CHAPTER 2: LITERATURE REVIEW

2.1 Introduction
This chapter basically summarizes the literature review done for the purpose of this study. It starts with scope of literature review, covering conceptual scope, time scope as well as publication scope. Thereafter the chapter covers the details under each of these headings. For the purpose of this research, scope of literature review is restricted to three basic concepts, namely supply chain performance, organizational performance and relationship between the two. Hence the conceptual scope starts with exploring supply chain origins & its evolution, followed by understanding key definitions of supply chain & supply chain management. Time period considered for this review is 1990 onwards. For the purpose of this literature review, articles / research papers from various sources like Google Scholar, EBSCO & Harvard Business Publishing were used. Similarly standard texts and reference books on the subject matter were referred. In order to make the review more relevant to practicing supply chain professionals, websites of supply chain professional bodies as well as websites of supply chain consulting firms were referred too. Last but not the least, business news articles related to the domain of supply chain management were also taken into consideration so as to make the review more contemporary.

The rest of the chapter is organized as follows. The chapter starts with understanding history & evolution of supply chain management as a discipline. It also touches upon the origins of supply chains. Thereafter key supply chain & supply chain management definitions are discussed. This is followed by understanding supply chain practices in select manufacturing industries. The next topic is devoted to performance measurement in supply chain / supply chain management, the frameworks and gaps in performance measurement in current literature if any. This is followed by a brief review of organizational performance measurement, existing methods, models, their pros & cons. The review then dwells on exploring the relationship between supply chain performance and organizational performance. The chapter ends with a review of Mckinsey’s 7 – S framework, covering its origins, evolution, description and analysis.
2.2 Evolution of Supply Chain Management

Historically ‘organizations’ have played an important role in survival nay progress of nations. Military establishments represented one of the earliest forms of organizations that existed from prehistoric times. According to Engels (1980), Alexander the great Macedonian general, 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. (Chandrasekaran, 2010). Thus, supply chain management is quite an old idea. Further, principles of effective flow of materials and information, to meet customer requirements were known and practiced as evident from the building of the ancient structures like Egyptian pyramids to recent relief work of WHO\(^5\) to eradicate hunger in Africa (Christopher 2011). This is what supply chain management as a function tries to achieve. Traditionally, supply chain management is concerned with three flows fundamental to any business viz. material, funds and information. The objective is to manage the entire process of interaction of these flows so as to deliver value to the customer. In the management domain, Forrester (1958) highlights importance of these integrated flows as, “Management is on the verge of a major breakthrough in understanding how industrial company success depends on the interactions between the flows of information, materials, money, manpower, and capital equipment. The way these five flow systems interlock to amplify one another and to cause change and fluctuation will form the basis for anticipating the effects of decisions, policies, organizational forms, and investment choices” (as cited in Mentzer et al., 2001). Thus from academic research perspective, the importance of effective management of supply chains was known even 55 years back.

Oliver, R.K. and Webber, M.D. (1982) were the first to coin the phrase Supply Chain Management when they used it to describe the range of procurement activities carried out by an organization to manage its supplies (as cited in Hines, T., 2008, p.70). Further, Done, A. (2011), argues that, origins of supply chain research can be traced back to the realization that merely studying single firms is not sufficient, but various firms involved in the supply chain need to be studied if one has to understand supply chain. As far as important

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\(^5\) World Health Organization
milestones are concerned, Shah, J.(2009) has described following three such milestones in the evolutionary journey of supply chain management. These are,  
- The First Phase (1910 – 1920): The Ford Supply Chain  
- The Second Phase (1960 – 1970): The Toyota Supply Chain  
- The Third Phase (1995 – 2000): The Dell Supply Chain  

2.2.1 The Ford Supply Chain

Henry Ford’s 1908 Model T was his twentieth design over a five year period that began with the production of the original Model A in 1903 (Womack et al., 1990). Most of the contemporary craft automobile manufacturers of those era, had a workforce which comprised of skilled craftsmen. These organizations were extremely decentralized and it was the owner who used to coordinate with suppliers as well as customers. Majority of the parts needed for building an automobile were produced in small machine shops. Highly customized and low production volume was the norm. There was very less (in fact none) interchangeability amongst two cars made from the same design. This was a result of variability involved in prevailing gauging system wherein each automobile manufacturer or supplier had his own gauging system.  

Ford with his Model T achieved complete and consistent interchangeability of parts and the simplicity of attaching them to each other. (Womack et al., 1990). He also invented the famous moving assembly line. Initially, Ford was also an assembler like much of his contemporaries. But by 1915, Ford was making everything required for his cars in-house. Womack et al. (1990) have summarized the main reasons behind this change. To start with Ford also bought various parts from other suppliers and did the assembly in-house. Over a period of time he realized that though he had achieved economies of scale through the mass production, majority of his suppliers were far from achieving the same. Also due to his ‘designed for manufacture’ approach, he needed parts with closer tolerances with tight delivery schedules. He was not sure that relying on arm’s length purchases in open market would serve the purpose. Additionally, in order to further achieve cost reductions, he decided to vertically integrate and do everything in-house. This was perhaps the first major revolution wherein ford managed to tightly integrate the supply chain. The Ford Motor Company virtually owned every part of the chain – right from raw materials like iron ore,
rubber or timber up to transportation modes like ships or rails. The close knit vertically integrated, centralized decision management ensured efficiency but also resulted in very inflexible supply chain. This supply chain was not able to handle wide product variation. The changeover times were very high and hence it was not sustainable in the long run. Further, as summarized by Tan (2001) these mass production systems had a very lengthy new product development process and time. The primary causes for the same were, highly centralized control systems rendering cross functional work very difficult and slow, exclusive reliance on in house competencies / technology and most importantly highly inefficient manufacturing process wherein huge amounts of inventory was used to cushion capacity & bottleneck operations. Meanwhile General Motors which also pursued vertical integration addressed this problem by creating decentralized divisions managed objectively as separate profit centers. It also offered customers a wider variety of automobiles at competitive prices. Till the second supply chain revolution, all the automobile firms in Detroit were integrated firms. Even traditional firms in India, like Hindustan Motors, were highly integrated firms where bulk of the manufacturing was done in-house (Shah, J., 2009)

2.2.2 The Toyota Supply Chain
By 1960s, in order to address the increasing demand for product variety, many vertically integrated auto manufacturers started to increase proportion of outsourced components. This also meant that they were forced to reduce their inventory levels. Further, on quality front customers were becoming more demanding. By this period, customers had a wide variety of choices and were not inclined to buy only on the basis of features. Customers started demanding quality, reliability and efficiency along with features. All these concerns were addressed by Toyota Motor Company through ‘lean manufacturing’ or what is also known as ‘Toyota Production System’. This ushered in the second revolution. As Womack et al. (1990) explain Toyota brought about following changes,

- It divided its suppliers into tiers. The bigger suppliers (first tier) were responsible for supplying entire sub-assemblies / assemblies rather than individual parts. In order to protect its technical knowhow and provide financially rewarding relationship to the first tier suppliers, Toyota also acquired equity in many of its
independent first tier suppliers. These first tier suppliers were located in the vicinity of Toyota assembly plant.

- The first tier suppliers were actively involved in new product development process, thus helping Toyota improve product and reduce cost at the same time.
- Each first tier supplier formed a cluster of second tier suppliers under him. These second tier suppliers were assigned individual parts.
- The second tier suppliers who were typically expert in manufacturing processes were grouped into supplier associations so that they can exchange information about advances in manufacturing techniques with each other.
- Toyota converted its in-house operations into quasi-independent first tier supply companies, in which Toyota retained some equity.
- The focal firm generally had ownership stake in some of its suppliers’ firms and helped them by providing financial and technological assistance. The first tier suppliers in turn have substantial cross holdings in each other’s companies (typically known as supply keiretsu).

Toyota also drastically reduced the set up times for die changeovers. Traditionally the set up times were about one day (24 hour) which over a period of time was reduced to a few minutes. Unlike its predecessors as Ford and GM whose relationships with their suppliers were mostly adversarial in nature, Toyota believed in long term collaborative relationship with its suppliers. This became the hallmark of Toyota philosophy. The newly invented lean production system gave rise to the second supply chain revolution. The lean manufacturing philosophy also gave rise to many new business practices like Kanban, JIT, Six Sigma and TQM which had a significant impact on altering the supply chain functioning. The most significant of those were early tier I supplier participation in new product development and process improvement, thus truly turning their suppliers into partners (Dyer, J.H., 1996).

2.2.3 The Dell Supply Chain
The Toyota supply chain also had certain limitations like permanent / long term relations with suppliers which could become liability over a period of time if there was a slack in
the supplier performance. Secondly, sustenance of such long term relationships in the wake of poor performance on the part of Toyota as against other competitors was yet to be validated. Further, even in Toyota supply chain, just like Ford supply chain, the demand side of the supply chain was not entirely integrated. In other words, the focus was more on upstream supply chain. With Dell supply chain, customers’ preference found a place in the supply chain. (Chandrasekaran, 2010). Advances in Information Technology (IT) was the major force behind this third revolution in supply chain. As summarized by Lapide (2000) the Dell supply chain uses supplier hubs who carry inventory that feed, ATO (assemble to order manufacturing) operations, thus allowing Dell to hold almost no inventory and providing it with the benefits of a negative cash to cash cycle (using customers’ money to finance its working capital needs). The Dell supply chain perhaps is the best example of use of IT to seamlessly integrate vendors, manufacturers and customers. The Dell supply chain model was able to provide economic benefits of two very different business models. While, it offered the advantages of vertical integration (strict control and tight coordination), at the same time it also providing benefits of virtual organization like flexibility, focus and efficiency. Michael Dell used IT to connect its supply chain partners thus enabling coordination across them. This higher level of effective coordination led to new levels of efficiency and productivity. (Magretta, J. 1998). With Dell, individual retail / industrial customers were able to customize their PCs / Servers. They were virtually able to build their own PCs using a simple pick and choose web based interface. Further the customers were able to track their orders in production and distribution systems. The Dell supply chain focused on inventory and how fast inventory was moving throughout the supply chain (inventory velocity). This practice helped Dell in slashing its own inventories as well its suppliers’ inventories and allowed them to be more responsive to respond to changes in market place. With Dell supply chains proximity to suppliers was not a condition like Toyota supply chain. Further, the Dell supply chain maintained medium term relationships with select world class suppliers.

Even before emergence of Dell supply chain and post Toyota supply chain, advances in IT really pushed the supply chain boundaries providing opportunities for organizations to integrate with their suppliers in particular. Technologies like Enterprise Resource Planning (ERP) helped companies achieved the much needed internal integration within its own
departments / functions. Whereas Electronic Data Interchange (EDI) allowed them to integrate their suppliers / dealers with them. However these technologies were costly and had their limitations. It was internet and web platform that really helped expand the horizons. From the supply chain context it also gave rise to new business models like e-retailing. These advances in IT have fuelled the third revolution, and the exact contours of the third revolution are still being defined. It will take a couple of years before we understand the model fully and apply it to all industries (Shah, J., 2009).

Figure 2.2.3.1

Above figure shows historic Supply Chain Management events in the United States. (Wisner, J, et al.(2008, p.11). The events are in line with the evolution in the Supply chain field clearly indicating a shift in focus from mass manufacturing (Ford era) moving on to best business practices under lean (Toyota era) and culminating with supply chain relationship formation and supply chain as an anti-thesis of vertical integration (Dell era). Over this entire journey, supply chains have become more dynamic, more holistic and more strategic in nature. The current business challenges like demanding customers, increasing customization leading to increase in product variety, short product life cycle, increasing
outsourcing, globalization of businesses, and continuous advances in information technology have all made the task of supply chain management very much complex and demanding (Lee 2002). Rise of internet and World Wide Web has provided unprecedented opportunities for the organizations to be connected with their supply chain partners on real time basis. The natural outcome of this is flow of information on 24 X 7 basis. Customers now are more informed. They seek products which are cheaper, are of better quality and which are delivered faster. Falling trade barriers between the countries and a focused push for core competence has resulted in clustering of organizations geographically. All this has a direct impact on the nature of supply chains which have become much more global and hence complex. This global orientation (with entire world as marketplace philosophy) and intense cut throat competition, coupled with rapid changes in technology and economic conditions (with added risk arising out of global monetary system connectivity), all contribute to marketplace uncertainty. Companies as well as their supply chains, need a far greater flexibility to tackle such uncertainty and flexibility in supply chain can only be attained through flexibility in supply chain relationships. (Mentzer et al. 2001).

