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CHAPTER 1
OVERVIEW OF SUPPLY CHAIN MANAGEMENT

1.1 Supply Chain Management [SCM]

A supply chain is a network of facilities and distribution options that performs the function of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers.

Supply chains exist in both service and manufacturing organization, although the complexity of the chain may vary greatly from industry to industry and firm to firm. Traditionally, marketing, distribution, planning, manufacturing, and the purchasing organizations along the supply chain operated independently.

However, these organizations have their own objectives and they were often conflicting, such as marketing objectives to achieve high customer service and maximum sales used to conflict with manufacturing and distribution goals. Traditional manufacturing operations were designed to maximize throughput and lower costs with little consideration for the impact on inventory levels and distribution capabilities. Purchasing contracts were often negotiated with very little information beyond historical buying patterns. This meant that the organizations did not have a single, integrated plan for carrying out these activities. Therefore, it was felt that there has to be a mechanism through which these different functions could be integrated. This need for improved inter-departmental cooperation, coordination and integration gave birth to the concept called Supply chain management.

The best companies around the world are always on a look out for a powerful new source of competitive advantage. Some of them discovered that SCM attempt to integrate various activities along the value chain of a firm and enables a firm to bring products to market faster and create satisfied customers. The SCM program integrates activities ranging from procurement, manufacturing operations, transportation, and physical distribution into a unified program. Successful SCM, then, coordinates and integrates all of these activities into a seamless process. It embraces and links all of the partners in the chain. In addition to the departments within an organization, these
partners include vendors, carriers, third party companies, and information systems providers. Within the organization, the supply chain refers to a wide range of functional areas. These include SCM related activities such as inbound and outbound transportation, warehousing, and inventory control, sourcing, procurement, and supply management fall under the supply-chain umbrella, too. Forecasting, production planning and scheduling, order processing, and customer service all are part of the process as well. Importantly, it also embodies the information systems so necessary to monitor all of these activities.

SCM seeks to enhance competitive performance by closely integrating the internal functions within a company and effectively linking them with the external operations of suppliers, customers, and other channel members. The benefit of such supply chain integration can be attained through efficient linkage among various supply chain activities, and the linkage should be subject to the effective construction and utilization of various supply chain practices for an integrated supply chain. This means that a firm that is pursuing the effective construction of SCM practices needs to pay attention to supply chain [SC] integration.

SCM practices implemented to achieve superior supply chain performance require internal cross-functional integration within a firm and external integration with suppliers or customers to be successful [Narasimhan, 1997]. Carter and Narasimhan [1996] suggest that SCM and purchasing practices associated with competition capabilities of the firm may have more significant effects on firm performance, by showing that, depending on advertising, level of competition, product pricing and positioning, and degree of innovation in product lines, the influence of SCM factors on the overall performance and success of the firm can be different.

1.2 Evolution of SCM

SCM did not exist as a separate discipline a few decades ago. In the late 1970s, deregulation of the public transportation industry brought about a closer analysis of traffic management in many corporations and allowed more decision-making capabilities in selecting modes of transportation. Then in the 1980s, the functions of warehousing and inventory management became of more concern among corporate officers due to increasingly high interest rates and a flux of corporate buyouts.
Another factor affecting the recent evolution of supply chain management was the highly successful use of just-in-time manufacturing in many Japanese firms. The rapid succession of these events prompted companies to focus increasingly on coordinating the inbound and outbound flow of goods and services in a more cost-effective manner, which, in essence, embodies the general idea of logistics management [Prince, 1999]. Logistics management can be formally defined as that part of the supply chain process that plans, implements, and controls the effective, efficient flow and storage of goods, services, and related information from the point of origin to the point of consumption in order to meet customer requirements [Chopra and Meindl, 2001].

SCM has now evolved beyond a mere cost-reducing business function into a core competency and source of competitive advantage for many firms because of its impact on customer service and the output of the entire logistics function. In a highly competitive marketplace where products, prices, and quality are easily imitated, superior customer service can be the key element that ranks one firm above another [Lambert et al., 1998; Ferguson, 2000]. Thus, the logistics function obviously plays a vital role in the success or failure of a company.

In order to understand the significance of changes taking place in supply chain initiatives, it would be prudent to review historical aspects of production and operations management activities [Bruce, 1997; Poirier and Reiter, 1996] as per following:

1) During the period from 1960 to 1975, corporations had vertical organization structures and optimization of activities was focused on functions. Relationships with vendors were winning-lose interactions, and many times adversarial. Manufacturing systems were focused on materials requirements planning [MRPI].

2) In the timeframe from 1975 to 1990, corporations were still vertically aligned but several were involved in process mapping and analysis to evaluate their operations. There was realization by organizations of the benefit of integration of functions such as product design and manufacturing. Various quality initiatives, such as the total quality management [TQM] philosophies of Deming, Juran, and Crosby, and ISO Standards for quality measurement were initiated by many organizations. The Malcolm Baldrige award and Shingo Prize for recognizing
excellence in these and other quality initiatives were initiated. Manufacturing systems were focused on MRPII.

3) Starting in 1990, corporations all over the world have been experiencing increasing national and international competition. Strategic alliances among organizations have been growing. Organization structures are starting to align with processes. Manufacturing systems in organizations have been enhanced with information technology tools such as enterprise resource planning, distribution requirements planning, electronic commerce, product data management, collaborative engineering, etc. [Aberdeen, 1996]. Design for disassembly, synchronous manufacturing, and agile manufacturing are some of the new paradigms in manufacturing. There has been a growing appreciation in many firms of total cost focus for a product from its source to consumption, as opposed to extracting lowest price from immediate vendor[s] [Turbide, 1997]. There has also been an increased reliance on purchased materials and outside processing with a simultaneous reduction in the number of suppliers and greater sharing of information between vendors and customers. A noticeable shift has taken place in the marketplace from mass production to customized products. This has resulted in the emphasis on greater organizational and process flexibility and co-ordination of processes across many sites. More and more organizations are promoting employee empowerment and the need for rule-based, real-time decision support systems to attain organizational and process flexibility, as well as to respond to competitive pressure to introduce new products more quickly, cheaply and of improved quality.

