

A More Relevant Nomenclature: Supply Network Management

Kamal Fatehi, Douglas R. Moodie*

Department of Management and Entrepreneurship,
Coles College of Business, Kennesaw State University
560 Parliament Garden Way, Kennesaw, GA 30144, USA.
*dmoodie@kennesaw.edu

Abstract: *This paper suggests that there have been sufficient environmental changes and concomitant managerial practices that, name-wise, the field should be called supply network management. Often, academic concepts lag managerial practices, which in turn could lag the changes in the environment. This paper traces the development of the field of supply chain and operations management to illustrate this has happened in the area that is commonly called supply chain management. The paper discusses the environmental changes and resulting managerial practices that are characteristics of supply networks to support such a name change. The value of such a change in the name would be to encourage managers and researchers to think in network terms rather than linearly.*

Keywords: *Supply Chain management, Networks, Supply Network Management.*

1. INTRODUCTION

In successful organizations, changes in management practices usually reflect environmental change. This is the essence of strategic management. Wheelen and Huger (2010) regarded strategic management, which is the appropriate and timely managerial response to environmental changes that influence the organization and shape its present and future status, as the critical aspect of managing. Observation of these changes should usher in the development of new managerial concepts, which in turn should influence managerial practices.

However, the development of new managerial concepts often lag managerial practices, which in turn may lag environmental changes. The former has happened in the area that is commonly called supply chain management. To illustrate, this paper, traces the developments in the field that started with the concepts and practices of production management, and ended up with those of supply chain management. It suggests that there have been sufficient environmental changes and resulting new managerial practices to warrant a new management concept called supply network management.

The paper is organized in the following sequence. First, it discusses chronologically the environmental changes, managerial practices, and related concepts and terminologies that introduced, in consecutive sequence: production management, production and operations management, and supply chain management. Second, it elaborates on the globalization development. Globalization has brought about the business practice of networking. One of the characteristics of networking is the establishment of business relationships between mainstream businesses that often originate in the development of new products with suppliers, vendors, investors, contract manufacturers, logistic firms, bankers, insurance companies, and all the subsidiary businesses. This makes it possible to offer products and services to global customers at prices and qualities that meet or exceed customers' demands. Supply network management is the use of networking in the process of managing all that it takes to meet customers' demands globally.

2. CHRONOLOGICAL EVENTS AND DEVELOPMENTS

The paper now describes events and developments that culminated in managerial concepts and practices that started with production management and ended up with supply chain management.

2.1. Production Management

World War II and its aftermath, which necessitated production of war materials and later on consumer products, brought about the prominence of manufacturing, especially that of U.S. manufacturing.

Manufacturing activities comprised a significant portion of the U.S. gross domestic product (GDP). For example, the manufacturing sector in 1950 was nearly 30% of the United States's GDP, whilst the service component of GDP was little more than 9% (Statistical Abstract of the U.S., 1960). Any mention of the service industry was almost an afterthought. By 2008, this situation had reversed totally. The service sector share of GDP was more than 79%, and the manufacturing share was about 19% (CIA Website, 2010).

During this period, the U.S manufacturing was supreme, and other nations were the willing recipients, albeit passive ones, of the U.S. exports, which comprised 5-8% of the US's GDP (U.N. Statistical Office, 1963: pp. 804). In 1950, for example, as a dominant exporter of manufactured products, the U.S. merchandize export was more than 16% of the world's merchandize exports (UNTAD, 2008). Naturally, the management of organizations was concerned mostly with production processes and their engineering aspects. To minimize unit production costs, Tan, (2001) stated that most manufacturers emphasized mass production as the primary operations strategy. Thus, it was not surprising that most early management scholars had engineering backgrounds. For example, Fredrick W. Taylor, known as the father of scientific management, Henry L. Gantt, and even the French management pioneer Henry Fayol, were all engineers. Even the exceptions, such as Mary Parker Follett, were interested in explaining the behavioral peculiarities of people in the production process. There was nothing more important and germane than activities that brought products to market. Consequently, most management scholars concerned themselves with improving the manufacturing process.

The successful management of organizations meant optimizing production to meet the growing demands domestically, and then do the same abroad. In short, the supply side was supreme and the demand was a given. Therefore, the term production management was used to indicate managing the supply side and providing products to the market. In effect, adopting the Hollywood terminology of the popular movie, the "Field of Dreams", it could be said that if you could make it, they would buy it. However, as the industry matured and more competitors entered the market, firms no longer could produce products and expect to have waiting and willing customers for them. Also, other activities that were not purely manufacturing had become a significant part of the economy. Production had acquired partners in the form of operations that were non-manufacturing in nature, such as the acquisition of materials and the logistic aspects of getting products to the market. These activities were simply called operations. Management terminology had to keep pace with this reality; therefore, production and operations management became the popular nomenclature.

