Supply Chain Management

PROCESS, SYSTEM, AND PRACTICE

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CHAPTER

Introduction to Supply Chain Management

Learning Objectives

After studying this chapter, you will be able to:

- Discuss the evolution of supply chain management
- Define supply chain management
- Comprehend the similarity and difference between logistics and supply chain management
- Delineate the role of a supply chain manager
- Understand the concept of value chain and its correlation to supply chain
- Describe the macro processes of supply chain
- Explain the nodes and processes of supply chain
- Comprehend how the interface of technology, process, and people has revolutionized supply chain management
- Understand the hierarchy and span of supply chain decisions
- Discuss the importance of professional excellence in supply chain management

1.1 SUPPLY CHAIN IN DAY-TO-DAY LIFE

On a Sunday morning, when a hawker walks into a neighbourhood with his basket of vegetables and fruits, one may wonder how he knows the demand pattern of the families living in the area. It may be that one of his regular clients—an elderly lady—chats with the hawker about the other households in the locality. Equipped with surprisingly precise knowledge about the demand pattern of each household, his basket would be stocked with the exact amount of perishables. If we observe his selling pattern a little more, we will find the hawker completes his round through the neighbourhood by 11 a.m.—a total work time of six hours—and has made a decent margin of profit with less variability in price, stock-keeping items, and quantity. It's amazing! The customers are happy with the fresh stock and fair prices. The vendor is happy with his service, realization, and stability of earnings. The cash-to-cash cycle is so perfect that his sourcing and distribution plans are also clear and well established. The synchronization with supplier relationship management and customer relationship management—the macro processes of supply chain management—is well in place.

Critics may feel this is no earthshaking achievement as the entities involved are small in quantity and insignificant in economic value. However, big players like

Exhibit 1.1 Innovation from a Paint Manufacturing Company

In preparation for the festive season, the head of a household wants his house to be painted. His daughter comes up with the idea of painting streaks of varying colours on the ceiling, walls, and doors. The father is a little sceptical at the idea—he can envision the painter coming in with a few colours of large SKUs and mixing them up to provide different shades. In the process, there will be wastage because of the uneconomic size of the packs, the number of brushes used, and so on. But his little daughter knows better. When the father expresses his reservation to her, she tells him about the website 'my painting room' where one can mix all shades virtually and forward the selected shade to the company. The father does so and gives the company the contract for painting his house. The company engages a local service provider who accomplishes the very colourful job to the delight of everyone!

Toyota and Dell work through the same method with corresponding stress on processes, people skills, and application of technology.

The evolution of trade in civilization is a fascinating study. From the days of barter in self-contained societies to the modern era of technology-led trade growth, society has benefited mainly through organizing demand and supply through planning and execution of production, storage, and movement of goods and services. Prima facie, commerce and trade could not have existed without logistics. The nomenclature itself could be recent and different but not the purpose and spirit. What is striking is the centrality of the art and science of logistics and supply chain management in a successful business, whether large or small, recent or ancient. Not just business but even public life, government, and military operations are extremely focused on logistics and supply chain efficiency, effectiveness, and evolution.

However, there also exist phenomenal supply chain innovations and reconfigurations impacting business models, and thereby, the fortunes of stakeholders. Exhibit 1.1 gives an example to explain the concept of supply chain network.

The explosion in technology and its adoption across networks, people capability, and structuring of business processes have enabled innovations in supply chain networks. Even product/service flows are synchronized with informational and financial flows for efficiency and effectiveness of the supply chain. At the end of the day, it is not only the focal organization that benefits but also every stakeholder, including the customer.

1.2 EVOLUTION AND LANDMARKS

In the brief period of just above ten years before he died in 323 BC, the great Macedonian general Alexander conquered countries including Greece and Persia because he had included logistics in his strategic planning (Van Mieghem 1998). According to Engels (1980), '… (W)hen the climate, human geography, physical geography, available methods of transport, and agricultural calendar of a given region are known, one can often determine what Alexander's next move will be.' Engels elaborates how Alexander used logistical tactics to ensure an open supply chain by maximizing speed and flexibility, forging alliances, and aligning the route

along the transportation corridor and supplies tie-up. This could be one of the earliest links to this domain on supply chain management.

Recent history would show that new ideas and technologies have revolutionized supply chains and changed the way enterprises work. With industrialization, capital-intensive mechanized production systems have come to replace labour-intensive production systems. Infrastructure development, such as railroads, national highways, seaports, aerospace, and the new communications media expanded markets and made supply chains effective and efficient. Population growth and the formation of regional and international trade unions accelerated the development of communities and the demand for goods and services, which could not have been met without the maturity of logistics and supply chain domain.

In the early 1900s, a man called Henry Ford successfully established an automotive company in the US, where he integrated car manufacturing process for the first time, enabling mass production. Ford can be said to have created the first moving assembly line, which reduced the time required to build a car from 728 hours to 1.5 hours. This brought down the cost of manufacturing as well, so Ford could sell his first car, Model T, at a relatively low price. In this sense, Ford can be said to have ushered in the mass production era. Over the next sixty years, American manufacturers became adept at mass production and streamlined supply chains with the help of scientific management methods and operations research techniques.

Post World War II, economies were resurrecting and a new world economic order was emerging. European economies, especially Germany, Belgium, and France, were gaining prominence because of the development in manufacturing and trade. Similarly, in the East, Japan was emerging strongly, rising like a phoenix from the ashes of war. The sudden growth in the Japanese economy was due to a leap in the manufacturing industry. Starting in the early 1970s, Japanese manufacturers such as Toyota changed the rules of production from mass to lean. Lean manufacturing focuses on flexibility and quality more than on efficiency and quantity. The significant lean manufacturing ideas include six-sigma quality control, just-in-time inventory, and total quality management, which will be explained later in the book.

It was in the 1970s that the US's superiority in manufacturing was challenged by firms in many global industries which made higher quality products at lower costs. Global competition forced the US manufacturers to concentrate on improving quality by reducing defects in their supply chains. The US also started focusing on quality initiatives while maintaining cost effectiveness. This was the beginning of the information technology (IT) boom when many IT companies set up shop in the US. These companies started revolutionizing trade with new generation business models, which required a responsive supply chain. The customer's preference was now finding place in the chain.

In the 1990s, the manufacturing and service industries started producing mass customized products and services with the help of the Internet and other technological advances. Dell revolutionized global business, being one of the earliest companies to adopt mass customization. Dell didn't have to stock in-house finished goods inventories and the customers were delighted as they got products that suited their

needs. Following Dell, many firms started effectively using new information technologies to improve their service and delivery processes. Secure cyber-based communication and web technologies led to the growth of e-commerce and e-business, changing the way supply chain network was structured. Online stores such as amazon.com, departmental store chains such as Walmart, and financial services companies opened a new era. Hence, one can observe how supply chain has evolved dramatically over the last four decades.

1.3 SUPPLY CHAIN MANAGEMENT

A number of authors and institutions have tried to define supply chain management over the years. Many a times it is seen as logistics, operations management, procurement, or a combination of the three (Lambert and Cooper 2000), but today the broader definition given by the Global Supply Forum is generally accepted: 'Supply Chain Management (SCM) is the integration of key business processes from the end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders.' This definition mentions key business processes without limiting itself to processes such as buying, movement or storage, and their integration. It also uses terms such as original suppliers and adding value to customers and stakeholders, which are quite interesting and appreciable.