2.3 Origins of Supply Chain Management

As proposed by Croom et al. (2000), there isn’t sufficient clarity about the origins of the concept of supply chain management, but it’s a discipline which is thought to have developed from other disciplines like physical distribution and transportation. Cavinato (2002) further adds that the growth in supply chain management as a domain is the result of growth in the field of logistics on one side of the business and growth in procurement on the other side of business. Whereas, Chopra et al. (2007) suggest that supply chain management represents a convergence of three major business management streams and practical experience of the business world spanning almost 60 years. According to them, these streams include business processes and managerial practices in the fields of operations management, industrial engineering and physical distribution. These three principal streams are,

- Sourcing, procurement and supply management
- Materials management
- Logistics and distribution
Most of the researchers believe that origins of supply chain can be traced to purchasing & supply activities as well as logistics & transportation function. While in India, majority of the now supply chain management professionals have started their careers in erstwhile materials management function & hence consider supply chain as an extension of materials management function. These are the professionals who are typically having more 15 plus years of experience. There is also a new breed of professionals especially those who have started their careers in logistics function post 2000 A.D. & for whom supply chain encompasses majority of the activities performed by logistics function. Since Supply chain theory and practice have evolved hand-in-hand through the 20th century (Done, A. 2011), the views expressed by researchers are in agreement with the views of practicing supply chain professionals.

Further, Tan, K.C. (2000), has done an extensive literature review for the purpose of understanding evolution of supply chain management and concluded that, supply chain management represents a broader strategic approach to materials and distribution management which in turn have their roots in the traditional purchasing and logistics functions. Figure below, depicts summary framework of the evolution of supply chain management along two separate paths.
A framework of evolution of supply chain management along two separate paths is shown below in figure 2.3.1.

(Adapted from, Tan, K. C. (2000)).

Croom et al. (2000) have carried out a review of literature with an objective of highlighting contribution made by different subject literatures to supply chain management literature.
from different perspectives. Accordingly they have listed down concerns which relate to supply chain management within six areas viz. strategic management, logistics, marketing, relationships, best practices and organizational behavior. The focus is on identifying and understanding activities and processes across these six areas which form a part of supply chain management. Their study highlighted cross functional nature of supply chain management as majority of the activities have multiple areas as their stakeholders. It highlights the overlapping nature of activities many of which now are considered to be under the domain of Supply chain management.

2.4 Supply Chain (SC)

Various researchers have defined supply chains. As on 1st January, 2015, a google search of ‘supply chain definition’ yielded close to 30,000,000 results. A few important ones are discussed in this article. As defined by The SCC\(^6\) (Supply Chain Council, 2002), “a supply chain encompasses every effort involved in producing and delivering a final product from the supplier’s supplier to the customer’s customer”. This definition clearly highlights the scope of supply chain. In line with this view, Kotzab et al. (2012) have proposed supply chain definition, which stresses on two important aspects of any supply chain namely process view and involvement of multiple entities in fulfilling supply chain objective. Chopra et al. (2007) while defining supply chain, further elaborate the scope stating that a supply chain not only includes the manufacturer and suppliers, but also transporters, warehouses, retailers and customers themselves. Thus it consists of all the entities which are directly or indirectly involved, in fulfilling a customer request.

Further, Shah (2009), defines supply chain in terms the activities involved in a typical supply chain like transformation of goods. Ballou et al. (2007) highlight a few of these activities when they describe supply chain as a activity sequence which is repeated many times throughout the channel so as to convert raw materials into finished products and value is added through a collection of functional activities (transportation, inventory

\(^6\) SCC Supply-Chain Council is an independent non-profit organization. As the cross-industry standard for supply chain management, SCC has developed and endorsed the SCOR. It was founded by consulting company PRTM and AMR Research in 1996
control etc.), This activity centric supply chain definition is further elaborated by Li. According to Li (2011), “a supply chain encompasses all activities in fulfilling customer demands and requests. These activities are associated with the flow and transformation of goods from the raw materials stage, through to the end user, as well as the associated information and fund flows”. Thus this definition of supply chain cites the most important flows in any supply chain namely material, information and funds. Whereas Ketchen et al. (2008) define supply chain from system perspective. According to them, it’s a system of people, activities, information and resources which is involved in creating a product and then delivering it to the customer. If we go by this definition, a supply chain becomes akin to an organization.

A few researchers have also defined supply chain with network of organizations as the central theme. According to Tummala Rao et al. (2006), the supply chain network includes upstream (towards supplier), downstream (towards customer) and lateral suppliers producing goods, services or other value adding activities. This particular definition is too narrow as it only focuses on supplier part of supply chain and fails to include customer / consumer as an integral part of supply chain explicitly. In line with this network theme, Aitken has opined that a supply chain represents a network of connected and independent organizations mutually and cooperatively working together to control, manage and improve the flow of materials and information from suppliers to end users (as quoted in Christopher 2011). Wisner et al. (2008) emphasize this fact by defining supply chain as a series of companies which are involved in making products and services available to consumers. It includes all of the functions enabling the production, delivery and recycling of materials, components, end products and services. Mohanty et al. (2005), highlight the network nature of supply chain and simultaneously also stress upon the typical activities falling under supply chain like procurement of materials, transformation of these materials into intermediate and finished products and the distribution of finished products to customers.

The thought process that organizations can deliver substantial value to their customers by effective management of their supply chains has gained ground with the emergence of Supply Chain Management (SCM) as an independent discipline. Apart from value flow,
there are two associated flows in a supply chain: information flow and cash flow (Raghuram & Rangarajan, 2009).

- **Value flow**: By far the most visible and obvious part of any supply chain starting from supplier and ending with the customer. This flow is demonstrated as materials / goods flow and service flow. In fact many researchers consider materials flow instead of value flow. This flow includes materials being stored / transported / being converted / lying idle in between operations. There can also be a reverse flow of materials due to rejection / rework or recycling. Service flows follow similar sequence. The most typical manifestation of service flow is transportation service.

- **Information flow**: By far the most significant flow within a supply chain. It consists of flows from both supplier to customer and the other way round. In the forward direction (supplier to customer), the information flow is concerned with components related to actual product / service delivery. It includes capacity estimates for plants, location wise stock availability reports, dispatch status reports, stock transfer status, quality assurance reports etc. In the backward direction, the information flow is concerned with components which are needed for planning of operations within supply chain. These include inputs for forecast, customer orders, sales & marketing plans, production orders, production plans, dispatch plans, material requirement plan, procurement quantities, customer feedback, customer rejection reports, warranty claims etc. (procurement, planning & inbound logistics functions).

- **Cash flow**: This flow predominantly takes place in backward direction (barring cash transactions for rejects if any) and reflects the most significant part of a supply chain. Major part of this flow is getting paid for goods and services delivered. It also includes other details like credit periods, advances extended etc. which are needed to manage the cash flow. The reverse cash flow takes place occasionally due to customer claim settlements.

Schematic diagram below capture all these flows. Conventionally, the supplier side of supply chain is referred as upstream end and the customer side as the downstream end of a supply chain. It is important to note that to for effective integration of material flow across the supply chain, the related information and cash flow also needs to be integrated (Shah
J., 2009). Further, as is observed most of the times, the departments which are part of the supply chain often concentrate on improving their performance at local level rather than performance at the supply chain level which often adversely impacts material/information/cash flow within the supply chain. Since a supply chain involves many entities, it’s usually studied from the focal firm’s perspective. Shah, J. (2009) has identified following characteristics of the focal firm (organization),

- The firm that provides identity to the products in terms of brand, and hence has higher stakes in the supply chain. Such a firm is identified as the main entity in the chain.
- By virtue of being main entity, the focal firm also has necessary clout and resources and usually takes on the responsibility of designing the incentive systems for the various other entities which are part of the supply chain.
- The firm also provides leadership to the entire value chain and ensures that it addresses customers’ best interest and drives profit for all chain partners.
Annexure I provides a comprehensive list of supply chain definitions as proposed by researchers / practitioners from time to time. Based on these definitions and above discussion, following key attributes of a modern day supply chain can be highlighted,
Supply chain are composed of multiple business entities both in the upstream and downstream direction which also includes the consumer. This indicates the integrated nature of supply chains.

Supply chain involves a set of activities like procurement of materials, conversion / transformation of materials into finished goods and delivering the same to ultimate customer. This highlights the cross functional nature as well as need for coordination and collaboration amongst those who perform these activities.

Material flow, information flow and funds flow constitute the three important flows in a supply chain.

Involvement of indirect agencies providing services like transport, warehousing, clearing and forwarding etc.

Both goods and services are a part of supply chain.

This peculiar nature of supply chain poses tremendous challenges in its performance measurement. The performance methodology as well as measures should not only be able to address this inherent complex nature of supply chains but at the same time should be able to cover its entire scope.

2.4.1 Types of Supply Chain

According to Mentzer et al. (2001) there are three types of supply chains based on supply chain complexity - Direct supply chain, an extended supply chain, ultimate supply chain. A direct supply chain consists of a company, a supplier (upstream), and a customer (downstream) who are involved in flows of products, services, finances, and/or information.

Figure 2.4.1.1

![Direct Supply Chain Diagram](image)

Direct Supply Chain
Whereas, an extended supply chain includes suppliers of the direct supplier and customers of the direct customer, all involved in the upstream and/or downstream flows of products, services, finances, and/or information.

Figure 2.4.1.2

Extended Supply Chain

An ultimate supply chain includes all the organizations both in upstream and downstream, who are engaged in flows of products, services, finances, and information from the ultimate supplier to the ultimate customer. In this type of supply chain, there can be a third party financial provider who may provide financing, assume some of the risk, and offer financial advice; a third party logistics (3PL) service provider taking care of the logistics activities; and a market research firm is providing information about the ultimate customer.

Figure 2.4.1.3

Ultimate Supply Chain

The most important thing to be noted is, irrespective of type of supply chain, it's rarely linear in nature the way a chain is thought / supposed to be thought. In other words, the
activities performed within a supply chain are not necessarily sequential but many of them are happening simultaneously.

In his seminal work on identifying the right supply chain depending on product type, Fisher (1997), in his seminal work, comments that the majority of the problems plaguing many supply chains, can be traced to the mismatch between the type of product offered by the company and the type of supply chain it employs to offer this product. He recommends to begin with, organizations’ should understand the nature of their product i.e. whether their product is functional or innovative. He also advises equally important is the fact of understanding nature of demand for the product and states that typically functional products have predictable demand as against innovative products which tend to have more of an unpredictable demand. Based on these characteristics, he has proposed two types of supply chains viz. physically efficient supply chains and market responsive supply chains.

Table 2.4.1.1, below provides the approach and distinguishing parameters for these two types of supply chains.
Table 2.4.1.1

<table>
<thead>
<tr>
<th></th>
<th>Physically efficient Supply Chains</th>
<th>Market responsive Supply Chains</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary purpose</strong></td>
<td>Supply predictable demand at the lowest possible cost</td>
<td>Respond quickly to unpredictable demand in order to minimize stock outs, forced markdowns &amp; obsolete inventory</td>
</tr>
<tr>
<td><strong>Pricing Strategy</strong></td>
<td>Lower margins as price is a prime customer driver</td>
<td>Higher margins as price is not a prime customer driver</td>
</tr>
<tr>
<td><strong>Manufacturing Strategy</strong></td>
<td>Lower costs through high utilization</td>
<td>Capacity flexibility to buffer against demand/supply uncertainty</td>
</tr>
<tr>
<td><strong>Inventory Strategy</strong></td>
<td>Minimize inventory to lower the costs</td>
<td>Maintain buffer inventory of finish goods to deal with uncertainty</td>
</tr>
<tr>
<td><strong>Lead time strategy</strong></td>
<td>Reduce, but not at the expense of costs</td>
<td>Reduce aggressively even if the costs are significant</td>
</tr>
<tr>
<td><strong>Supplier strategy</strong></td>
<td>Select based on cost &amp; quality</td>
<td>Select based on speed, flexibility, quality &amp; reliability</td>
</tr>
<tr>
<td><strong>Product design strategy</strong></td>
<td>Maximize performance and minimize cost</td>
<td>Use modular design in order to postpone product differentiation for as long as possible</td>
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</tbody>
</table>

(Adapted from Fisher, M., 1997)

Apart from these fundamental types, there are industry specific supply chains which address the industry specific needs and hence differ from each other in one way or the other. In one of the McKinsey report, the consultants based on their research and experience of working with leading consumer packaged goods (CPG) companies worldwide, conclude that, the supply-chain operating model differs from company to company and there is no universal model as such. Thus it is advisable that each CPG company, in line with its strategic vision should craft its own customized supply chain model and implement it systematically. (Fritzen, S. et al. 2014).
Yet another way of classifying supply chains can be on the basis of the fundamentals of lean manufacturing vis-a-vis agile manufacturing. As per the lean philosophy any excess 'fat' should be eliminated, whereas as per the agile philosophy, firm must be 'nimble' since sales lost are gone forever (Christopher & Towill, 2000). Very often it is treated as a trade-off. According to Lee (2004), the best supply chains are not only fast and cost effective but also agile and adaptable, and they ensure that all their companies' interests stay aligned. Christopher & Towill (2000) have done a comparison of lean supply chain with agile supply chain as below table 2.4.1.2. It is to be borne in mind that such clear cut compartmentalization of supply chains based on certain characteristics, rarely exists in practical business world. It is often seen that an organizations adopt multiple of these approaches, many a times simultaneously to meet customer demands / in line with organizations' strategy.