1.2.1 The Nature of SCM

Market success requires that companies, regardless of size, offer products or services that customer’s value. Doing so requires careful resource management. Facilities to provide resources are often scarce and depend upon the scale of companies. In large scale company's resources are more compare to medium and small scale company's [Marchington et al., 2003; Augustyn, 2004; Castrogiovanni et al., 2006a; Credit Suisse Worldwide, 2008]. SCM can help to overcome some of the limitations imposed by resource scarcity. Adopting a SCM mindset leads managers to proactively look beyond their companies’ boundaries to evaluate how the resources of suppliers
and customers can be used to help the small firm succeed [Christopher and Ryals, 1999; Dell and Fredman, 1999; Barclay, 2005].

Specifically, SCM enables a small venture to focus on doing exceptionally well a few things for which it has unique skills. All activities that are not at the core of the firm’s value proposition are shifted to other channel members that possess superior capabilities [Cox, 1999; Quinn, 2000; Fawcett and Magnan, 2002]. By establishing the right, collaborative relationships with other members of the supply chain, small firms can leverage complimentary competencies found throughout the chain to increase performance [Croom et al., 2000; Brau et al., 2007]. SCM thus changes the thought process for and options available in the value-proposition-definition and business-model-design process. Unique capabilities, not resources or scale, become the key to survival and success. SC collaboration becomes the vehicle for small-firm growth.

![A Supply Chain Network](image)

**Figure 1.1: A Supply Chain Network**

Advances in information and communication technologies complemented by sophisticated decision support systems enable designing, implementing and controlling strategies essential to delivery of integrated systems, such as supply chain systems. It has been derived from the general architecture of a supply chain network...
depicted in figure 1.1. An example of a manufacturing supply chain network (Tzafestas and Kapsiotis, 1994), depicted in figure 1.2, and captures the essence of the proposed framework.

As shown in the figure 1.2 it is understood that the supply chain is made up of a manufacturer and a two-level hierarchy of suppliers. In each sub-system the supply chain network incurs costs that are to be monitored and controlled. At each level in the supply chain, delay due to procurement activity is incurred, which has the potential of imposing waste, and thus incurring additional costs in the system. This closed loop form of a supply chain system mandates tight coupling among its components. This rationale is adapted for the proposed framework.

![Manufacturing Supply Chain Network](image)

*Figure 1. 2: A Manufacturing Supply Chain Network*

The supply chain framework elements are categorized as follows:

1] Goals;

2] Objectives;

3] Modeling principles;

4] Developing coordinated strategies;

5] Implementation.
Each of these elements is discussed in the context of a manufacturing supply chain, an example of which is depicted in figure 1.2.

Cooper and Ellarm [1993] compare supply chain management to a well-balanced and well-practiced relay team. Such a team is more competitive when each player knows how to be positioned for the hand-off. There is a strong relationship between players who directly pass the baton, but the entire team needs to make a coordinated effort to win the race. SCM is the management of a network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers [Harland, 1996].

Supply Chain Management spans all movement and storage of raw materials, work-in-progress inventory, and finished goods from point of origin to point of consumption. Supply chain is a network of suppliers of raw materials, processing facilities and distribution channels to deliver the furnished product to customers. For example, the Cement manufacturer procures various raw materials such as limestone, gypsum, fuel, packing materials, etc. from different suppliers. These raw materials are processed to produce cement; the cement is packed into bags and then transported to the warehouses. Depending on customers order, cement bags are distributed by transporting it through regional warehouses, to the wholesalers/dealers and retailers to the final customer.

1.3 Importance of SCM

In the ancient Greek fable about the tortoise and the hare, the speedy and overconfident rabbit fell asleep on the job, while the "slow and steady" turtle won the race. That may have been true in Aesop's time, but in today's demanding business environment, "slow and steady" won't get you out of the starting gate, let alone win any races. Managers these days recognize that getting products to customers faster than the competition will improve a company's competitive position. To remain competitive, companies must seek new solutions to important Supply Chain Management issues such as modal analysis, supply chain management, load planning, and route planning and distribution network design. Companies must face corporate challenges that impact Supply Chain Management such as reengineering globalization and outsourcing.
Faster product availability is keys to increasing sales, says R. Michael Donovan of Natick, Mass, a management consultant specializing in manufacturing and information systems. "There's a substantial profit advantage for the extra time that you are in the market and your competitor is not," he says. "If you can be there first, you are likely to get more orders and more market share." The ability to deliver a product faster also can make or break a sale. "If two alternatives [products] appear to be equal and one is immediately available and the other will be available in a week, which would you choose? Clearly, "Supply Chain Management has an important role to play in moving goods more quickly to their destination."

SCM capabilities are already delivering major economic benefits to businesses as diverse as manufacturers, retailers, and service providers. Benefits include such classic supply chain functions as inventory control, purchasing, and order fulfillment. But it is a mistake for businesses to think of SCM as limited to these functions alone. Enhanced SCM capabilities can create efficiencies and cost savings across a wide range of business processes. Properly implemented, SCM is a strategic activity that must be conducted across the entire enterprise, from marketing and product design groups all the way through to the accounts receivable department. Ultimately, SCM must be conducted between enterprises, since optimizing entire supply chains will require a level of information sharing and collaboration among enterprises previously unknown in most businesses. Traditionally, the focus of companies has been on the flows within the organization or flows over which the organization has direct control. But, successful supply chain management requires the recognition that the firm is simply one player in the long chain that starts with suppliers and includes transporters, distributors and customers. Close relationships between suppliers, manufacturers, transporters, distributors and customers are going to be the key to success in times to come.

Organizations must interact co-operatively with their channel partners for the mutual benefit of the channel as well as the gain of each player. In order to adopt this external perspective, organizations should not only consider the impact of any business decision on their own performance but also on the bottom line of their suppliers, distributors and transporters. Companies are recognizing that supply chain innovations can be not only a driver of cost reduction, but importantly, a catalyst for revenue growth by achieving greater levels of customer satisfaction. Anderson and
Lee [1999] call the new generation of supply chain strategy a "synchronized supply chain".

There is increasing interest in inter-firm relationships as more firms rely on resources outside their own firm to compete successfully [Harland, 1996]. Companies look at their supply chains and the upstream part of the value-chain from the company's perspective as a means of focusing on their own core competencies, of leveraging those of vendors, of lowering their costs, and thus, becoming more responsive to customers. Each link in the chain must add competitive advantage. However, this is not adequate enough. The basis of competition between organizations is shifting to how effectively these supply chains are managed.

