ANALYSIS OF ADVANTAGES OF EFFECTIVE SUPPLY CHAIN MANAGEMENT: A CASE STUDY OF IFAKARA HEALTH INSTITUTE-IHI
ANALYSIS OF ADVANTAGES OF EFFECTIVE SUPPLY CHAIN MANAGEMENT IN PROCUREMENT ACTIVITIES: A CASE STUDY OF IFAKARA HEALTH INSTITUTE-IHI

By
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A Research Dissertation Submitted in Partial Fulfillment of the Requirements for the Award of the Degree of Master of Science in Procurement and Supply Chain Management (MSc-PSCM) of Mzumbe University Dar es Salaam Campus College

2013
CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by the Mzumbe University, a dissertation entitled: Analysis of Advantages of Effective Supply Chain Management: A Case Study of Ifakara Health Institute-IHI, in partial fulfillment of the requirements for award of the degree of Master of Science in Procurement and Supply Chain Management (MSc-PSCM) of Mzumbe University.

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ACKNOWLEDGEMENT

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Secondly, I wish to extend my profound gratitude to the management of Ifakara Health Institute for allowing me to carry out this study. Also, I would like to express my deep sense of gratitude to the staffs working within the Procurement management Unit for their cooperation and disclosing technical inputs to this research.

Lastly, I would like to express my sincere thanks my lovely parents, Mr. and Mrs. Coroneli Serikali, for their encouragement, devotion, love, understanding and support during the whole course of the study.
DEDICATION

I would like to dedicate this work to God Almighty for his care, my brother and his wife Mr and Mrs. Revocatus Serikali, Alex Serikali, Abel Serikali, David Serikali, Kiza Serikali, my beloved brother, the late Sylvester Serikali, and lastly to my ever loving parents, Mr. and Mrs. Coroneli Serikali, for their encouragement, devotion, love, understanding and support they have always been giving me both morally and financially. May the Almighty God, be with you always and reward you million times.
<table>
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<th>Acronym</th>
<th>Full Form</th>
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<td>IHI</td>
<td>Ifakara Health Institute</td>
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<td>PMU</td>
<td>Procurement Management Unit</td>
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<td>SCM</td>
<td>Supply Chain Management</td>
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<td>COSTECH</td>
<td>Commission for Science and Technology</td>
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ABSTRACT

This study focused on analyzing the advantages of effective supply chain management at Ifakara Health Institute in Dar es Salaam, Tanzania.

The purpose of the study is to analyse the possible advantages that can accrue when the Supply chain management is done effectively and efficiently in the daily Procurement activities.

Questionnaires will be used as research instruments in collecting data in order to achieve the intended objectives. From the field work some questionnaires will be distributed for the staff to fill in and present what is currently happening as per their point of views.

The future supply chain presents a far more complex scenario, in which organizations must deal with more issues and greater demands. It deals with both execution and design; is global from both sourcing and marketing; is highly adaptive to changes in both supply and demand; focuses on cost avoidance not just cost savings.

The challenge that exists today is to identify the major changes taking place in Supply Chain Management and address those changes through action agenda items. Such agendas are critical to success as they not only reveal major gaps that require attention, but also assist companies in focusing and directing activities which will close those gaps.

The goal of tomorrow's supply chain is not simply to be efficient, but to be effective. The largely tactical supply chain has reached the upper limits of its performance potential due in part to design constraints and a lack of seamless integration. The new strategic supply chain has yet to tap its potential. It is not simply a tool for reducing cost, but also a tool for increasing sales and generating higher levels of value faster and better than the competition.

