

# Drivers of Supply Chain Performance Enhancing Organizational Output: An Exploratory Study for Manufacturing Sector

Irum Shahzadi, Saba Amin, Kashif Mahmood Chaudhary\*

President GCUF Toba Tek Singh Group

Department of Business Administration, Government College University Faisalabad, Pakistan

\* Tel: +923016517083, E-mail: [kashifmahmood5970@yahoo.com](mailto:kashifmahmood5970@yahoo.com), [www.km5970.webs.com](http://www.km5970.webs.com)

## Abstract

**Purpose** - The Purpose of this study is to explore the drivers of supply chain performance and give a framework that how organizations can manage these drivers for their survival. This paper is written especially for the students of business management to enhance their knowledge about supply chain practices.

**Methodology** - The paper contains qualitative approach. In first phase the authors reviewed literature about the drivers of supply chain performance. In second phase the data from internationally published articles were collected and suggest a framework to manage the drivers of supply chain performance.

**Findings** - The whole study concluded that there are six drivers of supply chain performance in literature that need to be managed to enhance organizational performance. These drivers are; Facilities, Inventory, Transportation, Information, Sourcing and pricing. These drivers are closely related with each other and have a greater impact on organizational performance. Organizations need to find a situation where both efficiency and responsiveness in supply chain practices are at average level to enhance their performance. This average level can only be achieved through better management of drivers of supply chain performance.

**Paper Limitation** - The paper is limited by the fact that it focuses only manufacturing sector.

**Originality/value** - This paper provides a collective framework for managing all drivers of supply chain performance.

**Keywords** - Drivers of supply chain performance, Efficiency, Responsiveness, Supply chain management, Supply chain performance

**Paper Type** - Research paper

## 1. Introduction

Supply chain management refers to what is at outside the firm to create high values for customers (Lalonde, 1996). Supply chain management includes the activities inside and outside the organization that are done by that particular organization in order to deliver the high values to customers. It means the management of organization must create check and balance on internal and external activities of organization.

To increase organizational efficiency the integration among supply chain activities is very necessary. We can not oppose this concept of integration. Because in the contrast of integration another concept of disintegration is always exist (Mouritsen et al., 2003). Integration means whole activities around the globe of supply chain management must be closely linked with each other. It must always be exist if one activity ends than automatically the next begins with a particular sequence. In the second thought if integration among supply chain activities not exist than their will be disintegration. And in this way of disintegration supply chain management have no meaning for organizations.

Supply chain management includes how a company share information and take action in order to ensure the best flow of product from raw material to end user (Chiappe and Herrero, 1997). Supply chain management is also the distribution of information to verify what sequence of activities an organization adopted to create and deliver high values to its customers. Any organization can not makes its customers loyal until it adopted the smooth flow of raw material to production and final product to end user that delivers product just in time with efficiency.

Synchronized supply is new and emerging phenomenon in business world. Sequenced supply chain activities are much valuable for any organization in enhancing performance and efficiency (Bannett and Kane, 2006). This concept focusing on sequenced activities in supply chain management are required to make products and services on standard. It means it must be well defined and documented that what activity to be performed in what manner and at what time.

In recent days the organizations competes on supply chain management rather than individually. Any organization can get a competitive advantage on another organization through effective and efficient supply chain management (Hassini, 2008). This concept concluded that supply chain management is the basis for all organizational worlds to compete with each others. It shows that there is nothing else but supply chain management on which the organizations can survive.

Any organization's ability to show effective performance always based on successful and effective adoption of supply chain activities with proper sequence and practices. These practices includes information distribution,

facilities management and be objective. And barriers to supply chain management actually increase a firm's performance when a firm competes with those barriers to create linkage between supply chain activities (Richey et al., 2009). If any firm want to perform effectively it must adopt the ways of information distribution, management of facilities such as logistics, transportation and where housing. It also exists in reality that barriers of supply chain management are actually play to increase the organization's performance when it compete with them to create smooth flow among the supply chain activities.

To increase a firm's performance the drivers of supply chain management are much valuable (Soni and Kodali, 2010). Drivers of supply chain performance management are as facilities, logistic management, transportation, inventory management, information distribution, pricing and sourcing. The better management of all these activities leads to increase a firm's performance.

Organizations must follows seven points in their supply chain practices such as integration between supply chain and business strategy, create goals for supply chain, identify the market demands, link with suppliers, link with customers through logistic management, supply chain information distribution system, and adopt cross functional activities (Lummus and Vokourka, 1999). Integration between supply chain strategy and business strategy give birth to effective business operations that lead to increase firm's performance. Create goals for supply chain are just like to creating objectives and after creating objectives be specific to goals. Identification and verification of market demands in creating link with suppliers and customers by information distribution and facilities management will always be the priority for all organizations.

