INTRODUCTION OF SCM IN CELLULAR INDUSTRY
1. Introduction Supply Chain Management

1.1 SUPPLY CHAIN MANAGEMENT

A supply chain is a network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers. Supply chains exist in both service and manufacturing organizations, although the complexity of the chain may vary greatly from industry to industry and firm to firm.

Traditionally, marketing, distribution, planning, manufacturing, and the purchasing organizations along the supply chain operated independently. These organizations have their own objectives and these are often conflicting. Marketing’s objective of high customer service and maximum sales dollars conflict with manufacturing and distribution goals. Many manufacturing operations are designed to maximize throughput and lower costs with little consideration for the impact on inventory levels and distribution capabilities. Purchasing contracts are often negotiated with very little information beyond historical buying patterns. The result of these factors is that there is not a single, integrated plan for the organization---there were as many plans as businesses. Clearly, there is a need for a mechanism through which these different functions can be integrated together. Supply chain management is a strategy through which such an integration can be achieved.

Supply chain management is typically viewed to lie between fully vertically integrated firms, where the entire material flow is owned by a single firm, and those where each channel member operates independently. Therefore coordination between the various players in the chain is key in its effective management. Cooper and Ellram have compared supply chain management to a well-balanced and well-practiced relay team. Such a team is more competitive when each player knows how to be positioned for the hand-off. The relationships are the strongest between players who directly pass the baton, but the entire team needs to make a coordinated effort to win the race.

1.2 Supply Chain Decisions

Decisions for supply chain management can be classified into two broad categories -- strategic and operational. These are closely linked to the corporate strategy the corporate strategy, and guide supply chain policies from a design perspective. On the other hand, operational decisions are short term, and focus on activities over a day-to-day basis. The effort in these type of decisions is to effectively and efficiently manage the product flow in the "strategically" planned supply chain.

There are four major decision areas in supply chain management: 1) location, 2) production, 3) inventory, and 4) transportation (distribution), and there are both strategic and operational elements in each of these decision areas.
1.2.1 Location Decisions

The geographic placement of facilities, stocking points, and sourcing points is the natural first step in creating a supply chain. The location of facilities involves a commitment of resources to a long-term plan. Once the size, number, and location of these are determined, so are the possible paths by which the product flows through to the final customer. These decisions are of great significance to a firm since they represent the basic strategy for accessing customer markets, and will have a considerable impact on revenue, cost, and level of service. These decisions should be determined by an optimization routine that considers production costs, taxes, duties and duty drawback, tariffs, local content, distribution costs, production limitations, etc. Although location decisions are primarily strategic, they also have implications on an operational level.

1.2.2 Production Decisions

These decisions include what products to produce, and which plants to produce them in, allocation of suppliers to plants,. As before, these decisions have a big impact on the revenues, costs and customer service levels of the firm. These decisions assume the existence of the facilities, but determine the exact path through which a product flows to and from these facilities. Another critical issue is the capacity of the facilities--and this largely depends the degree of vertical integration within the firm. Operational decisions focus on detailed production scheduling. These decisions include the construction of the master production schedules, scheduling production on machines, and equipment maintenance. Other considerations include workload balancing, and quality control measures at a production facility.

1.2.3 Inventory Decisions

These refer to means by which inventories are managed. Inventories exist at every stage of the supply chain. They can also be in-process between locations. Their primary purpose to buffer against any uncertainty that might exist in the supply chain. Since holding of inventories can cost anywhere between 20 to 40 percent of their value, their efficient management is critical in supply chain operations. It is strategic in the sense that top management sets goals. These include deployment strategies control policies --- the determination of the optimal levels of order quantities and reorder points, and setting safety stock levels, at each stocking location. These levels are critical, since they are primary determinants of customer service levels.
1.2.4 Transportation Decisions

The mode choice aspect of these decisions are the more strategic ones. These are closely linked to the inventory decisions, since the best choice of mode is often found by trading-off the cost of using the particular mode of transport with the indirect cost of inventory associated with that mode. While air shipments may be fast, reliable, and warrant lesser safety stocks, they are expensive. Meanwhile shipping by sea or rail may be much cheaper, but they necessitate holding relatively large amounts of inventory to buffer against the inherent uncertainty associated with them. Therefore customer service levels, and geographic location play vital roles in such decisions. Since transportation is more than 30 percent of the logistics costs, operating efficiently makes good economic sense. Shipment sizes, routing and scheduling of equipment are key in effective management of the firm's transport strategy.