Another interesting description: 'SCM is the term used to describe the management of the flow of materials, information, and funds across the entire supply chain, from suppliers to component producers to final assemblers to distribution (warehouses and retailers), and ultimately to the consumer.' This description talks about managing three flows—physical, informational, and financial—across the chain and also the importance of the customer. The objective of SCM is to manage a '… network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer' (Christopher 1998). This connotes that a supply chain involves two or more organizations for serving the ultimate customer, which happens by articulating flow of material, finance, and information. It may be worth reiterating here that the key to the existence of a supply chain is the presence of an ultimate customer and its value to him.

A network of organizations, generally, links up nodes and flow of multiple entities. Some of the flows could be divergent while others could be convergent. An organization would focus on the flow of goods and services to a set of customers for which a value is being enabled. One of the interesting cases in India is the Amul supply chain—its success story is widely portrayed among business leaders, scholars, and academia. Appendix 1.1 gives an idea of the complexity of the Amul supply chain in terms of customer spread, sales and distribution network, manufacturing and process facilities, number of product ranges, procurement centres, and support services. It may be interesting to note that the initial success of this is what led to Operation Flood being sanctioned by the World Bank, which dramatically over four

tranches changed India's fortune from a net importer to a leading dairy products processor in the world.

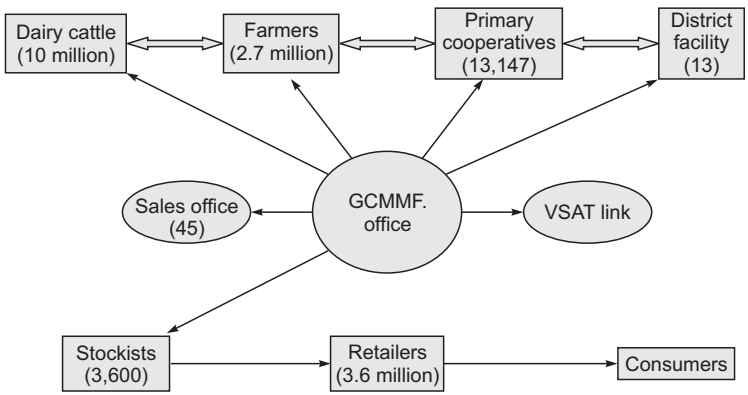

Figure 1.1 The Amul supply chain (all figures are estimates)

Figure 1.1 shows linkages among various inter-organizational entities for achieving value for the focal organization, namely GCMMF (Gujarat Cooperative Milk Marketing Federation), in serving its customers across different geographical locations in India and abroad. The effectiveness and efficiency of the SCM involves deploying various business approaches, concepts, and methods.

1.4 LOGISTICS AND SCM

There has been a tendency to use both nomenclatures interchangeably. It may be useful to understand the focus areas of both of these so we can find both the commonality between the two and the niche of each. The evolution of each process has benefited from the other. As mentioned earlier, logistics functions have existed for a long time and contributed in civic life, military operations, and business. Logistics is all-pervasive. For instance, it is amazing to understand the logistics operations for holding parliamentary and assembly elections in India. Till 2004, the activities involved moving physical ballets across the length and breadth of the vast country. Today, there are electronic voting machines, which have phenomenally improved the process of holding elections and have reduced the cycle time and cost of managing elections. Similarly, the use of voter's identification cards and building an electronic database of citizens have facilitated managing logistics in public life. It may be worth understanding some of the definitions of logistics management.

In 1991, the international Council of Logistics Management (CLM) defined logistics as: 'The process of planning, implementing, and controlling the efficient, effective flow and storage of goods, services, and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements.' This definition describes logistics as the management of movement and storage of goods and services of an entity from the point of origin to the point of consumption, based on consumer needs. The definition sounds more operational, dealing with a

single entity, and is customer focused. Typically, when competition is restricted or focused, in cases such as military operations, such definitions clearly depict the function.

This definition was later modified as: 'Logistics is the process of strategically managing the procurement, movement and storage of materials, parts and finished inventory and the related information flows through the organization and its marketing channels for the cost effective fulfilment of customers' orders.' This encompasses, apart from storage and movement, key aspects such as strategic focus, product and information flows. This definition is more appropriate for commercial organizations and business. Over the decades, many organizations have started focusing on the logistics aspect of their business. Large engineering companies realized that their progression depended upon their ability to efficiently manage the transportation of inbound material, stocking, and handling outbound goods, which many a times involved an over-sized cargo. Such cargo required specialized vehicles and movement on project mode, and so on. One could handle such complexity only with a good knowledge of logistics operations such as managing transport operators, yard management, and contract logistics service providers.

Some of the terms such as logistics, inbound logistics, materials management, physical distribution, and supply chain management are used interchangeably. Inbound logistics covers the movement of material, components, and products received from the suppliers. Materials management is about the handling of material and the movement of goods and components within the factory or firm. Physical distribution refers to the outward movement of the finished goods from the shipping or despatch department. Logistics describes the entire process of material and products moving into, through, and out of a firm. The gamut of logistics management includes:

- Order management
- Outbound transportation and distribution management
- Inventory management
- In-plant logistics such as stores, movement towards line and shops
- Inbound transportation
- Procurement
- Information management

It may be inferred from this that logistics management is oriented towards cost minimization for the focal firm/group. This gives the sense of logistics management being limited to internal supply chain management. But current thinking on supply chain management and experience has evolved from a broader perspective, where one needs to go beyond logistics operations.

1.5 SUGAR INDUSTRY—LOGISTICS AND SCM

In India, plantation white sugar is a regulated industry which is dependent on agro-economic conditions. It's not simply role agents in the environment who decide the fortune of this business. Logistics and supply chain operations too are critical for its success. This is a seasonal industry, operating on an average for about seven months

in a year. A teaspoon of sugar takes approximately twenty-two to twenty-nine months cycle time to get into your beverage. Imagine a plant with a daily cane crushing capacity of 5,000 tonnes. In this plant, the tasks of the supply chain manager, who is generally head of the plant, would be:

1. **Planning:** Plan cane plantation, growth, and supplies. Draw up plant management, stocking, and sales management plans.
2. **Operations:** Cane management begins with seed cane and goes on to getting the harvest cane to hopper at plant. This is a highly planning and operations-oriented activity, as about 50,000 units of farms and farmers have to be managed. Typically, in a country like India, where mechanization of cane harvesting is not possible, a group of thirty people can harvest and load about 6–9 tonnes a day. To avoid the risk of stoppages from a particular route, cane harvest plan and supply to a plant is scheduled in a phased manner. One can imagine the logistics coordination required by the cane department, which is a key procurement team. Similarly, sugar process plants run with crushers, mills driven by motors, and a number of vessels handling boiling and condensing of juices, which are again impacted by the corrosive nature of the juice and dependability of pumping motors. Proactive plant maintenance and plant logistics, including management of byproducts like molasses, bagasse and pressmud, are critical to the success of sugar plant economics. One can see that logistics-intensive operations such as movement and storage are sensitive in a traditional low-profit, high-volume business.
3. **Stock and sell:** Sugar plants in India cannot sell sugar in the open market as desired. Since sugar is listed under essential commodities, the sale and distribution of sugar takes place as per the release order of the government. The government decides the quantum and limits the sale of sugar within a period, say a month. So what is produced over seven months is sold over fourteen months. In such a scenario, planning to hold stocks and selling on time are going to be critical decisions. Generally, sugar plants maintain stock within the plant considering the volume, ease of handling, and tariff, especially duties, to be paid. More often, sales contracts happen at the plant and outbound handling is minimal. All the same, it is important that goods are stocked in order and movement is supported so that volume permitted for sale is fully utilized. Again, this is logistics-intensive functionality as warehousing and outbound facilitation are critical for this.
4. **Managing physical, financial, and informational flows:** As mentioned earlier, physical flow management requires careful planning, both in terms of farms and harvests, so that the plants continuously receive a definite capacity, say 5,000 tonnes of cane per day or about 230 tonnes per hour. If one has to manage such physical flow successfully, information flow management must be efficient and effective. Right from the planning stage, wherein field and farmers are registered for procurement, to the stage of monitoring growth at frequent