Research in the field of supply chain management give rise to two issues that are research in this field always open for challenge and debate and research not only drive from industrial sector alone (New Stephen, 1997). This is new angle of research in the field of supply chain management. It refers to research in this field is not close ended it must be open ended. We can further explore the different angles in this field. And research must not only be of industrial sector. There are so many other sectors exist in which we can explore and study supply chain management.

Dr. Kevin McCormack and Dr. Archie Lockamy III, indicated following five maturity levels of supply chain management in their research paper. Ad Hoc: in this phase the processes of supply chain management were ill defined. Organizations were using traditional ways at that time. In this situation cost of supply chain management remains high and customer satisfaction low. Defined: processes in this phase were well defined and documented. There was improvement in organizational structure but still remained traditional. Linked: this was the break through level. Managers took strategic decisions. Cross functional teams formed and link between companies to other companies developed. Integrated: in this phase the parties of supply chain management involved in the actual process and advance management practices. Extended: in this phase competition based not among organizations but on mass level and among their supply chain practices. Horizontal integration and customer focus developed.

## **2. Literature Review**

### *2.1 Overview of Past Papers*

The 23 research papers relating to drivers of supply chain management and one book of supply chain management are viewed on the basis of this view points reported as: In this phase we elaborate the previous research on drivers of supply chain management that focused on enhancing the efficiency of the firm and developed frame work for future studies. In the literature, Nazali and Pitt (2009) argued that how new emerging phenomena's can lower the problems in facilities management. The implementation of supply chain management activities is indispensable for the ease of facilities management in service delivery problems. It is a good effort to overcome the gap between demand and supply of facilities management. Supply chain management helps organizations to adopt market position in the competitive environment. Facilities would be effectively managed by strategic planning in supply chain management through faster services and by decreasing costs as facilities management is a driver of supply chain management. Jensen (2011) discussed that facilities management always supports supply chain activities. Core business concept creates value for external customers while facilities management creates value for internal customers with the support of core business. The purpose of long term facilities management is to create strategic relationship between core business needs and provisions of facilities. This paper shows that the concept of core business can only be effective if the relationship between core business concept and facilities management exists that drive supply chain activities with efficiency and effectiveness.

Baker (2007) explored the importance of buffer inventory in international supply chains and told that it is very difficult to eliminate this type of inventory. The proper check and balance on lead time is required. It is not necessary to check whether the inventory good or bad but the necessary is to find whether it is at correct level or not. This was the traditional way of inventory management. In the current scenario the authors used to tell about how inventory reduction strategies, risk management and inventory control functions can be done that can

enhance efficiency of supply chain activities. Stanger et al. (2010) gave frame work about the two key research questions on inventory management practices and performance. Authors explored in this research paper about what happen with perishable inventory in blood supply chain management. And the research paper suggested that the inventory theory is generally correct. But the usability and application of these practices can be challenging in real world. After conclusions six key points evaluated for how managers can enhance the performance of perishable inventory. They need to adopt simple management procedures that boosts up by the experienced staff for enhancing organizational efficiency. Reza Nasiri et al. (2010) suggested an attempt to define how supply chain distribution network leads to location of inventory, allocation of inventory and decision about inventory. Authors in this paper told about how we can use inventory policies for the better management and use of inventory. Inventory policies refer to at what level we demand inventory and how control it. This model consists non-linear mixed programming and solved for the location, allocation module in warehousing and stores. And this paper also investigates performance measures affected by multi-capacity levels. Verwijmeren et al (1996) have analyzed that the increasing customer requirements are a great stimulus for networked and integrated inventories management. High level of competition in the result of emergence of new markets boosts up the customer requirements. Businesses that have the networked and organized system of inventory management in supply chain activities can stand in changing environment of business world. Networked inventory management system is a key concept that can be used to enhance organizational efficiency and performance. Chandra and Kumar (2001) discussed that the taxonomy concept can be explained to inventory management in supply chain using the example of United States textile industry. This research paper explored the strategic importance of inventory management in supply chain practices. The product and process life cycles are analyzed to study inventory management. Authors told about the empowered business entities generalized the inventory models and techniques in business environment. Through this study three generic models evaluated for the inventory management decisions.