1.3 SCM IN TELECOMMUNICATION

In modern telecommunications industry, supply chain management (SCM) needs reliable design and versatile tools to control the material flow. The objective for efficient SCM is reducing inventory, lead times and related costs in order to assure reliable and on-time deliveries from manufacturing units towards customers.

SUPPLY chain management (SCM) is the combination of art and science that goes into improving the way the company finds the raw components it needs to make a product or service and deliver it to customers. A supply chain is a coordinated network of entities that transforms raw goods into finished products. The overarching goal of supply chain management is to produce the right products, in the right quantities, at the right time, at minimal cost. SCM is the process of planning, implementing, and controlling the operations of the supply chain with the purpose to satisfy customer requirements and internal targets as efficiently as possible. SCM in telecommunication industry connects component suppliers, inbound logistics, manufacturing and work-in-process, finished goods and outbound logistics to customers.

1.3.1.1 INBOUND MATERIAL FLOW

Modern telecommunication assembly manufacturing plant is continuously working with 30 to 50 component suppliers and 300 to 400 different components. Component lead times could vary from few hours to several weeks. To minimize component buffers and tied-up capital in supply chain, planning and timing the components availability plays significant role. Through SCM the focus is shifted from monitoring single deliveries to monitoring stock levels.
1.4 SCM Core Components in Telecommunication industry

In today's market environment, achieving operational efficiencies and cost reductions has taken on new importance. There still is a great deal of complexity in the purchasing processes that service providers use. For example, a single purchasing agent within one of the operators may purchase telecom equipment from hundreds of suppliers. It is estimated that telecom products and functional common components are supplied by over 1,000 manufacturers, distributors, and wholesalers.

The supply chain encompasses all the activities associated with moving goods from the raw materials stage through to the end user. The supply chain includes a variety of companies, ranging from firms that process raw materials to firms engaged in retailing and wholesaling products. Functions of these firms include procurement, production scheduling, manufacturing, order processing, inventory management, warehousing, and customer service.

Supply chain management (SCM) enables telecom equipment purchasers in fragmented markets to reduce procurement process inefficiencies. Purchasers can reduce their time-to-market pressures, improve their purchasing processes, and easily access current product specifications and information. Suppliers are able to post updated product data on bulletin boards, cost-effectively access global markets, and streamline their sales, marketing, and distribution channel operations.

1.5 Key Success Factors

A large number of products and services are currently being produced, continually expanding oversupply for many offerings. A gray market for products is becoming quite pervasive as providers unload excessive inventories of cable modems, set-top boxes, digital subscriber line access multiplexers (DSLAMs), servers, routers, and data cabinets. Operators are selling these products to other operators at discounts below current list prices posted by vendors. Gray market sales will have a direct effect on the original manufacturers’ inventories, which are already at record levels. Successful companies will be able to manage inventory levels efficiently as demand changes.

The introduction of new operators and services often requires the new construction of telecom buildings, the refurbishment of non-CO facilities, and substantial re-configuration of existing COs. These facilities are required to house digital switches, transmission systems (copper, fiber-optic, and coax), DSL equipment, Internet protocol (IP) equipment, Web servers, and cable headends. New construction, while tempered by the slowdown, still exerts a positive effect on demand in the functional common core components sector. The investments required for constructing and maintaining the existing plant and infrastructure, as well as superimposing new technologies,
amount to billions every year. Successful vendors will pay close attention to product standards and how to integrate new technologies within the network. Standards have played a key role in increasing the use and acceptance of telecom infrastructure products and core components. Network operators often struggle to implement numerous new infrastructure products with less-than-stable specifications and standards. Vendors also need to understand the true nature of the installed base of equipment. Despite the many advantages of new and improved standardized products, ample quantities of legacy copper, fiber-optic, and coax cables are already buried under cities, laid along highways and railroads, and strung over poles and towers. This infrastructure will continue to be used for decades. More and more equipment suppliers (such as Lucent Technologies, Motorola, Cisco Systems, and Nortel Networks) are outsourcing basic manufacturing to third-party electronic manufacturing suppliers (EMSes). The EMS firms (such as Flextronics International, Sanmina, and C-MAC) now form strategic relationships directly with the network operators and equipment suppliers to coordinate logistics, installations, manufacturing, and e-commerce interactions. The products and services that EMSes offer include:

- Manufacturing;
- Integration of enclosures;
- Power supplies;
- Wire and cable;
- Customer service; and
- Online customer help desks.