intervals with the support of input materials such as fertilizers, to harvesting, to engaging harvest labourers and inbound transportation, there is an immense need for information coordination between the planning and operations departments. Good information systems and equipment, including handheld devices, are deployed to manage this. Another equally important flow that needs to be organized is the financial flow as one would deal with farmers who are dependent on timely and fair payment of proceeds. Since farmers operate on an annual crop with bunched pay-out during the early stage of planting and during the final stages, such as harvesting and transportation, financial flow is critical for the success of this industry. Else, farmers have a tendency to switch crops, affecting plant economies. In India, switching has one more aspect: agriculture on wet lands like cane plantations tend to be driven by availability of contiguous lands for plantation (even though there are multiple owners) and volumes can swing due to reasons beyond the control of the plant.

One can see the sugar business fits in the definition of logistics and supply chain mentioned earlier. This adds up to the question: Where is the divide and commonality between logistics and SCM? The definitions by the Council of Supply Chain Management Professionals (CSCMP) are given in Appendix 1.2. Using experience and definitions given by the council, let us throw more light on both the topics.

Logistics primarily focuses on order management, inbound transportation, in-plant management, outbound transportation, storage and procurement, and managerial phases of strategic, planning, and operational decisions. The focus is more on internal organization, especially with regard to cost, service, resource/asset utilization, and quality. Primarily, it is inward-looking. In the sugar business discussed above, the process is more logistics centred, with inward-looking focus of optimizing sugar production from a satellite area of farming, managing farmers, time window, process plant, and so on.

On the other hand, supply chain management is more outward-looking and inter-organizational in approach. It involves collaboration, partnering, and coordination across entities serving the nodal organization. Relationship management depends heavily on logistics effectiveness and efficiency. Hence, supply chain is a super set of activities, which is more strategic in nature and performs the specific function of managing demand and supply.

As a profession, both logistics and supply chain have their own areas of orientation and specialization, which must be enriched and worked in unison for achieving excellence. Logistics professionals would like each of the perspectives—warehousing, transportation, inventory, and information—to be optimized, micro-managed, and aligned. Primarily, most of it is a scientific and routine decision system. On the other hand, supply chain professionals would look at the process more from the point of view of relationship management and could be behavioural in approach. Supply chain professionals would also

approach management from a logistics perspective. Appreciating this difference is important for long-term sustenance of goals and objectives of a business and its evolution.

To cite an example, in the sugar business, a strategist in logistics must use an engineering-centred approach for the development of produce with ease, design improvements in warehouse operations, and so on. At times, the logistics strategist must engage with civil bodies of government for improving roads, availability of water storages, and so on. All these actions would be informed by the goals of plant optimization and long-term growth. In the same case, a supply chain strategist would look into managing relationships with farmer communities, improving relationships with transport operators, harvesting ties with labourers and financiers, and so on. Thus, both logistics and SCM help an organization achieve high growth and remain competitive. In an organization, specificities of supply chain and logistics initiatives must be clearly defined and pursued.

Logistics infrastructure could largely be government-initiated and driven by public and private partnerships. Many countries in the US and Europe, and of late China, are achieving improvements in supply chain mainly because of investment in building logistics infrastructure such as highways, seaports and airports, cold chains, and so on. India must also invest in this sector at an aggressive pace to meet the increasing demands of the industry and achieve improvements in efficiency. Hence, logistics investment leads to supply chain improvements. As logistics infrastructure is a separate branch of study, this book will focus more on supply chain.

1.6 VALUE CHAIN, VALUE SYSTEM, AND SUPPLY CHAIN

As one observes the relationship between logistics and supply chain management, it may be useful here to discuss another useful concept, namely value chain, developed by Porter (1985), and relate it with supply chain. Figure 1.2 gives a flow chart of value chain. According to Porter, value chain analysis can be used to identify an organization's internal business processes and how they interact. An organization, in the process of creating value for different customers, performs numerous value activities. These could be a part of development, production, sales, or distribution of its services and products. The customer's perspective is given more importance than the cost parameter, as the organization is open to increasing cost for a premium product or service. According to this rule, value is more important than the cost as it is

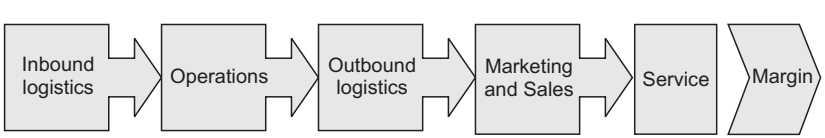

Figure 1.2 Value chain outline

believed that a customer will be willing to pay a higher price for a value-added product.

According to Porter, there are five generic categories of primary activities involved in competing in any industry, as shown in Table 1.1. Each of the main activities in Table 1.1 is divisible into a number of distinct activities that depend on the particular industry and organization strategy. One may observe that two of the five categories, namely inbound logistics and outbound logistics, are the key focus areas of logistics management and play a significant role in value chain activities. The other categories—operations, manufacturing, marketing and sales, and service—also involve supply chain and logistics management. Hence, the primary activities of value chain have a strong connection with logistics and supply chain management. One could argue that the essence of value chain arises from efficient management of supply chain. Value chain for competitive advantage could only be possible if strategies like cost leadership, differentiation, and focus are applied to primary activities. For example, in an industry like auto manufacturing, a player may gain an edge over competition by using effective just-in-time inventory management to reduce cost and provide value to customers. The advantage could be due to strategic initiatives deployed over years. The key point here is that synchronization of logistics is important for managing value chain activities.

Table 1.1 The value chain of a washing machine manufacturer

Category	Activities	Washing machine example
Inbound logistics	Associated with receiving, storing, and disseminating inputs into the product, such as material handling, warehousing, inventory control, vehicle scheduling, and returns to suppliers.	Receiving components such as motors, electrical switches, controls, metal sheets, and paints.
Operations	Associated with transforming inputs into the final product form, such as machining, packaging, assembly, equipment maintenance, testing, printing, and facility operations.	Assembly of components and conversion into the final product.
Outbound logistics	Associated with collecting, storing, and physically distributing the product to buyers, such as finished goods warehousing, material handling, finished goods inventory control, delivery vehicle operation, order processing and scheduling.	Movement of finished goods into mother warehouses, dealers, and own stores.
Marketing and Sales	Associated with promoting a product and providing means by which buyers can purchase the product and inducing them to do so.	Marketing functions such as pricing, promotions, appointment of channel partners and sales force management.
Service	Associated with providing service to enhance or maintain the value of the product, such as installation, repair, training, parts supply, and product adjustment.	Installation of the product at the customer's place on purchase, warranty management, and parts availability.

Support activities, according to Porter, can be divided into four categories: procurement, technology development, human resource management, and the firm's infrastructure, including general management, planning, finance, accounting, legal, government affairs, and quality management. Of these, procurement is more of a logistics-related function. Porter defines procurement as the function of purchasing inputs used in the firm's value chain and not purchasing inputs per se. According to him, the cost of procurement activities is usually a small portion of the total cost but often has a large impact on the firm's overall cost and differentiation. Improved purchasing practices can strongly affect the cost and quality of inputs, as well as of other activities associated with receiving and using the inputs, and interacting with suppliers.

