Demand and supply chain integration framework

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ABSTRACT

All organizations need to coordinate their value creation (demand) and value delivery (supply) processes in order to survive in today’s competitive market environments. In this research, we compare different ways to coordinate the demand and supply chain processes. Current literature has been analyzed to develop a framework on demand and supply chain coordination. Thereafter, the framework has been exemplified using a case study. The framework combines multiple research streams and provides a method for decision-makers to estimate different coordination possibilities.

1. INTRODUCTION

All organizations have a demand chain and a supply chain that need to be managed and coordinated to maximize effectiveness and efficiency [1]. There is no major difference between them with regard to the enterprises involved but the processes considered [2]. The demand chain includes the demand processes necessary to understand, create, and stimulate customer demand [3], and is managed within demand chain management (DCM). The supply chain, instead, includes the supply processes required to satisfy customer demand [4], and is managed within supply chain management (SCM).

It may be right for an organization to focus either on the demand processes, the supply processes, or both. Some organizations embrace a demand-oriented model by focusing on coordination and management of the demand processes (DCM). These so called demand chain masters gain a competitive advantage by offering superior customer value. Other organizations embrace a supply-oriented model by focusing on coordination and management of the supply processes (SCM). These organizations are called supply chain masters and gain a competitive advantage by providing comparable customer value at lower cost. A final group of organizations embrace a customer oriented model by focusing on coordination and management of both the demand and supply processes. These so called demand-supply chain masters gain a competitive advantage by providing superior customer value at a lower cost.

It may be argued that DCM and SCM must be coordinated [5], and balanced [6], in all market environments. An imbalance between DCM and SCM may induce major difficulties [1]. Organizations with a high demand chain competence, that is not coordinated with the supply chain, may experience detrimental effects on cost and delivery performance, while an organization with a high supply chain competence, that is not coordinated with the demand chain, may experience inefficient product development, segmentation, and product delivery [3]. The choice of management orientation does not take away the fact that the demand and supply logic must be balanced one way or another [6].

The purpose of this research is to study different ways of coordinating DCM and SCM processes. Two different approaches have been proposed in the literature (the micro and macro level coordination) but these issues have been handled separately in the literature. We aim to provide a framework, which can help managers choose an alignment approach. The research question of this paper is: “How can demand and supply chain management be coordinated?” We approach this issue by identifying different ways how coordination can be achieved and construct a framework, which can be used by decision-makers. We illustrate our framework through a case study from Sweden.

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2. Literature Review

The need to coordinate the demand and supply processes has been emphasized in both the demand chain as well as the supply chain literature. From a supply chain perspective, many authors who aim to describe SCM refer to the importance of coordinating demand and supply processes by including different demand processes in the SCM definition. For instance, Cooper et al. [7] define SCM as the integration and management of key business processes across the supply chain. They outline three demand processes: customer relationship management (CRM), customer service management, and demand management. Mentzer et al. [8] also have proposed a SCM model based on the inter-functional coordination of processes spanning demand and supply functions. Similarly, Bechtel and Jayaram [9] emphasize the need for the supply chain to begin with the customer. They propose that a better term would be seamless demand pipeline, where the end user and not the supply function drive the supply chain. Lee [10] emphasizes the problems of SCM acting separately from DCM. If the demand and supply processes are separated, supply will view demand as exogenous and will fail to recognize that the customer facing functions influences demand. Fisher [11] links the integration of DCM into SCM to the concept of the market mediation role of the supply chain. Within this role, the supply chain needs to ensure that the variety of products reaching the market matches what customers want to buy. Finally, Min and Mentzer [12] stress the important role that DCM (e.g., market orientation and relationship marketing) plays in the implementation of SCM.

From a demand chain perspective, Flint [13] argues that marketing strategy implementation requires SCM, since it includes the distribution part of the strategy. Likewise, Sheth et al. [14] emphasize, in their customer-centered marketing approach, the need for DCM to be in charge of SCM. They argue that in environments with increasing diversity in customer needs and requirements, firms must rapidly adjust their supply to meet demand. Moreover, Kumar et al. [15] suggest that market-driven companies can gain a more sustainable competitive advantage, by not only providing superior customer value propositions, but also by having a unique business system. Furthermore, Srivastava et al. [16] define SCM, NPD, and CRM as the three core business processes which contribute to creating and delivering customer value. They argue that the role of DCM is to connect these processes. The authors emphasize that the processes have to be integrated; however, the integration itself is not discussed. Similarly, Payne and Christopher [17] argue that CRM and SCM processes have to be integrated to provide high levels of product availability and variety in a cost-efficient manner. Interestingly, the stream of research in the demand chain field which recognized the move towards network competition at the beginning of the 1990s redefined and extended the role of marketing, but did not acknowledge the need for a closer integration with SCM [18].