<table>
<thead>
<tr>
<th>Distinguishing attributes</th>
<th>Lean supply</th>
<th>Agile supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical products</td>
<td>Commodities</td>
<td>Fashion goods</td>
</tr>
<tr>
<td>Marketplace demand</td>
<td>Predictable</td>
<td>Volatile</td>
</tr>
<tr>
<td>Product variety</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Product life cycle</td>
<td>Long</td>
<td>Short</td>
</tr>
<tr>
<td>Customer drivers</td>
<td>Cost</td>
<td>Availability</td>
</tr>
<tr>
<td>Profit margin</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Dominant costs</td>
<td>Physical costs</td>
<td>Marketability costs</td>
</tr>
<tr>
<td>Stoc-kout penalties</td>
<td>Long term contractual</td>
<td>Immediate and volatile</td>
</tr>
<tr>
<td>Purchasing policy</td>
<td>Buy goods</td>
<td>Assign capacity</td>
</tr>
<tr>
<td>Information enrichment</td>
<td>Highly desirable</td>
<td>Obligatory</td>
</tr>
<tr>
<td>Forecasting mechanism</td>
<td>Algorithmic</td>
<td>Consultative</td>
</tr>
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</table>
2.5 Supply Chain Management (SCM)

Supply Chain Management was a phrase first invented in the early 1980s to describe the procurement and supply management activities coordinated by an organization (Oliver, R.K. and Webber, M.D., quoted in Hines, T., 2008).

As per Council of Supply Chain Management Professionals (CSCMP), “Supply chain management encompasses the planning & management of all activities involved in sourcing and procurement, conversion and all logistics activities. It also includes coordination and collaboration with channel partners which can be suppliers, intermediaries, third party service providers & most importantly customers. In essence SCM integrates supply and demand management within and across companies”. (CSCMP, 2003).

From practitioners’ perspective, DuPont’s director of logistics (Clifford Sayre) has defined supply chain management as a loop since it starts with the customer and ends with the customer forming a complete circle. All the transactions, information and materials flow through this loop. So the entire business needs to be viewed as a continuous process. The business process comprises of traditionally distinct functions like forecasting, purchasing, manufacturing, distribution and sales and marketing which need to continuously interact with each other to achieve organizational objectives. In short the functional compartmentalization no longer works; instead all the departments are structured as a continuous joint pipeline that connects company’s supplier and its customers’ (Gattorna & Walters, 2006).

Once again, as with supply chain, there is no consensus amongst academic researchers as well as practitioners about definition of supply chain management. Annexure II captures some of these definitions. For the purpose of this research, we have considered SCM to be encompassing all the traditional functions and their coordination within & across individual companies. This is best described by Mentzer (2007) as:

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7 CSCMP (Council of Supply Chain Management Professionals), founded in 1963, providing educational, career development, and networking opportunities to members and to the entire Supply Chain Management professionals. CSCMP members are the leading practitioners and authorities in the fields of logistics and supply chain management.
Today’s supply chains consist of all suppliers and customers and it exists in global environment meaning they are either selling, sourcing globally or competing with a company that does.

There is a need to coordinate all the traditional business functions within individual companies (intra-organization) before the company starts coordination across other companies (inter-organization) in the supply chain.

Using of third party service providers, relationship management and supply chain structures to efficiently and effectively manage six flows of any supply chain (products, services, information, financial resources, demand & forecasts).

Here efficiency should be measured in terms of commitment of financial resources. So the lesser the better. Whereas effectiveness should be with reference to customer satisfaction and value. This will lead to profitability and subsequently to competitive advantage.

Over the years, researchers have developed varied frameworks to capture the essence of supply chain management. Important ones are dealt with in the next section.

2.5.1 SCM Frameworks

As stated by Min, S. and Mentzer, J. (2004), due to different conceptualization of SCM by different authors, we have different SCM frameworks.

These can be classified majorly under four headings,

A) SCM as integrated logistics

Muller (1992) suggests that practitioners’ views about supply chain management are not much drastically different and in line with the theory of integrated logistics that exists in literature. He further adds that the major difference seems to be SCM is the preferred name for the actualization of ‘integrated logistics’ thus hinting more at execution role of SCM. Whereas Cooper et al. (1997) argue that from a comparison of understanding of integrated logistics management and the characteristics of SCM as described by most of the authors, it is unclear what specific characteristics differentiate the two disciplines. It adds to the confusion to the discipline of logistics to conceptualize SCM as implementing logistics across independent organizations in the
supply chain. Raghuram & Rangaraj (2009) argue that SCM has basically evolved from logistics management with following dimensions:

1. The addition of financial system to the physical, managerial and informational aspects of logistical systems, with a clear focus on cash flow across a chain

2. In addition to physical goods (logistics management), it is useful to think in terms of services as a part of value delivered. Thus making SCM principles valid even for service dominant organizations.

3. The physical scope of SCM is enlarged to take into account activities starting from vendor and ending with customer. Logistics function typically is focused on given task of movement (transportation) and storage of goods, whereas the SCM perspective emphasizes stream of activities from raw material to consumption (which includes conversion).

4. Logistics management is typically concerned with improving efficiency to achieve certain goals of service at minimum cost and thus goal is cost minimization. On the other hand, the SCM concern is much broader in the sense that SCM tries to capture the dynamic nature of value creation by considering several competitive elements like responsiveness, quality and design. In this context, profit maximization in the long run becomes the major goal of SCM, rather than cost minimization which is merely one of the factors contributing to profit maximization.

On similar lines, Mitra and Datta (2013), while tracing evolution of SCM argue that the myopic view of 'distribution management' later got transformed into 'integrated logistics management' in the 1980s with a system wide objective (figure 2.5.1.1).
Figure 2.5.1.1

Reengineering of organizational cost structures

Increased competition and globalization

Distribution Management 1970s

Integrated logistics management 1980s

Supply chain management 1990s

- No coordination among functions
- Focus on reducing inventory & distribution costs
- Coordination among functions internal to a company
- Achieve a system wide objective
- Coordination among several companies to reduce cost & redundancies
- Create customer value

While distinguishing integrated logistics from SCM, Cooper et al. (1997) conclude that, companies over a period of time have realized that logistics process cuts across the entire supply chains as well as across all business processes. In short the business processes have now become supply chain processes. The supply chain processes are thus penetrating intra and inter organizational boundaries and hence should be managed as a whole process. Thus logistics becomes a sub domain of SCM.

B) SCM as a Management Process

Members of The international Center for Competitive Excellence have defined SCM as, “supply chain management is the integration of business processes from end user through original suppliers that provides products, services and information that add value for customers” (Cooper et al. 1997). This is by far the most widely accepted connotation for SCM. The scope of supply chain as management process cuts across various functional boundaries as well as various organizational boundaries. The international Center for Competitive Excellence, has identified seven processes under SCM namely Customer Relationship Management (CRM), Customer Service Management, Demand Management, Order Fulfillment, Manufacturing Flow Management, Procurement, and Product Development & Commercialization (Cooper
et al. 1997). On similar lines, Chopra et al. (2007) have classified SCM activities into three macro processes as shown in the figure 2.5.1.2 below,

Figure 2.5.1.2

<table>
<thead>
<tr>
<th>Supplier Relationship Management (SRM)</th>
<th>Internal Supply Chain Management (ISCM)</th>
<th>Customer Relationship Management (CRM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
<td>Strategic Planning</td>
<td>Market</td>
</tr>
<tr>
<td>Negotiate</td>
<td>Demand Planning</td>
<td>Price</td>
</tr>
<tr>
<td>Buy</td>
<td>Supply Planning</td>
<td>Sell</td>
</tr>
<tr>
<td>Design Collaboration</td>
<td>Fulfillment</td>
<td>Call Center</td>
</tr>
<tr>
<td>Supply Collaboration</td>
<td>Field Service</td>
<td>Order</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Management</td>
</tr>
</tbody>
</table>

(Source: Chopra et al. 2007)

As per them, the above three macro processes are vital for managing the flow of information, product and cash / funds required to generate, receive and fulfill a customer request. CRM covers all the processes that are part of the interface between the organization and its customers, ISCM covers all processes that are internal to the firms and SRM covers all processes that focus on the interface between the firm and its suppliers. Yet another perspective of viewing SCM as a process leads to two ways, namely Cycle View and Push/Pull View. The cycle view of SCM, divides processes into series of cycles, each indicating a successive stage in supply chain. These cycles are, customer order cycle, replenishment cycle, manufacturing cycle and procurement cycle. In case of push/pull view, the processes are divided into two categories based on whether they are executed in response to a customer order (pull) or in anticipation of customer order (push). The cycle view of supply chain helps specify role of each member within the supply chain and hence

36
it’s useful in operational decision making. As against this, push/pull view of the supply chain is useful in strategic decision making especially related to supply chain design (Chopra et al. 2007).

On a similar lines, the Supply Chain Council developed the Supply Chain Operations Reference (SCOR) model 1996. The SCOR model considers the supply chain management function as an operational process and includes customer interactions, physical transactions, and market interactions (Zhou et al. 2011). In other words it’s also a process centric representation of SCM. The SCOR model builds on the concepts of process reengineering, performance measurement, and logistics management (Wang et al. 2010). So in that sense it does take into account the similarities between SCM and integrated logistics management but also fills the gaps which arise from differences between these two concepts.

C) SCM as yet another form of vertical integration of firms

In its earliest forms, supply chains have evolved from vertically integrated firms. The Ford motor company being the classic example of vertically integrated firm which highlighted the need to manage multiple business entities (though operating under same parent company) from the perspective of a focal firm controlling the entire material, information and funds flow. The obvious benefits of vertical integration is that the firm can control access to inputs and hence can control the cost, quality and delivery times of those inputs. The idea of vertical integration was totally transformed by Dell Computers. Michael Dell, founder of Dell Computers successfully merged the traditional vertical integration model with the special characteristics of the virtual organization and created “virtual integration” model for its supply chain. Dell assembles computers by sourcing its parts from other firms. However, Dell ensures that its relationships with suppliers are much more obligatory in letter and spirit than the traditional contractual relationships / arms’ length relationships between buyer and supplier. Dell does not have a stake in its suppliers, neither does it have any ownership stake in them, but through transparent exchanges of information and a variety of loose associations it achieves a tightly coordinated supply chain. (The economist, 2009). In an interview with Magretta J. (1998), Michael Dell has described how Dell computers
used a combination of technology and information to overcome the traditional barriers forced by boundaries in the value chain among suppliers, manufacturers and end users. Virtual integration as practiced by Dell, offers advantages of a tightly coordinated supply chain that have traditionally come through vertical integration.

D) SCM as a management philosophy

As a philosophy, SCM takes a systems approach by treating the supply chain as a single entity rather than treating it as comprised of a set of fragmented parts, each performing its own function (Ellram and Cooper 1990; Houlihan 1998). This approach highlights the collaboration aspect of supply chain management as it involves managing activities performed by multiple entities within a single supply chain. Cooper et al. (1997) opine that supply chain management is a common set of beliefs in the sense that, performance of each member in the supply chain is interdependent in the sense it directly or indirectly gets impacted due to the performance of other supply chain members, as well as overall supply chain performance.

Based on extensive literature review, Mentzer et al. (2001) have proposed following characteristics of SCM as a management philosophy,

1. It’s a systems approach, which manages the total flow of goods inventory from the supplier to the ultimate customer and views supply chain as a single entity;
2. A strategic alignment involving cooperative efforts to synchronize both intra-firm and inter-firm, operational and strategic capabilities into a unified whole; and
3. Customer satisfaction initiative with a focus to create unique and individualized source of value proposition for the customer.