There are some more reasons why SCM is so vital for organization in recent times. They are:

- Due to increased competition and saturation of markets in developed countries, firms are searching for new markets.
- Globalization practices being politically accepted by most of the nations.
- Customer expectations are increasing and at the same time their affordability is also increasing
- There is a growth of transportation and manufacturing facilities within and across countries.
- Shortened Product-life cycles and faster introduction of new products.
- Cheaper labor availability in backward regions of a country as well as in developing / under-developed nations.
- Availability of cheaper sources of raw materials across the country/world not earlier tapped.
- Progress of Information Technology to provide cheap hardware, software and communication system. Many software vendors now develop software for SCM, which enhances the existing ERP systems to SCM as add-ons.
1.4 Partners of SCM

There seems to be a consensus that a supply chain at its simplest degree of complexity comprises three entities: a company, a supplier and a customer directly involved in the upstream and downstream flows of products, services, finances and information [Mentzer et al., 2001]. A key characteristic of supply chain management is the coordination of activities between these interdependent organizations and can hence be defined as “the management of upstream and downstream relationships with suppliers and customers in order to create enhanced value in the final market place at less cost to the supply chain as a whole” [Christopher, 1992].

Therefore, any approach to managing risks from a supply chain perspective must have a broader scope and vision to work than that of a single organization and provide insights regarding how the key processes have to be performed across at least three organizations. However, supply chains should not be thought of as a single organizational entity. Instead, it should be recognized that coordination and joint effort rely on dependency, bargaining, negotiation and persuasion across organization borders and is inhibited by management goal and vision to implement and smooth working of the organization with efficiency of the incongruence.

The supply-chain of an industrial organization consists of a network of:

(a) Suppliers / vendors of the raw materials and other input components purchased from outside

(b) Processing / production / manufacturing facilities used to convert them into finished products needed by customers

(c) Distribution / marketing channels used to make the products reach the customers

SCM is a set of practices and techniques to integrate the functioning of all the above three components for smooth and efficient flow of materials, information and money overcoming individual constraints. All the partners, internal and external, share the risks and prosperity through overall healthy growth while serving the customer’s needs at right time with good quality products. Many critical decisions are needed at different levels of management covering different time spans for successful design and implementation of SCM.
Due to the competitive environment in the market varying customer’s demands, availability of resources across the world, and globalization fired by rapid growth in Information Technology, SCM has evolved from earlier material management practices to the present strategic partnerships of units across different nations in the world. Many examples of successful SCM are available in each and every type of industry and existing globally and in India.

In today’s scenario organizations cannot achieve success and market leadership unless they create and manage efficient, responsive and profitable supply chains and it is essential for everyone to survive in the market. At present situation of the market is very crucial and getting orders is tough one and execution of the same is very tougher in the competitive market and due to that efficient SCM is must for everyone.

1.4.1 Logistics

“Logistics” finds its root with the terminologies used in major wars. It means planning and deployment of soldiers, armored vehicles, artillery and ammunition to the battlefield as per the strategies of the generals. It also involves all supporting activities like food and suppliers, medicines, bringing back injured personnel, maintenance of vehicles, equipment and many other tasks for the soldiers at difficult locations. It emphasizes coordination with fighter aircrafts, communication [signals], and engineering for roads / bridges in the forward areas.

Due to the development in supply chain management, logistics has become a focal point for organizations today in both manufacturing and services organization employ special “Logistics Managers” and their services are more important in the day to day internal and external movement of the materials. If the movement takes place at right time and completes within the stipulated time than the time management of the organization becomes accurate.

Logistics is a function, which gained importance in the modern Supply Chain Management. It helps the organization to effectively handle procurement of incoming materials and delivery of final products to the customers in an integrated and planned way. It is effectively and efficiently managing the network for delivering products / services from raw materials to end customers through an engineered flow of information, physical distribution and cash.
1.5 Technology for Supply Chain Management

In recent years the development and use of new and advanced technologies in SCM companies got amazing results through implementation of SCM. There are three new technologies as per following:

1.5.1 Web Services Interoperability for Supply Chain Management

In the view of Sun Microsystems (2004), web services interoperability for supply chain management is being used to support business-to-customer models. The computing giant provided an example where retailers offer electronic goods to consumers. To fulfill orders, the retailer has to manage stock levels in warehouses. A typical business-to-business model is used when an item in stock falls below a certain threshold. In that case the retailer must restock the item from the relevant manufacturer’s inventory. In order to fulfill a retailer’s request, a manufacturer may have to execute a production run to build the finished goods. In reality, a manufacturer would have to order the component parts from its suppliers and that may be a manual process which is supported through the use of fax. This example is shown in figure 1.3.

Figure 1. 3: Example of web services interoperability for supply chain management
1.5.2 Radio Frequency Identification [RFID]

RFID is a type of automatic identification system. The purpose of an RFID system is to enable data to be transmitted by a portable device, called a tag, which is read by an RFID reader and processed according to the needs of a particular application. The need to minimise operating costs and employed assets has resulted in the adoption of radio frequency technology to track inventories within a supply chain down to the item level, thus reducing channel volume and enhancing forecasting and planning capabilities [D’Avanzo et al., 2004].

Companies can use the RFID in pressure on inventory and is related to reduce lead times of information through faster and more reliable registration, increased traceability and visibility in the supply chain. RFID has been used in terms of cost cutting and to reduce labour costs. Other practical applications of RFID include authentication and shrink prevention, the tracking of work-in-progress in automotive manufacturing and computer hardware manufacturing. Tags are re-used on other components or products or they may remain permanently fixed to the product to provide a secure serial number (Schneider, 2003). Original equipment manufacturers (OEM’s), retailers, drink sectors and suppliers benefit equally from tracking inventories and decrease product losses and increase revenues.
1.5.3 Collaborative Product Commerce [CPC]

CPC is a set of tools that allows companies to manage product information and share that information with suppliers and partners through the web. CPC helps a company’s development strategy become three-dimensional, by making possible the collaborative development of products, processes and supply chain strategies such as BTO [Turner, 2001]. A distinct advantage of CPC is the integration of product development with procurement processes, which can help significantly reduce material costs of new products while decreasing time-to-market, by allowing collaboration of the enterprise’s sources of expert knowledge in the details of design, cost and manufacturing [CIOL IT, 2002]. Based on CIOL IT [2002] findings, CPC enables integration of design processes and supply chains; co-ordinated response to customer requirements; instant and secure availability of information to all those who need to know; and just-in-time inventory processes that actually work.

