E-Business Supply Chains Drivers, Metrics, and ERP Integration

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INTRODUCTION

The world of business is witnessing the emergence of electronic supply chains (e-SC or e-supply chain). The Internet has radically changed the nature of supply chains at its core (Sambasivan, Mohamed, & Nandan, 2009). In fact, as more business is performed via the Internet, e-SCs are becoming an integral part of supply chain management (SCM; Gunasekaran, Patel, & Tirtiroglu, 2001; Sambasivan et al., 2009). Businesses are becoming supply chain-sensitive organizations. With business via the Internet requiring different fulfillment approaches, traditional drivers of regular supply chains are no longer adequate for explaining how and to what extent e-SC performance is driven (Sambasivan et al., 2009). E-commerce offers consumers more buying options than traditional business. Buyers can instantly compare prices, product attributes, and delivery parameters. As a result, customers have become increasingly demanding. The task of supply chain professionals is more complicated than ever because e-SCs rely on ERP software. This situation often leads to unsatisfied customers, which can force companies to close their doors.

SCM is responsible for ensuring that customer needs are satisfied in a cost-effective manner. To do this, they formulate strategies, allocate resources, organize activities, and assess performance. Effective and efficient SCM resource allocation is contingent upon a proper understanding and interpretation of its performance drivers (Stock & Boyer, 2009). However, managers often operate on the basis of their own experience and commonly-used methodologies that do not always result in the desired level of performance. Therefore, a framework to leverage actual drivers of e-SC performance is needed (Caputo, Cucchiella, Fratoccchi, Pelagagge, & Scacchia, 2004).

In fact, e-SCs involve partners that are linked by Internet technology in broad networks where customers, retailers, distributors, manufacturers, and suppliers are connected (Fliedner, 2003; Lightfoot, & Harris, 2003; Williams, Esper, & Ozment, 2002). Within and across the networks, actors collect, process, store, and disseminate information on materials, goods, funds, and services. e-SCs are composed of many-to-many connections, while relationships in traditional supply chains are characterized by one-to-one connections. A dramatic revision of current SCM techniques is needed (Caputo et al., 2004). Therefore, understanding e-SCM performance drivers and their integration with ERP becomes a necessity for any SCM professional. Based on the literature survey, little attention has been devoted to SCM performance driver evaluation despite the high volume of ongoing research in the field (Gunasekaran et al., 2001; Sambasivan et al., 2009).

This article discusses the performance drivers of eSCs, metrics for measuring efficiency, and their integration with ERPs. Considering the fact that e-SCs are becoming an integral part of the extended enterprise (Sambasivan et al., 2009), the first section of this article introduces a model of the traditional supply chain for both manufacturing and service systems. In addition, it assesses the logistical and cross-functional performance drivers of supply chains (Chopra & Meindel, 2010; Olver, Lant, Plant, Majeste, & Kursh, 2010). The section concludes with a brief comparison between physical product and information flow.

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The second section examines e-SC structures and performance metrics for capturing and gauging system effectiveness and efficiency. It also explains the corresponding measures for the implementation of each metric. It should be noted that e-SC metrics and their corresponding measures are effective ways for managers to ensure that the supply chain is achieving the expected benefits (Riggins & Mitra, 2001).

The role of information technology has shifted from passive enabler to high-performing processes that directly impact the organization's performance. Because e-SC performance requires integration (Smart, 2008), the third section discusses the integration of ERPs into e-SCs to enhance their performance. In this last section, the author discusses the effectiveness and efficiency benefits of ERP for e-SCs (Sambasivan et al., 2009).

SCM is among the most important factors to organizational success (Gunasekaran et al., 2001). There are many benefits of e-SCs that are quantifiable and others that are not (Singh & Byrne, 2005). Effective SCM can enhance competitiveness and increase profitability. Nevertheless, SCM professionals and other actors must understand the factors that undergird driver performance in order to achieve a competitive advantage.

BACKGROUND

According to Stevenson (2012), supply chains are sequences of organizations involved in the production of a good and/or the provision of a service. The author argues that organizations generally consist of facilities, functions, or units, and carry out production or service provision activities. Therefore, their facilities, functions, and activities involved in the production or service provision are integral parts of supply chains. Facilities may include operating units, such as factories, storage facilities such as warehouses, processing centers, distributions centers, and even offices since information is manipulated to trigger, move, and track products and services within and throughout the supply chain. As a result, every product is made through its supply chain within and across multiple sequential organizations. The main conceptual dilemmas have always been: (1) What activities and components of an organization should it include in its given supply chain? (2) Where are the boundaries of SCM territory?

The consensus today seems to be that the supply chain begins with the original suppliers of raw materials. This is followed by the production in an operating unit, the storage in processing centers and warehouses. It ends with the delivery of the finished item to the user. Therefore, supply chains existed since the creation of the first good. However, developing a consensus definition of a supply chain has not been an easy task for academicians and practitioners.

Stock and Boyer (2009) examined 173 unique definitions of SCM from systematic reviews of the entire decision science field in an effort to frame the adoption of a consensus definition of SCM. The definitions were considered unique because they added at least one new element that differed from existing definitions. This inquiry was performed based on the assumption that in the absence of a uniform agreed upon definition, it would be impossible to advance the SCM theory and practice (Stock & Boyer, 2009). The study identified three themes (activities, benefits, and constituents) associated with the definition of SCM. Six sub-themes were also identified. The theme titled "benefits" consisted of three sub-themes: value added, efficiency created, and customer satisfaction. These three sub-themes accounted for 47%, 35%, and 28%, respectively. The theme titled "activities" was credited with physical (materials), services, finances, and information flows counting as its first sub-theme, with networks of internal and external relationships as its second sub-theme. However, there continues to be a variety of theories on what is a supply chain and how SCM should be defined (Mentzer et al., 2001).

With the advent of the Internet and its business applications, the world has witnessed a new