Thus, systems approach, cross functional coordination and customer focus are the three dimensions of SCM philosophy (Min, S. & Mentzer, J., 2004). Bowersox et al. (2012) have conceptualized SCM as a strategy based on collaboration that connects inter-organizational business operations with the expressed purpose of achieving maximum out of the shared market opportunity. Further, Stank et al. (2001) state that SCM involves integration, coordination and collaboration throughout the supply chain. On similar lines, Mentzer et al. (2001) have suggested the various activities that are necessary to implement SCM which are listed as under,

- Unified cohesive behavior
• Mutual transparency through sharing of information
• Sharing of risks and rewards
• Co-operation
• Common goal of serving customers
• Process integration and
• Long term relationships between partners

Burgess et al. (2006) have reviewed a 100 randomly selected referred journal articles on supply chain management and have concluded that a more than half of the articles (57 percent) had visualized SCM as some form of process while about 24 percent viewed SCM as a system followed by a smaller portion (9 percent) saw SCM as a simple activity. Further they have also classified the constructs which majority of the researchers have used to cover all aspects of SCM, under two broad categories namely, the “soft” people-focused constructs that deal with social relationships; and the “hard” system-dominated constructs that deal with technological and infrastructural issues. The soft constructs related to SCM are leadership, intra organizational relationships and inter organizational relationships whereas the hard constructs are logistics, process improvement orientation, information system and business results & outcome. For the purpose of this research, we have considered supply chain management as a management philosophy. This approach helps us visualize entire organization as an end to end supply chain. With manufacturing getting commoditized, supply chain management has risen to predominance. It is felt that such approach aptly captures this change.

2.5.2 Need for SCM

Today, competition in business is led by advances in technology, tremendous improvement in information availability, abundance of finance through venture capital and creative business designs to cater globalization needs. (Bovet & Sheffi, 1998). In early evolution of SCM, a benchmarking study was conducted by management consulting firm PRTM, to ascertain importance of supply chain management. This study surveyed 225 US based manufacturers in eight industry segments. They concluded that in all sectors, the best companies outperformed their peers in all areas of supply chain management.
Brief findings of this survey are,

- The leading 20 percent of manufacturers recover as much as seven percent of annual revenues by improving supply-chain management
- Top companies carry as much as 60 percent fewer days of inventory
- Top electronics companies have 44 percent higher productivity than median companies of the same sector
- Top performing companies pay 50 percent less than their counterparts on material acquisition.

The study also compared the total supply chain management cost (Total supply chain management cost is the sum total of costs incurred for order management, material acquisition, inventory carrying, and supply chain finance). Table 2.5.2.1 below depicts this comparison.

(Tables are not shown in the text but are expected to contain data related to the mentioned industries and their performance metrics.)

Cooper et al. (1997) summarize the potential benefits for organizations to pursue SCM as depicted below in the table. These are classified according to economic, managerial and strategic benefits as under,
Table 2.5.2.2

### Potential Benefits of Supply Chain Management versus Traditional Approaches

<table>
<thead>
<tr>
<th>To the Buyer* of Goods / Service</th>
<th>To the seller of Goods / Service</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Economic</strong></td>
<td><strong>Economic</strong></td>
</tr>
<tr>
<td>Transfer Financial Risks</td>
<td>Realize economies of scale</td>
</tr>
<tr>
<td>Lower Cost / Increase Quality</td>
<td>Reduce capacity utilization risks</td>
</tr>
<tr>
<td><strong>Managerial</strong></td>
<td><strong>Managerial</strong></td>
</tr>
<tr>
<td>Concentrate on Core Business</td>
<td>Concentrate business expertise on fewer customers</td>
</tr>
<tr>
<td>Manage Fewer Relationships</td>
<td>Manage Fewer Relationships</td>
</tr>
<tr>
<td><strong>Strategic</strong></td>
<td><strong>Strategic</strong></td>
</tr>
<tr>
<td>Competitively position the supply chain</td>
<td>Plan for longer horizons</td>
</tr>
<tr>
<td>Meet customer service objectives</td>
<td>Invest for longer horizons</td>
</tr>
</tbody>
</table>

* Note – A single party is generally both a buyer and a seller of goods and/or services within a supply chain. (Source: Cooper, M. C. et al., 1997).

Throughout 1970s, quality and related techniques were the focus areas for companies. In 1980s, quality was a basic requirement, something like an order qualifier, and the emphasis shifted to manufacturing efficiency techniques and philosophies like lean manufacturing, JIT, design for manufacturability etc. Throughout 1990s, companies drastically improved their operations, by applying these principles / manufacturing techniques and eliminating excess. In late 1990s and beginning of twentieth century, companies realized there are many other improvement opportunities which are outside their companies such as sourcing places / suppliers, processing or converting places / job-worker, distribution channels, transporters, thus ushering era of supply chain management, wherein companies focused on optimizing the overall performance. Off course, this meant companies had to put in extra efforts to build relationships with suppliers and customers, obtain end to end visibility using information technology, coordination of material, cash and information flow with its SCM partners.

This view supports that, the growth and development of supply chain management (SCM) is not driven only by reasons which are inherent, but by a number of external factors over
which the organization rarely has any control. (Gunasekaran et al. 2004). Over a period of
time, it has clearly seen that the additional efforts which an organizations has to put in for
SCM, does pay. At a macro / broader level the increasing importance of SCM is highlighted
by PwC\footnote{PricewaterhouseCoopers International Limited, a multinational tax, auditing and consulting services firm} global supply chain survey report (PwC, 2013),

- Economic cycles of growth, recession and recovery have become irregular and
unpredictable. This has affected the task of end to end supply and demand planning,
making it much more difficult and hence unreliable.
- Increased frequency of natural disasters and disruptions in supply chains have
further increased supply chain volatility.
- Business-to-business relationships still matters but long-term customer loyalty no
longer exists thus adversely impacting predictable order flow.
- Customers have become more demanding in terms of throughput time, perfect-
order delivery and reductions in supply chain cost.
- Increased use of IT and online market places has resulted in reduction of response
times
- Supply chain managers are now struggling to address this new market
requirements. This market wants global micro-delivery of multiple small-customer
orders, instead of the large-batch movements, thus impacting the bottom line.
- Maximizing supply chain flexibility and managing multiple supply chain
configurations (splintering) are the topmost imperatives for today’s supply chain
executives

In this survey more than 500 participants from both manufacturing as well service
industries participated. The survey included opinions of supply chain experts in Europe,
North America and Asia from wide range of industries. The participating companies were
classified into two groups, namely leaders (those who have consistently outperformed their
peers) and laggards (those who have consistently underperformed both financially and
operationally). Participating companies belonged to following industries,

- Automotive
- Technology and Telecom
The difference between the leaders and laggards was highlighted by the key finding of this report - companies that acknowledge supply chain as a strategic asset achieve 70% higher performance. This gap in performance was arising due to,

- Top companies (leaders) delivered OTIF\(^9\) at 96% compared with on an average 89% delivered by others
- In addition, leaders have 87% more inventory turns per year than companies with average results

Both the above indicators not only hit bottom line performance but in a way also are an indication for more satisfied customers. In a way it also challenges the widely held belief that delivery performance is a function of inventory and a company can’t achieve efficient delivery performance without increasing its working capital costs. Further, as an offshoot of above,

- Leaders also enjoy 30% higher EBIT margin than average

Over the last two decades or so with increased market uncertainty both in terms of supply and demand, managing supply chains has become extremely important. So much so that companies across the world have realized importance of supply chain management for gaining competitive advantage. (Lee 2002). Firms having realized this, have been attempting on their part to have robust performance measurement system which will help them to ascertain the output supply chain. Thus in the next section, an attempt is made to understand characteristics of performance measurement systems. The section also discusses a few systems.

2.6 Performance Measurement Systems

As per Beamon (1999), developing a performance measurement system is one of the most difficult areas of performance measure selection. The most significant issues which the

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\(^9\) On Time In Full, one of the most widely used delivery performance criteria
The performance measurement system should address are, what is to be measured? How frequently it is to be measured? And, is it possible to develop a unified measurement system which can integrate multiple individual measures? The major objective of any measurement system is to ensure a perfect translation of strategic objectives of a firm into operational performance measures.

Caplice & Sheffi (1995) have identified following six evaluation criteria for performance measurement system, which they feel is more of a change in management practice than a simple change in management procedure.

1. Comprehensive – The measurement system should be comprehensive enough to cover all the relevant constituents and stakeholders for the process.
2. Causally oriented – The measurement system should be in a position to establish the cause and effect relationship i.e. capable of tracking those indicators and activities that influence current as well as future performance.
3. Vertically integrated – All the decision makers should be in a position to translate overall firm strategy into the measurement system.
4. Horizontally integrated – The measurement system should be able to address cross functional nature of business processes and should include all the pertinent activities, functions and departments.
5. Internally comparable – The measurement system should provide flexibility of alternatives in the terms of allowing for trade-offs between the different dimensions of performance.
6. Useful – The measurement system should have ease in understanding and should provide guideline to decision makers for further action.

Beamon (1996) has presented a number of characteristics of effective performance measurement systems. These characteristics include, inclusiveness, universality, measurability, and consistency. On similar lines, Neely (2004) provides an exhaustive list of characteristics that an integrated performance measurement system possess.

As per him, performance measurement system should,

- aim to maximize stakeholder satisfaction
- be in a position to capture competitive position of an organization
take into account changes in market conditions from time to time, so as to facilitate strategies and actions for improving the competitive position of the organization

provide necessary feedback to decision makers which can be used for strategy development

be able to maximize the effect of an improvement initiatives by focusing on critical areas of the business

be expressed in a terminology which is meaningful, encourages understanding and maximizes ownership

ensure allocation of necessary resources to processes and activities critical to overall performance

be useful in performance planning based on constraint management

focus on leading measures thereby promoting a more proactive management style, which will in turn facilitate improved performance

have a mix of both quantitative and qualitative measures

capable of measuring organizational capability and learning wherever appropriate

ensure measurement at correct levels

encourage managers to understand of the causal relationships between various measures

be able demonstrate trends wherever possible

be dynamic and open to change in response to the changes in the internal and external environment of the organization

Further, Keebler (2001) has summarized that good performance measurements should,

• cover all aspects of the process being measured,
• be appropriate for the business situation,
• minimize measurement error, and
• aligned to the management reward system.

Traditionally business performance systems have been skewed in favour of financial performance. However in the late 1970s and 1980s, many researchers and authors were of the opinion that the prevailing traditional lagging accounting based performance
measurement systems were not satisfactory (Bourne et al. 2000). In fact by the 1980s, many professional managers wanted to use operational measures instead of the traditional measures of financial performance as they felt that the traditional measures were not effective enough (Kaplan & Norton, 1992). This forced businesses to recognize the need for more balanced performance measurement systems which can also take into account forward looking non-financial measures. The logic was, improvement in non-financial measures will ultimately lead to improvement in financial performance in the longer run. The management literature is full of performance measurement systems / frameworks. In paragraphs below, the researcher reviews a few prominent performance measurement systems from literature.

In 1989, Keegan et al. presented a performance measurement matrix which tried to capture both financial as well as non-financial performance measures. The framework also categorized the measures in two viz. internal and external,

*Figure 2.6.1*

<table>
<thead>
<tr>
<th>Non Cost</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>External</strong></td>
<td><strong>Internal</strong></td>
</tr>
<tr>
<td>Nos. repeat buyers</td>
<td>Design cycle time</td>
</tr>
<tr>
<td>Nos. customer complaints</td>
<td>Percent on time delivery</td>
</tr>
<tr>
<td>Market share</td>
<td>Nos. new products</td>
</tr>
<tr>
<td>Competitive cost position</td>
<td>Design cost</td>
</tr>
<tr>
<td>Relative R&amp;D expenditure</td>
<td>Material cost</td>
</tr>
<tr>
<td>Manufacturing cost</td>
<td></td>
</tr>
</tbody>
</table>

Source: Keegan et al., 1989
One of the major drawbacks of this matrix is that it doesn’t have an explicit linkage with varied dimensions of business performance. This drawback is overcome by results and determinants framework as proposed by Fitzgerald et al. 1991 (as cited in Neely, A. 2004). This framework has its origin in the research on performance measurement in service sector. It’s based on idea that there are two basic types of performance measure in any organization,

- Relating to results – competitiveness, financial performance
- Relating to means or determinants – quality, flexibility, resource utilization and innovation

Here results are lagging indicators whereas the determinants of results are leading indicators. Thus results are a function of past business performance with reference to specific determinant.
Brown (1996) has proposed a performance measurement system which is focused on business process approach. Here the performance measurement is done at three stages viz. input, process and output. Accordingly, for each stage measures are defined.
During the same period, Lynch & Cross (1989) developed performance pyramid. The pyramid was an outcome of triggered by dissatisfaction among professionals about traditional performance measures dealing majorly with utilization, productivity and other financial variances. The system so developed focused on performance indicators which can help sustain success. This system is also known as Strategic Management Analysis and Reporting Technique (SMART). The system comprises of four levels of performance objectives and measures.
At the apex level management assigns roles and provides resources to each business unit. At the second level, objectives in terms of market and financial terms are defined for each business unit. These objectives are then translated into operational objectives and priorities in terms of customer satisfaction, flexibility and productivity are decided for business units at the third level. While at the fourth level, the operational objectives are further translated into measures like quality, delivery, process time and cost. In other words the company strategy gets implemented top down whereas achievement of the same is through bottoms up approach.