Shin et al. (2012) provided framework for route finding mechanism of transportation system in supply chain management. This paper helps to give explanation and full understanding to managers that how they save their supply chain activities from various unusual and unwanted risks. By using this assessment and route finding approach the managers can find the ways from which their unexpected cost become low and also supply chain risks reduced. Transportation is considered to be big problem in the management of supply chain activities. Huq et al. (2010) argued on the different effects of transportation system on the supply chain modeling. The critical factor of this study is how the managers can manage transportation and controls the transportation cost. And also evaluated the important issues of transportation that play in the integrated supply chain management costs. Managers can also analyze from this study that how they can save the supply chain transportation activities from unnecessary insufficiencies and costs. Better management of transportation system can drive supply chain activities with efficiency and effectiveness. Creazza et al. (2010) explored the logistic network in supply chain management. This study develops five suitable logistic networks and at the end suggests one best logistic network for manufacturing business. The five assumptions for networking are as overall demand, demand between suppliers and customers, the supplier geographical dispersion, the product values density and differential labor cost. In this context it is evaluated that the direct shipment with full container load (FCL) is much better to enhance transportation efficiency and to reduce insufficient costs. Ellram and Cooper (1990) have founded the third party relationship in shipping and transportation activities of supply chain management. This paper examines forces that have shaped and organized the relationship between supply chain management and third party partnership. Third party relationship in shipping, transportation, logistics and warehousing boosts up the work efficiency and increase organizational performance. This relationship is beneficial both for manufacturers and for service providers and this relationship also reduce the cost of supply chain activities. Lummus et al. (2001) discussed the relationship of logistics to supply chain management. The authors argued that the terms “supply chain management” and “logistics” are closely linked with each other. This paper shown the activities included in both the concepts and develop hierarchical relationship between these activities. Logistics management includes planning, implementing and controlling the effective flow and storage of goods from supplier to manufacturer and from manufacturer to end customer in order to meet with customer requirement.

Walter (2006) has analyzed the role of information management in supply chain efficiencies. Management information system is an essential part of any organization whether it manufacturing or service organization. This research paper argued that before analyzing the supply chain activities we would needs to check what is demand and perform functions in accordance with demand. And this activity can be performed in better way if the management information system in the organization is well established that enhance organizational efficiency. Karkkainen et al. (2007) provided frame work of information system in supply chain management. The purpose of this paper to explore how and for what the companies use inter-firm information system in supply chain management and how the inter-firm information system work in good manner. The following three

categories of inter-firm information system use for supply chain management as transaction processing, supply chain planning and collaboration, order tracking and delivery co-ordination. Further they explored the drivers of these inter-firm information systems. Better inter-firm information system can reinforce the efficiency of supply chain activities and organizational efficiency. Tibin et al. (2012) proposed the information sharing in supply chain management activities. In supply chain activities, supply information reinforce by demand information makes input of material to be value added process that increased its market value for purchasing, manufacturing and distribution. The final output of supply chain activities can be determined by input of these activities. The paper shows the dynamic impact analysis of supply chain information. They suggested the overall mechanism of information sharing in supply chain co-ordination. Pieter Van Donk (2008) argued upon the challenges in supply chain management and information and communication management. The output of this paper is to define the integration between supply chain management and information and communication technologies and relates it to managerial and organization theories. Managers would needs to implement information and communication technologies in the field of supply chain management for the better output. Information sharing and communication technologies considered to be driver that enhances organizational efficiency in the context of supply chain management. McLaren and Vuong (2008) explored and classified supply chain management information system as a plus point for enhancing organizational efficiencies. This paper explored the supply chain management information using hierarchical rather than traditional flat taxonomies. This paper developed 83 major functional attributes that tells about five top level categories as primary supply chain processes, data management, decision support relationship management and performance improvement. Selection and analysis of supply chain management information system is difficult but a better information system is considered to be driver that drives supply chain activities.

Cox et al. (2007) supported that how an appropriate sourcing strategy can be choose for a business and also includes the interrelationship among firm's sourcing, marketing and branding strategy. Basically this paper was written to explore the sourcing of beef supply chain management in United Kingdom to highlight the need of government agencies. We link these sourcing strategies to other supply chain management decisions. Sourcing means the appropriate inputs for making and delivering goods and services to final customers. Pazireandeh (2011) argued upon the sourcing in global health supply chains for developing countries. The author explored that if we want to find best sourcing strategy we would need to investigate product, organization and country factors. And quality is considered to be a key factor while selecting sourcing strategy. This paper presented a decision making frame work for sourcing strategies. Sourcing in supply chain activities is a key driver that drives the organizational functions in order to achieve organizational efficiencies.