The study therefore, looks at the possible ways where organizations can harness the potential and trivial benefits yielded through effective and efficient supply chain management from not only the national eye but also the international scope and view.
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CHAPTER ONE

INTRODUCTION

1.1 Historic Background of Ifakara Health Institute [IHI]
Ifakara Health Institute (IHI) was first established as a field research station of the Swiss Tropical Institute (Basel) in 1956. In 1996 the organization was registered as an independent, non-profit entity in Tanzania. IHI is led and managed by Tanzanians. The name Ifakara Health Institute reflects the historic origins at the town of Ifakara in Kilombero Valley. Over the past fifty years, IHI has expanded its operations to seven sites including Rufiji, Bagamoyo, Dar es Salaam, Kigoma, Mtwara and Dodoma. A sentinel panel of 27 districts in Tanzania mainland makes the institute one of the leading reference points for nationally representative estimates of the performance and impact of health services in Tanzania.

The last decade has witnessed a period of rapid growth. IHI has partnerships with numerous international centers of excellence in health research including local and international universities. In 2008, Dr. Salim Abdulla took over as Director of IHI from Dr. Hassan Mshinda who was appointed by the President of the United Republic of Tanzania to head the Tanzania Commission for Science and Technology (COSTECH). However Dr. Mshinda continues to serve on IHI’s Board of Trustees. [IHI Strategic Plan 2012-2013]

1.2 Background to the Research Problem
IHI is primarily centered on health research activities. There has been massive procurement and logistics of different research gadgets ranging from medicines, laboratory machines and equipment that are all used in different areas of research activities. Some of these gadgets are procured locally [here in Tanzania] and others are procured internationally [outside Tanzania]. This calls for an effective and efficient supplier selection and finally contracting. [IHI Strategic Plan 2012-2013]
The process of looking for suppliers, both locally and internationally is done by a team of Procurement officers [specialists] primarily by comparing the bids offered by all the contacted suppliers. Automatically there has to be a very effective supply chain management within the institute that will ensure the value for money is of paramount importance.

Cases have been happening that suppliers delay in supplying the consignments, the consignment supplied is of low quality or the amount ordered is not exactly as what has been supplied. The Procurement Management Unit [PMU] is being strengthened to exercise their tasks with the uppermost expected efficiency to demolish these vices that bring about a bad image to the organization at large. These phenomena, call for the researcher to come into realization that there is a need of understanding how effectively the supply chain management is being carried out at IHI.

1.3 Vision and Mission of IHI

Vision
To become a model of high quality oriented institute in providing competitive training, best research and services in the country.

Mission
To conduct as many researches as possible, to train and mould young scientists and provide services with regard to core competences aiming at satisfying the market needs/wants in particular, and to contribute to the overall social, political and economic development of the country.

1.4 Contents of the Study
Increasingly, supply chain management is being recognized as the management of key business processes across the network of organizations that comprise the supply chain. While many have recognized the benefits of a process approach to managing the business and the supply chain, most are vague about what processes are to be considered, what sub-processes and activities are contained in each process, and how the processes interact with each other and with the traditional functional silos. Supply
chain management (SCM) is the management of a network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers (Harland, 1996). Supply chain management spans all movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption (supply chain).

Supply chain management is the systematic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole (Mentzer and others, 2001).

1.5 Emerging Challenges
IHI has been facing some challenges on the availability of raw materials and at the right time, and of the right quantity since its sources of supplies is not very effective. Many organization’s “consumables” are locally available, but the problem is timely-availability of the latter. This challenge imposed a big hindrance towards the overall realization of the IHI goals. The researcher cautiously ventured in the arena and came up with relevant reasons as to why and how the phenomena emerged and feasible solution to alleviate the existing saga.

1.6 Statement of the Research Problem
A supply chain is basically a group of organizations connected together through the products and services that they separately/ and or jointly add value on in order to deliver them to end user. Supply Chain Management is the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders. In other words the smooth flow of activities from every partner that is involved in one way or another is of paramount importance since the delay or fault within his area may interrupt the whole flow of items/materials down the consumer.
Recently IHI has been facing the problem of late deliveries, high price of items and sometime poor products due to either poor knowledge on Supply Chain Management or In-effective handling of suppliers. With the help of this research, the findings are expected to be relevant and instrumental towards enhancing the smooth flow of supply chain management. It is highly expected that effective Supply Chain Management would automatically lead to better performance of the any organization as a whole. IHI is capitalizing on the importance of effective supply chain management as the key area to achieving its strategic objectives.