The Balanced Scorecard (BSC) is perhaps the most popular and universally accepted performance measurement framework. Kaplan and Norton (1992) devised the BSC as a measurement framework for strategic, operational and financial measures. It allows managers to measure business performance along four different perspectives and provides answers to four basic questions,
• How do customers see us? (customer perspective – typical measures include lead times, quality, service, costs etc. which help customers' perceive value)

• What must we excel at? (internal business perspective – typical measures include cycle time, quality, employee skills, productivity etc. which help businesses measure value addition)

• Can we continue to improve and create value? (innovation and learning perspective – new product launches, operating efficiencies etc. which help businesses deliver value)

• How do shareholders see us? (financial perspective – cash flow, sales growth, market share etc. which help businesses generate value for shareholders)

However the major advantages of balanced scorecard over contemporary business performance measurement systems are,

• Instead of providing a lengthy list of performance measures, the balanced scorecard focuses on a select few measures that are the most crucial for business. Thus it helps managers avoid information overload and prioritize on select few.

• Since the scorecard takes into account all the important measures together, it avoids the tradeoff between the performance measures thereby ensuring a holistic evaluation. It thus ensures optimal performance.

• Provides a balanced representation of both financial (lagging) and operational (leading) measures

• Focus is on building a scorecard around organizational strategy and vision rather than merely controlling.

• By including diverse perspectives which in turn are interrelated, the scorecard forces managers to focus beyond traditional functional barriers

At the same time both Kaplan & Norton (1992) have stressed that the major challenge for managers is to learn how to make an explicit linkage between operations and finance in the sense that improvements in operational measures like quality, cycle time, lead time, delivery and new product development time will lead to improvement in market share, operating margins, and asset turnover or reduction in operating expenses. Thus, a judicious
balance between the four perspectives can help businesses achieve growth as well as long term sustainability.

On similar lines, while extending the four perspectives of BSC, Kanji (1998) proposed a comparative business scorecard (CBS). According to this framework, companies need to maximize stakeholder value, achieve process excellence, improve organizational learning and delight the stakeholders. Further, each of these four areas need to work in tandem in the sense output of one becomes input to the other, so as to form a cycle of continuous improvement so that it can achieve,

1. stakeholders’ delight which in turn can help generate revenues and satisfactory return to the investor;
2. increased revenues and thus more investments in processes and learning &
3. better processes and learning which again will lead employees to delight the stakeholders and thereby create business excellence (Kanji and Moura e Sa; 2002).

Kanji’s Comparative Business Scorecard is reproduced below in figure 2.6.5,
The four areas as identified in CBS are the drivers of success.

One of the key objectives of having an effective business performance measurement system is to constantly upgrade and move towards excellence. Typically such business excellence frameworks/models emphasize on self-assessment. These performance measurement systems have their origins in the 'quality movement'. Deming Prize in Japan and Asia, Malcolm Baldrige National Quality (MBNQ) Award in USA and European Foundation for Quality Award using the EFQM Excellence Model in Europe. Baldrige model has seven categories through which organizational performance excellence is measured. These are leadership, strategic planning, customer focus, information/analysis, workforce, processes and business performance results. Thus the first six are approaches whereas the last one is the result.
EFQM Excellence Model allows for understanding the cause and effect relationship between what an organization does, the Enablers and the Results it achieves. The framework is depicted below.

Figure 2.6.6

Enablers

Leadership

People

Strategy

Processes, Products & Services

Customer Results

Business Results

Partnership & Resources

Society Results

Learning, Creativity & Innovation

(Source: EFQM 2012)

It consists of 5 enablers which are the things an organization needs to develop and implement the strategy. The 4 result areas are in line with the strategic goals. The model also proposes RADAR logic, which is an investigative tool that provides a structured way of analyzing organizational performance.

As per this approach an organization should,

- decide on the Results it aims to achieve through its strategy
- do the planning and development of Approaches which can deliver the required results in the current state as well as in the future state
- ensure that the approaches are Deployed in a systematic way to so as to guarantee their implementation
follow up with **Assessment and Refinement** of the deployed approaches based on monitoring feedback and in line with on-going learning initiatives (EFQM, 2012)

We now use evaluation typology developed by Hudson et al. (2001) to evaluate the performance measurement systems discussed so far. The typology is based on three criteria,

1. Development process requires typically covering aspects like top management support, employee involvement, clarity of objectives etc.
2. Dimensions of performance wherein only critical dimensions covering all business aspects are considered &
3. Characteristics of performance measures

Details of the performance evaluation typology are provided below in table 2.6.1,

**Table 2.6.1**

<table>
<thead>
<tr>
<th>Development process requirements</th>
<th>Performance measure characteristics</th>
<th>Dimensions of Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need evaluation / existing PM audit</td>
<td>Derived from strategy</td>
<td>Quality</td>
</tr>
<tr>
<td>Key user involvement</td>
<td>Clearly defined explicit purpose</td>
<td>Flexibility</td>
</tr>
<tr>
<td>Strategic objective identification</td>
<td>Relevant and easy to maintain</td>
<td>Time</td>
</tr>
<tr>
<td>Performance measure development</td>
<td>Simple to understand and use</td>
<td>Finance</td>
</tr>
<tr>
<td>Periodic maintenance structure</td>
<td>Provide fast, accurate feedback</td>
<td>Customer satisfaction</td>
</tr>
<tr>
<td>Top management support</td>
<td>Link operations to strategic goals</td>
<td>Human resources</td>
</tr>
<tr>
<td>Full employee support</td>
<td>Stimulate continuous improvement</td>
<td></td>
</tr>
<tr>
<td>Clear and explicit objectives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set timescales</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Hudson et al. (2001)

While brief description of the select performance measurement systems is already provided above, their comparison on the basis of evaluation typology is shown in the below table. The major objective of this analysis is to check completeness of these systems with
reference to typology proposed by Hudson et al. (2001). At the same time such analysis is going to help further in choosing an appropriate performance measurement system / measures for measuring supply chain performance and organizational performance. The comparison is provided below in table 2.6.2

<table>
<thead>
<tr>
<th></th>
<th>IEPM</th>
<th>R&amp;DM</th>
<th>IPO</th>
<th>SMART</th>
<th>BSC</th>
<th>CBS</th>
<th>EFQM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A strategic PM development process should,</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluate existing PM system</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>√</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Enable strategic objective identification</td>
<td>--</td>
<td>√</td>
<td>--</td>
<td>--</td>
<td>√</td>
<td>√</td>
<td>--</td>
</tr>
<tr>
<td>Enable performance measure development</td>
<td>√</td>
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<td>√</td>
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<tr>
<td>Provide a maintenance structure</td>
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<td>√</td>
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<tr>
<td>Involve key users</td>
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<td>√</td>
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</tr>
<tr>
<td>Have top management support</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
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<tr>
<td>Have full employee support</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
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<tr>
<td>Have clear and explicit objectives</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>--</td>
<td>√</td>
<td>√</td>
<td>√</td>
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<tr>
<td>Have set timescales</td>
<td>--</td>
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<td>--</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td><strong>The measures in PM system should be</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Derived from strategy</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
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<tr>
<td>Link operations to strategic goals</td>
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<td>√</td>
<td>--</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
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<tr>
<td>Stimulate continuous improvement</td>
<td>--</td>
<td>√</td>
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<td>√</td>
<td>√</td>
<td>√</td>
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<tr>
<td>Provide fast, accurate feedback</td>
<td>√</td>
<td>√</td>
<td>√</td>
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<td>--</td>
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<tr>
<td>Clearly defined / explicit purpose</td>
<td>√</td>
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<td>√</td>
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<td>√</td>
<td>√</td>
<td>√</td>
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<tr>
<td>Relevant and easy to maintain</td>
<td>√</td>
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<td>--</td>
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</tr>
<tr>
<td>Simple to understand and use</td>
<td>√</td>
<td>√</td>
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<td>√</td>
<td>√</td>
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<tr>
<td><strong>A PM system should measure</strong></td>
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<td>Quality</td>
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<tr>
<td>Flexibility</td>
<td>√</td>
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<td>--</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Time</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Finance</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Customer satisfaction</td>
<td>--</td>
<td>--</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Human Resources</td>
<td>--</td>
<td>--</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
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</tr>
</tbody>
</table>
While it can be seen BSC, CBS and EFQM framework all three satisfy most of the conditions laid down by the evaluation typology. Interaction with respondents about the current performance measurement system revealed that a majority of them are using BSC in some form or the other. Going ahead, this input was used to choose a similar framework as a reference for data collection instrument. It is also worthwhile to note outcome of research conducted in the past. Research conducted by Kirby (2005), confirms that, whilst there is no universal agreement in defining organizational performance, there is agreement that sustainable organizational performance is a combination of growth and profitability. Hence these two indicators will prominently figure in the proposed measurement framework. The measurement of the outcome or performance is done through performance indicators / measures. Thus indicators are observable numerical references / illustrations of important issues, which are relevant to the organization success (Kotzab et al. 2012). Performance can be observed in terms of utilization of resources or in terms of achieved results as compared to targets. Finding the appropriate performance measures for processes which are cross functional in nature is of critical importance. As per Neely et al. (1995), a performance measure is a set of metrics used to quantify the efficiency and / or effectiveness of an action. Griffis et al. (2004) explain the three forms of disconnect between measurement needs and choice of measure. The first is not to choose any measures for performance evaluation. The second being an outcome of bad information resulting in measures that are unreliable, inconsistent or invalid. The third disconnect results from using wrong measures altogether.

While summarizing the performance measures of world class manufacturing companies, Maskell, 1991 (as cited in Beamon, B. 1999) has identified seven common characteristics, The performance measures should,

- have direct relationship with the manufacturing strategy
- primarily use operational (nonfinancial) measures
- vary among locations
- be dynamic i.e. change with time
are simple and easy to measure and comprehend
provide fast feedback to operators and managers
lead to improvements instead of just monitoring

Equally important is to choose relevant performance measures. Griffis et al. (2004) explain the three forms of disconnect between measurement needs and choice of measure. The first is not to choose any measures for performance evaluation. The second being an outcome of bad information resulting in measures that are unreliable, inconsistent or invalid. The third disconnect results from using wrong measures altogether. All these issues should be consulted before choosing the performance measures.

2.7 Supply Chain Performance Measurement
Lambert et al. (2001) opine that, a comprehensive system of supply chain metrics can help an organization to align processes across multiple firms thereby effectively targeting the most profitable market segments. This can help the organization to offer differentiated products, services at a lower cost and provide competitive advantage vis-à-vis its competitors thereby increasing its chances for success. In line with definition of performance measures, supply chain performance measures provide the basis for measuring both efficiency as well as effectiveness of supply chain. The cross functional, intra firm nature of supply chain also means that the performance measurement system has to take into account this process view while choosing the measures. Across the world, majority of the companies have an abundance of performance measures and metrics. Where they struggle is in determining the right performance measures and metrics for the given logistics and supply chain and then putting these measures in to practice so that the company can have continuous improvement (Gunasekaran et al. 2007). It is also necessary that the supply chain performance measurement is aligned with overall firm strategy as supply chain strategy is derived from the same. Chopra et al. (2007) have emphasized the same fact and opined that there has to be consistency between the customer needs & priorities, the organizational competitive strategy used to meet customer needs and the supply chain strategy which the company will use for the execution with the aid of its own supply chain capabilities. It is also necessary that the measures should be of both financial as well as of non-financial nature.
Thakkar, J. (2012) has based on literature review has contrasted characteristics of traditional performance measurement system versus desirable characteristics of supply chain performance measurement system. These supply chain performance measurement system characteristics are summarized below:

The supply chain performance measurement system should,

- help managers formulate a set of actions that they can take for improving performance and direct efforts which will improve supply chain competitiveness.
- take into account the influence a players has in the chain (supplier, manufacture, wholesaler, service supplier) along with the level of integration.
- initiate actual improvement in the supply chain by facilitating strategic trade-off and ensure top management commitment.
- frame the measures based on their contribution to supply chain competitiveness as against strategy.