Yong et al. (2012) suggested on the dynamic pricing in supply chain activities. There is an interrelationship exist between price expectation and price fluctuation. The maximum output in form of money can only be generated through supply chain integration. This paper reflects the influence of whole pricing factors on different advantages and on supply chain activities. This paper also suggested upon the price models under E-commerce functions. Pricing function is a way to earn what we deserve from our output. Aramyan and Kuiper (2009) gave frame work and analyzed price transmission in agro-food supply chains. This paper identified three key factors in price fluctuation in agro-food supply chains that are structure of supply chain, factors affecting price transmission and supply response. This paper proposed to empirically investigate how the price can fluctuate in supply chain activities and in what manner we can earn good output price from these activities. Yan and Wang (2010) explored pricing strategy and firm's performance in supply chain management issues. Authors derived service level and pricing strategy by two market structures that are non-coordinative structure and coordinative structure. In order to maximize profit the management and giant retailer must employ coordinative structure. Coordinative structure includes the proper sequencing in supply chain activities and interrelationship among these activities.

Gopal and Thakkar (2012) in the summary of their literature review show data of representation of supply chain management papers year wise and approach wise that are in figure 1 and figure 2 respectively,

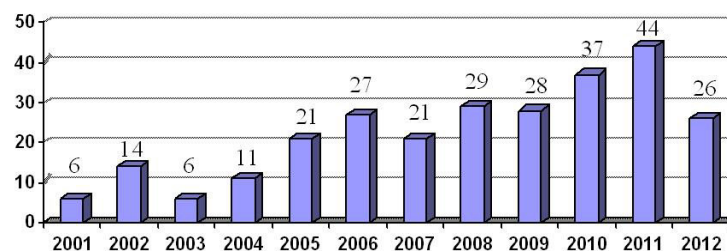


Figure 1, Year wise representation of SCM articles  
Source: Based on Gopal and Thakker (2012)

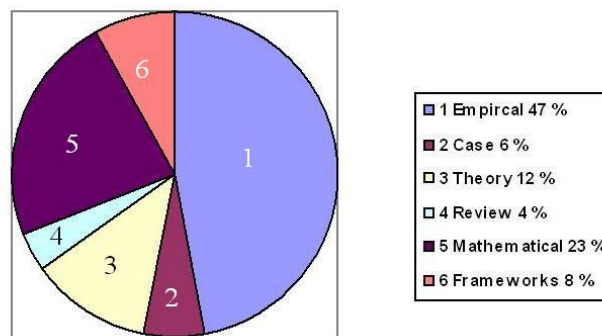


Figure 2, Approach wise representation of SCM articles  
 Source: Based on Gopal and Thakker (2012)

Sunil Chopra and Meindl (2007) mentioned in their book about six drivers of supply chain performance. A company can enhance its responsiveness and efficiency by the good management of six drivers of supply chain performance. They elaborated following six drivers of supply chain performance as facilities, inventory, transportation, information, sourcing and pricing. (a) Facilities mean the actual physical placement of raw material, work in process material and finished goods. For example, warehouses and storerooms are the facilities in supply chain management. (b) Inventory means flow of all material in supply chain activities such as from raw material to finished goods. (c) Transportation means by which medium and route the inventory flow from one place to another place. (d) Information refers to data flow and analysis of data and distribution of this final information among supply chain personnel's. (e) Sourcing means how and by whom different activities of supply chain management to be performed such as manufacturing, storing and transportation. (f) Pricing refers to price setting that how much the company can demand for its products.

### 2.2 Findings of Past Papers

By collecting data from 23 research papers and from 1 book various angles upon supply chain performance evaluated and find out. These all factors tell about the different stories of how any firm's performance and efficiency can be increased and in what manner the existing researchers explored these factors. All these factors can implements the supply chain network in firms with strong financial position and with potential supply chain personnel's. Form above literature review summery we find there six drivers of supply chain performance exists in business world of supply chain management. These six drivers are as facilities, inventory, transportation, information, sourcing and pricing. All the six drivers are interrelated with each other and supports each other in enhancing the firms output.

## 3. Discussion about How Drivers of Supply Chain Performance can be managed

### 3.1 Facilities

Facilities are where a product is being stored, assembled and fabricated. The better management about the role, location, capacity and flexibility of these facilities having a positive affect towards supply chain performance. In facilities management a company proved to be more responsive or more efficient but not at same For example, an auto parts distributor have many warehousing facilities exist near to the customers for providing them quick and better access of products. These many warehousing facilities show responsiveness of distributor but at the same time his efficiency becomes low because he is paying high cost for warehousing. In contrast if he has fewer warehouses exists only at main points than he is more efficient because of low cost of warehouses but his responsiveness is very low (Sunil Chopra and Meindl, 2007)