According to the Council of Logistics Management, Supply Chain Management is the oversight of materials, information, and finances as they move in a process from supplier to manufacturer to wholesaler to retailer to consumer. It is the goal to manage flows both between and among companies in the supply chain, whether they are upstream (suppliers) or downstream (consumers). It is plain to see that logistics is only an element of supply chain management. It has fallen to the logistics managers in organizations to manage this aspect of business though. Supply chain management consists of three flows: product flow, information flow and finance flow. Product flow is the physical movement of raw materials, goods-in-process and finished product from supplier to manufacturer to the wholesaler and on to the consumer. Sometimes the flow is reversed with goods being returned as well. Information flow is the shared information within the supply chain garnered from the various systems such as the transport planning systems, warehouse management systems, customer record management, order fulfillment systems and more. Information is shared to ascertain where an order is in the pipeline for the manufacturer. He should be able to see the approximate lead time for his raw materials and be able to plan his production schedules around availability of raw materials as well as consumer demand. At the same time a consumer or a wholesaler can see where his or her order is in the process and when it can be expected.
1.7 Research Questions

1.7.1 General Research Question
What was the advantage of effective supply chain management at IHI?

1.7.2 Specific Research Questions
(i) What were the key players in the SCM Cycle?
(ii) How effective is the SCM Process at IHI?
(iii) What were the challenges facing IHI in carrying out SCM effectively?

1.8 Research Objectives

1.8.1 General Research Objective
The main research objective was to analyze the importance of effective SCM at IHI

1.8.2 Specific Research Objectives
Apart from having the general research objectives, there were also some specific objectives:
(i) To identify the key players in the SCM.
(ii) To identify the effectiveness of the SCM Processes at IHI
(iii) To identify challenges those are facing IHI in implementing SCM effectively.

1.9 Significance of the Study
The research conducted at IHI had a number of advantages not only to the researcher but also to different area and fields of education.

(i) To the Researcher
The research was very important to the researcher since it was used as a partial fulfillment of his Masters Degree in Procurement and Supplies Chain Management offered by Mzumbe University Dar Es Salaam Campus.
(ii) **To the Organization**

The research is also very important to the organization that is the researcher’s case study since it will help the organization identify the importance of carrying out effective supply chain management and to point out the possible challenges the organization is facing and spotting out also the feasible solutions to combat the challenges.

(iii) **To the Board of Knowledge**

The research came up with some new ideas on how to deal with different situations in the organizations and by so doing so has added some new insights in the school of Knowledge whereby new findings were discovered and new solutions suggested. Other researchers also will gain advantage of referencing from the research and possibly capitalize on what has not been covered by the researcher.

1.10 **Scope of the Study**

IHI has a number of branches in Tanzania. Though it was rooted in Morogoro [Ifakara] it had spread in many regions in Tanzania including Dar es Salaam, Pwani [Bagamoyo and Rufiji] Kigoma, Dodoma, Mwanza and Zanzibar. In this case the research covered all the stations of IHI in Tanzania.

1.11 **Limitations of the Study**

The researcher has the budget and the timeframe set for conducting his research, but the following were the obstacles towards reaching his predetermined objectives.

The amount of financial assistance allocated for the researcher was not enough since some other times there may be needed some printing and stationery activities, transport expenses and even the personal accommodation expenses.

Lack of accessibility to key information was another factor impeding the proper collection of data. Not all data or information was gathered easily within IHI. Some information was being treated with the highest degree of confidentiality. This was also a problem towards the proper research data collection process.
There was also a poor response from the respondents when asked questions or in filling in the questionnaires. The researcher did not expect all respondents to respond positively towards some questions directed to them since were illiterate of the importance of the research and in that case some gave wrong information and others were reluctant to give the truth on any matter under question.