As per Caplice & Sheffi (1995) it's very difficult nay impossible to get measures spanning the entire supply chain and at the same time, logistics or other functional measures fail short in capturing the scope of supply chain management. There are number of conceptual frameworks suggested by researchers to develop supply chain metrics. Lambert et al. (2001) have suggested a seven steps framework that aligns the performance at each link (supplier-customer pair) within the supply chain.

The framework consists of following seven steps:

1. Supply chain mapping, from point-of-origin to point-of-consumption with an objective of identifying and locating the key linkages.
2. Use customer relationship management and supplier relationship management processes to analyze each dyadic relationship / link (customer-supplier pair) and find out ways in which additional value can be generated for the supply chain.
3. Develop both customer and supplier profit and loss (P&L) statements to ascertain the effect of the relationship on profitability and shareholder value of the two firms.
4. Achieve desired performance objectives through realignment of supply chain processes and activities.
5. In order to align individual behavior with supply chain objectives (including financial goals), create non-financial performance measures at individual level.

6. Carry out a revision in process and performance measures, by comparing shareholder value and market capitalization across firms with supply chain objectives.

7. Repeat the steps at each link in the supply chain till you get desired results.

This framework provides a generic guideline in framing aligned supply chain metrics. However it does not give any specific examples of metrics per say.

Brewer et al. (2000) have used balanced scorecard as a reference to create a supply chain performance measurement framework. The framework highlights how internal process perspective of balanced scorecard (BSC) truly reflects the integrative nature of supply chain.

The other perspectives of supply chain performance measures are linked to BSC as shown in table 2.7.1. The philosophy behind balanced scorecard i.e. to balance financial measures with non-financial measures, to balance leading with lagging indicators and to balance internal with external indicators, suits supply chain’s scope of activities and its nature. Since many of the organizations have opted for BSC as an organization wide performance measurement system, extending it to measure supply chain performance becomes much easier. Hence this framework reflects by far the most popular approach.
Figure 2.7.1

SCM

SCM Goals
- Waste Reduction
- Time Compression
- Flexible response
- Unit cost reduction

Customer Benefits (Improvement in terms of)
- product/service quality
- timeliness
- flexibility
- value

Financial Benefits
- Higher profit margins
- Improved cash flows
- Revenue growth
- Higher ROA

SCM Improvement
- Product/process innovation
- Partnership management
- Information flows
- Threats/Substitutes

Balanced Scorecard

Business Process Perspective

Customer Perspective

Financial Perspective

Innovation & Learning Perspective

Source – Brewer et al. (2000)
Otto et al. (2002) have proposed profit versus goal as two alternative perspectives to measure supply chain management performance. Based on an extensive literature review they have proposed six different perspectives based on perceived nature of supply chain, the standard problems and standard solutions. The six perspectives along with focal area of improvement and performance metrics are listed in Table 2.7.1 below. The framework provides a roadmap of framing of supply chain measures based on organization perspective in alignment with the goal of supply chain.

Table 2.7.1

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Purpose / Objective of SCM</th>
<th>Focus Area</th>
<th>Performance Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Dynamics</td>
<td>Effectively manage tradeoffs along the complete supply chain</td>
<td>Order Management</td>
<td>Capacity utilization, stocking, stock outs, time to adapt, time lags</td>
</tr>
<tr>
<td>Operations Research</td>
<td>Providing optimum solution within given set of constraints</td>
<td>Network Design</td>
<td>Service level, cost per unit, time to deliver, OTIF</td>
</tr>
<tr>
<td>Logistics</td>
<td>Ensuring integration of generic processes vertically, horizontally and sequentially</td>
<td>Process Integration</td>
<td>Order cycle time, lead times, inventory level, flexibility</td>
</tr>
<tr>
<td>Marketing</td>
<td>Segmenting products and markets and serving them with the right distribution channel</td>
<td>Alignment between customer segment, product and channel</td>
<td>Customer satisfaction, distribution costs per unit, market share</td>
</tr>
<tr>
<td>Organization</td>
<td>Determining the relationships to manage and ensuring the same</td>
<td>Intra enterprise segmentation</td>
<td>Flexibility, transaction costs, time delays</td>
</tr>
<tr>
<td>Strategy</td>
<td>Merging competencies and helping business to serve the most profitable segments</td>
<td>Ability to synergize, Positioning</td>
<td>ROI, time to market, lost sales</td>
</tr>
</tbody>
</table>

Source: Adapted from Otto et al. (2002)
Gunasekaran et al. (2001) have considered four phases of supply chain systems viz. plan, source, make and deliver, with an intention of developing relevant performance measures and metrics for supply chain. Gunasekaran et al. (2004) through literature review and empirical analysis have developed a supply chain performance metrics framework which further develops this idea, considering the organization need at various management levels (strategic, tactical & operational). Table 2.7.2 depicts the framework. This framework is majorly based on the metrics discussed in literature and only reflects the important metrics based on a small sample. Still this is much simple to understand framework, is executable and can serve as a good starting point for most of the organizations. Having said this, surprisingly this framework fails to include a single metric of strategic nature for sourcing process. In today’s world of outsourcing and core competency this becomes a major limitation.

One of the major advantage of this framework is that it takes a process centric approach in measuring supply chain performance. Building on the same logic, Gunasekaran et al. (2007) have further come up with key performance measures in logistics and supply chain environment. It consists of 27 key measures as presented which can be customized as per the specific needs of individual organizations. These 27 key measures are based to literature review (1995 – 2004) carried out by the researchers. The framework does give adequate weightage to non-financial performance measures. However as observed by the researchers, this framework gives less consideration to innovation and process improvements. The framework also fails to include any performance measures related to information system. For each of the four phases i.e. plan, source, make & deliver, it includes both financial as well as non-financial measures.
<table>
<thead>
<tr>
<th>Supply chain activity / process</th>
<th>Strategic</th>
<th>Tactical</th>
<th>Operational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
<td>Budgeget Variances, Order lead time, Profitability &amp; productivity, total cash flow time, new product development, cycle time, customer perceived value of product / service</td>
<td>Product development time, customer query time, forecasting accuracy, HR productivity, order entry &amp; execution</td>
<td>Order entry time, HR productivity</td>
</tr>
<tr>
<td>Source</td>
<td></td>
<td>Supplier delivery performance, lead time against industry average, Supplier competitiveness against market, purchase order cycle time, efficiency of cash flow</td>
<td>Delivery time, lead time, pricing, flexibility, rejects, rework</td>
</tr>
<tr>
<td>Make / Assemble</td>
<td>Product / service portfolio</td>
<td>Percent rejects, rework, cost per unit, capacity utilization, WIP Inventory (money blocked)</td>
<td>Percent rejects, rework, cost per unit, HR productivity, WIP Inventory</td>
</tr>
<tr>
<td>Deliver</td>
<td>Flexibility in meeting customer needs, Effectiveness of distribution schedule</td>
<td>Flexibility in meeting customer needs, Effectiveness of distribution schedule, percent goods in transit, percent goods invoiced, delivery reliability</td>
<td>OTIF, quality of delivered goods, percent in transit damage, no. of wrong deliveries, no. of wrong invoices, percent urgent deliveries accommodated, traceability, visibility in transit, delivery reliability performance</td>
</tr>
</tbody>
</table>

Source: Adapted from Gunasekaran et al. (2004)

Perhaps the most widely known supply chain performance measurement framework is the SCOR. The Supply Chain Operations Reference (SCOR) Model was introduced by SCC (Supply Chain Council) which is a global non-profit organization whose objective is to
help member organizations improve supply chain performance by providing improvement methodology and benchmarking tools. The purpose of this framework is to link supply chain processes, performance metrics, best practices and people into a unified structure. It’s a consensus model which was developed with the direct inputs from industry leaders who manage global supply chains. The model is dynamic in nature i.e. it keeps on evolving with change in practices. The SCOR model contains:

- Standard metrics for process performance measurement called as performance metrics
- Standard descriptions of management processes and a framework of process relationships
- Best-in-class management practices
- Training and skills requirements aligned with processes, best practices, and metrics

SCOR has identified five core supply chain performance attributes which are nothing but a group of metrics used to express supply chain strategy. They are as follows:

1. Reliability – It addresses the ability to perform tasks as promised / expected. Reliability provides process predictability in terms of the process outcome. Typical metrics for the reliability can be: on-time delivery, the right quantity, the right quality etc. Reliability is a customer-focused attribute.

2. Responsiveness – It describes the speed at which tasks are performed once the trigger is received (usually from customer). Examples include cycle-time metrics. Responsiveness is also a customer-focused attribute.

3. Agility – It describes the ability to adapt and respond to external influences. Typical examples include sudden surge or drop in demand which is not-forecasted; supply chain partners shutting down; natural disasters; acts of (cyber) terrorism; non-availability of financial tools (the economy); or labor issues. Agility is again a customer-focused attribute.

4. Costs – This attribute describes process operating costs. It comprises of labor costs, material costs, and transportation costs. The SCOR KPIs include Cost of Goods Sold and Supply Chain Management Cost. These two indicators cover all supply chain spend. Cost is an internally-focused attribute.
5. Assets – This attribute deals with Asset Management Efficiency. In simple words it describes how efficiently an asset is utilized during day today processes. Improvement can be achieved by inventory reduction and judicious decisions on in-sourcing vs. outsourcing. Metrics include: inventory days of supply (inventory turnover) and capacity utilization. Asset Management Efficiency is an internally-focused attribute.

Each of the performance attribute KPIs for the above attributes are supported by level 2 metrics. In fact each of the KPIs is further characterized by level 2 metrics. Thus level 2 metrics serve to identify the causes of a performance gap for a KPI. Similarly there are level 3 metrics which serve as diagnostics for level 2 metrics. The SCOR model provides readymade metrics which an organization can choose as deemed appropriate.

The model focuses on five level 1 supply chain processes viz. Plan, Source, Make, Deliver and Return. The level 2 processes differentiate the strategies of level 1 processes. SCOR contains 26 level 2 processes. Level 3 processes describe the steps performed to execute level 2 processes. SCOR contains 185 level 3 processes. An organization desires of using SCOR, can use the SCOR processes to standardize the supply chain architecture (level 1 and level 2 processes) and the implementation of the architecture (level 3 processes) (Supply chain council 2010). This framework by far is the most comprehensive and is in ready to roll out format.

Across all these frameworks one common thread is, almost all of them are predominantly focused on the apparently tangible or quantifiable measures which are the outcomes of managerial decisions. The human behavioral aspect (skills, values), organizational cultural aspect, and leadership style aspect which are so crucial to any decision and which impacts the actual performance are rarely considered in these frameworks. Notable exceptions to this are SCOR model which takes into account the people skills and competency aspect. The SCOR skills framework provides a global view of the needs and issues surrounding skills management for supply chain professionals. It has a comprehensive list of skills like

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10 [www.supply-chain.org/scor](http://www.supply-chain.org/scor)
technical skills, aptitude, and experience required to manage an effective supply chain (Supply chain council 2010).

Further, the BSC also has innovation and learning perspective & internal process perspective both trying to address this issue indirectly. As argued by Knemeyer et al. (2012), logistics and supply chain systems can also be viewed as networks of interacting human beings.

Hence an organization desirous of improving its supply chain performance, has to take into account the behavioral and other such softer issues (skills, shared value, leadership style). Mckinsey’s 7-S framework is one such model. The 7-S model suggests that those organizations which can achieve a synergy amongst the three “hard” “S’s” of strategy, structure and systems and four “soft” “S’s” of skills, staff, style and super-ordinate goals (referred to as shared values) are the ones who become successful (Kaplan, 2005).