2.2. Production/Operations Management

As manufacturing activities expanded and market size increased so the number of firms offering similar products increased. Pressure for gaining a competitive advantage vis-à-vis other firms resulted in organizations searching for better and cheaper ways of production. The search brought about attention to activities that were previously either ignored or were relegated to a secondary position. By attending to these activities, firms were able to improve the manufacturing process and establish a more successful position in the marketplace. These firms learned, for example, how to manage their inventory better, how to use plant layout to smooth the production process, and how to use other firms as sub-contractors to produce the same products less expensively, at a higher quality, and in a shorter time.

Make or buy became an important managerial decision that could improve profitability. Sometimes, a decision to buy an intermediate product instead of making it could increase the profitability of the firm without the burden of additional assets, debts, personnel, and related costs. Ensuring proper specifications for these products where the management had no direct supervision required working with the contractors and bridging the gap between two quite different firms. Developing and maintaining good relationships with suppliers was certainly not a manufacturing task.

Trouble-free production necessitated maintaining inventory of raw materials, semi-finished products, parts, and components, which added to the cost of production and in turn to the final price of the products. Firms realized that controlling inventory costs could result in a lower final prices and subsequently could generate more sales. They developed inventory control models, to achieve a lower cost of maintaining inventory while causing no disruption in the production process. The most common model, economic order quantity (EOQ), that calculated the level of inventory that minimized total inventory holding costs and ordering costs, contributed substantially to profitability of firms.

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Concurrently, efforts to control costs and therefore improve profitability brought about a number of mathematical models, such as linear programming. Linear programming developed during the Second World War. Using this model, the army was able to plan expenditures and returns in order to reduce costs and increase losses to the enemy. After the war, many industries used it in their daily planning. A special case of linear programming was the transportation model. It was a model that estimated how to minimize the transportation costs of supplying materials to several plants from several locations. The model took into account variables such as distance, fuel costs, labor costs, etc.

Firms learned that they could achieve improved performance and profitability only by producing superior and less expensive products, but also by focusing on non-manufacturing but related activities, such purchasing. They had to invest much time and effort in the acquisition of materials, parts, and components before the production process could begin. It was evident that efficient purchasing could significantly contribute to the firm's performance. Therefore, purchasing as a critical activity gained the attention of top management. If performed well, purchasing management could bestow on the firm three major benefits: first identify major areas for potential cost savings; second, have a major impact on quality; and third, provide information on technological development and improvement in product and process designs.

Buyers were no longer just processors of requisitions and order forms, but increasingly were involved in more strategic activities including supplier development and improvement, early supplier involvement, cross-functional teams, the use of full-service suppliers, and integrated information system linkages with suppliers.

Expanding on the concept of transportation and purchasing management brought about the advent of materials management that dealt with all of the activities involved in the acquisition of intermediate products in the process of supplying the final product to market. This encompassed spare parts and replacements, quality control of purchasing and ordering of such parts, and the standards involved in ordering, shipping, and warehousing the parts. The goal of materials management was to consolidate and efficiently handle core services related to supplying products to the market. It dealt with truck deliveries and service vehicle routes that reduced costs and improved performance. It also involved the effective management of delivery sites and loading docks, while reducing redundancy. In particular, Mentzer, et al. (2001) pointed out that since hazardous material had become a major by-product of manufacturing process, material management could reduce cost when handling solid and hazardous waste removal, storage, and recycling.

All of non-manufacturing activities that were related and contributed to the production of final products such as make or buy, inventory control, linear programming, transportation model, etc. came under the rubric term of operations management. The two related stream of activities, manufacturing and operations, that supplied the market with needed products were referred to as production and operations management. However, it was clearly evident that much of the activities that were labeled operations were not performed by the firm that was directly involved in manufacturing of the final product. Therefore, calling them operation may imply that they were part of the processes that the manufacturing firm handled. In fact, firms that were not directly involved in the manufacturing of the final product performed many of these activities. These firms were outsiders performing tasks on a contractual basis. Some operations activities had expanded and acquired totally different characteristics than when originally envisioned. For example, make or buy decision of the early operations management that covered the production of parts and components, now covered manufacturing of the whole product and the firms performing such activities were called contract manufacturers.