If one looks at the value chain activities, they are mainly inward-looking and organization-centric. Porter's framework on industry analysis discusses the 'five forces model', in which he reckons the bargaining power of buyers and sellers, and the intensity of rivalry among firms in an industry with respect to the five factors that shape competition and drive strategic decision-making of firms. It is natural for Porter to extend in value chain analysis the spectrum of relationships for competitive advantage.

According to Porter, a firm's value chain is embedded in a larger stream of activities termed as value system. A value system links up the value chain of a firm with the value chain of the supplier and the value chain of the channel and buyer (shown in Figure 1.3). In the upstream linkage with the supplier, the firm must synchronize its value chain with that of the supplier.

The value system is not merely the movement of goods from a supplier. It involves much more because it is crucial for an organization to understand the value-creating activities of the supplier, including margin, for competitive advantage. In the same way, value mapping and understanding are critical for downstream linkages with buyers. A firm could gain competitive advantage and sustain it by not merely understanding value chain but the whole system. This holistic appraisal is what the concept of supply chain targets. Today, companies no longer compete for products or services, but mainly on the strength of their supply networks. Hence, it is important for a supply chain manager to understand nuances of value chain and value system and work with strategic management orientation for driving success. Exhibit 1.2 relates this for a capital goods manufacturer.

Exhibit 1.2 Supply Chain of a Capital Goods Equipment Manufacturer

Let's look at the supply chain of an engineering company, which could be a multinational company (MNC), manufacturing food industry capital goods equipment. Typically, this could cater to the domestic food industry like dairy, juices, alcohol, and so on. This company will have to look at value chain internally for all primary activities, namely inbound, operations, outbound, marketing, and post-sale support; and secondary activities such as procurement. There could be number of suppliers, such as component-vendors, including those dealing in sheets and metals, motors, electrical parts, and so on. The same vendors may be supplying components to competition as well. Unless this company synchronizes the value chain of the supplier with its value chain, margins would not improve. Similarly, the company could have channel partners, who could be project implementers or direct customers, whose value chain must also be synchronized with its own.

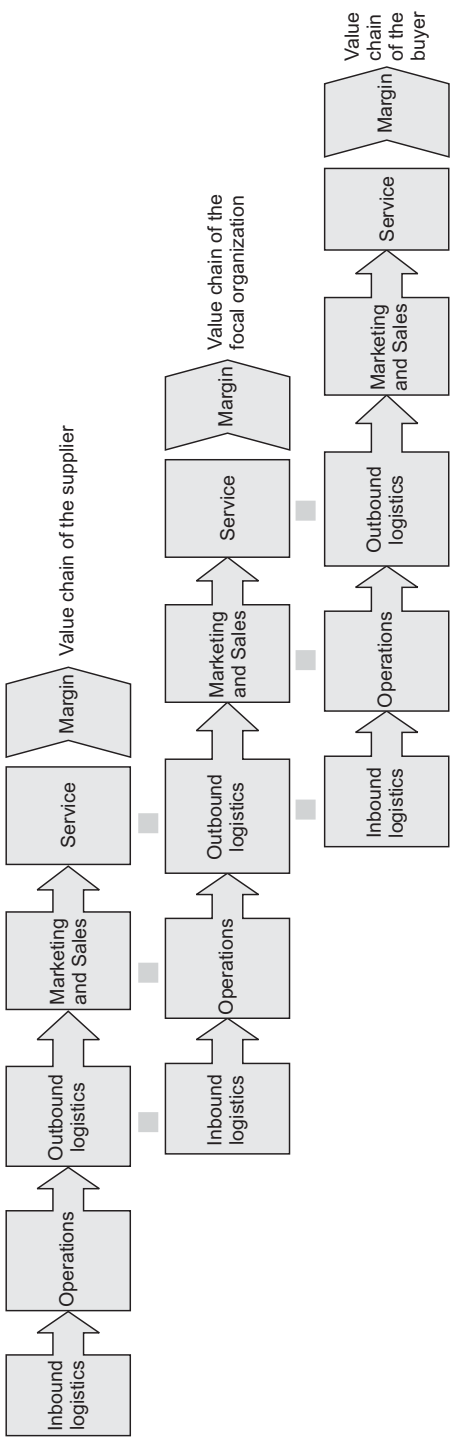

Figure 1.3 Value system

Hence the essence of a value system is to strategically manage suppliers, channel partners, and customers, which are key to supply chain management.

1.7 SUPPLY CHAIN MACRO PROCESSES

To enhance our discussion in Section 1.6, it could be useful to have an understanding of the macro processes of supply chain. One may cite the linkages among supply chain processes as being key to synchronization of activities and delivering value to customers. Process orientation links identifiable flows and value-adding activities. The debate about value addition and value creation is kept outside this discussion and these terms are used here interchangeably. Figure 1.4 shows the supply chain macro processes.

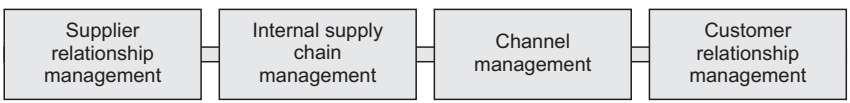

Figure 1.4 Supply chain macro processes

Traditionally, logistics were looked upon as a functional activity. The orientation was towards the accomplishment of tasks by grouping various resources. This was a silo approach (that is, 'acting independent of others') and led to suboptimal decisions. There was a complete lack of systemic thinking. For example, an inventory-control manager would look at reducing inventory holding so that the cost is reduced. The inventory policy could be at times independent of the market situation wherein consolidation could have been initiated. With reduction in ordering cost, frequent orders could be placed, leaving the scope of price negotiation to the procurement department. The conflict would become more pronounced with the procurement department as well as with marketing, which may prefer responsiveness. Apart from poor managerial effectiveness, another major problem would be behavioural concerns and playing the blame game, which would lead to further loss of effectiveness in supply chain. The worst cases were those where the lost sales could not even be mapped and escalated as behavioural issues which superseded managerial demands of growth and customer satisfaction. Thus, the functional approach was effective only where the boundaries of operation were clear with definite deliverables and adequateness of resources.

Given the drawback of the functional orientation, one may look upon process orientation for supply chain efficiency and effectiveness. Process orientation emphasizes on 'how' of an activity rather than 'what'. Each process has a set of certain flows and defined activities. With respect to supply chain at the macro level, informational, physical, and financial flows are paramount. At the macro level, activities would pertain to supplier management, the focal organization's internal supply chain, channel management, and customer relations. Each of the macro activities could be seen as a nodal point for decisions that are inter-linked, and the three flows ensure that the deliverables are achieved. A good process orientation would have defined procedures and policy for such activities so that quality is adhered to.

Supplier management process would include the goal of ensuring supplies at the best cost and terms, depending on whether it is a tactical purchase, a strategic buy, a negotiated purchase, or an engineered item. Each of these would have a different process. By and large, the process would include analysing information on supplier capabilities and pricing. Strategic buying and engineered buying would have more activities in the process of evaluation, especially at the initial stage of collaboration. It must be clearly understood that the entire supplier management process is driven by the nature of purchase and linked to the product manufactured.

In the case of Amul, supplier development formed a key component with process orientation. The development of dairies depended upon the commitment of the supplier, for which collection and payments had to be carried on schedule. More importantly, information flow was also critical, which was also enabled. Apart from these, a number of strategic initiatives such as animal husbandry support, bio-technology intervention, feed management, and so on were committed. If Amul had used only the functional approach, much of its developmental activities would have been limited to transactions and disparate handling of processes, lacking synchronization for growth.