1.12 Delimitation
The research constraints stipulated above are the common phenomena in the research arena. A solution to them is of quick need since they impose a big hindrance towards the proper flow of research activities.

**Adherence to Budget limits:** A researcher tried his level best to work within the budget limits in order to avoid the issue of either running the shortage of money or overspending.

**Encourage Cooperation:** For the researcher to have worked smoothly, cooperation between the IHI staff and the researcher was of a paramount importance. Mutual cooperation would enhance the flow of information up and down. In this case the researcher would be in a position of gathering more data and relevant information from the staff.

**Time Management Concept:** For a researcher to do away with running out of time, he had always to be on time in conducting his research activities in such a way that he started on time and finished on time. All the critical activities were given more importance without neglecting other activities.

**Education to the respondents before the research activities:** The researcher educated the respondents and all other responsible for the research before gearing into the game. This helped the respondents to understand and value the importance of the research hence gave the best out of them to facilitate the exercise.
CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction
This chapter reviewed the both theoretical and empirical literature related to Supply Chain Management as per different authors and researchers. To observe how far they have covered the topic, and their overall contribution to the school of thought. The objective here was to enrich the understanding of Supply Chain Management, its challenges and ultimate advantages that could be gained if effectively carried out.

2.2 Definitions of Supply Chain Management
Supply Chain Management (SCM) is the management of a network of interconnected businesses involved in the ultimate provision of product and Service packages required by end customers (Harland, 1996). Supply chain management spans all movement and storage of raw materials, work-in-process inventory and finished goods from point of origin to point of consumption (supply chain).

Within the organization, the supply chain refers to a wide range of functional areas. These include Supply Chain Management-related activities such as inbound and outbound transportation, warehousing, and inventory control. Sourcing, procurement, and supply management fall under the supply-chain umbrella, too. Forecasting, production planning and scheduling, order processing, and customer service all are part of the process as well. Importantly, it also embodies the information systems so necessary to monitor all of these activities. Simply stated, "the supply chain encompasses all of those activities associated with moving goods from the raw-materials stage through to the end user."

The Global Supply Chain Forum defines the Supply Chain Management as the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders.
Supply Chain Management Cycle is the strategic management of activities involved in the acquisition and conversion of materials to finished products delivered to the customer.

Supply chain is the system by which organizations source, make and deliver their products or services according to market demand. Supply chain management operations and decisions are ultimately triggered by demand signals at the ultimate consumer level. Supply chain as defined by experienced practitioners extends from suppliers’ suppliers to customers’ customers. [Essentials of Supply Chain Management, 2006]

There is a basic pattern to the practice of supply chain management. Each supply chain has its own unique set of market demands and operating challenges and yet the issues remain essentially the same in every case. Companies in any supply chain must make decisions individually and collectively regarding their actions in five areas:

(i) **Production**: What products does the market want? How much of which products should be produced and by when? This activity includes the creation of master production schedules that take into account plant capacities, workload balancing, quality control, and equipment maintenance.

(ii) **Inventory**: What inventory should be stocked at each stage in a supply chain? How much inventory should be held as raw materials, semi-finished, or finished goods? The primary purpose of inventory is to act as a buffer against uncertainty in the supply chain. However, holding inventory can be expensive, so what are the optimal inventory levels and reorder points?

(iii) **Location**: Where should facilities for production and inventory storage be located? Where are the most cost efficient locations for production and for storage of inventory? Should existing facilities be used or new ones built?
Once these decisions are made they determine the possible paths available for product to flow through for delivery to the final consumer.

(iv)  **Transportation:** *How* should inventory be moved from one supply chain location to another? Air freight and truck delivery are generally fast and reliable but they are expensive. Shipping by sea or rail is much less expensive but usually involves longer transit times and more uncertainty. This uncertainty must be compensated for by stocking higher levels of inventory. When is it better to use which mode of transportation?