3. Proposed Framework

We begin analyzing the coordination aspects by looking at the supply and demand chain strategies. The strategy itself is dependent on external factors. The organization can position itself against its competition [19], or value their relative resource scarcity [20]. The strategy then defines how organizations develop their own internal processes. A company does not necessarily need to have a strategy for the actual supply or demand chain activities. In these cases the solutions are more ad-hoc style in order to fit their current needs. In most organizations either supply or demand chain is prioritized over the other [2]. This indicates that the organizations have developed a strategy for one of these issues, and then developed processes to suit those needs. The other chain is then simply aligned against the other [1], or in the worst case separated. Our framework has similarities to the information system and business strategy framework of Henderson and Venkatraman [21]. We also have divided strategy as an external issue while processes are internal (Figure 1).

The development and deployment of the supply chain strategy and processes, is part of SCM, as the development and deployment of the demand chain strategy and processes, is part of DCM. When either one of the management orientations are prioritized over the other, it is possible to say that the coordination between them is dominated by one of them. However, it is also possible to create different strategies for both the supply and demand chain. In this case, either one of the strategies first is formulated and then has an impact on the other strategy, in other words one strategy leads the other. This implies that it exists four main approaches to create alignment between the demand and supply chain. We will now analyze all of them separately and discuss the most important issues.
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Figure 1: Demand and supply strategy deployment and coordination

The first alignment approach is the supply-dominated alignment (Figure 2). In this approach, the organization first develops a supply chain strategy. This strategy is then deployed as supply chain processes. This results in various solutions for the actual supply chain processes. When the chosen supply chain processes are in place the organization aligns its demand chain processes with its supply chain processes. It can be argued that the demand chain strategy is in a tacit form. The organization has an understanding of the customer requirements, but these are not emphasized when the demand-supply chain is developed. The demand processes are simply developed after the supply chain processes.

Figure 2: Supply-dominated alignment

When using supply-dominated alignment, an organization is mainly interested in the efficiency of the delivery system. These supply chains are able to source, manufacture, and distribute the goods efficiently but might be extremely sensitive to changes in customer requirements [17]. The term SCM was originally used in wholesaling and retailing context [22]. Tan [23] points out that the primary focus in this environment is the efficient distribution of final products from the manufacturer to the consumer. Thus, it could be argued, that the original SCM discussion has concentrated on developing a supply chain dominated strategy. Distribution is heavily dependent on the chosen supply chain strategy and efficiency can best be gained by aligning the supply processes with the chosen strategy.

The second alignment approach is the demand-dominated alignment (Figure 3). In this approach, the firm initially develops a demand chain strategy. This strategy is then deployed as demand chain processes. When the chosen demand chain processes are in place the organization aligns its supply chain processes with its demand chain processes. It can be argued that the supply chain strategy is in a tacit form. The firm has a basic understanding of
different types of supply chains but these are not emphasized when the demand-supply chain is developed. The supply processes are simply developed after the demand chain processes.

When using demand-dominated alignment, an organization is mainly interested in the creation of value to customers. For instance, Sheth et al. [14] point out the importance of customer-centered marketing approaches in an environment with increasing diversity. Kumar et al. [15] claim that market driven companies can gain a sustainable competitive advantage by having a business system supporting a superior customer value propositions. If we analyze these comments according to the proposed framework, it can be argued that customer-centered approaches use a demand chain dominated strategy. The final supply chain will simply reflect the chosen demand chain processes. For example, if customers require a quick delivery for customized products, the supply chain will be totally different to a supply chain dominated strategy as efficiency is not so important.

The third alignment approach is the supply-led alignment (Figure 4). In this approach, the organization initially develops a supply chain strategy, which is then used to develop a demand chain strategy. The supply chain strategy is thereafter deployed as supply chain processes while the demand chain strategy is deployed as demand chain processes. The demand chain strategy is not independent; it is dependent on the supply chain strategy.

One of the main differences between the supply-led and demand-dominated alignment is the demand chain strategy. In a supply-led strategy the demand chain strategy has specific “constraints” due to the supply chain strategy. If a company decides to be a low cost producer by utilizing offshore production in Asia, the demand chain strategy cannot require a quick response manufacturing solution.

The final alignment approach is the demand-led alignment (Figure 5). In this approach, the organization initially develops a demand chain strategy, which then is used to develop a supply chain strategy. The demand chain strategy
is then deployed as demand chain processes while the supply chain strategy is deployed as supply chain processes. The supply chain strategy is not independent; it is dependent on the demand chain strategy.

![Diagram](image)

**Figure 5: Demand-led alignment**

One of the main differences between the demand-led and supply-dominated alignment is the supply chain strategy. In a demand-led strategy the supply chain strategy has specific “constraints” due to the demand chain strategy. This was also the case with a supply-led alignment. If a company decides to use a quick response manufacturing to enhance value creation, offshore production is not feasible.