**Mckinsey 7 S Model**

The Seven-Ss is a framework was developed with an intention to analyze organizations and their effectiveness. It is based on the seven critical factors that make the organizations successful. These are, strategy; structure; systems; style; skills; staff; and shared values. It was developed by the McKinsey consultants the late 1970s with a specific purpose of helping managers to handle the difficulties which arise during any organizational change initiative. As stated by Carter and Carmichael (2009), 7 S framework is a useful tool for organizing fundamental traits in order to make better informed decisions about change and the move towards best practices. The model shows that there are many interconnected variables involved, making change a complex process. It further stresses that for an effective change, organizations need to address many of these issues simultaneously.

The framework is used to analyze whether or to what extent organization can achieve its intended objective
The theory holds that the traditional view of organizations hinges on three axes: strategy, structure and systems. Further, strategy leads almost implicitly to organization structure, and systems which orchestrate complex functions resulting in performance (Watson, 1983). 7 S model suggests four additional S's which are critical for achieving the effectiveness while managing. These are style, staff, skills, and superordinate (or shared) goals. Waterman et al. (1980) and Kaplan (2005) describe these seven factors as under,

1. **Strategy**: Those actions which an organization plans or the decisions an organization takes in response to or in anticipation of changes in external environment. Objective of such actions / decisions is to improve organization’s position vis-à-vis its competitors by providing better value to the customers. Typically it’s achieved through low cost production or delivery, or by achieving sales and service dominance though offering differentiation. In short, strategy can be interpreted as, the positioning and actions taken which an organization takes, in

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**Figure 2.7.2**

![Diagram showing the relationship between Strategy, Structure, Systems, Superordinate Goals, Skills, Style, and Staff.](image)
response to or anticipation of changes in the external environment, with an intention to achieve competitive advantage.

2. Structure: Structure divides tasks and provides coordination. Organizations use structures as coordinating and controlling mechanisms. It defines formal reporting relationships as to who reports to whom, also includes number of levels in the hierarchy and the span of control. In short, it represents the way in which tasks and people are specialized and divided, and authority is distributed. Structures allow Organizations to have a formalized and systematic way of dealing with external environment. It also highlights which activities / functions are grouped; the mechanisms by which activities in the organization are coordinated.

3. Systems: Simply means all the procedures formal and informal that help the organization carry out its day today function without any hiccup. Systems represent the way things are done in an organization irrespective of who does the work. They include management control systems, performance measurement and reward systems, planning, budgeting, resource allocation system etc.

4. Style: Majorly represents the leadership style of managers - how they spent their time, what are their priorities or how they decide their priorities, what questions they ask of employees; what considerations they have when they make decisions; also their dominant values, beliefs, the norms, the symbolic acts taken by leaders (job titles, dress codes, executive dining rooms, corporate jets, informal meeting with employees) are all part of ‘style’.

5. Staff: This particular dimension deals with the employees within the organization. The people, their backgrounds and competencies, how the organization recruits, selects, trains, socializes, manages their careers, and promotes employees. It represents how people as pool of resource are nurtured, developed, guarded, and allotted.

6. Skills: The dimension which differentiates the organization from other organizations. It represents what the organization does best. In short represents, the distinctive competencies of the organization; what it does best along dimensions such as people, management practices, process systems, technology, and customer relationships.
7. Superordinate goals (shared values): These are the core or fundamental set of values and aspirations, often unwritten that are widely shared in the organization. These can also be viewed as guiding principles of what is important, vision, mission and value statements that provide a broad sense of purpose for all employees. It often helps employees in decision making at the time of conflict.

The framework proposes that there has to be perfect alignment / harmony amongst the three hard “S’s” of strategy, structure and systems, and four soft “S’s” of skills, staff, style and super-ordinate goals, if organizations want to become successful. In the next section relationship between supply chain performance and organizational performance is explored.

2.8 Supply Chain Performance and its Relationship with Organizational Performance
One of the most significant change which has happened in modern business management is that businesses now compete as supply chains rather than as solely autonomous entities (Lambert, D. & Cooper, M. 2000). What can’t be achieved through an individual firm in an optimum manner can now be achieved through collaboration with different business firms. This has given rise to increasing number of firms focusing on practice and performance of supply chain management. So much so that, in the market, supply chains compete among themselves rather than the companies they serve (Christopher, 2000).

While discussing the concept of supply chain management, Mentzer et al. (2001) have cited specific drivers which are responsible for the emergence of supply chain management as a specialized discipline. These include increasing trends in global sourcing, an emphasis on time and quality-based competition, and their respective and cumulative impact resulting in greater environmental uncertainty. Todays’ businesses often consider their supply chains to be mission critical for their businesses. This thinking is stemming from the belief that effective management of supply chains will provide the much needed competitive advantage to their businesses. Further, newer and newer Internet technologies are constantly changing the dimension of enterprise operations as well as its boundaries. Gone are the days of individual competencies. Companies now collaborate and use strategic alliances which make the most of distinct individual core competencies. This has helped companies to achieve flexibility and responsiveness in their supply chains (Gunasekaran
& Ngai 2005). It is observed that in recent years, almost every organization is concerned about improving its supply chain performance rather than organizational performance (Thakkar, J. 2012). This can only stem from a strong belief that there exists a link between the two. In fact considering the end to end nature of supply chains, it really is no wonder in this organizational thinking of improvement in supply chain performance will have some impact on improving overall organizational performance. However, it’s equally crucial to have right measurement metrics for the same. The importance of supply chain performance measurement is aptly summed up by Hofman (2006) as, “In the end, excelling at supply chain measurement is crucial not just because it allows you to set targets to get to best, but because it also helps you get there and stay there”.

With evolution in information technology and emerging digitization of businesses, organizations have realized that managing performance of their supply chains has become one of the topmost priorities. In fact as per PricewaterHouse Coopers (PwC) survey (2013), companies that treat their supply chain as a strategic asset, achieve 70% higher performance.

With this as a backdrop, a comprehensive review of 33 past research papers which tried to empirically validate relationship between supply chain management and organizational performance, was done. It was imperative that not all those 33 articles focused on both the dimensions i.e. supply chain management & its link to organizational performance and empirical study. In all, 22 papers were found to be much more relevant which included both these dimensions.

The list of reviewed papers and their focus, contributions and approaches of individual papers are summarized in table 2.8.1 provided below.

There is considerable past research showing supply chain performance as an outcome of supply chain management which in turn is manifested through supply chain strategies, supply chain practices & supply chain initiatives. The CSCMP definition emphasizes SCM as a combination of strategy, activities and encompasses collaboration.
### Table 2.8.1 – Classification with respect to focus and contribution

<table>
<thead>
<tr>
<th>No.</th>
<th>Author/s</th>
<th>Year of Pub.</th>
<th>Title</th>
<th>Focus</th>
<th>Contribution / Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Scannell, Thomas et al.</td>
<td>2000</td>
<td>Upstream supply chain management and competitive performance in the automotive supply industry</td>
<td>Supply chain practices like supplier development, supplier partnering &amp; JIT purchasing and competitive performance</td>
<td>Survey based study for US Automobile industry which links upstream SC practices with organizational performance (measured along four dimensions - flexibility, innovation, quality and cost).</td>
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<td>5</td>
<td>Min, Soonhong &amp; Mentzer, John</td>
<td>2004</td>
<td>Developing and measuring supply chain management concepts</td>
<td>Supply chain orientation, supply chain management &amp; organizational performance</td>
<td>A rigorous survey based study testing relationship between supply chain orientation, supply chain management and organizational performance using Structural Equation Modeling. Takes into account softer aspects like leadership, cooperation, integration</td>
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<td>6</td>
<td>Sanders, Nada and Premus, Robert</td>
<td>2005</td>
<td>Modeling the relationship between firm IT capability, collaboration and performance</td>
<td>IT capability, internal collaboration, external collaboration and firm performance</td>
<td>Empirical survey based study proposing a structural model. Rigorous statistical treatment</td>
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<td>7</td>
<td>Narasimhan, Ram et al.</td>
<td>2006</td>
<td>An empirical investigation of supply chain strategy typologies and relationships to performance</td>
<td>Corporate SCM initiatives, functional SCM initiatives &amp; firm performance</td>
<td>Proposes six SCM strategy typologies based on SCM corporate and functional initiatives.</td>
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<td>8</td>
<td>Li, Suhong et al.</td>
<td>2006</td>
<td>The impact of supply chain management practices on competitive advantage and organizational performance</td>
<td>SCM practices, competitive advantage, organizational performance</td>
<td>A survey based study resulting in a structural model. Proposes a comprehensive detailing of SCM practices construct. Uses rigorous statistical methods.</td>
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<td>No.</td>
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<td>10</td>
<td>Crook et al.</td>
<td>2008</td>
<td>Antecedents and outcomes of supply chain effectiveness: An exploratory investigation</td>
<td>Supply chain effectiveness and focal firm performance</td>
<td>A focus group based study exploring relationship of supply chain effectiveness operationalized through knowledge sharing between supply chain members and focal firm performance</td>
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<td>13</td>
<td>Grosse-Ruyken et al.</td>
<td>2010</td>
<td>The impact of supply chain fit on firm performance</td>
<td>Supply chain strategies, financial performance</td>
<td>Uses secondary data to investigate link between supply chain fit and firm's financial performance</td>
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<td>14</td>
<td>Adelkahnali, A. A. and Taghavi, R.</td>
<td>2010</td>
<td>Relationship between supply chain quality management practices and their effects on organizational performance</td>
<td>Supply chain quality management practices and firm performance</td>
<td>Considers six TQM factors viz. leadership, strategic planning, customer focus, HRM, process management and supplier management and their relationships with organizational performance</td>
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<td>15</td>
<td>Hofmann, Erik &amp; Kotzab, Herbert</td>
<td>2010</td>
<td>A supply chain oriented approach of working capital management</td>
<td>Supply chain management, working capital management</td>
<td>Analyses secondary data from supply chain oriented perspective for cash to cash cycle as an indicator of working capital management</td>
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<td>No.</td>
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<td>17</td>
<td>Rajwinder Singh et.al.</td>
<td>2010</td>
<td>Relating organised retail supply chain management practices, competitive advantage and organisational performance</td>
<td>Supply chain management practices, competitive advantage and organisational performance</td>
<td>A survey based study of Indian retail supply chain practices. Tests relationships between the focused constructs</td>
</tr>
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<td>19</td>
<td>Sezhiyan, D. &amp; Nambirajan, T.</td>
<td>2011</td>
<td>The impact of supplier selection, supply effort management, logistics capabilities and supply chain</td>
<td>Indian manufacturing firms, supply chain strategy &amp; firm performance</td>
<td>Tests relationships between supply chain management strategy, firm performance and supplier selection, supply effort management &amp; logistical capabilities. Tests conceptual model using SEM &amp; regression analysis</td>
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Previously, after a comprehensive literature review, Mentzer, J.T. et al. (2001) have classified SCM into three categories.

i. SCM as a management philosophy, having following characteristics:
   A systems approach which considers the supply chain as a whole, and manages the total flow of goods inventory from the supplier to the ultimate customer

ii. SCM as a set of activities to implement a management philosophy
   Refers to management practices that are consistent with the philosophy with an execution bias. These practices typically include SCM activities like, integrated behavior, mutual sharing of information, mutual sharing of risks & rewards, cooperation, identical goal & focus on customer, integration of processes & partners to build and maintain long term relationships.

iii. SCM as a set of management processes
This view similar to the view proposed by SCOR framework. It includes processes pertaining to managing relationships, information and materials flows across enterprise boundary with a clear end customer focus. All the functions within a supply chain are organized as key processes.

For the purpose of this review, we have considered the same dimensions under supply chain management. From table 2.8.1 it’s clear that questionnaire based surveys using statistical techniques for the analysis dominate the list. Further many of these papers use rigorous approaches most predominant of those is structural equation modeling i.e. SEM.

2.8.1 Major Themes
The review revealed that four major themes emerge under which the relationship between supply chain and organizational performance can be classified, as under:

i. Supply chain strategy and its relationship with firm performance
ii. Supply chain practices and its relationship with firm performance
iii. Integration / collaboration within supply chain and its relationship with firm performance
iv. Papers that focus on other varied aspects of supply chain and their relationship with firm performance

2.8.1.1 Theme One: Supply Chain Strategy & Its Relationship With Firm Performance
The supply chain strategy determines the methodology adopted by an organization to meet the customer demand (Sinha, A. & Kotzab, H. 2012). But it’s not sufficient to meet customer demand alone. Shah, J. (2009) opines that a firm’s supply chain strategy should ensure that its supply chain delivers superior value to its end customer. Thus organizations devise their supply chain strategy with an intention of providing competitive edge against their rivals. Lee, H. (2002) has cited a number of factors that the supply chain strategy is dependent on,

• It needs to be customized so as to meet customer specific needs
• Demand and supply pattern i.e. a product having a more or less flat, stable demand and an equally reliable source of supply needs to be managed differently than the one with highly unpredictable demand coupled with an unreliable source of supply

• The internet can act as an enabler for supply chain strategies for products with different demand and supply uncertainties

Scannell, Thomas et al. (2000) focus on supplier development, supplier partnering and JIT purchasing while operationalizing SCM strategy. The paper then tests effect of these three variables on four measures of flexibility performance, three measures of innovation performance, three measures of quality performance and two measures of cost performance. The research focuses on SBU of the top 150 first tier suppliers to top three (GM, Ford & Chrysler) US automobile manufacturers.