Internal supply chain process includes a number of activities with respect to receiving, conversion, and despatch of finished goods. During this process, goods are internally value added through in-plant logistics operations such as stores management, movement and storage, and so on. All these activities are heavily linked to supplier collaboration like just in time (JIT), kanban (a technique of inventory management discussed later in the book), and design collaboration, and also with channel partners and customers. One may note that automated information flow and physical movement are synchronized for supplier-maintained inventory at the plant. The same would be true if one were to consider the importance of information flow from the customer's end to plant operations, especially with regard to changes in the weekly production as per the change in market conditions. Financial flows are fundamentally essential in these. Hence the functional approach to manufacturing would be limited to excellence in manufacturing but may lack supply chain synchronization unless it is explicitly pursued.

It could be useful here to cite an example noticed in a jewellery manufacturing unit wherein electronic kanban is practised. The internal operations are organized as per the cellular manufacturing concept and the production schedule clearly provides design and studding pattern. The vendor supplying gems and stones for studding at the cellular desk delivers to the daily requirement as per the production schedule. This kind of synchronization is enabled by process orientation, equipped by electronic kanban, leading to zero inventory on speciality items. But such sophistication in operations and supply chain management cannot be achieved in every scenario, specially in the continuous process industries.

The next important macro process is **channel management**. One can look at this as the key distribution functionality. Instead of looking at distribution as a function, one may treat this as a process. It is important to note linkages in distribution with multi-tier arrangements, depending upon the type of products moved. In case of fast-moving

consumer goods (FMCG) and the consumer products group, it may have a multi-tier structure. In case of heavy capital goods, it may be a simple channel structure but with complicated movement and handling activities. The goal at this stage is mainly to reduce channel cost and improve availability to customers. Channel conflicts emerge because of priorities and conflicts in objectives between channel partners and the focal organization. Unless flows are synchronized and trust is created among stakeholders, the supply chain would suffer in terms of effectiveness and efficiency.

One may understand the importance of this macro process with the example of a consumer electronics supply chain and the role of a dealer in the channel. A dealer selling X brand of television must be expected to link up with the focal organization, namely the brand owner of X, and his own dealership brand where he would be a large retailer of consumer electronics selling multiple brands. The dealer brand value could be because of location factor, availability of SKUs, quickness to launch new brands, and so on. In the X supply chain, his role is to mainly ensure the sale of X to customers who would like to own the brand. Unless the dealer passes on the discounts and promotions offered by X to its customers, there could be a choking of sale. The dealer may not lose a customer as he can cross-sell another brand by manipulating the promotion structure, but X fails to optimize its supply chain in this case. The failure in process orientation here is due to the lack of right flow of information and inability to involve dealers in promotions and so on. Hence, a synchronized supply chain thrives on process orientation and not just on functional approach.

Another important macro process is **customer relationship management**. As mentioned earlier, the purpose of a supply chain network is to serve the ultimate customer of the focal organization. The focal organization orients itself to synchronize its role agents and processes to serve its customers. Customer delight happens only if the product meets the customer's satisfaction in terms of time, quantity, responsiveness, and cost. Also aspects like warranty, service support, and parts availability are critical. Customer retention and upgradation would be the main objectives of the focal organization, which could happen only if financial, informational, and product flows are managed effectively. The interdependence among processes and role agents must be well-appreciated and synchronized for effective and efficient supply chain network. Customer relationship management from supply chain management perspective must take care of responsiveness, reliability, and flexibility. These could be possible only when the focal organization seamlessly integrates all processes.

If one were to look at the same situation of a consumer electronics distributor from the customer's perspective, customer value is enhanced only when the brand of a customer's choice is delivered on time and installed appropriately. In other words, customer value is about making the product functional. Over and above these, the customer must be provided with operational warranty, post-sale support from installation to maintenance and replacement with spares on failure. When the customer experiences such committed service which has linkages to other processes, he would be delighted. For example, a television chosen by a customer must be

installed and after-sale service support must be provided. The replacement of spares requires production and distribution tie-up for spares.

Hence it is important to enable process orientation and linkages among macro processes for running an effective supply chain network. Many successful organizations have identified their macro processes and synchronized them seamlessly.

A process view of supply chain is discussed by Sunil Chopra and others (2007). According to Chopra, 'A supply chain is a sequence of processes and flows that take place within and between different supply chain stages and combine to fill a customer need for a product.' There is the 'cycle' view, according to which the processes in a supply chain are divided into a series of cycles, each performed at the interface between two successive supply chain stages. Alternatively, the 'push/pull' view divides the processes in a supply chain into two categories, depending on whether they are executed in response to a customer order (pull) or in anticipation of a customer order (push).

There are typically five nodes—namely the customer, retailer, distributor, manufacturer, and supplier—and four stages in a supply chain. The cycle view clearly defines processes involved in each stage and the owner of each process. This view specifies the roles and responsibilities of each member and the desired outcome of each process. The four processes in four stages are:

1. Customer order cycle (customer–retailer)
2. Replenishment cycle (retailer–distributor)
3. Manufacturing cycle (distributor–manufacturer)
4. Procurement cycle (manufacturer–supplier)

It can be observed that these are closely linked to the macro processes discussed earlier. One may also note that the number of stages is decided on the basis of the number of intermediaries. For example, traditional businesses, such as the dairy industry, have a number of stages as intermediaries are more. On the other hand, businesses such as capital goods manufacturing may have fewer intermediaries. However, such operations would have severe process intensity within the level of operation. The importance of the cycle view approach is that it is useful in specifying roles and responsibilities of different players in the supply chain network and establishing rules and procedures across the various stages in supply chain operations.

A supply chain is mainly aimed at serving the ultimate customer and processes get triggered in relation to customer demand. The processes could be initiated either in anticipation of a demand or in response to a demand. The concept of 'pull' in supply chain is about the execution of processes in response to a customer order. This concept is reactive but brings value creation to customers by allowing flexible configuration of products. The advantage to the focal organization in this process is that it reduces finished goods inventory by postponement. For example, dial-a-pizza is normally a pull-based supply chain wherein the focal organization provides the customer the flexibility of selecting the toppings of his choice. At the same time, the focal organization manages its inventory better.

The idea of 'push' in supply chain means the execution of processes is initiated in anticipation of customer orders. This mainly depicts the speculative character of a supply chain where production and stocking happens on the basis of demand forecasts. This process would be more driven by economies of scale in operations and for low-value items. For example, popular models of two wheelers are produced in India on the basis of demand estimates. These are stocked and await customer demand. However, it is important to understand the boundary of push and pull in any supply chain network. Even in the above example of dial-a-pizza, the final choice of pizza could be customer driven but the base and common ingredients must be ready for serving on time. Push and pull processes are useful in considering strategic decisions relating to supply chain design as one gets a more global view of how supply chain processes relate to customer orders. Based on such a global view, facility locations, which could be split or consolidated, and other facets of the supply chain can be designed accordingly. One may also note here that the balancing of push and pull processes and their relative importance will have an impact on the supply chain process. Generally, it is believed that a push process would be cost-based and a pull process would be based on responsiveness. Now let's look at the Dell direct model explained in Exhibit 1.3.

Exhibit 1.3 Dell Direct Model

The Dell Corporation business model is based on the supply chain strategy of direct-to-customer, which was a source of competitive advantage, especially in the home PC segment. Dell differentiated from competition by providing a channel for customers to place orders of their configuration from a set of choices, cutting intermediaries. Dell's aim was to achieve fulfilment of orders at the least cost. For customer satisfaction, logistics operations had to be streamlined to ensure the timely delivery of customized products. Dell was required to design its supply chain appropriately across the globe to give similar experience to all customers, wherever they may be. This involved defining strategy with respect to the location of facilities and structuring of relationships among suppliers, assembly centres, and delivery operators.