This can result in improved collaboration for more innovative products; reduced design and manufacturing costs; a quicker time to market; improved product quality; rapid product development; customised BTO product offerings; and greater customer satisfaction through collaboration.

![Structure of a CPC solution](image-url)

Figure 1.5: Structure of a CPC solution
1.6 SCM Integration and Implementation

Singapore is one of the most industrially developed countries in the Asia-Pacific region. The economic growth of Singapore was powered by continued global demand for electronic products. Although Singapore’s GDP contracted by 2 percent in 2001 [Business Asia, 2002], a sustained recovery is on the cards as the global economic outlook improves. Indicators of a moderate export-led recovery are starting to materialise: imports of intermediate products are rising, suggesting that overall manufacturing activity will soon pick up. Export orders for the crucial electronics sector have expanded in consecutive months.

Through its economic policies, Singapore has attracted many multinational consumer electronics manufacturers who have invested in high value added manufacturing facilities. Seagate Technology Inc. is one multinational that has established itself in Singapore. Seagate’s aim is to be the leading high-quality provider of technology based products that enable people to access information when, where and how they want, anywhere in the world. The chief executive officer [CEO] and president of the company have identified three main initiatives to provide leading edge, high-quality products for Seagate’s customers. These initiatives are:

[1] Time-to-market [product development];

[2] Supply chain initiatives [supply chain management]; and

[3] Six sigma initiatives [quality management system].

As organizations seek to develop partnerships and more effective information links with trading partners, internal processes become interlinked and span the traditional boundaries of firms. Physical logistics become more dependent on information technologies, and these technologies can also become enablers of further cooperative arrangements. Firms are then faced with the management of an extended enterprise as a network of processes, relationships and technologies creating an inter-dependence and shared destiny. The truly strategic nature of supply chain management thus becomes apparent for participating companies, with successful implementation becoming a source of competitive advantage.
1.6.1 Information Flows

Effective application of information technology to the integration of supply chain activities has the effect of reducing levels of complexity and it is managing the complete information flow throughout the organization. Due to that each and every person in the organization will be well aware of the latest status of any process or information related to the job. Senge [1990] defines two types of complexity, detail and dynamic. Detail complexity exists when there are many variables needing to be managed. Dynamic complexity exists where cause and effect are separated and difficult to associate, in both time and space: situations where cause and effect are subtle and effects over time of interventions are not obvious. Conventional forecasting, planning and analysis methods are not equipped to deal with dynamic complexity [Senge, 1990, p. 71].

1.6.2 Strategy and Planning

In examining the strategic nature of integrated supply chain management, and business to business e-commerce in general, the example of the computer industry provides a graphic example. Bovel and Martha [2000] use the examples of Gateway and Dell Computer as companies that have managed to move supply chain management from the realm of operations into a source of competitive advantage.

Gateway and Dell, for example, make good personal computers, but so do Hewlett-Packard, IBM, Compaq, and other vendors. Since all are built from fairly standard components and loaded with identical software, it is difficult to say that one is better than another. What differentiates Gateway and Dell in the eyes of customers is the fact that they can build and deliver a customer-configured PC within five business days. It is there perfect planning and control of the online system that they are working very efficiently and due to that they can achieve this target with almost no inventory and lesser capital investment. This is the main difference that Gateway and Dell are different from their rivals.

They also make the point that these companies are in the minority, with the focus for differentiation still revolving around price, product innovation and cost cutting, rather than an integrated and coordinated value chain. Porter [2001] offers some support for this view, although he sees the integration of a value chain as complementing
traditional strategies. In analyzing the potential for internet-based technologies to alter competitive environments, he sees a major opportunity for organizations to differentiate themselves on the basis of a distinctive value chain. In this competitive market this may be one of the few ways in which companies can develop a sustainable competitive advantage using internet technologies, as the overall effect of their adoption will be to intensify competition, lower barriers to entry and increase bargaining power of both buyers and suppliers:

1.7 Issues and Challenges of SCM

Today the key issues in SCM are the formation of the supply chain and its efficient coordination with objectives of customer satisfaction and sustaining competency. This requires complex flow of information, materials, and funds across multiple functional areas both within and among companies. To achieve this company must identify, evaluate, rank, and manage its supply chain risks. The leaner and more integrated supply chains get the more likely uncertainties, dynamics and accidents in one link affect the other links in the chain. Company’s obsession with speed and costs also causes supply chains to break down particularly during the launch of new products [Lee, 2004]. Also coordinating actions across firms is tough because organizations have different cultures and companies cannot count on shared beliefs or loyalty to motivate their partners [Narayanan and Raman, 2004].

1.7.1 Supply Chain Management Philosophy

To balance customer’s demands with the need for profitable growth, many firms have moved aggressively to improve supply chain management [AMR, 1995; Andersen et al., 1997; Copacino, 1997; Poirier and Reiter, 1996]. Their channel integration efforts have focused on the following main issues:

1) Organisational structures and associated relationships;

2) Supply chain coordination;

3) Inter-and intra-enterprise communication;

4) Sourcing;

5) Manufacturing orientation;
6) Inventory and cost management.

Many strategists agree that firms may not be able to rely either on a price leadership role or on a differentiation strategy alone to guarantee sustained market strength. To sustain long-term growth, however, combinations of both strategies are typically needed to operate effectively within constraints imposed by the environment.

As noted earlier, a supply chain network, depicted in figure 1.1, can be a complex web of systems, sub-systems, operations, activities, and their relationships to one another, belonging to its various members, namely, suppliers, carriers, manufacturing plants, distribution centers, retailers, and consumers [Swaminathan et al., 1996]. Advances in information and communication technologies complemented by sophisticated decision support systems enable designing, implementing and controlling strategies essential to delivery of integrated systems, such as supply chain systems.

The design, modeling and implementation of such a system, therefore, can be difficult, unless various parts of it are cohesively tied to the whole. The motivation in proposing a framework to manage a supply chain system is to facilitate integration of its various components through a common set of principles, strategies, policies, and performance metrics throughout its developmental life cycle.

1.7.2 Strategic Insights

The recognition of the SCM as a key and vital area, both in the private and public sectors has focused attention on its effectiveness. In a number of organizations, cost-effective supply chain is a matter of survival as purchased goods and services account for up to 80 per cent of sales revenue [Quayle, 2003], while in the public sector there is an ever-increasing demand for savings in the procurement process [Groznik et al., 2008].

