

Chapter 10

Methodology to Support Supply Chain Integration a Business Process Perspective

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ABSTRACT

This chapter explains and describes a detailed framework based on integrating a number of different methodological strands from the literature. A literature review was conducted in three different domains - business process re-design, supply chain re-design and e-business process design-. The literature review revealed potential for integrating elements of a number of different methods and techniques found in different methodological strands into a framework for conducting Business Process Re-design (BPR) to support Supply Chain Integration (SCI). The proposed BPR methodology can be applied in any company or sector; methods and techniques incorporated are not specific to any sector.

BACKGROUND

The supply chain has grown in importance as a source of competitive advantage among companies across different sectors. Companies have been facing a new competitive environment due to changes brought by the globalization of markets, characterized by an increase in the number of competitors, shorter product life cycles and changing customer demand. Therefore, many companies are aiming to achieve competitiveness by improving their supply chains. Accordingly, integration of the supply chain has gained importance as a key issue in supply chain management (SCM). When integration is achieved, the supply chain operates as a single entity driven directly by customer demand. The more integration across the supply chain, the easier to balance supply and demand. Additionally, integration allows synchronization among supply chain partners and well-coordinated flows of materials. SCI is also attractive because it allows reduction of the bullwhip effect and brings a number of operational benefits such as reduction of supply chain costs, lead time and risks.

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Challenges in the Construction of SCI

However, the supply chain literature shows the existence of a number of challenges associated to the integration of supply chains (Awad & Nassar, 2010; Baghchi & Skjoett-Larsen, 2005). According to Awad and Nassar (2010), different perspectives have been used to enumerate the challenges associated to the construction of SCI. In this chapter, a business process perspective will be used. A process is a set of one or more linked activities that collectively accomplish a business objective by transforming a set of inputs into a specific set of outputs. From the business process perspective, sharing of information, coordination of material flows and integration of business processes appear to be most critical challenges.

Traditionally, business processes were understood as a series of sequential tasks and activities restricted to the functional areas in a business. However, as result of the evolution of management paradigms and internet and communications technologies (ICT) applications, a new dimension was added to the business process definition. This new dimension consists of business processes crossing functional and organizational boundaries, as is the case with supply chain processes. Additionally, as the number of process links between supply chain partners increase, the coordination of material flows becomes more difficult affecting inventories all across the supply chain and ultimately the customer service level offered. In order to achieve supply chain integration, is necessary for the supply chain partners to coordinate the material flows with each other.

Information sharing can be viewed as a prerequisite to material flow coordination. However, as result of the supply chain complexity, information flows have to cross through several processes and entities provoking information distortion, delays and unreliability. Thus, one of the challenges in SCI is to share critical information in real time among selected partners. The challenge of information sharing is not reduced to a technical issue of transferring data. It is necessary to consider an adequate distribution of the information among supply chain partners, in other words, to transfer the correct information to the right supply chain partner.

For a successful SCI initiative, business processes need to be integrated so that they can work synchronously and aligned. However, integration of business processes is affected by the presence of elements of dynamic complexity such as: (1) non-linearity, (2) feedback loops, and (3) time delays. As explained by Sterman (2000), non-linearity is an element of dynamic complexity which consists of unproportional effects attributed to multiple factors, as opposite to a simple cause-effect relation between variables. In the internet era, business processes became more nonlinear as a consequence of alliances and increased collaboration between companies. Feedback loops are understood as the existence of future consequences from present actions (Sterman, 2000). Time delays are explained as a non-direct cause-effect relation between variables, bringing as consequence variations and oscillations in the behaviour of systems (Sterman, 2000). Presence of these elements of dynamic complexity affects synchronization and alignment of business processes for a successful construction of SCI.

In search for solutions which can facilitate the construction of SCI, companies have turned their attention to internet based technologies (Wiengarten, Humpreys, McKittrick, & Fynes, 2013; Chen & Holsapple, 2012; Cagliano, Caniato, & Spina, 2003; Auramo, Aminoff, & Punakavi, 2002). New internet based e-collaboration tools allow the integration of multiple organizations, making it feasible to construct SCI systems. According to a study conducted by Auramo et al, (2002), organizations across different sectors have recognized the potential of ICT to share timely and reliable information, to enable business process integration and coordination of activities. ICT can support the collaboration through the supply chain and closer integration among partners.

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