The Dell Direct Model facilitates immediate market feedback as the company has direct links with customers. With such an advantage, the company can quickly influence demand trends. Another important aspect of this model is that all players are accountable as roles and responsibilities are clear and management is through metrics. The model lays tremendous emphasis on fulfilling customer orders, an approach which requires the customer to be treated with respect.

The key attribute of this model is 'build to order' as the customer order initiates the process of finalizing the product. This gives the firm the advantage of postponing material ownership until the point of sale. The focus of operations is to ensure resource productivity so that cost advantage is created. The operations run 24 X 7 and matrix form of organization is deployed for organizational efficiency. All these are followed up with commitment and dedication for value creation across the chain.

Dell Direct Model has also defined boundaries of push and pull. Components and accessories need to be available commonly across SKUs, whereas the delivery process from the hub would be initiated after an order is received. The customer order cycle would be in response to a demand, and hence pull-based, whereas aggregation of common items at the hub would be on push basis. The engineering of common products and demand estimation is critical in this whole process.

1.8 INTERFACE OF TECHNOLOGY, PROCESS, AND PEOPLE IN SUPPLY CHAIN

The quality measures and technological advances have revolutionized supply chain in the last two decades. The various process opportunities for supply chain configuration could be understood from the models so far discussed. Business processes mapping and documentation have attained sophistication because quality initiatives are being increasingly adopted across the globe. Rather, quality adherence has become mandatory and transparent for global business.

At the same time, global business has been transformed by technological advances. Technology can be divided into information technology and purely business-specific technology. The advancement of each of these independently triggered growth for the other, and customers were the biggest beneficiaries. A classic example would be e-business, especially trading in goods from apples to apartments, books to boutiques, cards to cars, and so on. One could see success achieved in different models such as B-to-B, B-to-C, G-to-C, and so on. Today, in India, one can buy a bouquet of flowers off the web and get it delivered in any corner in the country. This is how technology empowers customers. Selling flowers online is a simple idea but a great effort from the supply chain perspective. One is now able to send flowers to the remote parts of India, which are not easily accessible and where bouquets may not be available. Aggregators deliver this service at an affordable price because technology has opened up new business opportunities that thrive on economies of scope and collaboration rather than on the simple model of economies of scale.

Of course, there are other less dramatic but still remarkable applications of technology in business which have streamlined the supply chain. These will be discussed at length in chapters that follow. But to provide a window to them, it can be said that business applications have moved from the simple use of technology for transactions and management information system to real-time connectivity and integration with partners, reducing time and eliminating the need to stock information and cash.

Today manufacturing firms have supplier networks linked to their servers. Their visibility in production plans and schedule is enabled for efficiency and effectiveness in the supply chain. It is difficult to imagine life and business without the interface of technology, which is now more like a routine and close to being a universal truth.

The performance of people in the supply chain domain has also been improving dramatically. The competencies of people are critical at the operating and planning levels, and the advances in technology have enhanced their output. For instance, while delivering a courier, the delivery personnel usually take the confirmation of receipt on a document. It leaves one wondering when they would confirm delivery to the consigner. Nowadays some delivery personnel carry a small handheld device and take signature on the monitor of the same. This allows one to track from anywhere in the world the delivery status of one's consignment on near real-time basis. Similarly, stores staff, which handles a huge number of documents for reordering and analysis, is able to do so efficiently because of new technology. The personnel have not changed but their performance has improved dramatically. One can go on listing such examples from around us. These could be in public life, in services like banking,

insurance and education, or in manufacturing like engineering and pharmaceuticals. The productivity of people has moved up due to new business models and developments in the supply chain. The relationship is illustrated in Figure 1.5.

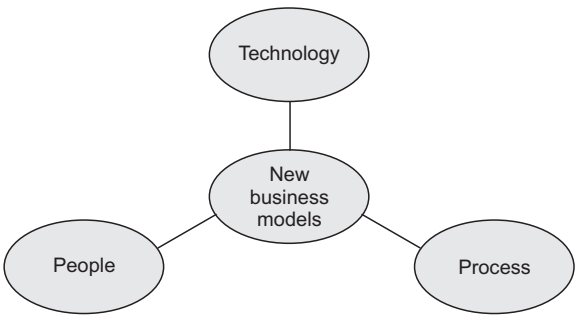

Figure 1.5 Relationship among technology, process, and people

It is important to note that development of new business models is happening not just because of technological advancement or process improvement or quality of people. It is rather due to the ability to interface all of these in a systematic way. In reality, improvements in one leads to the other and new improved models evolve. One would be amazed at the changes that have occurred during this decade in financial services, especially in stock broking. The players are able to assimilate information and act quickly because of the availability of information, improvements in processes, and heightened skills of people who assimilate and make use of such changes. The interface among technology, process, and people has benefited all stakeholders. Similarly, one can look at how many purchasing decisions at the corporate level have improved. It is important to note here that the level of interface would vary according to the business. However, it is certain that interfaces among technology, process, and people are facilitating the configuration of new supply chains, either directly or indirectly, and have dramatically improved supply chain performance. Exhibit 1.4 demonstrates one such story in India.

1.9 SUPPLY CHAIN DECISION HIERARCHY

Supply chain management decisions could belong to one of the three levels—strategic, planning, or operational—based on the time bucket of decision. Figure 1.6 shows the three levels of decisions in a hierarchy. Decisions on the strategic level would set the conditions under which planning and operational level decisions would be made. The strategic level would involve non-routine and critical decisions, planning would engage more of scheduling and structuring a framework for effectiveness, and operational level would concern activities related to execution.

The strategic decisions would have three characteristics: they are long term, capital in nature, and may not be easily reversible. These are related to network design wherein issues such as plant and warehouse location are decided. Other facets such as

Exhibit 1.4 The Story of Metal Junction

mjunction services limited operating at the cutting edge of information technology and the Internet, is a 50:50 venture of SAIL and TATA Steel. Founded in February 2001, it is today not only India's largest eCommerce company (having eTransacted worth over Rs 30,800 crore till date) but also runs the world's largest eMarketplace for steel. The steel and coal supply chain in India has been transformed by mjunction, which has ushered in efficiency, transparency, and convenience to the way steel and coal is bought and sold. Similar transformational change is being sought to be made in the automobile industry and in the sale of fixed priced branded products with the launch of autojunction and straightline respectively.

Business volume of the company in terms of transaction value has soared from Rs 94.35 crore in fiscal year 2002 to Rs 14,393 crore in fiscal year 2009, registering a spectacular CAGR of 105 per cent. mjunction's growth has not only been in terms of transactional value, revenue, and profits. In the space of just eight years, it has established a national footprint with offices at twelve locations all over the country. Starting out with a team of less than six people at inception, today more than 375 people from different professional and academic backgrounds are working on growing the company at a scorching pace.

Today, mjunction offers a wide range of eSelling, eSourcing, eFinance and eKnowledge services across diverse industry verticals that empower businesses with greater process efficiencies. mjunction has service offerings spanning the entire eCommerce spectrum and operates through metaljunction.in, buyjunction.in, coaljunction.in, autojunction.in, straightline.in, valuejunction.in, financejunction.in, and mjunctionedge.