Shutdown of production and other facilities leads to downsizing in a firm. Managers should carefully consider the eight factors before closure of one site out of a set of two or more having similar activities. These eight factors are as (a) Plant Size, the efficiency of small plants is less than large plants. At small plants the average cost of each unit produced is higher. So, the managers would need to close the plants of small size rather than large size. (b) Site Constraints, this factor is important in number of ways. Extra space is indispensable for vehicles and car parking. Extra space is also helpful for the future modification of production and storage facilities. Managers would decide for closure of less space and high constraints sites. (c) Capacity, this factor is closely related with size of plant or site. It may be occurs the capacity of one site is different from the other. The few activities and small capacity associated with small size plants and sites respectively. Lower and small capacity plants and sites can not survive and managers would close these types of plants and sites. (d) Labor Productivity, managers must check and balance the labor characteristics and productivity regarding each plant. Closure should be given to those plants and sites where the labor productivity is low. (e) Distance from Head

Office, if the production plants or sites are far from firm's head office than the authority of head office top management is limited. They have less information about their subordinates at concerned site. Therefore, if a firm having two plants one near to head office and other far from head office than closure would be given to high distant site. (f) Age of Building or Plant, old age building and plants require high cost of maintenance. So, managers must give closure to those plants or sites where the building or machinery is old and requires high cost for operations. (g) Remoteness, this factor includes transportation cost associated with different production and storage sites and managerial time involved to maintain it. Closure would be given to those sites where these types of activities are considered to be unusual. (h) Grants Elsewhere, this factor includes plant expansion, building rehabilitation and training cost. Grants are given to those site where above three activities could be done. Those sites would subject for closure where the grants for above activities is not helpful for the productivity of company (Kirkham et al., 1998).

If a plant has no formal manufacturing strategy it would be adopted one of these three processes: pattern of action must be choose, improvement in manufacturing process and manufacturing competency (Swamidass et al., 2001).

### 3.2 Inventory

A clothing retailer proved to be more responsible by storing large inventory but efficiency becomes low because of high inventory cost and low work quality (Sunil Chopra and Meindl, 2007).

Perishable inventory can be management in supply chains through following six ways. (a) Hire the experienced staff and give them training, this step includes that human resources planning in any manufacturing firm plays a vital role to hire efficient personnels. Organizations needs to hire experienced personnels and after hiring organizations would give them training for better output in relation to inventory management. (b) Define target stock levels and order patterns, includes that the personnels for inventory management to be well known about the targeted stock levels and must know order patterns of respective organizations. This leads to ensure just in time delivery of inventory. (c) Organize and control transparency of inventories, inventory management personnels must be well known about their inventory in home to forecast about what their next requirement of inventory. (d) Simple inventory procedures, organizations must follow up the simple inventory management procedures. (e) Fresh stock and check and balance on shelf life, this step tell that organizations must keep fresh stock in their inventory and maintain check and balance on the shelf life of inventory. They must use inventory before its expiry. (f) Collaboration with other businesses, organizations must create valuable relations with businesses outside the organization. This step leads to the vertical and forward integration (Stanger et al., 2012)

Vendor-managed inventory (VMI) is efficient in construction sites and also for other manufacturers. Authors apply their methodology on three selected pilot sites and find that the efficiency and responsiveness of vendor managed inventory is higher than that of organization's self managed inventory. Authors argued upon eight key steps that are; time for finding item, receiving and storing item, order v/s recording, rushed orders, hardware store visits, time for invoice handling, total time spent at site and remaining inventory (Tanskanen et al., 2009). The results regarding above eight key points are shown in following figure 3,

	Results
Time for finding items	70 percent less at pilots
Receiving and storing items	Zero at the pilots
Ordering (ref. site) vs recording (pilots)	40 percent longer time in the pilots
Rushed orders	Zero at the pilots vs seven per month at reference site
Hardware store visits	Zero at the pilots vs. four per month at reference site
Time for invoice handling	90 percent less at pilots
Total time spent at site	70 percent less at pilots
Remaining inventory	70 percent less at pilots

Figure 3, Results of Vendor Managed Inventory  
 Source: Based on Tanskanen et al. (2009)

There are following four approaches for inventory. (a) Inventory speculation, means holding inventory with business in accordance with quick delivery of raw material for manufacturing. In this context the advantage is the just in time delivery of inventory but the disadvantage is that the organizations face high cost of holding the inventory and capital investment. (b) Inventory postponement, this approach includes that delay in inventory purchasing. It means organizations using this approach are totally out of cost speculation, free from holding cost and free from large speculative capital investment. But this approach is limited by the fact that quick delivery of raw material is not possible. (c) Inventory consignment, according to this approach inventory physically holds by the manufacturer but ownership still in the hand of supplier. When manufacturer used a part of inventory than he

pays the price of used inventory to supplier. In this way manufacturing firms can use inventory quickly without any investment. This approach has disadvantage that inflation may occur in the price of inventory. (d) Reverse inventory consignment, in this approach inventory is owned by the manufacturer and manufacturer pay price to supplier but physical possession held in the hand of supplier. Whenever manufacturer wants than supplier supply the inventory. This approach decrease the inflation risk and having low cost of holding the inventory. But disadvantage of this approach is the capital investment in inventory. Any organization can adopt one from the above four approaches for inventory management by forecasting these three factors that are; customer demand requirement, nature of supply line and bargaining power of firm relative to the supplier (Wallin et al., 2006). The forecasting of these three factors is indispensable for any manufacturing firm if it wants to adopt one inventory management approach from above four.