Wisner (2003) has provided a comprehensive detailing of supply chain management strategy. This paper also studies link between inbound & outbound logistics strategy and firm performance. It considers both upstream view (supplier management strategy) as well as downstream view (customer relationship strategy) of the supply chain management strategy. Reduction in response time, improvement in integration activities, firm’s JIT capabilities & effectively communicating with suppliers, customers are few of the indicators used in the study.

Narasimhan et al. (2006) have used alignment between corporate strategy and functional strategy as theoretical background and research framework to describe typology of SCM strategies. This paper tries to identify a core set of SCM initiatives at both corporate and functional level while identifying SCM strategy typology based on the same. It also investigates the matched set of initiatives (with consistency and alignment as focus) at the corporate and functional levels that leads to superior performance.

Grosse-Ruyken et al. (2010) highlight the strategic scope of supply chain management and its impact on firm’s performance. For this, the researchers have studied relationship between supply chain fit i.e. ideal strategic consistency between a product’ demand characteristics & supply chain design characteristics and firm’s cost and asset streams i.e. EBIT margin, Sales growth, ROCE & ROA.
While, Sezhiyan, D. & Nambirajan, T. (2011) in their paper on nationwide survey of Indian manufacturing firms, have tested relationship between supply chain strategies and firm performance. The researchers have considered supply effort management, supplier selection and managing logistical capabilities as the three important aspects of supply chain management. So upstream supply chain seems to be the focus of their research.

2.8.1.2 Theme Two - Supply Chain Practices & Its Relationship With Firm Performance

There is a wide range of supply chain practices that generate superior performance as identified by supply chain researchers (Chen & Paulraj 2004). Although the studies differ in terms of the variables considered by the researchers as well as methodologies adopted by them, the empirical evidence suggests a significant positive relationships between discrete SCM practices and performance (Paulraj et al. 2012). For the purpose of this review upstream activities related to supplier performance are not included under this subgroup.

Impact of supplier performance on organizational performance is studied by Vivek, N. & Ravindran, S. (2004) through their empirical study consisting of survey of small scale manufacturers in Coimbatore, India.

Min, S. & Mentzer, J. (2004) develop measurement scales for supply chain orientation (SCO), supply chain management (SCM) and firm’s business performance. They define SCO as an implementation of SCM philosophy. They take into account various facets of supply chain practices under both SCO & SCM constructs. Further, they also consider factors like top management support, commitment, norms, leadership, cooperation and long term relationship while developing the measurement items and propose a structural model that supports nomological validity of SCO - SCM path improving business performance of firms.

Li, Suhong et al. (2006) conceptualize and develop five dimensions of supply chain practice namely strategic supplier partnership, customer relationship, level & quality of information sharing and postponement. Uses qualitative tool like Q-sort method to pre-assess the convergent and discriminant validity of the scales at pilot stage. Researchers test
the relationship between SCM practices, competitive advantage and organizational performance.

Martin, P.R. & Patterson, J.W. (2009) discuss three classes of performance measures to measure supply chain practices viz. inventory, cycle time and financials. Effects of supply chain management practices (organizational structure, partnering, supplier agreements & process improvement) on the selected performance measures are investigated via a survey based study.

Adelkahnali, A. A. & Taghavi, R. (2010) review supply chain quality management aspect and conclude that six TQM factors, i.e. leadership, strategic planning, customer focus, human resource management, process management and supplier management are the most commonly used practices. Relationships among these six practices and organizational performance is tested using a survey based instrument within manufacturing companies in automobile industry located in Iran.

Conceptualization and development of five secondary constructs (use of technology, SC speed, customer satisfaction, SC integration & Inventory management) for supply chain practice is done by Rajwinder Singh et.al. (2010).

The research also identifies four primary competitive advantage constructs and tests relationship among supply chain practices, competitive advantage and organizational performance within non livestock organized retail players in India.


In general this review emphasizes on various supply chain practices and the linkage of the same with organizational performance. It is evident that there is less agreement within researchers as to which dimensions of supply chain should be considered as ‘supply chain practices’ and hence activities ranging from operational level to strategic level are all included under this theme.
2.8.1.3. Theme Three - Integration / Collaboration Within Supply Chain & its Relationship With Firm Performance

Stank, T.P. et al. (2001) develop a conceptual model exploring the relationship between internal & external collaboration and logistical service performance of a firm. The research uses survey method and concludes that internal collaboration mediates between external collaboration and logistical service performance.

Sanders, Nada & Premus, Robert (2005) also investigate the relationship between internal & external collaboration, firm IT capability and firm performance through a survey based study. This research also suggests that information technology is a separate construct which promotes both internal & external collaboration which in turn impact firm performance.

An interactive model that expands on the individual effects model is proposed by Germain, R. & Iyer; Karthik N.S. (2006) while studying the relationship amongst internal integration, downstream integration and firm performance. The researchers have bifurcated firm performance into two categories namely, logistics performance (includes lead times) and financial performance (includes profitability).

Zacharia, Zach et al. (2009) use a structural model to highlight the influence of interdependence of knowledge & process and supply chain partner insight on the level of collaboration. The study also explores the effect of collaboration outcomes and business performance. This research classifies collaboration outcomes under two categories viz. operational outcomes & relational outcomes.

Thus this theme highlight the relationship amongst supply chain collaboration / integration and firm performance. All the reviewed papers have taken a quantitative approach to test the proposed conceptual framework.

2.8.1.4 Theme Four – Other Varied Aspects of Supply Chain And Their Relationship With Firm Performance

The review also indicated literature wherein other aspects of supply chain and its relationship with organizational performance was studied by the researchers. Ellinger et al. (2011) have used Delphi style opinion data from AMR Research’s supply chain top 25 rankings to assess SCM competency along with Altman’s Z-score statistic as a measure of financial success. Similarly, Hofmann, E. & Kotzab, H. (2010) have used secondary data
to explore differences between cash to cash cycle in a single company and from supply chain perspective by analyzing the role of payment terms for working capital management. Further, Crook et al. (2008) have used semi-structured focus group interviews, to understand what exactly constitutes supply chain effectiveness and how it is linked to firm level outcomes. The paper also explores mechanisms which enable supply chain members to collaborate and share knowledge.

Germain, R. et al. (2011), based on survey, develop an empirical model exploring link between relational supplier exchanges, on financial performance amongst hospital sector with hospital responsiveness as moderator. They propose that quality orientation of the hospital and supplier uncertainty associate with relational supplier exchange.

While investigating the role of firm agility as a mediator between supply chain information technologies & supply chain organizational initiatives and firm performance, Vickery, S.K. et al. (2010) examine two competing models. The researchers evaluate three categories of supply chain IT technologies namely, integrated EDI, computerized production systems and integrated information systems whereas supply chain organizational initiatives are categorized as supplier related, operations related and cross functional. The research concludes that impact of supply chain information technologies and supply chain organizational initiatives on agility is through interaction of their complementary components.

Gligor, D.M. & Holcomb, M.C (2012) explore the behavioral / relational antecedents of supply chain agility while empirically establishing a link between supply chain agility and firm performance. The research considers three behavioral / relational elements viz. coordination, co-operation and communication and concludes that co-operation leads to coordination and communication which in turn directly impact supply chain agility.

The above review indicate other aspects of supply chain especially relational / behavioral along with role of information technologies all of which have an equally important impact on organizational performance.

The entire review specifically highlighted a few issues pertaining to relationship between supply chain performance and organizational performance. They are pointed as below

i. Lesser evidence of studies which include behavioral / relational aspects of Supply Chain Management while exploring effect on Organizational Performance
ii. Lesser evidence of research exploring Supply Chain Performance and its relationship with Organizational Performance

iii. Lack of sizeable number of empirical studies in Indian context especially manufacturing sector

This also leads to the current research gaps in supply chain management literature.

i. Lesser evidence of studies which include behavioral / relational aspects of Supply Chain Management while exploring effect on Organizational Performance – The review has underlined clear trends in the current empirical studies exploring the effect of supply chain performance on organizational performance. First and foremost, there is sizeable number of studies linking supply chain strategies with organizational performance. Varied initiatives under upstream and downstream supply chain strategies, supply chain fit as well as consistency between corporate level SCM strategy & functional level SCM strategy have all been empirically tested for their effect on organizational performance.

Further various supply chain initiatives like JIT Purchasing, supplier partnering, supplier development, process management, agility etc. have been included as secondary constructs to arrive at primary construct of supply chain practices. Majority of the reviewed papers fall in this category wherein relationship between these supply chain practices and organizational performance is tested empirically. The same can be said about collaboration / integration within supply chain which have been shown to have impact on organizational performance.

Considering the intra-firm & inter-firm scope of supply chain management, it is imperative that behavioral / relational aspects will also have an important role in overall success of supply chain and consequently on organizational performance. However this fact does not get fully reflected in the reviewed papers. Though a few papers do take in to account such aspects like HRM, co-operation, co-ordination, leadership etc. Most notable amongst them are Min, S. & Mentzer, J. (2004) who cover leadership & co-operation under supply chain management. Similarly, Crook et al. (2008) also cover skills & knowledge as one of the antecedents of supply chain effectiveness. Further, Adelkahnali, A. A. & Taghavi, R. (2010) use TQM philosophy to study relationship between supply chain quality management
practices and its effects on organizational performance and take into account behavioral aspects like leadership and human resource management. Also, most of the papers which have collaboration / integration as a theme also to some extent take these behavioral aspects into account. However this can’t be said for papers whose predominant focus is no supply chain practices and supply chain strategies. In fact as proposed by Waterman et al. (1980) through their 7 S model, apart from strategy and structure, the other soft, informal variables like style, systems, staff, skills and superordinate goals also play an important role in organizational success. Exploring how these variables will impact supply chain management and consequently the organizational performance needs to be studied. This clearly highlights a need for exploring role of behavioral aspects in supply chain management and its impact on organizational performance.

ii. Lesser evidence of research exploring Supply Chain Performance and its relationship with Organizational Performance – Almost all the papers reviewed, try to explore the relationship between various facets of supply chain management with organizational performance. So the underlying assumption is that these supply chain practices / strategies / initiatives must be also be impacting supply chain’s performance. Exception being first, Crook et al. (2008), having established the antecedents of supply chain effectiveness, try to test relationship between supply chain effectiveness and organizational performance through focus group based study. On similar grounds, Ellinger, A.E. et al. (2011), have tested supply chain management competency with Altman’s Z score as an indicator for organizational financial performance. They have used AMR research SCM leadership data as an indicator for supply chain competency. If we consider supply chain’s end to end nature, it will be interesting to explore relationship between supply chain performance and organizational performance.

iii. Lack of sizeable number of empirical studies in Indian context especially manufacturing sector – Out of the 22 papers reviewed, only two papers are based on study in Indian context and only one out of these is pertaining to manufacturing sector. This can be due to many reasons, primary amongst them is that even today in many Indian firms, no single entity / department responsible for supply chain
activities, resulting in supply chain activities getting broken down into separate departments with independent reporting. This in turn harms the professional perception about supply chain management, ultimately resulting in not so holistic view of supply chain management amongst industry professionals and hence non optimal results for the organization. But considering the overall global scenario, it is imperative that Indian firms need to focus on their supply chains and more research of empirical nature validating supply chain role shall be most welcome.

2.9 Research Gap
This review highlights the need of further research especially exploring the link between supply chain performance and organizational performance. More research is also needed to establish the role of behavioral aspects in terms of supply chain management and its impact on organizational performance. There is also need for India specific studies. At the same time, the review highlighted the role of collaboration within supply chain and information technology in overall supply chain management. Further research especially exploration of behavioral and relational variables of supply chain as antecedents to supply chain management and their impact on supply chain performance and organizational performance needs attention.