Some contract manufacturers grew to significant size and became global firms that specialized only on the manufacturing of various products (the whole product not just components of the products) for other companies. For example, Electronic, Design, Strategy, News website, (2010) reported that in 2004, global contract manufactures such as Flextronics (Singapore), Hon Hi Precision (Taiwan), Selectron (U.S.A.), and Clectica (Canada) each had total revenues of 8-15 billion dollars. These contract manufactures regularly produce various products for well-known global companies such as Apple, Hewlett-Packard, and Dell. Therefore, these activities should more accurately come under the label of supply chain management. Labeling these activities as supply chain management could bring under the same umbrella other activities that may not be purely operations, such as building relationship with contract manufacturers.

2.3. Supply Chain Management

Because, other activities had become significant aspect of the process of supplying products, services and information to the market, a new terminology was needed. At the same time, such a term should not down-play the importance of the production and operations processes. Therefore, supply chain management became a popular terminology.

The involvement of organizations, people, technology, activities, information and resources in moving products and/or services from suppliers to customers was a supply chain. As the terminology implies, this process was more than production and related operations. Gone were the early days of post war period that brought about the dominance of the manufacturing. Gone were the days that manufacturing activities comprised a dominant portion of the GDP. Now, services were a major component of GDP and managing service activities was a major management undertaking. Service industry had grown to a significant size dominating the economy of the U.S. As mentioned before, in 2008, the service industry had become more than 79% of the U.S. GDP (CIA Website).

A service industry provides intangible goods (services) to both businesses and to consumers. It may involve the transportation and distribution, and sale of goods from producer to a consumer, or may involve the provision of a service, such as in entertainment. In some cases, such as the restaurant industry or equipment repair, goods are transformed in the process of providing a service. Therefore, rather than transformation of physical goods, the interaction between the provider of the service and the customer is a distinguishing factor.

The service sector always existed and was not a new development, but because it was such a small portion of the economy, often was not considered important. The service sector consists of the "soft" parts of the economy such as insurance, government, tourism, banking, retail, education, and social services. Other examples of service sector include franchising, news media, education, hospitality industry (restaurants, bars, hotels, motels, and casinos), consulting, legal practice, healthcare/hospitals, waste disposal, real estate, personal services, business services, and material management. The service industry now employs more people than the other industries (Statistical Abstract of the U.S.: 2004-2005).

The term supply chain implied that the goal was to fulfill customer demands by the most efficient use of resources; be it material, labor, inventory, or distribution and logistics. By emphasizing the management of supply side to meet the demand, various aspects of optimizing the process became the focus of attention. These aspects included implementing just in time (JIT) techniques to optimize manufacturing flows, maintaining the right mix and location of factories and warehouses by use of logistics, and improving efficiency while satisfying customer demand.

Supply chain was an appropriate way of conceptualizing the process that started with the activities of upstream (e.g. materials and extraction activities) and ended with those of the downstream (e.g. meeting customers' needs). However, due to the developments in the market this linear view became increasingly inappropriate. Multiple relationships between the original manufacturer and a number of the providers of materials, parts, components, logistics, etc. made the supply chain more like a collection of connecting rods going in all directions, and not in a straight line. By this time, a new form of organization had appeared in the market that did not have the traditional hierarchical form and straight one to one and fixed relationships. This new entity was the "born global" firm and the conceptualization of it was "network" structure.

2.4. Globalization and Development of Networks

Internationalization has gone through successive phases, the last of which is occurring today. Now, we are experiencing international linkage among all who are involved in the provision of economic value. Often, this is called globalization. Fatehi (2008: 14). Defined globalization as the integration across borders, of markets for capital, goods, services, knowledge, and labor. For manufacturing, this phrase has increased cross border sourcing, collaboration for parts of value chain with low-cost providers, shared service centers for logistical and administrative functions, and increasingly global operations, with concomitant global coordination and planning.

2.5. Networks and Born Global Firms

There are two paths to internationalization: The traditional path and the new path. The new path is the free trade system and the network of its participants that act as a springboard, from which firms can

launch themselves directly into the global stage. In doing so, they become a part of the network and acquire network structures.

Previously, not having a large home market was a hindrance to growth and internationalization. While many European firms were by necessity engaged in cross-border businesses, their operations were merely an expansion to neighboring markets that were within a few hours travel time. Today, globalization has made it possible for the firms from small home markets to expand globally. Because of their small home markets, these firms are forced to use innovative strategies that consider the whole world a market. Also, they are free to design organizational structures that are not burdened with intermittent, large scale modifications, as traditional companies have had to go through; namely progression through domestic, international, multinational, and global structures. From the beginning, or at an early state of their growth, they become global players.