Source: http://www.mjunction.in/about_us/, accessed on 30 December 2009.

inventory management, supplier development through alliance network, transportation modelling, and so on are also decided at this level. The decisions made at the strategic level are interrelated. For example, decisions on the mode of transport are influenced by decisions on the geographical location of plants and warehouses, and inventory policies are influenced by the choice of suppliers and production locations. Modelling and simulation are frequently used for analysing these interrelations, and the impact of making strategic level changes in the supply chain.

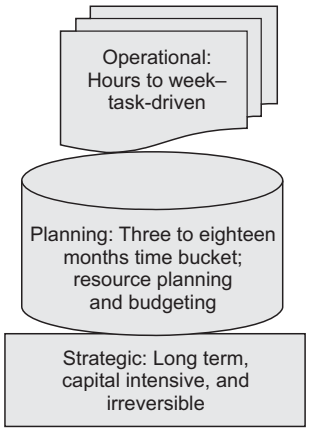

Figure 1.6 Hierarchy of supply chain decisions

At the planning level, quarterwise demand estimates help in arriving at production plans, decisions about tie-ups with suppliers, aggregate planning for personal care products, quarterwise inventory policy, and so on. The decision hierarchy at this level is mainly based on resource planning and budgeting for achieving efficiency and effectiveness of supply chain. For example, an automotive plant would arrive at an annual budget and indicate the same to the suppliers for their preparedness. Then, it would release a quarterwise production plan, which would give the suppliers an estimate of the quantity of components they should be

prepared to supply. This estimate would be fine-tuned and adjusted from month to month.

At the operational level, decisions and activities are meant for accomplishing immediate tasks on set parameters and policies. These are routine and a fixed number of functions which could be happening repetitively. The focus is to accomplish the function without any error or loss of resources. Some operational activities could be production scheduling, executing delivery, movement of a consignment, and so on.

It is important to note the nature of decisions for resource requirement and competence requirement vary widely among the hierarchy of a supply chain. Hence, the preparedness of suppliers and the execution capability of a firm must factor in the same. Many a times, strategic decisions are driven from top management, planning decisions are structured and anchored by supply chain experts, and operational decisions take place at the ground level. However, supervisory management is responsible and accountable for these decisions in reality.

1.10 SPAN OF DECISIONS AND PROFESSIONAL EXCELLENCE IN SCM

It may be pertinent here to highlight the span of supply chain decisions. The rationale is to highlight the importance of supply chain professionals and the nature of decision areas where they may concentrate. Here, it is more indicative to stress the importance of professional approach to SCM and orient a supply chain professional towards opportunities and challenges.

First, strategic decisions involving the supply chain domain and linkages of supply chain strategy with other functional strategies—Strategic Business Unit (SBU) level strategy and corporate strategy—must be clearly understood. This is a decision which would involve top management and a team of functional managers. Hence, a supply chain champion must be able to spearhead decision-making for getting required attention for resources and domain specialization so that value creation for customers could be ensured. A supply chain champion must clearly map information systems required for the chain strategy framework and involve a review mechanism and feedback to other functions and strategic decision-makers.

Second, responsiveness and the efficiency spectrum calls for a trade-off between cost management and service factors. It may be noted that increasing service costs disproportionately is harmful and hence understanding this trade-off is critical. Also this decision needs the support of top management, as service and cost are key competitive features on which the company could be operating in the market. The supply chain manager, who should ideally be a part of the top management, must champion this. If there is no such role, he must be able to draw the attention of the top management.

Third, the span of decision would involve planning functionality like aggregate plans, coordination of production plans, inventory plan, and so on. All these would require functional capability to handle and coordinate. Though technology has been increasingly deployed and decision support systems are available, it is important to appreciate time sensitivity and relational sensitivity of these decisions. Relational

sensitivity is how a decision criteria is inter-related within the supply chain domain and across other domains. For example, a manufacturing company may consider a production drop for a product that is to be replaced. If it is planned during a particular planning bucket, the supply chain manager must ensure all stakeholders in the supply chain system are informed and adjust their volume to this requirement.

Four, another area of supply chain decision would be in relation to operational issues, which may involve coordinating inbound and outbound transportation, in-plant logistics, day to day handling with suppliers for daily production schedule, and so on. These decisions, as mentioned, would be taken at a supervisory level. It is critical to understand the occurrences and escalate to the next level. Going back to the sugar plant, in such an enterprise daily reports are critical to understand whether certain production areas are susceptible to failure and need adjustment. This may affect the flow of cane from fields or yield or efficiency parameters. A supply chain analyst must relate such operational data to various parameters and bring it to the attention of appropriate managerial hierarchy.

Five, supply chain managers must coordinate with technology support managers, process owners, and people managers for an interface of the three functions for supply chain improvements. This requires a supply chain manager who can focus on these three aspects with adequate background on contemporary developments and understanding of competition moves on these. The business values of these applications can be mapped by a supply chain manager as he understands the system from the ultimate customer's perspective.

Professional excellence in supply chain is important for any organization to be a high performer. Supply chain focuses on strategically and operationally linking all stakeholders in serving the ultimate customer. Unless the domain is given due share of representation in senior and top management functions and professionally qualified personnel are engaged, the organization would find it difficult to be competitive. Professional excellence is not gained by experience alone. There must be organized effort from the individual and the organization, stakeholders like academia and government, and other professional bodies like Confederation of Indian Industries (CII), Indian Institute of Materials Management (IIMM), and so on. Academia is giving importance to this domain with engineering and management institutions and universities now offering courses in SCM. CII has made an excellent effort by creating a centre of excellence. IIMM has been imparting knowledge on the subject. International programmes and affiliations like Council of Supply Chain Management and others have certification to train professionals in this domain.

SUMMARY

Supply chain management (SCM) is defined as 'the integration of key business processes from the end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders' (the Global Supply Forum). A supply chain involves two or more organizations for serving the ultimate customer, which happens by streamlining the flow of material, finance, and information. Supply chain is more outward looking and inter-organizational in approach.

Collaboration, partnering, and coordinating across entities serving the nodal organization are the key to success.

Logistics is the process of strategically managing the procurement, movement, and storage of materials, parts, and finished inventory. The related information flows through the organization and its marketing channels for the cost-effective fulfilment of customers' orders. Logistics primarily focuses on order management, inbound transportation, in-plant, outbound transportation, storage and procurement, and managerial phases of strategic, planning and operational decisions. The focus is internal organization-centric, primarily on cost, service, resource/asset utilization, and quality parameters.

Value chain, value system, and supply chain management interface, complementing the approach to value creation to customers by defining activities and systems. According to Porter, there are five generic categories of primary activities involved in value creation by any firm competing in an industry: inbound logistics, operations, outbound logistics, marketing and sales, and service. While discussing procurement, Porter defines it as the function of purchasing inputs used in the firm's value chain and not purchasing inputs per se. According to him, the cost of procurement activities themselves usually represents a small if not significant portion of total costs, but often has a large impact on the firm's overall cost and differentiation. Value chain analysis can be used to identify an organization's internal business processes and how they interact. A firm's value chain is embedded in a larger stream of activities termed as value system. Value system links up the value chain of the firm with that of the supplier, channel, and buyer.

While defining macro processes in SCM, it may be noted that process orientation emphasizes on 'how' of an activity rather than 'what'. With respect to supply chain at the macro level, the activities would pertain to supplier management, focal organization's internal supply chain, channel management, and customer relationship management. Supply chain management is entrenched in process orientation and adherence. Many successful organizations have identified their macro processes and synchronized them seamlessly.