In short, many of the EMSes offer services provided previously solely by the equipment suppliers. Leaders in the functional common core component sectors will also be technology innovators. For decades, functional common core components have not been considered high-tech products, at least when compared to next-generation equipment, such as optical switches. Even though such components are crucial, they have tended to be ignored. For example, power plants are traditionally the last items to be ordered by an operator, but the first items needed. Many improvements can still be made for these products in terms of cost, performance, and functionality. Power plants are presently being upgraded to: Provide distributed power for various pieces of equipment and apparatus; Offer monitoring and management functions; and Tolerate rolling blackouts, brownouts, and large voltage swings that can still occur in rural areas.
1.6 Functional Common Core Component

- Revenues
- Integrated Electronic Enclosure Packaging (IEEP)
- Telecommunications Construction
- Wire and Cable
- Power Plants and Systems
- Worldwide Integrated Electronic Equipment Packaging Revenues
- Telecom Construction and Professional Services Revenue
- Telecom Construction
- Professional Services
- Wire and Cable Revenue
- Cable Harnesses
- Insulated Fiber Optics
- Copper Wire
- Coax
- Power Plant Revenue
- Small & Mid-Size Plants
- Large Plants
- AC-DC Converters

1.7 What help does SCM provides

Supply chain management (SCM) controls the supply chain as a process from supplier to manufacturer to wholesaler to retailer to consumer. Supply chain management does not involve only the movement of a physical product (such as a microchip) through the chain but also any data that goes along with the product (such as order status information, payment schedules, and ownership titles) and the actual entities that handle the product from stage to stage of the supply chain.

There are essentially three goals of SCM in telecom sector: to reduce inventory, to increase the speed of transactions with real-time data exchange, and to increase revenue by satisfying customer demands more efficiently.

The major benefits of SCM are:-

- Competitive advantage
- Improved quality of service
1. Introduction Supply Chain Management

- Increase visibility
- Increase bottom line growth
- Better customer service delivery
- Reliability
- Responsiveness
- Consistency
- Flexibility
- Cost Reduction
- Improve operational efficiency
- Better controlling
- Collaboration with business partners
- Efficient resource planning
- Understanding the customers better

1.8 Developments in SCM in different Era’s

Three major movements can be observed in the evolution of supply chain management studies: Creation, Integration, and Globalization.

1.8.1 Creation Era

The term supply chain management was first coined by an American industry consultant in the early 1980s. However the concept of supply chain in management, was of great importance long before in the early 20th century, especially by the creation of the assembly line. The characteristics of this era of supply chain management include the need for large scale changes, reengineering, downsizing driven by cost reduction programs, and widespread attention to the Japanese practice of management.

1.8.2 Integration Era

This era of supply chain management studies was highlighted with the development of Electronic Data Interchange (EDI) systems in the 1960s and developed through the 1990s by the introduction of Enterprise Resource Planning (ERP) systems. This era has continued to develop into the 21st century with the expansion of internet-based collaborative systems. This era of SC evolution is characterized by both increasing value-added and cost reduction through integration.
1.8.3 Globalization Era

In the third movement of supply chain management development globalization era, can be characterized by the attention towards global systems of supplier relations and the expansion of supply chain over national boundaries and into other continents. Although global use of global sources in the supply chain of organizations can be traced back to several decades ago (e.g. the oil industry), it was not until the late 1980s that a considerable number of organizations started to integrate global sources into their core business. This era is characterized by the globalization of supply chain management in organizations with the goal of increasing competitive advantage, creating more value-added and reducing costs through global sourcing.

1.9 Supply Chain Management focus areas in Telecom sector

Supply chain management addresses the following areas.

1.9.1 **Distribution Network Configuration:** Number, location and network missions of suppliers, production facilities, distribution centers, warehouses, cross-docks and customers.

1.9.2 **Distribution Strategy:** Including questions of operating control (centralized, decentralized or shared); delivery scheme (e.g., direct shipment, direct store delivery)

1.9.3 **Information:** Integration of and processes through the supply chain to share valuable information, including demand signals, forecasts, inventory and transportation etc.

1.9.4 **Inventory Management:** Quantity and location of inventory including raw materials, work-in-process and finished goods.

1.9.5 **Cash-Flow:** Arranging the payment terms and the methodologies for exchanging funds across entities within the supply chain.

Supply chain execution is managing and coordinating the movement of materials, information and funds across the supply chain. The flow is bi-directional. Supply chain management is a cross-functional approach to managing the movement of raw materials into an organization, certain aspects of the internal processing of materials into finished goods, and then the movement of finished goods out of the organization toward the end-consumer. As organizations strive to focus on core competencies and becoming more flexible, they have reduced their ownership of raw materials sources and distribution channels. These functions are increasingly being outsourced to
other entities that can perform the activities better or more cost effectively. The effect is to increase the number of organizations involved in satisfying customer demand, while reducing management control of daily logistics operations. Less control and more supply chain partners led to the creation of supply chain management concepts. The purpose of supply chain management is to improve trust and collaboration among supply chain partners, thus improving inventory visibility and improving inventory velocity.

1.10 SCM Levels

Supply chain activities can be grouped into strategic, tactical, and operational levels of activities.

1.10.1 Strategic

Strategic network optimization, including the number, location, and size of warehouses, distribution centers and facilities. Strategic partnership with suppliers, distributors, and customers, creating communication channels for critical information and operational improvements such as, direct shipping, and third-party logistics. Information Technology infrastructure, to support supply chain operations. Where-to-make and what-to-make-or-buy decisions. Aligning overall organizational strategy with supply strategy.

1.10.2 Tactical

Sourcing contracts and other purchasing decisions. Production decisions, including contracting, locations, scheduling, and planning process definition. Inventory decisions, including quantity, location, and quality of inventory. Transportation strategy, including frequency, routes, and contracting.

1.10.3 Operations

Benchmarking of all operations against competitors and implementation of best practices throughout the enterprise. Milestone payments Operational distribution planning, including all nodes in the supply chain. Scheduling for each facility in the supply chain (minute by minute). Demand planning and forecasting, coordinating the demand forecast of all customers and sharing the forecast with all suppliers. Sourcing planning, including current inventory and forecast demand, in collaboration with all suppliers. Inbound operations, including transportation from suppliers and receiving inventory. Outbound operations, including all fulfillment activities and transportation to customers. Order promising, accounting for all constraints in the supply chain, including all suppliers, distribution centers, and other customers.
1.11 Need and Research Objectives

There exist a wide variety of details to evaluate the Supply chain management systems in Organizations w.r.t different criterion e.g. Accuracy, Timeliness, Presentation, Ease of access, Users satisfaction, Business performance metrics, Service quality, Cultural differences, Planning alignment, Service planning & control etc. Further these details have been in place with various points of focus - a mix product / process / organization culture, however no metric gives a composite view of total effectiveness. The survey of the literature which has been given in chapter 2, clearly indicates a gaps in past researches. It further indicate that there is a need to have one integrated output / suggestions that enables the

- Model to achieve business goals
- Identification of weakness / limitations in existing process
- Easy way to facilitate monitoring such that it can be used as a self assessment tool

The details / model should measure the status of effectiveness and give directions for improvements. Keeping in view the inadequacies of the available details, the following research study has been undertaken "Supply Chain Management of Cellular Phone Industry"

1.12 Objectives of the Study

The following research objectives have been defined for the present work.

- To identify and study the process for supply chain management
- To study performance indicators of supply chain in cellular industry
- To study impact of Supply Chain Management on Productivity and efficiency
- To study the factors for minimizing supply chain costs, maximizing outputs.
- To study the various barriers for effective SCM
- To suggest a model of SCM for cellular phone industry

1.13 Scope of the Study

Principal aim was to gather and collate information from the literature and from leading researchers, consultants and practitioners with objective of identifying and delineating the major aspects of supply chain management in both industries. To fill in the evaluation of secondary data, primary data is collected from Hutch & Airtel. Primary data is collected though questionnaire
and personnel interview method. Scope of the study is limited to SCM practices of Airtel & Hutch (Vodafone). Though the proposed models with suggestions are generic in nature, it has been developed keeping the scope of study as the Cellular industry in Delhi and National Capital Region of India. This industry has been chosen because it is one of the major industries of the economy and it has been one of the early adopters of technology.

1.14 Research Methodology

A study has been carried out in the cellular industry in the National Capital Region of India using Questionnaire cum interview approach. Questionnaires have been designed based on the study of the literature and modified based on the discussions held and the testing done with the practitioners. 171 respondents were taken from two Cellular service providers from different functions and managerial levels within and outside the organization. Chi-Square, P value test and correlations techniques have been applied using SPSS package to analyze the gathered responses. These details have been highlighted in chapter 3 and 5.

1.15 Who will get the benefit

The primary beneficiaries of this work would be the business Houses that are investing in this cellular industry SCM with associated expectations of results. The Organizational heads, managers, employees who plan SCM, Suppliers, partners should be able to understand the basic principal of having SCM and use the proposed model to gauge where they stand, what they can do to refine their standing.

Members of SCM Steering committees, Heads of Systems Units, Systems Analysts, System Auditors and consultants will get directions as well as a defined tool for system planning, evaluation, control & improvement.

Academic & researchers will find this work as a milestone towards improved use of SCM. Many issues are resolved and many more raised laying further stones towards removing the technology paradox and achieving a seamless merger of technology and business.