Earlier purchasing was wedded to routine in many companies. For the last two decades though, no company can allow purchasing to lag behind other departments in adjusting to worldwide changes [Kraljic, 1983].

However, there is [in line with the contingency theory] no single best way of organizing/leading the supply chain that is effective in all situations and there is no
universal set of choices that is optimal for all SCs [adapted from [Fiedler, 1964], [Gingsberg & Venkatraman, 1985]]. In order to optimize the SC the following five configuration components are critical: operations strategy, outsourcing strategy, channel strategy, customer service strategy and asset network [Cohen & Roussel, 2005]. The four main approaches towards production are make to stock, make to order [see e.g. [Gunasekaran & Ngai, 2005] for a comprehensive review of make to order SC challenges], configure to order and engineer to order [Cohen & Roussel, 2005] – they considerably affect the correct strategy.

### 1.7.3 How did SCM get so complicated?

Supply chains in essence are not complicated and if implemented with proper planning it is a very easy and simple system. Material is purchased and converted into finished products and moved to customers in one direction. In the other direction customer demands and orders are converted into forecasts, build schedules and material orders. Inventories are held at regular points to enable response to unpredictable customer demands and supplier capabilities. Supply chain management is about meeting customer demands with high precision and as cost effectively as possible. It is about focusing on major customers, major constraints and major cost drivers.

![Figure 1. 6: Supply Chain Overview](Source: Supply Chain Council)
In most cases it is the latter – a massively complex operation held together by constant fire fighting and heroics. Anyone who has walked through world class manufacturing plants knows very well how simple and empty the whole operation looks. No aisles crowded with work in progress, no big batches with complex prioritization rules, no emergency planning, no expediting, and no rework piles and so on. World Class comes from the ruthless and relentless application of simple principles. Simplicity comes from clear principles of operation, well defined and operated processes and focus. Complexity is often another word for inefficiency. The same goes for the supply chain. Excellence in supply chain comes from a well-defined strategy, which aligns with the business needs, and is well executed to deliver the required supply chain capabilities, through enabling business processes, organization, technology and metrics.

1.7.4 Supply Chain Risk Management

After liberalization and globalization of the economy, Indian small and medium enterprises [SMEs] are under intense pressure since the markets are now facing competition from countries like China, Taiwan, and Korea which have emerged as low cost manufacturing destinations, a distinction earlier enjoyed for long by Indian SMEs. Although the information and communication technology revolution of the 1990s and the rapid proliferation of internet has to a large extent leveled the playing field by uninhibited flow of information regardless of the geographical boundaries and opened new vistas of opportunities, SMEs are finding that these new markets and commercial opportunities also generate a new dimension of uncertainties and risks in the supply chains [Ritchie and Brindley, 2000]. The risks in the supply chains can be mitigated if SMEs can understand the variables having an impact on risk management in the supply chains. Some of the variables that enable risk mitigation are information sharing, aligning incentives, risk sharing, corporate social responsibility [Chopra and Sodhi, 2004; Speckman and Davis, 2004]. So managers in small- and medium-sized organizations now need to be equipped to identify analyze and manage risks and crises from a more diverse range of sources and contexts and this involves an understanding as to how various enablers of risk mitigation interact with each other.

There are several examples of SCM that in one part of world is getting in problem than it affects whole world’s routine life and also other part of the world is trying or
helping out that country to come out from that problem. In recent years the widespread disruptions caused by fuel protests, and then by foot and mouth disease in the UK, by terrorist attacks and the threat of weapons of mass destruction in the USA, or by the SARS outbreak in China, Hong Kong and Canada have transformed perceptions of security across supply chains, and have underlined their vulnerability. In our technology-entwined global marketplace, an earthquake in Asia can seriously disrupt business in North America or Europe. In the case of Daimler Chrysler, it was Hurricane “Floyd” which flooded a plant producing suspension parts in Greenville, North Carolina. As a result, seven of the company’s other plants across North America had to be shut down for seven days [McGillivray, 2000]. Similarly, Toyota was forced to shut down 20 of its 40 assembly lines for six weeks following a fire at its brake-fluid proportioning valve supplier. The costs caused by the disruption were an estimated $40 million per day. In the UK, the insolvency of chassis manufacturer UPF Thompson at the end of 2001 had sudden and serious impacts upon its major customer, Land Rover, which faced the possibility of having to suspend production of the discovery [Jennings, 2002]. These examples demonstrate vividly that a disruption affecting an entity anywhere in the supply chain can have a direct effect on a corporation’s ability to continue operations, get finished goods to market or provide critical services to customers.

Modern supply chains are very complex and it is well equipped with latest technologies that can help and track the complete process, with many parallel physical and information flows occurring in order to ensure that products are delivered in the right quantities, to the right place in a cost-effective manner.

1.7.5 What is Supply Chain Security?

SCS is defined as: The application of policies, procedures, and technology to protect supply chain assets product, facilities, equipment, information, and personnel from theft, damage, or terrorism and to prevent the introduction or unauthorized contraband, people or weapons of mass destruction into the supply chain [Closs and McGarrell, 2004, p. 8].

This definition shows that SCS involves efforts to protect against both products leaving and contraband entering the supply chain. This possible “disruption of flows between organizations” represents risk to a supply chain [Ju’ttner, 2005, p. 122].
More formally, supply chain risk is the likelihood, the value, and the variance in distribution of supply chain outcomes [Jüttner et al., 2003]. Therefore, SCS is a subcomponent of an organization’s overall risk management strategy.

### 1.8 Supply Chain and Quality Management

As customer’s expectations are evermore addressed towards both products and their related features [delivery time, after sales assistance, and service level], competition within the global market will certainly concern supply chains rather than single industries. An effective and integrated management is even more important in those fields where business justifications are coupled with compulsory safety constraints, in order to care for the end-users. As well as the economic optimization for a single subject does not lead to the overall optimization of the supply chain, the numerous but yet independent certifications [quality, environment, and safety] available for the management systems of the single industries cannot assure the best results for the whole chain.

Total Quality Management [TQM] and Supply Chain Management [SCM] have both played an increasing role in strengthening organizational competitiveness [Sila et al., 2006]. In the continually changing the global market, quality products along are no longer enough. New challengers now include a focus on supply to determine the right time and place for product delivery [Chin et al., 2004; Robinson and Malhotra, 2005]. International business competition is no longer limited to organizations but now includes the supply chains [Li et al., 2006; Kuei et al., 2001]. Although both TQM and SCM are critical to organizational performance, they are rarely studied together [Gunasekaran and McGaughey, 2003; Robinson and Malhotra, 2005; Casadesus and Castro, 2005].