### *3.3 Transportation*

By using fast transportation service we can increase responsiveness but efficiency becomes low because of high cost of fast transportation and more chances of damage (Sunil Chopra and Meindl, 2007).

A better transportation approach for manufacturing firms is joint route planning. This concept includes that to enhance efficiency and responsiveness the manufacturing firms must continue their transportation function in collaboration with the firms outside internal environment. Joint route planning can be achieved by two ways that are outsourcing transportation function or horizontal cooperation with other transportation service providers. These two concepts lead to achieve the economies of scale by decreasing the distribution cost. Joint route planning concept save 30.7 percent costs in comparison with traditional transportation system (Cruijssen et al., 2007). Outsourcing means the organizations contracts with third parties to distribute their final product to customers on their own behalf so that the transportation cost of manufacturing firms become low. Horizontal cooperation means the manufacturing firms contracts with the firms of same size and level for collaboration to distribute the products.

In manufacturing firm the performance of transportation activity can be increased by a model of smart transportation management system. This model includes three components that are smart freight, smart vehicle and smart infrastructure. (a) Smart freight, it means instead of using traditional identification of barcodes for individual products the firms must needs to develop and use new technology that identify the whole freight unit. This concept of smart freight can be achieved by developing automatic identification software, integration of organizations and data exchange, decentralize information setup and enabler's technology etc. (b) Smart vehicles, it means the organizations needs to develop special smart vehicles in which management information channel installed. This information system automatically provides information at database about the goods in vehicle loads and unloads. This concept can be managed by developing goods identification system in vehicle and the vehicle system (vehicle management, transportation management and driver management). (c) The smart infrastructure, this concept of smart infrastructure can be achieved by the collaboration of physical infrastructure and digital infrastructure (Stefansson and Lumsden, 2009).

### *3.4 Information*

Information provides customer taste to supplier that leads supplier's responsiveness and efficiency because supplier forecasts customer demand and only supplies required product (Sunil Chopra and Meindl, 2007).

In January 2000, the manager of Swedish post office started a programme to involve their customers in developing new transportation services. At that time company losing their customers and wanted to know about the needs and wants of customers to satisfy them. Company's managers decided to conduct direct meetings with their customers to provide services in accordance with customer demands. This process done through exchange information between company and customers. After knowing the customer demand they started their transportation services and use one vehicle instead of five and pollution problem also reduced that resulting in increase efficiency (Lundkvist and Yakhlef, 2004). This increase in cost efficiency of the firm can only be achieved through direct information sharing between firm and customer.

Continuous conversation with customers plays a vital role in strategy development that resulting in creation a planning team for company. A company can identify its customers or distributor companies for strategic planning input by these four ways. (a) Use 80/20 rule, according to this rule the company must in conversation with those specific top 20 percent customers that generate 80 percent of company income. (b) Choose the companies in different conversation channels. (c) Choose that company that considers your product or service for different applications. (d) Continue with companies that want to continue with you. The conversation in above four steps can be done through following five ways. (a) Marketing department, best way for conversation to identify the customer for strategic planning input. (b) Customer service manager, this conversation channel is good only if their conversational level match with customer level. (c) Sales staff, they considered to be excellent in conversation but it is only for short term purpose. (d) CEO's conversation, a good way but the conversation

not at good time. (e) Outside agencies, working as third parties and valuable for good information distribution to customers (Oleksak, 2005).

Business information system can be developed by these twelve ways. (a) Geographical information system, this information system enables the companies to know about the customer income level, population and lifestyle. (b) Inventory management system, it involves just in time delivery of inventory by exchanging information about the inventory level. (c) Warehouse management system, information sharing about warehouse that how much the stock available for customer and how much required by the customer. (d) Smart chip technology system, this is technology in which smart cards developed to know the customer habits and for tracking the customers. (e) Customer relationship management system, through this step the firms develop such information system through which they know the customer needs and wants and than manufacture to enhance relationship with customers. (f) Supply chain management system, this information system exchanges information among the different stages of supply chain management. (g) Transportation management system, this system provides information about the orders and shipments. (h) Self check out stands, through these systems the cartons scanned and payment to be made without human interactions. (i) Kiosks, these are the system just like the online stores. (j) Electronic commerce system, this system provides the facility of sales electronically. (k) Electronic data interchange system, this system provides easy and quick access of data from business to business. (l) Global information system, this system is useful for those organizations working in many countries through satellites information sharing system (Kadiyala and Kleiner, 2005).

