficiency and IS for Flexibility) are associated with enhanced performance of the particular supply chain and that of the focal firm. Validation of the framework with confirmatory analysis of survey data from senior executives in supply chain/materials management/procurement roles from 205 manufacturing firms shows that IS for Efficiency and IS for Flexibility positively moderate the relationship between Lean SC strategy and Agile SC strategy, respectively, and supply chain performance. The theoretical implication is that IS for Efficiency and IS for Flexibility reinforce the supply chain benefits from Lean SC strategy and Agile SC strategy, respectively, and also facilitate improved firm performance.

To situate the paper's contribution, we note here that firstly, the literature has developed classifications of SC strategies (Fisher, 1997; Lee, 2002; Vonderembse et al., 2006), without explaining the associated implications for adopting supporting information systems. Therefore it is largely deficient, in offering a theoretical understanding of how particular IS can support the information processing requirements of processes associated with specific types of supply chains, or how or why specific SC strategies should be aligned with relevant IS strategies. Our study addresses this conceptual gap by offering a theoretical and empirical basis for analyzing the benefits of different types of IS applications to supply chains. It shows that *particular* types of information systems application portfolios when *associated* with different types of SC strategies, can enhance supply chain and firm performance. Secondly, existing studies describe the impact of information technology (IT) *in general* on *individual* supply chain aspects such as supply chain integration (Shah et al., 2002; McLaren et al., 2004; Rai et al., 2006), procurement-related activities and supplier relationships (Premkumar et al., 2005; Subramani, 2004; Sanders, 2008). This paper builds on and extends these studies by considering the *broader* aspect of the nature of the supply chain (i.e. SC strategy), and identifying the relevant *set of applications* (i.e. IS strategy) that would enhance its impact on supply chain performance. Based on these observations, we submit that the paper contributes to the literature by suggesting that appropriate fit between SC strategy and supply chain IS strategy leads to improved supply chain performance, to the best of our knowledge, one of the first studies to theoretically and empirically examine such alignment. Thirdly, it offers validated instruments for measuring SC strategy and supply chain IS strategy of a firm and supply chain performance.

For supply chain and operations management practitioners, the study demonstrates the importance of adopting and implementing those IS applications that fit the particular type of the supply chain. We provide guidance to managers for acquiring and deploying *appropriate* applications in the supply chain, for a specific supply chain strategy. In doing so we provide a basis for understanding which IS applications should be developed/purchased and implemented, for specific supply chains. That is, the paper offers a framework by which supply chain and operations managers can analyze investment decisions with regard to the deployment of IT in the supply chain.

The paper is set out as follows. First, we provide theoretical background from IS and supply chain literatures. Next, we develop the research model and hypotheses. We then describe methods and findings, followed by interpretations, contributions and limitations.

2. Theoretical background

The theoretical background informing this paper draws from the information processing view of the firm (Galbraith, 1973). Exemplified by the information processing theory (IPT), this view looks at organizations as information processing entities that collect, analyze, and coordinate information in order to make operational and strategic decisions. Design of processes then, should address information processing capabilities that support information requirements for decision-making. This can be either through structural means such as rules, procedures and lateral communication mechanisms or through the application of IS. Applying the IPT to supply chain processes, emerging research (Schoenherr and Swink, 2012) shows that integration of external (i.e. supplier and customer facing) processes leads to improved supply chain performance and that integration of internal (i.e. intra-firm logistics, operations and supply chain management) processes positively moderates this relationship. In this study we draw from the IPT to suggest that the information required to implement particular SC strategies represents the supply chain's *information processing needs*. Supply chain IS strategy encompasses different applications applied to supply chain processes and thus represents its *information processing abilities*. That is, the supply chain IS strategy of the focal firm provides the infrastructure or vehicle, with which its SC strategy can be most effectively translated into performance. We thus argue that matching particular SC strategies (i.e. supply chain *information processing needs*) with appropriate supply chain IS strategies (i.e. supply chain *information processing abilities*) will enhance the benefits from those SC strategies.

2.1. Supply chain strategy and supply chain information systems strategy

The SC strategy reflects the "nature" of the particular supply chain and establishes its specific objectives and goals (Lee, 2002; Fisher, 1997). Classifications of SC strategies suggest that supply chains can be predominantly focused on cost efficiencies and leanness, on flexibility and quick response, or on a contingent mix of both. A number of such classifications (e.g. Vonderembse et al., 2006; Lee, 2002) describe efficient supply chains, risk-hedging supply chains, responsive supply chains, and agile supply chains. In this paper, we will focus on two distinct SC strategies—Lean and Agile SC strategies. A "Lean" SC strategy is one aimed at creating a cost efficient supply chain, with a focus on reducing inventory lead times and waste (Wang et al., 2004; Vonderembse et al., 2006). This strategy works well where demand is relatively stable and predictable, and product variety is low (Qi et al., 2009). An "Agile" SC strategy is aimed at achieving flexibility and adaptability in the face of changing customer needs and competitive environments through quick, dynamic and continual response (Gunasekaran et al., 2008; Lin et al., 2006). Table 1 summarizes differences between Lean and Agile SC strategies.

Please cite this article as: Qrunfleh, S., Tarafdar, M., Supply chain information systems strategy: Impacts on supply chain performance and firm performance. International Journal of Production Economics (2012), http://dx.doi.org/10.1016/j.ijpe.2012.09.018

دریافت فوری ← متن کامل مقاله

ISIArticles
مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات