

Supply Chain Management-Knowledge Domain

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Introduction

The concept of supply chains has recently drawn considerable attention in global economy. This supply-side emphasis explains the success of the newly boomed economy in many regions under the great global competition after the decline of Fordism. It also plays an important role in the theories of industrial restructuring. This paper will first discuss the definition and role of supply chains in regional industrial restructuring, then demonstrate the increasing competitiveness through supply chain management using some examples of implementation.

Definition of supply chain management

To understand supply chain management, we need to first we need to first understand what supply chains is. A supply chain is less a *chain* but rather a *network* of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers (Ganeshan and Harrison, 1995).

Figure 1. Traditional Supply Chain



Source: Blackwell & Blackwell, 1999

Traditionally, as shown in figure 1, manufacturing, wholesaling, distribution and the purchasing organizations along the supply chain operated independently. These organizations have their own

objectives and these are often conflicting. To reduce transaction cost occurred along supply chain and to increase efficiency of material flow, there is a need for a mechanism through which these different functions can be integrated together. Supply chain management is a strategy through which such an integration can be achieved.

Peter J Metz in Sloan School of Management gives a definition to supply chain management in his Dymystifying Supply Chain Management from Supply Chain Management Review in 1998:

"MIT's definition is integrated supply chain management is a process-orientated, integrated approach to procuring, producing, and delivering products and services to customers. ISCM has a broad scope that includes sub-suppliers, suppliers, internal operations, trade customers, retail customers, and end users. It covers the management of material, information, and funds flows."

Role of supply chains and restructuring models

The concept of supply chain management is originated from logistic research. The emphasis on supply chain management among current economic analysts came from the study of deindustrialization and restructuring of the industry. Since the decline of American industry in the 1970s, a number of economic analysts have focused on production and organizational perspectives to explain the failure of mass-production strategies in traditional US and British industries and the success of several foreign industries, such as the Third Italy and Japan. Supply chain management reflects these foreign industrial practices (especially the Japanese competitors' approach) to reduce time to market and increase customer service. According to Ellram (1991, pp.13), supply chain management represents a network of firms interacting to deliver a product or service to the end customers. It is an integrated approach using information to manage material flow from suppliers to end-users.

There are many forms of such integration through information exchange in the production (or supply) side of industrial institutions. This production-oriented perspective is defined as the

“New Competition” by Best (1990, pp. 1-26). They include a looser, and more horizontal integration of firms based on cooperation in research and information sharing, and a deeply tied and more vertical integration of firms working together for product development. The first type of integration is referred as the “Italian model”, whereas the second is as the “Japanese model” in Polenske’s recent article about competition, collaboration, and cooperation in the context of regional economics (Polenske, 1998). These two forms of supply-side networking are discussed below and the roles they play in the regional economics are also discussed.

The Italian Model

The Italian model represents the type of network that consists of a cluster of many small firms in particular regions. This type of cluster can be seen in industrial districts in Italy, Germany, France and the United States (Polenske, 1990, pp.19). These firms took innovative and cooperative strategies to face an environment of changing consumer taste, to overcome the associated technological barriers and the problems of mass production. Such strategies contribute to their success in the international competition in the 1970s to 1980s. The successful strategies include flexible multi-use equipment, use of skilled workers, technological advance, cooperative research, financial cooperation and joint marketing (Sabel, 1984, Best, 1990, Polenske, 1998).

Strictly speaking, the strategies taken by the firms in the Italian Model do not quite meet Ellram’s definition of supply chain management. For example, although the more flexible production and marketing approach taken by these clustered firms is to meet changing consumers’ tastes, management of supplier-consumer relationship to achieve high-level end-user services is not emphasized in this model. Moreover, the cooperation among these clustered firms is more horizontal: they integrate to deal with outside suppliers, to meet highly specified product requirement, to reduce transaction costs and to form an external economy of scale. The vertical

integration of firms of different stages of material flow from raw material supply to final delivery is not stressed. However, the Italian type of cooperation networks plays an important role in the analysis of production (or supply side) oriented industrial restructuring. It is often studied by reconstructing analysts in comparison with the Japanese Model that will be discussed in the next section. In general, the Italian model has stronger regional implication (in the form of industrial district) than the Japanese model. However, they are equally important to explain the success of small to medium firms from certain regions in the era of global competition.

The Japanese Model

The Japanese model describes the success of Japanese-style industrial organization. Compared to the Italian model, the inter-firm cooperation is tighter, often involve formal, long-term contracts and close collaboration between large firms and small contractors in product-developing processes. This long-term, collaborative relationship provides mechanism for risk sharing, reduce transaction costs and enhance the efficiency of transmitting information from the large to small firms (Polenske, 1998, pp. 21). The Japanese model is a good example of supply chain management described by Ellram. The outsourcing of large manufactures to upstream suppliers and downstream distributors and the information transmission throughout the channel help the entire industrial organization to achieve just-in-time production goals and improve the service to customers (Ellram, 1991 and Polenske, 1998).

The third restructuring model

The Italian and Japanese industrial organization gradually influenced the modern industry and demonstrated the importance of the 3Cs: competition, cooperation, and collaboration in the global competition. These two types of industrial restructuring generally occurred in small to medium-sized firms. In addition to the two models discussed above, the third form of industrial restructuring were studied later by a group of analysts, including Amin and Robbins, Gereffi,

Harrison, Helper, and Scott, in the success of multinational large corporations (Polenske, 1998, pp.24). The emphasis in supply chains is eminent, the multinational firms shows more effective corporate integration, increased control over markets and finance, pushing of risks and costs along the supply chains onto small suppliers and establishment of collaborative arrangements among participating firms (Polenske, 1998, pp. 24). These corporations keep technological innovation and collaboration in the core regions and employ low-skilled workers in the peripheral regions. The network of information exchange is across spatial boundaries.

Examples of supply chains in the context of competitiveness

This section introduces two examples of integration of large firms with the upstream suppliers and downstream distributors respectively to support the argument that supply chains management increases the competitiveness of the industry. The factors that contribute to the enhancement of competitiveness are then stated, and the implication of government policy to encourage supply chain management is discussed.

The first example represents the Japanese-style supplier-customer collaboration (called *keiretsu*) in the typical Japanese automobile industry. Take the Nissan example used in Best's article (Best, 1990, pp. 15-16), the Nissan engineers do not prepare the specifications of the automobile parts for the contractors, instead, they describe the function of the products and ask a familiar supplier to design it. This way, the customer-supplier relations are more consultative and cooperative. In order to achieve production goals, they share an unusual degree of information disclosure. This relationship is built on shared network norms and a mutual long-term responsibility and trust (Best, 1990, pp. 16, Polenske, 1998). In many cases, a limited degree of mutual shareholding between supplier firms and subcontractors is common (Sayer and Walker, 1992). The security and high-degree collaboration in product design increase the efficiency and

flexibility of the R&D/production processes and built a strong base of competitiveness for the Japanese automobile industry in the global market.

The second example involves the outsourcing of third-party firms in product distribution. According to Glasmeier and Kibler, some transportation and warehousing industries use modern management techniques, such as just-in-time (JIT), rapid inventory turnover, direct store delivery, electronic data interchange, bar coding, automation, functional warehouse and cross docking, to provide distribution services. These third-party service providers actually manage all or part of the companies' logistics systems (Glasmeier and Kibler, 1996, pp. 753). For example, North American Van Line (NAVL) provides third-party outsourcing service for Wang and IBM and oversees and controls the product delivery process from line-haul transportation, order consolidation and assembly, to customer delivery. Some major transportation companies, including Federal Express, Roadways, and Union Pacific, have also entered this logistics-outsourcing market (Glasmeier and Kibler, 1996, pp. 753). Some of these third-party firms have regionalized at the outsourcing firms' location, according to Copp's study, some of these outsourcing service providers actually provide implants that operate at the contacting firms' location (Glasmeier and Kibler, 1996, pp. 754). The utilization of modern distribution techniques and cooperation with specialized firms for product delivery increase the efficiency and competitiveness of large manufacturers.

Taking Cardinal Health as another example. As shown in Figure 2, Cardinal has positioned itself to provide services throughout the pharmaceutical supply system. It can fulfill different clients'

Figure 2. Supply Chain Management of Cardinal Health

EXHIBIT 3

How Cardinal Health Is Positioned



Source: Blackwell & Blackwell, 1999

needs through a variety of services provided by its various business units. Cardinal has attained its greatest success, however, by performing the information function of monitoring consumer demand (see broken line on the illustration) and by developing the logistics systems required for shipping and inventory replenishment. The company can perform these activities more efficiently than many of the retailers and their manufacturer suppliers.

Pros and cons of supply chain management

The restructuring of industries in certain regions successfully adapted to the rapid changing market. The supply chain examples illustrated above share a set of common characteristics to increase competitiveness of firms. Such characteristics including reduced costs, decreased risks, increased efficiency and technological innovation through mutual learning in the supply chains have enhanced the competitiveness of the industries. These competitive benefits are discussed below.

1. *Reduced costs:* Networking in supply chain has the potential to reduce transaction costs, lead to internal economy of scale through innovation and help to form external economy of scale through cooperation (Polenske, 1998).

2. *Decreased risk*: The risks and uncertainty of the changing external market environment can be greatly reduced through insurance of quality and quantity supply, sharing information and assets, future commitments, trust and risk-sharing (Ellram, 1990, pp. 13-22).
3. *Increased efficiency*: the information exchange and the management of material flow by the specialized firms throughout the supply chains increase the efficiency of the industries.
4. *Technological innovation*: continuous technological innovation to meet the market needs can be achieved from cooperative R&D, employee training and flexible specialization among firms.

However, network of supply chain is difficult to maintain. Increase in operational cost because of inefficient management and the increase of risk from opportunists and exaggerate synergies may reduce the competitive benefits of supply chains (Ellram, 1990).

Conclusion

Many modern businesses have adopted the concept and methodologies of supply chain management in their business model and have great success. There are also many tools and consulting services available to help companies to plan and optimize their supply chain management practices. Gone are the days when the professionals or organizations in product design, purchasing, manufacturing, warehousing, distribution, materials handling, information technology, plant engineering, and logistics could do their jobs as if they had nothing do with anyone else.

Networking, lineage, material and information flows are the central concepts of supply chain management in the business world. It requires a change of mindset by all involved. People in the various functions and disciplines no longer be able to look at themselves as the sole pivot point in the supply chain. Instead, they are one of many pivot points. All actors in the supply

chain must also come to realize that the supply chain will not run without full participation by each function. And each has to be optimized for the good of the chain but not for its own good.

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