Knowledge creation for the customers is a valuable concept to attract the customers. Organizations can provide knowledge and information to customers by these four steps, Socialization, Externalization, Combination and internalization (Ramirez, 2012). The interrelationship of these four steps is indispensable for distribution of knowledge from customers' needs to the end process of attracting the customers.

### 3.5 Sourcing

When Motorola outsourced its production functions to China manufacturers its efficiency increased but responsiveness became low because of long distances (Sunil Chopra and Meindl, 2007).

Outsourcing has many positive implications for organizations in relation to house functions of organizations (Juma'h and Wood, 2000). These implications are in following figure 4,

Examples	Reduce employment cost	Reduce equipment expenditure	Reduce research and development
Short-term	Wages and salaries	Maintenance and repairs	Access to immediate technology
Long-term	Rights and pensions	Software and Hardware	Solving future problems

Figure 4, Outsourcing implications  
 Source: Juma'h and Wood (2000)

There are four key strategies of outsourcing to be adopted in any firm that are as follows. (a) Focus – Nike and Dell, always adopt the strategy of focusing in corporate resources. For example, Nike started its business in 1960's. By the end of its first decade its sales were just \$ 2 Million. Even with low volume of sales and profits the managers continued to focus primarily on activities and outsource most of production functions. At the start of second decade Nike was core competent in brand building and design. At the end of second decade Nike's sales reached at \$ 700 Million. Nike still adopts this outsourcing strategy that's why it has much share in UK market. (b) Scaling with-out mass – Nokia and Nortel, outsourcing leads organization to exist in market with out expansion in business size. For example, in 2000, when the employees at Nokia were increasing at 1000 per month and approaching 6000, the CEO of Nokia decided to outsource most of its production function to third parties to maintain same high share in market with out expansion in business. (c) Disruptive innovation – IKEA, Canon and Ryanair, disruptive includes setting prices low at starting to attract customers and then increase step wise to show the improvements in business. In this concept firms not only outsource their production functions but also outsource the final assembly to others. For example, IKEA's entry into furniture retailing, Canon into photocopying makes and Ryanair into European airline industry. (d) Strategic repositioning – IBM, for example, IBM's traditional strategy was to provide services tied only to final product that they sold. But IBM adopted innovative strategy of providing consultancy and solutions to problems of customers. In this strategy IBM also



plays as provider of outsourcing services for other manufacturers and companies (Leavy, 2004). Medium clock-speed firms are always benefited from the outsourcing strategies because they can create long term relations with third parties in medium duration that is unachievable by very low or very high clock-speed firms (Perrons and Platts, 2005).

### 3.6 Pricing

If a transportation company charges high and low costs for quick and late delivery respectively than efficiency oriented customers demand quick delivery and responsiveness oriented customers demand late delivery (Sunil Chopra and Meindl, 2007).

There are two approaches of pricing in relevant research paper that are linear pricing approach and strategy matrix pricing approach. Standard linear approach includes following five steps to determine the correct price. (a) Company pricing objective, a company pricing objective is may be profit maximization, sales volume, market share target return on investment level or survival. (b) Pricing policies, a company can choose pricing strategy as skimming pricing, penetration pricing, life cycle pricing, above/at/below competitors or customer value. (c) Develop list price, by using above strategies a price list to be developed. This list can be developed by using cost based, competitive based or demand based methods. (d) Discounts, discounts are to be given on the basis of variation in quantity, season, credit, special sales or allowances for distribution channels to perform services. (e) Adjustments and final pricing, adjustments to be made for different geographical locations. It involves the difference of standard prices and shipping zone prices. After adjustment final prices decide. Strategy matrix pricing approach includes price setting in relation with customer characteristics. In this approach company objectives compare with competitive situation and evaluate alternatives (Duke, 1994). These approaches are in following figure 5,