Globalization provides small and medium-size firms, as well as start-ups, the possibility of becoming global operators. The global market is a vast network of many firms, in many industries, with a multitude of links to each other in the form of supplier - buyer - customer - marketer - middle man - service provider links, etc. According to the United Nations, there are 60,000 firms with more than 800,000 national affiliates operating in the global market (UNCTAD, 2001). This vast network is at the disposal of those who have the ability to use it.

The newcomers to the global operation are not encumbered with the organizational memory of old methods, and are free from the organizational habits, traditions, cultures, and structures that are past oriented. The newcomers to global market can move quickly and effectively. Often, these firms will take much less time to become global players than their traditional counterparts took to reach to a global status. The period from domestic establishment to initial foreign market entry for the newcomers is often less than 3 years (Autio et al. 2000; McDougall and Oviatt, 2000). Particularly, the development of organization of these firms follows a less cumbersome path that directly takes them to a global structural design. Traditionally, the organizational structure of the firm goes through successive states of domestic, international, multinational, and global forms. The innovative newcomers, all of which start with a much smaller size than existing global companies, in a short time acquire a global posture and structure. They are firms that could be called born global. Because they move quickly to the global level, these firms are not using any of the conventional designs. They use innovative, fluid, and organic structures, which are in congruence with the network character of global economy. In a way, in the process of supplying the market with needed products, they disaggregate and disperse various aspects of the operations. Levy (2008) refers to the disaggregation and dispersion of production (both goods and services) activities to multiple geographic locations as a global production network. He, however, uses the conventional concept of supply chain and notes that this dispersion requires a high degree of coordination and integration of supply chain activities (Levy, 2008: pp. 944). It is clear that the global production network requires coordination and integration of global supply network activities instead of supply chain activities. This points out the relevance of using the term supply network rather than supply chain.

Mathews (2002) states that the global economy is emerging as a worldwide web of inter-firm connections. One can define internationalization as the process whereby firms become integrated into the worldwide web of economic activities. From this perspective, major features of the global economy, namely its size and web like features, free trade system, and the existence of global customers, push and pull firms to become global players using innovative organizational designs (Ernst, 2004; Fatehi, 2008, pp. 434).

The push comes from the size of the network of global market that cannot be reached by conventional methods if a firm does not have a considerable resource base. Also, most of these firms have a global mission from their inception. The pull comes from free trade system that allows cross-border transactions without many restrictions, and makes far-away people the next door customers. Even niche-players that previously did not have enough customers at home to grow can find enough customers in distant places. The pull also comes from the needs of the existing global companies that need suppliers to service their operations in multiple markets. These global customers pull competent and imaginative newcomers onto the global stage. To serve these customers and move quickly, the newcomers cannot be burdened with the rigidity of traditional forms. They devise their own forms that do not fit into conventional designs. These firms are characterized by their connections with suppliers, marketers and other firms, and if needed, with the local governments. Fatehi (2008: pp. 434) calls these forms Anetwork@ design.

The network, however, is not a solid form nor a design that has a permanent skeleton upon which the organizational requirements of job design, authority-responsibility designation, communication and relationships could be fleshed-out. It is more of a multidirectional than either a vertical or horizontal organization. It is in a permanent state of evolution and mostly involves external relationships with other firms, and their own subsidiaries and joint ventures. The framework of traditional organizational structures cannot portray a network organization because this form of organization relies on dynamic relationships. Fatehi (2008, pp. 434) says that it is not a hierarchical and authority-based firm, but a “hyperarchy”.

2.6. Supply Network Management

While the practice of engaging a network of partners in supplying the market with products and services that the customers demanded was in full operation, its conceptualization remains entrenched in the past. The use of supply chain management terminology ignores the network nature of linkage among the providers of goods and services. For example, Mabert and Venkataramanan (1998), while illustrating a five stage model of supply chain, admitted that sourcing (as one stage) involves, among other things, the supply of raw materials and components through a network of vendors, but still maintained the use of supply chain terminology. However, they foresaw the need for incorporation of other activities such as financial, marketing and human resources into the process.

The development of network organization can be attributed to rapid technological changes which increased uncertainty and unpredictability. This in turn made corporate flexibility a desired characteristic. Globalization magnified the need for flexibility. Firms were forced to abandon vertical bureaucracy in favor of horizontal-flat design that measured performance by customer satisfaction. This required maximizing contact with suppliers and customer and having information available at all levels of the organization.