There are typically five nodes—the customer, retailer, distributor, manufacturer, and supplier—and four stages in supply chain. According to the cycle view, the four processes in the four stages of supply chain are: customer order cycle, replenishment cycle, manufacturing cycle, and procurement cycle. 'Push' in supply chain means the execution of processes is initiated in anticipation of customer orders. This mainly depicts the speculative character of supply chain where production and stocking happens on the basis of demand forecasts. The concept of 'pull' in supply chain is about the execution of processes in response to a customer order. This concept is reactive but brings value creation to customers by allowing flexible configuration of products.

The trilogy of technology, process, and people plays a key role in improving supply chain effectiveness. The advance in technology and its successful deployment for business, process improvements driven by quality measures, and enhanced people's skills due to technological development contribute to the efficiency of supply chain.

KEY TERMS

Business model: A business model refers to an estimate of revenues and costs incurred in conducting a business. It includes an asset and liability structure, which shows margins and return on investment. The model is fundamental to product/service offering and approach to competition.

Cycle view of supply chain: The cycle view clearly defines processes involved in a supply chain and the owners of each process. This view specifies the roles and responsibilities of each member and the desired outcome of each process. There are normally four stages and five stakeholders, namely the customer, retailer, distributor, manu-

facturer, and supplier. Each of the two successive nodes are connected to form a cycle.

Hierarchy of supply chain decision-making: This refers to the management level, the level at which decisions are made. Supply chain could be strategic, planning-related, and operational, based on factors such as the time window, the significance of resource deployment, whether the decision is routine or not.

Inbound logistics: Activities associated with receiving and storing material, disseminating inputs from suppliers, inspection, inventory management, transport management, and so on, are categorized as inbound logistics.

Logistics management: Logistics management is about defining a system and managing the same. It ensures that the movement of material, the storage of goods in intermediary stages, and the movement of finished goods to customers are in line with the business strategy of the organization. Logistics management is inward looking and is focused on cost optimization and service level of the focal organization.

Outbound logistics: Activities associated with order processing, order picking and packing, shipping, delivery vehicle operations, and dealer/distributor network are categorized as outbound logistics.

Pull in supply chain: The execution of processes in response to a customer order. This process is reactive but brings value creation to customers by allowing flexible configuration of products.

Push in supply chain: Push in supply chain means the execution of processes is initiated in anticipation of customer orders. This mainly depicts the speculative character of supply chain where production and stocking happen on the basis of demand forecasts.

Strategic business unit (SBU): This level of strategy pertains to a geography or a product group, and so on.

Supply chain management (SCM): SCM is the integration of key business processes of a focal organization with downstream players (customer and customer's customer) on one side and upstream players (supplier and supplier's supplier) on the other side. It also includes managing three flows, namely products/services, information, and finance.

Value chain: A value chain identifies primary activities such as inbound logistics, operations, outbound logistics, marketing and sales, and service; and related support activities such as human resources, procurement, product R&D, technology and systems development, and so on.

Value system: A focal organization's value chain is linked to the value chains of its suppliers and customers. Together these are addressed as a value system.

CONCEPT REVIEW QUESTIONS

1. Analyse supply chain management perspectives in managerial decisions with examples.
2. Define value chain and its linkages in upstream and downstream activities. Identify a focal organization's value chain and elucidate how it works within the industry it operates. Discuss whether value chains of different firms within an industry could be different. If yes, cite an example.
3. Discuss the role of technology application and process adherence in effective supply chain management and cite examples from real life.
4. What do you understand by macro processes in supply chain and how are they related? Explain the concept with an example.
5. 'The role of a supply chain manager is more like a functional manager and has a limited scope.' Comment on the statement with different industry situations.

CRITICAL THINKING QUESTIONS

1. Imagine that you are the supply chain manager of a power equipment engineering company. You have ancillaries who do product-related work. Your customer is erecting a power plant. You have been asked to demonstrate your value system to your management and suggest a fair distribution of supply chain profits among the players involved. Point out the focal points for your discussion with your management.
2. Assume you are in charge of the internal supply chain of a construction site where a residential complex is being built. Discuss the important processes and approaches for effective supply chain management.
3. Assume that you are in charge of the supply chain of a retail chain's large store. How would you approach technology, process, and people integration for in-store supply chain management? It is recommended you visit a store and apply your experience accordingly.

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http://cscmp.org/Council of Supply chain management Professionals

www.amul.com/organisation.html

www.mjunction.in/about_us/

www.supply-chain.org/

Appendix 1.1

Gujarat Cooperative Milk Marketing Federation

GCMMF: AN OVERVIEW

Gujarat Cooperative Milk Marketing Federation (GCMMF) is India's largest food products marketing organization. It is a state level apex body of milk cooperatives in Gujarat which aims to provide remunerative returns to the farmers and also serve the interest of consumers by providing quality products which are good value for money.

CRISIL, India's leading Ratings, Research, Risk and Policy Advisory company, has assigned its highest ratings of 'AAA/Stable/P1+' to the various bank facilities of GCMMF.

Details of GCMMF

Members: 13 district cooperative milk producers' unions

No. of producer members: 2.7 million

No. of village societies: 13,141

Total milk handling capacity: 10.21 million litres per day

Milk collection (total 2007–08): 2.69 billion litres

Milk collection (daily average 2007–08): 7.4 million litres

Milk drying capacity: 626 Mts per day

Cattle feed manufacturing capacity: 3090 Mts per day

Sales Turnover	Rs (in millions)	US$ (in millions)
1994–95	11,140	355
1995–96	13,790	400
1996–97	15,540	450
1997–98	18,840	455
1998–99	22,192	493
1999–2000	22,185	493
2000–01	22,588	500
2001–02	23,365	500
2002–03	27,457	575
2003–04	28,941	616
2004–05	29,225	672
2005–06	37,736	850
2006–07	42,778	1,050
2007–08	52,554	1,325

Products Marketed

Bread spreads	3 products
Cheese range	8 products
Mithaee (Ethnic sweets) range	6 products
UHT milk range	7 products
Pure ghee	3 products
Infant milk range	3 products
Milk powders	4 products
Sweetened condensed milk	1 product
Fresh milk	6 products
Curd products	4 products
Amul ice creams	6 products
Chocolate and confectionery	2 products
Brown beverage	1 product
Milk drink	2 products
Health beverage	1 product

Source: http://www.amul.com/organisation.html.

Appendix 1.2

SCM Definitions by CSCMP

As supply chain covers a broad range of disciplines, the definition of supply chain management can be variable and confusing. Often, supply chain management is confused with logistics management. The definition given by the CSCMP board of directors, comprising industry experts, is accepted as the official definition of supply chain management.

CSCMP's Definition of Supply Chain Management

Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies.

Supply Chain Management—Boundaries and Relationships

Supply chain management is an integrating function with primary responsibility for linking major business functions and business processes within and across companies into a cohesive and high-performing business model. It includes all of the logistics management activities noted above, as well as manufacturing operations, and it drives coordination of processes and activities with and across marketing, sales, product design, finance, and information technology.

CSCMP's Definition of Logistics Management

Logistics management is that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverses flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customers' requirements.

Logistics Management—Boundaries and Relationships

Logistics management activities typically include inbound and outbound transportation management, fleet management, warehousing, materials handling, order fulfilment, logistics network design, inventory management, supply/demand planning, and management of third party logistics services providers. To varying degrees, the logistics function also includes sourcing and procurement, production planning and scheduling, packaging and assembly, and customer service. It is involved in all levels of planning and execution—strategic, operational, and tactical. Logistics management is an integrating function, which coordinates and optimizes all logistics activities, as well as integrates logistics activities with other functions, including marketing, sales manufacturing, finance, and information technology.

Source: http://cscmp.org/aboutcscmp/ definitions.asp.