(v)  **Information:** How much data should be collected and how much information should be shared? Timely and accurate information holds the promise of better coordination and better decision making. With good information, people can make effective decisions about what to produce and how much, about where to locate inventory and how best to transport it.

The sum of these decisions will define the capabilities and effectiveness of a company’s supply chain. The things a company can do and the ways that it can compete in its markets are all very much dependent on the effectiveness of its supply chain. If a company’s strategy is to serve a mass market and compete on the basis of price, it had better have a supply chain that is optimized for low cost. If a company’s strategy is to serve a market segment and compete on the basis of customer service and convenience, it had better have a supply chain optimized for responsiveness. Who a company is and what it can do is shaped by its supply chain and by the markets it serves. [Essentials of Supply Chain Management, 2006]
Efficient supply chain management must result in tangible business improvements. It is characterized by a sharp focus on

(i) Revenue growth
(ii) Better asset utilization
(iii) Cost reduction.

As seen previously, there are five areas where companies can make decisions that will define their supply chain capabilities: Production, Inventory, Location, Transportation and Information. Chopra and Meindl define these areas as performance drivers that can be managed to produce the capabilities needed for a given supply chain.

Effective supply chain management calls first for an understanding of each driver and how it operates. Each driver has the ability to directly affect the supply chain and enable certain capabilities. The next step is to develop an appreciation for the results that can be obtained by mixing different combinations of these drivers. Let’s start by looking at the drivers individually. [Essentials of Supply Chain Management, 2006]

**Production**

Production refers to the capacity of a supply chain to make and store products. The facilities of production are factories and warehouses. The fundamental decision that managers face when making production decisions is how to resolve the trade-off between responsiveness and efficiency. If factories and warehouses are built with a lot of excess capacity, they can be very flexible and respond quickly to wide swings in product demand. Facilities where all or almost all capacity is being used are not capable of responding easily to fluctuations in demand. On the other hand, capacity costs money and excess capacity is idle capacity not in use and not generating revenue. So the more excess capacity that exists, the less efficient the operation becomes. [Essentials of Supply Chain Management, 2006]
Factories can be built to accommodate one of two approaches to manufacturing:

(i) **Product Focus**—A factory that takes a product focus performs the range of different operations required to make a given product line from fabrication of different product parts to assembly of these parts.

(ii) **Functional Focus**—A functional approach concentrates on performing just a few operations such as only making a select group of parts or only doing assembly. These functions can be applied to making many different kinds of products.

A product approach tends to result in developing expertise about a given set of products at the expense of expertise about any particular function. A functional approach results in expertise about particular functions instead of expertise in a given product. Companies need to decide which approach or what mix of these two approaches will give them the capability and expertise they need to best respond to customer demands. [Vivek Sehgal and Chris Barnes, Supply Chain Management, Atlanta, GA on April 17, 2012.]

As with factories, warehouses too can be built to accommodate different approaches. There are three main approaches to use in warehousing:

(i) **Stock Keeping Unit (SKU) Storage**—In this traditional approach, all of a given type of product is stored together. This is an efficient and easy to understand way to store products.

(ii) **Job Lot Storage**—In this approach, all the different products related to the needs of a certain type of customer or related to the needs of a particular job are stored together. This allows for an efficient picking and packing operation but usually requires more storage space than the traditional SKU storage approach.
(iii) **Cross-docking**—An approach that was pioneered by Wal-Mart in its drive to increase efficiencies in its supply chain. In this approach, product is not actually warehoused in the facility. Instead the facility is used to house a process where trucks from suppliers arrive and unload large quantities of different products. These large lots are then broken down into smaller lots. Smaller lots of different products are recombined according to the needs of the day and quickly loaded onto outbound trucks that deliver the products to their final destination.