Sophisticated information technology provides easy access to the global network of suppliers and vendors, even to the smallest firms, at a very low cost. Low cost information makes vertical integration more expensive as compared with the network, which is more economical. The Internet has reduced transaction costs of doing business externally instead of relying on in-house suppliers. As formal, hierarchical controls are replaced with informal and personal relationships, internally and externally, the boundaries of firms become more porous and permeable. This will lead to a blurring of the line that separates the firm from its suppliers, buyers, and competitors, and creates a hospitable condition for the emerging alternative organizational form, the network. Traditionally designed and managed companies cannot successfully operate in such an environment. With all of its versatility, flexibility, and adaptability, Koza and Lewin (1999) believed that the network structure is inherently unstable and transitional.

While the network structure as elaborated by Koza and Lewin (1999) is regarded as an unstable form, it identifies the relationship between the original manufacturers and the other firms that traditionally partnered together to bring to market the needed goods. The network form that enables companies to deliver products and services to the market more efficiently and in much less time than otherwise would be possible is precisely the arrangement that the today’s manufacturers need. Most of these firms are already using it. The businesses relationship, globally or locally, among the firms involved in the supply side of the economy is no longer a linear one. It has metamorphosed into a network structure. The process is no longer the supply chain, now it is the supply network.

3. CONCLUSIONS

More than half a century ago, by optimizing the process of production, the industry embarked on meeting consumers’ demand more efficiently. This resulted in use of the terminology; production management. This optimization necessitated enlisting the assistance of the firms that were not directly involved in the manufacturing process, such as components and parts producers. Theological extension of such an effort saw the birth of production and operations management concept. Included in this extension were all firms that engaged in assisting the original manufacturer in meeting customers’ demand, even though these firms were not directly involved in the manufacturing process. The further refinement of this process saw the advent of supply chain management that started with upstream firms and ended with downstream enterprises.

Much has changed in and around the process of bringing products and services to the market, most of which is due to globalization and the birth of network structure. The linear relationships that existed

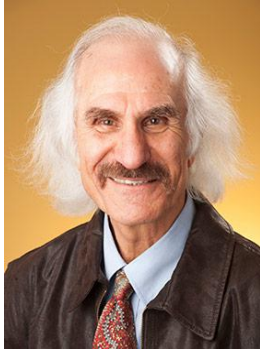
among and between the firms involved in the supply side of the economy has been altered. Instead of one to one relationships that brought about the concept of supply chain management, firms have formed a spider-web structure of relationships. This development has unleashed the power of multi-directional business transactions of the network. No longer is appropriate to use the phrase, supply chain management. The linear relationship has been supplanted by multi-faceted, multi-directional, and multi-purpose of network process. It has given us supply network and the management of it, supply network management.

A question may be asked, “What is in a name, and why change it?” First, the name should be relevant and descriptive of the subject. Successive terms such as “production”, “production/operation”, etc. were descriptive of what was actually taking place in the field. Supply chain no longer descriptive of global networks that serve businesses. Second, the name should be relevant. This change makes it easier to be relevant and to convey the message of efficiency, flexibility, speed, and multidirectional relationships that represent the web of global relationships among businesses. Third, the name should reflect the reality of dynamic relationships and be time sensitive. The global relationships among businesses are not as permanent and static as “supply chain” implies. These relationships are dynamic and constantly alter to meet new requirements. A “supply network” nomenclature is a dynamic term.

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AUTHORS' BIOGRAPHY



Kamal Fatehi, is a Professor of International Management and former Chair of the Management and Entrepreneurship Department at Coles College of Business, Kennesaw State University. Before that, he was Chair of the Management and Marketing Department and Interim Dean of the College of Business Administration at Texas A&M International University.

He has taught at Louisiana State University, Western Illinois University, Eastern Illinois University, and Texas A&M International University. In 1995, he was a Fulbright Senior Scholar at Western University in Baku, Azerbaijan and at the International Academy of Business, Almaty, Kazakhstan.

Dr. Fatehi has published in many journals such as the *International Journal of Management*, and the *Journal of Global Business*. He is the author of *International Management: a Cross-Cultural and Functional Perspective* (Prentice Hall, 1996) and *Managing Internationally: Succeeding in a Culturally Diverse World* (Sage 2008).



Douglas Moodie, is a Professor of Management at Kennesaw State University. He has taught at Syracuse University, Michigan Technological University, Dalian Maritime University, and The Ohio University. His research is in international operations and transportation management, scheduling, project management, and job shop operations. He has published in several journals including *Operations Research* and *Production and Operations Management*. He uses his experience working for 15 years as a process and petroleum engineer for BP.