#### 1.8.1 Usefulness of TQM in SCM

The primary focus of TQM is customer satisfaction. Continuous improvements, standardization of product and worker empowerment are primary vehicles for achieving customer satisfaction. Effective TQM hinges also on management performance in planning, organizing, influencing and controlling activities in all functional areas for efficient outcome [such as marketing, purchasing, design, and engineering, production, distribution, finance and accounting, human resources etc.].
TQM implies good and right time decisions. Correct and positive action by managers in creating an environment that empowers workers and fosters to implement continuous improvement of all organizational processes in and among various functional areas. TQM requires cross-functional communication to facilitate teamwork which will work in one direction for achievement of good results and hence continuous improvement, which leads to customer satisfaction in both manufacturing and service organizations. TQM was frequently cited as a strategic option for achieving competitive advantage in the 1990s, yet it had received little attention in the evolving enterprise environments of integrated SCM and e-commerce.

SCM has generally been associated with modern materials management, advanced information technology, rapid and responsive logistics service, effective supplier management, and increasingly with customer relationship management [Fawcett and Magnan, 2002]. It should be noted that maintaining good supplier relations, teamwork among supply chain partners if you will, is a cornerstone of TQM. New initiatives in resource planning, electronic commerce and extended supply chain management are moving organization steadily in the direction of fully integrated strategic business applications and fully integrated supply chain. Enterprise resource planning [ERP] and SCM have been driving force in the movement toward a fully integrated supply chain that spans the entire value chain. ERP systems assist enterprises in automating and integrating corporate processes such as inventory control, procurement, distribution, finance and project management, all of which span functional boundaries. Through information sharing, SCM enables supply chain partners to work in concert [teamwork] to minimize transaction cost [Tarn et al.2002].

TQM methods and approaches could be used to eliminate those inefficiencies, thereby improving the overall effectiveness of a supply chain. Appropriate performance measures and metrics including activity-based costing and management may be helpful in identifying non-value-adding activities across a supply chain. Customer requirements and supply chain relationships are keys in selecting the most appropriate method of target costing for supply chains. Process-based, value-based, and activity based cost management approaches may be suitable for TQM in SCM [Locamy and Smith, 2000] intangible assets comprise the majority of a firm’s market value and the majority of intangible assets constitute the value contents within relationships; relationships with customers, employees, partners and suppliers. In ordered to achieve
success in the relationship age and achieve sustainable market value, firms will need to develop a balanced approach in goal setting, quality programs and management techniques to grow and maximize their most important capital store, relationship assets [Galbreath, 2002]. TQM should be applicable to management of intangible assets, just as it is applicable to the management of tangible assets.

1.9 SCM Performance Measurement System

In today’s world, supply chain management plays a key strategic role in increasing organizational effectiveness and accomplishment of organizational goals such as enhanced competitiveness, better customer service and increased profitability. Today’s management can’t afford to focus only on company’s performance in a vacuum; there is an emerging requirement to focus on the performance of the extended supply chain or network in which company is a partner. An extended supply chain is one that involves not only tier one buyers and suppliers, but also the end supplier [suppliers’ suppliers] to end buyers [buyers’ buyers]. The competition is at a chain or network level, i.e. supply chain vs. supply chain, with emphasis on continuous improvement across the extended supply chain.

In a supply chain the problem lies at the interfaces that is at the boundary of two organizations. The reason for this is the high level of interdependence intermingled with independence and autonomy of the firms in an integrated supply chain. Every member is fully autonomous but highly dependent on the performance of other members. Supply chain performance measures differ from traditional performance measures as it crosses company boundaries i.e. it includes suppliers and distributors. Supply chain performance also crosses all functional links like procurement, manufacturing, sales and distribution etc. However, there is often lack of insight for the development of effective performance measures and measurement system needed to achieve a fully integrated extended supply chain. The process of choosing appropriate supply chain performance is difficult due to the complexities of supply chain.

1.9.1 Measurement Systems

In majority companies management veterans argue that measurement is a key to continuous improvement and this lead to variety of maxims like “you can’t manage
what you don’t measure” and “anything that gets measured gets done”. Measurement systems have been used in process management [Ljungberg [1994]], who focused on the order process in his work, has suggested the following definition of a measurement system:

A set of related measures described by rules and procedures for the collection, compilation and communication of data that in combination reflect key performance aspects and characteristics of the process in question effectively enough to admit intelligent analysis, if called for to action.

**Characteristics of Effective Measurement System**

An effective measurement system is one that has following characteristics [Beamon 1996]:

- Inclusiveness: measurement of all pertinent aspects
- Universality: allow for comparison under various operating conditions
- Measurability: data required are measurable
- Consistency: measures consistent with organization goals

In recent years, the concept of supply chain management, introduced to address the integration of organizational functions ranging from the ordering and receipt of raw materials through the manufacturing processes to the distribution and delivery of products to customers with a view to enable organizations to achieve higher quality in products and customer services with reduced inventory cost, has attracted considerable managerial attention because of its huge potential competitive impact [Stevens, 1989]. In today’s global market place, individual firms no longer compete as independent entities with brand names, but work as a part of an integrated supply chain. As such, the ultimate success of the firm depends on its managerial ability to integrate and coordinate the intricate network of business relationships among supply chain partners [Lambert and Cooper, 2000].

**1.9.2 Review of Data Envelopment Analysis (DEA) and its Applications in Supply Chain**

DEA is a nonparametric method based on linear programming technique to evaluate the efficiencies of the analyzed units. DEA can measure multiple inputs and outputs,
as well as evaluate the measures quantitatively and qualitatively, hence enabling managers to make reasonable judgment on the efficiency of the analyzed units.

DEA was first introduced by [Charnes and Cooper [1978]] as a linear programming [LP]-based methodology for performing analysis of how efficiently a company operates. Its analyzed units are denoted as “DMU,” which stands for decision-making units. It is a non parametric programming approach to frontier estimation. In other words, it means DEA does not require the existence of a particular function to specify the relationships or tradeoffs among the performance measures in the computation of efficiency and it utilizes the concept of efficient frontier as an empirical standard of excellence. These advantages of DEA enable managers to evaluate any measures efficiently as they do not need to find any relationship that relates them. In addition, the concept of efficient frontier proves to be a valid measure of performance comparison [Farrell, 1957].