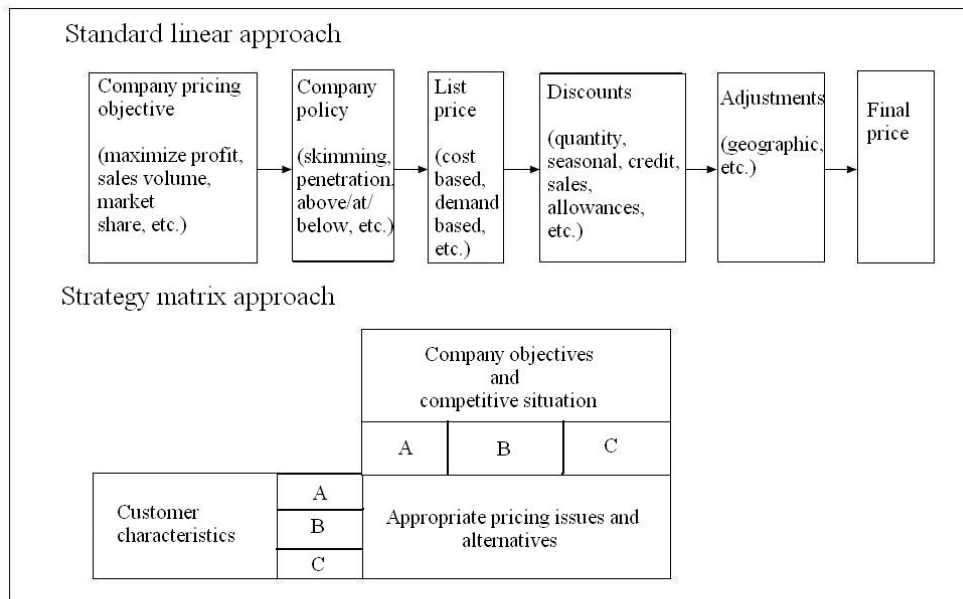


Figure 5,  
 Comparison of Pricing Decision Approaches: Standard Linear Approach versus Strategy Matrix Approach  
 Source: Charles R. Duke (1994)

The Rowley’s solution of pricing policy and pricing methods is as follows. There are following four pricing policies for business world. (a) Pioneer pricing policy, in this policy the organizations evaluate their development cost and their aim of pay back period. It includes price skimming (setting price at high level to capture profit in short term and penetration pricing (setting price at low level to enhance market share). (b) Psychological pricing, in the context of this policy organizations set price on emotional response rather than rational response. It includes odd even pricing (set price as 49.99 rather than 50), customary pricing (the price that customer willing to pay even in ups and downs of market situations) and set price high (to create prestige image as jewelry). (c) Professional pricing, set price at standard weather the customer is willing to pay or not. For example, fee of a doctor or consultant. (d) Promotional pricing, this policy is to be adopted when organizations want to draw customer attention towards a specific product. It includes to options, price leaders (set price near to cost or below and earn revenue from other product) and special event pricing (aims to increase

sales volume and generate operating expense on special event). To calculate the price Rowley also suggested following nine price calculation methods. (a) Cost plus pricing, this is to be used when the production costs are undeterminable. In this way manufacturer forecast the seller's cost and add a percentage of overall production cost to it. (b) Mark up pricing, includes predetermined percentage of cost. (c) Demand oriented pricing, organizations use this method when demand of a product is high. (d) Price differentiation, it includes different price of a same product at different segments or channels. For example, the different price at restaurants and at supermarkets. (e) Geographical pricing, include different prices at different geographical locations. For example, price of a cold-rink is high at airport as compare to a general store. (f) Competition oriented pricing, prices are to be set in relation to competitors. (g) Historical pricing, set today's price in relation with yesterday's price because customers accept prices relating to early prices. (h) Discounts, in this pricing method organizations offer various types of discounts in prices to customers. (i) Bundling, in this method the price of bundle of one product is less than if the customer purchase one unit of same product (Rowley, 1997).

#### 4. Summary and Conclusions

In the modern era of technology firms whether manufacturing or service they are looking forward to increase their efficiencies and performances. Supply Chain Management is one of the major tools that play a vital role in enhancing organizational efficiency in this world of new technology. This research paper is written to explore the factors or drivers included that are indispensable for any organization to increase efficiency in supply chain management. Supply chain management is focusing on management of activities from raw material to final product and end user. It includes the suppliers of raw material, transformational process, final product and the activities of how deliver final product or service to end user.

A company's supply chain needs to achieve balance in efficiency and responsiveness that leads company's competitive strategy (Sunil Chopra and Meindl, 2007). The whole study concluded that there are six drivers of supply chain performance that need to be managed to enhance organizational performance and output. These drivers are; Facilities, Inventory, Transportation, Information, Sourcing and pricing. These drivers are closely related with each other and have a greater impact on organizational performance. Organizations need to find a situation where both efficiency and responsiveness in supply chain practices are at average level to enhance organizational performance and output. This average level can only be achieved through better management of drivers of supply chain performance. High efficiency and maximum responsiveness could never ever to be achieved at same time.

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