4. **Case Study Example**

The case company operates in a fast moving appliance industry and holds a leading position in its market. The case company has begun to transform itself from a production-focused enterprise to an innovative and customer-oriented business. It aims to combine cost-efficient production in low-cost countries with manufacturing as close as possible to major final markets. In reality, it has come to focus on increasing the number of products produced in low-cost countries. The required data has been collected during the five-year period of 2006-2010, mainly from in-depth and semi-structured interviews with key persons representing senior and middle management in the case company.

**Case description**

The case company focuses on providing innovative products and customer service, for which customers are willing to pay a premium. The company has defined product management flow (PMF) and demand management flow (DMF) as two major business processes.

The PMF is a holistic process for managing and coordinating all the activities involved in creating customer demand (value creation). In essence, it concerns all areas of developing and selling products, from the cradle to the grave. The aim of the process is to develop products that are adapted to local needs, together with products that can be sold worldwide on the basis of common global needs. The PMF includes a structured working method with check and decision points, to ensure that no activities are forgotten. It consists of three sub-processes: market intelligence, product creation, and commercial launch.

The DMF is a holistic process for managing and coordinating all the activities involved in fulfilling customer demand (value delivery). In essence, it concerns all areas of manufacturing and delivering products, from source to consumption. The aim of the process is to supply materials and products on demand. The most important factors to achieve this are keeping the end-user in focus and to manage the whole supply chain in a competitive way. This requires collaboration, first internally, then with the customers and suppliers. The DMF includes common goals and procedures in order to meet customer needs and requirements while minimizing both the capital tied up in operations and the costs required to fulfill demand. It consists of three sub-processes: sourcing, manufacturing and distribution.

The case company is aware that the demand and supply processes have to be coordinated in an efficient and effective way, and this requires coordination between the PMF and the DMF. For example, it is important that value creation and delivery are coordinated and regarded as equally important, and that value creation is not restricted to
products, but also applies to the supply chain. However, their business is currently heavily influenced by the demand-side of the company, which more or less gives directives to the supply-side. Thus, there is a lack of coordination between value creation (PMF) and value delivery (DMF).

**Case Analysis**

The case company concentrates on managing the demand chain. In essence, the supply processes are aligned to the demand processes. Therefore, the company is using a demand-dominated alignment. The PMF gives guidelines for the DMF (what, where, how), which then creates the desired supply chain. Furthermore, the top-level strategies are established by the marketing personnel, which indicate that the supply chain strategy is not so important at the moment. One interesting question is whether the company should go more towards a demand-led alignment instead of demand-dominated alignment. The company has started to show more interest towards this (utilizing more low cost production) and it would most likely decrease the costs associated with value delivery if the focus would be shifted towards a demand-led strategy. However, it is possible that this would somewhat weaken some of the value creation processes as more attention and resources would be focused towards the value delivery process. The company’s profit structure would change due to this shift (less capital and lower costs, but possibly lower amount of sales) but it is difficult to say, which would yield higher overall profits.

The company is still learning coordination between the demand and supply chain so in the future it becomes clearer whether more focus need to be directed towards the supply chain, in which a shift to a demand-led alignment would be a good idea. There are many linkages between the PMF and DMF, since where and how to sell products (addressed in PMF) are clearly connected to how products are delivered (addressed in DMF), and these linkages the case company has begun to explore. However, today, marketers in the PMF, only make these kinds of overall and strategic analysis. If supply chain representatives were involved, the case company could probably develop better supply chain solutions faster, which would imply shorter time-to-market. In addition, supply chain capabilities are required, in order to successfully launch new products on the market. Moreover, it is not only important to carefully specify, design, and verify new products, but it is also necessary to consider the supply chain processes, since some of the new products may require new processes. The move from commodities to innovative products requires a change of the supply chain design process and how it is connected to the product development process.

**5. Conclusion**

Due to heightened competition organizations need to be able to master both the supply and demand chain. If these activities are not synchronized, it is possible to have poor overall performance, even if individual activities are working well. Organizations have noticed the need to coordinate these efforts, but there has been no previous approaches how to handle this issue. In this research various approaches of coordinating DCM and SCM activities have been identified and analyzed and a framework has been constructed. The framework provides a platform that DCM and SCM managers can use to compare and discuss various coordination options. The framework provides a structured way for the managers to analyze their current coordination (if it exists) and gives four different lenses, which can be used to enhance coordination. For instance, if an organization needs to improve its demand and supply coordination, it can use the four different lenses to analyze the potential avenues of how coordination is achieved. The organization can then choose the approach which best fits its current market conditions. Depending on the chosen approach the company can expect to increase its revenues and/or decrease its costs.

**References**


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