DEA is able to measure multiple inputs and outputs, which mean it can operate as a multi criteria decision making [MCDM] tool. In comparison of this inherited feature of DEA to other MCDM tools such as the analytic hierarchy process [AHP] [Chan et al., 2004; Chou et al., 2005], DEA does not require assigned numeric weights or modeling preferences for analysis, although these could be introduced if/when desired. This helps to prevent discrimination of criteria used in the analysis based on different perspectives of analysts.

1.9.3 Supply Chain Performance Measurement System using DEA Modeling

Supply chain is defined as a combinatorial system consisting of four processes namely plan, source, make and deliver, whose constituent parts include material suppliers, production facilities, distribution services and customers linked together via the feed forward flow of materials and the feedback flow of information [Stevens, 1989; Christopher, 1998]. Effective management of an organization’s supply chains has proven to be a very effective mechanism for providing prompt and reliable delivery of high-quality products and services at the least cost. This is an essential corner stone for the organizations to develop a sustainable competitive advantage and to remain at the forefront of excellence in a level playing market field. To achieve an efficient supply chain, performance evaluation of the entire supply chain is extremely important. This means utilizing the combined resources of the supply chain members
in the most efficient way possible to provide competitive and cost-effective products and services. Hence, “overall supply chain efficiency” is defined as the efficiency which takes into account the multiple performance measures related to the supply chain members, as well as the integration and coordination of the performances of those members. As such, managing this entire/overall supply chain efficiency is indeed a very difficult and challenging task. Ross [1998] had even mentioned that, even within large corporations such as Sears and General Motors which had large supply chain systems, the entire supply chain performance measurement systems were not in existence.

1.10 Governance of SCM

In the mid-1990s, many industry researchers looked to the future, claiming that competitive success would depend on collaborative supply chain teams [Blackwell, 1997; Christopher and Ryals, 1999; Elliff, 1996; Harps and Hansen, 2000]. For example, Harold Sirkin, Vice President at the Boston Consulting Group, noted that, “As the economy changes, as competition becomes more global, it’s no longer company vs. company but supply chain vs. supply chain” [Henkoff, 1994]. This vision has yet to become a reality. Part of the reason for the struggle arises from the very nature of supply chain management is resource intensive, requires dramatic change in entrenched mindsets and practices, and depends on a yet to emerge governance structure [Lambert and Cooper, 2000].

1.10.1 Supply Chain Governance

Managerial commitment must be supported and reinforced by an effective governance system. It’s not possible to optimize the firm we have to optimize the supply chain, but no one is superior in supply chain. Without the superiority of governance it is easy for each member of the supply chain to follow its own course, pursuing a strategy of myopic self-interest. The challenge is to establish a governance infrastructure to enhance communication and coordination among supply chain partners. This infrastructure must drive strong operational excellence and corporate competence while simultaneously promoting inter-organizational process collaboration.
1.10.2 Executive Governance Councils

The supply chain governance council can help mitigate internal resistance to supply chain initiatives. At one interview company, the role of the governance council is twofold: first, to “maintain ongoing executive level awareness of business initiatives to avoid reinventing the wheel” and second, to “coordinate supply chain activity throughout the company.” Senior executive participation is mandated and membership is limited to divisional executives with authority to allocate resources.

The goal is to focus on company-wide initiatives to capture cost savings, drive productivity enhancements, and offer unique solutions to customers. The council has helped unify divisional managers and led to harmonized policies and procedures. Collaborative initiatives that have been coordinated through the governance council include global lean operations, postponement manufacturing, and internet-based virtual sourcing.

1.11 SCM in Various Industries

SCM is now a day’s used in each and every sectors/industries. In engineering majority of the large scale industries have implemented the SCM practices in their organization. Most of the Indian manufacturing small and medium engineering enterprises like cutting & hand tools & auto parts & spare parts & industrial equipments and machinery manufacturer & various other products manufacturer are seem to be quite advanced in the implementation of SCM. Also majority all the agri food industry, fast moving consumer goods (FMCG), consumer packaged goods (CPG), IT sector, Logistics/transportation have implemented the SCM practices and all are getting good results in terms of increased inventory turnover ratio, high customer satisfaction, increased in cash flow, increased in annual turnover, reduced in rejection rate and increased efficiency of man and machines.

1.11.1 Innovative Supply Chain Business Models and IT

Build to Order [BTO] initiatives is major and foremost decision which is adopted by major companies now a day and now it is seen as a potential source of competitive advantage, have been embraced by different manufacturing sectors and are gaining broad attention from all branches of industry [Du et al., 2003]. According to Automotive News [Auto week Online – 4 July 2002], huge potential cost savings
have kept automakers busy on their BTO initiatives. A BTO initiative implies substantial changes to the way companies operate.

Moreover, immediate impacts of BTO initiatives may involve:

1) Reduction of cycle times and inventory turnover;

2) Increase in the number of data links between suppliers; and

3) Relocating production facilities near main customer production facilities.

Firms can no longer effectively compete in isolation of their suppliers and other entities in the supply chain [Lummus and Vokurka, 1999]. As organizations seek to develop partnerships and more effective information links with trading partners, internal processes become interlinked and span the traditional boundaries of firms.

According to the various study and researchers reported their views for SCM are as follows:

1) The functions within and outside a company that enable the value chain to make products and provide services to the customer [Cox et al., 1995];

2) SCM is defined as the systematic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across business within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole [Mentzer et al., 2001];

3) SCM is a melding of logistics [i.e. of distribution and production], procurement, and industrial organization economics, marketing and strategy, which emerged as a distinct area of research in the mid-1980s [London and Kenley, 2001];

4) SCM is the collaborative effort of multiple channel members to design, implement, and manage seamless value-added processes to meet the real needs of the end customer [Burt et al., 2004].

The field of supply management is evolving, developing positively, and addressing discipline and theory issues [Harland et al., 2006; Burgess et al., 2006]. Supply chain management is ultimately about influencing behavior in particular directions and in particular ways [Storey et al., 2006].
Supply chain management appears in as a new[ish] terminology but definitions of what it encompasses are at best vague [Tan, 2001]. The development of an idea of the supply chain owes much to the emergence from the 1950s onwards of systems theory, and the associated notion of holism [New, 1997; Cavinato, 1992]. New also argued that the supply chain metaphor is used in many ways, but three meanings dominate discussion:

1) The supply chain from the perspective of an individual firm;

2) A supply chain related to a particular product or item [such as the supply chain for beef, coffee, or oil]; and

3) "Supply chain" used as a handy synonym for purchasing, distribution and materials management [New, 1994].

![Figure 1. 7: Supply Chain Strategy Framework](image)

The element of trust between purchaser and supplier within the supply chain is also relevant here [Morgan and Hunt, 1994].

**1.11.2 International Trade in Supply Chain Management**

International trade is a necessity in many supply chains. Global markets present opportunities for growth. Global suppliers often produce product less expensively than it could be produced domestically, supplement domestic production capacity
when demand outstrips supply, or produce product when it is out of season in the USA [Roth et al., 2008]. However, industry and government have become increasingly familiar with the complexity and risks that are characteristic of international trade. Factors contributing to global supply chain risk and complexity include threats of terrorism and the related security measures established to defend against this threat [Suder and Czinkota, 2005]. Further, natural disasters [e.g. floods and hurricanes] impact domestic and global supply chains. Finally, we have seen recent and significant recalls relating to product safety. As stated by [Wagner and Bode [2008, p. 307]], “we find a relatively unstable world on the one hand, and increasingly sensitive supply chains on the other.” This sensitivity, in part, relates to the ability of a firm to develop supply chain continuity. Continuity refers to the minimization of supply chain disruptions such that a firm can reduce supply chain disruptions as well as recover should a disruption occur [Autry and Bobbitt, 2008]. As such, supply chain continuity is not just about responding appropriately to a crisis, but also about trying to prevent a crisis from occurring in the first place.

The consolidation of supply chain management as a principal component of a company’s business strategy has been in part motivated by a series of trends affecting several manufacturing sectors.

1.11.3 New Trends Developed in the Industry after the Implementation of SCM

In recent times, manufacturers have tended to rationalise their activities to concentrate on core competencies and business services and outsource more of the non-core activities to existing or new supply-chain partners.

Some trends identified in the academic literature include:

1) Globalisation [Gunasekaran et al., 2001; Papageorgiou et al., 2001; Bowersox et al., 2002]:

Globalisation is a trend reflected in the reduction of trade barriers, de-regulation of commerce and the use of information technology [IT] to facilitate links to potentially anywhere in the world. Apart from increasing competition in every market, globalisation provides organizations with the opportunity to find synergies and reduce costs.
2) Outsourcing [Gunasekaran et al., 2001; Davenport and Brooks, 2004]:

Outsourcing as an important trend present in industry. Indeed, outsourcing is becoming one of the main strategies adopted by organizations that find it increasingly difficult and less economical to produce their needs on their own.

3) Time-to-market [Papageorgiou et al., 2001]:

Time-to-market is an important that we have to study the market well in advance that what are the latest needs and trend are going to launch in the market and accordingly we have to launch or introduce our product and this is very important.

4) Mass customisation [Da Silveira et al., 2001; Duray et al., 2000]:

Mass communication is a latest trend available in the market. We have to use the same wisely to launch our product. In recent times, companies do their advertisement in the different news papers, magazines, on internet, television etc. and within in no time send the message of their product to the mass.

5) Pricing pressure [D’Alessandro and Baveja, 2000]:

In the edge of competitive market to reduce the price of the product is a big and major issue to the companies to survive in the market. For that they have to control their system from grass root level and offer competitive pricing to the market.

1.12 SCM and Organizational Performance

The scope of SCM has expanded, and its importance has increased. While originating from purchasing and supply management, SCM research has evolved into a body of knowledge focused primarily on integration, customer satisfaction and business results. Although SCM efforts sometimes fail to achieve desired results [Keah, 2002], SCM is now a strategic tool to improve competitive position and a major concern for top-level managers.

1.12.1 Literature Review

A marketing orientation is indicative of company’s effort to implement the marketing concept, which involves striving to satisfy customers at a profit [McCarthy, 1981]. There is a considerable body of evidence to suggest that marketing oriented
businesses are more successful than those that are not [Day, 1999; Jaworski and Kohli, 1993; Narver and Slater, 1990]. Narver and Slater [1990] showed that marketing orientation is comprised of behavioral components [customer orientation, competitor orientation, and inter-functional coordination] and decision criteria [long-term focus and profitability]. Kohli and Jaworski [1990] identified customer focus and coordinated marketing as themes of marketing orientation, while suggesting that profitability was an outcome.

Other research by Martin and Grbac [2003] asserts that strong supplier relationships tend to affect a firm’s performance, at least in part, because they help the firm responds to customer needs in a timely manner. They suggest that supplier relationships are a way of leveraging a firm’s market orientation by improving customer responsiveness.

In keeping with the notion that competition is increasingly between supply chains rather than between firms, Vokurka et al. [2002], expanded on the sand cone model developed by Ferdows and De Meyer [1990], and the sand cone model extension of Vokurka and Fliedner [1998] which incorporated agility into SCM priorities, to provide a framework for a cumulative and sustainable improvement process wherein supply chains can build competitive advantage. Their model considers the supply chain as an extended enterprise, and suggested that all of the firms comprising a supply chain should focus their sequential, cumulative efforts on quality, dependability, flexibility, agility, and cost efficiency. They advocate this approach to improve SC competitiveness in a highly dynamic environment characterized by rapidly changing customer requirements. Their approach, in essence, would result in all firms in the supply chain setting priorities consistent with a marketing orientation. Marketing orientation would thus be positively related to effective SCM. A link between SCM and marketing orientation, marketing success, organizational success and supply chain success is thus implied.

IEElmuti [2002] examined the relationship between SCM and perceived organizational success through a survey of managers in organizations representing a variety of industries. Regression analysis was employed in examining the strength of the dependency relationship between SCM programs and organizational effectiveness, measured in terms of cost, quality, productivity, and cycle time. At the end of the
examining it is concluded that although significant improvements in organizational performance can be attributed to SCM, the magnitude of improvements in costs, profits and productivity, risk reduction and organizational success has been less than expected for most companies. Issues or problems in SCM were identified. One particularly noteworthy finding in this study was that only a few of the surveyed companies included end product user needs in their SCM practices. That leads one to speculate that sub-optimal performance in the area of SCM could be due to a weak marketing orientation.