**Inventory**

Inventory is spread throughout the supply chain and includes everything from raw material to work in process to finished goods that are held by the manufacturers, distributors, and retailers in a supply chain. Again, managers must decide where they want to position themselves in the trade-off between responsiveness and efficiency. Holding large amounts of inventory allows a company or an entire supply chain to be very responsive to fluctuations in customer demand. However, the creation and storage of inventory is a cost and to achieve high levels of efficiency, the cost of inventory should be kept as low as possible. [Vivek Sehgal and Chris Barnes, Supply Chain Management, Atlanta, GA on April 17, 2012.]

**There are three basic decisions to make regarding the creation and holding of inventory:**

(i) **Cycle Inventory**—This is the amount of inventory needed to satisfy demand for the product in the period between purchases of the product. Companies tend to produce and purchase in large lots in order to gain the advantages that economies of scale can bring. However, with large lots also come increased carrying costs. Carrying costs come from the cost to store, handle, and insure the inventory. Managers face the trade-off between the reduced cost of ordering and better prices offered by purchasing product in large lots and the increased carrying cost of the cycle inventory that comes with purchasing in large lots. [Essentials of Supply Chain Management, 2006]
(ii) **Safety Inventory**—Inventory that is held as a buffer against uncertainty. If demand forecasting could be done with perfect accuracy, then the only inventory that would be needed would be cycle inventory. But since every forecast has some degree of uncertainty in it, we cover that uncertainty to a greater or lesser degree by holding additional inventory in case demand is suddenly greater than anticipated. The trade-off here is to weigh the costs of carrying extra inventory against the costs of losing sales due to insufficient inventory.

(iii) **Seasonal Inventory**—This is inventory that is built up in anticipation of predictable increases in demand that occur at certain times of the year. For example, it is predictable that demand for antifreeze will increase in the winter. If a company that makes antifreeze has a fixed production rate that is expensive to change, then it will try to manufacture product at a steady rate all year long and build up inventory during periods of low demand to cover for periods of high demand that will exceed its production rate. The alternative to building up seasonal inventory is to invest in flexible manufacturing facilities that can quickly change their rate of production of different products to respond to increases in demand. In this case, the trade-off is between the cost of carrying seasonal inventory and the cost of having more flexible production capabilities.

**Location**

Location refers to the geographical sitting of supply chain facilities. It also includes the decisions related to which activities should be performed in each facility. The responsiveness versus efficiency trade-off here is the decision whether to centralize activities in fewer locations to gain economies of scale and efficiency, or to decentralize activities in many locations close to customers and suppliers in order for operations to be more responsive. [Essentials of Supply Chain Management, 2006]

When making location decisions, managers need to consider a range of factors that relate to a given location including the cost of facilities, the cost of labor, skills
available in the workforce, infrastructure conditions, taxes and tariffs, and proximity to suppliers and customers. Location decisions tend to be very strategic decisions because they commit large amounts of money to long-term plans. Location decisions have strong impacts on the cost and performance characteristics of a supply chain. Once the size, number, and location of facilities is determined, that also defines the number of possible paths through which products can flow on the way to the final customer. Location decisions reflect a company’s basic strategy for building and delivering its products to market. [Essentials of Supply Chain Management, 2006]

**Transportation**
This refers to the movement of everything from raw material to finished goods between different facilities in a supply chain. In transportation the trade-off between responsiveness and efficiency is manifested in the choice of transport mode. Fast modes of transport such as airplanes are very responsive but also more costly. Slower modes such as ship and rail are very cost efficient but not as responsive. Since transportation costs can be as much as a third of the operating cost of a supply chain, decisions made here are very important. [Essentials of Supply Chain Management, 2006]

There are six basic modes of transport that a company can choose from:

(i) **Ship** which is very cost efficient but also the slowest mode of transport. It is limited to use between locations that are situated next to navigable waterways and facilities such as harbors and canals.

(ii) **Rail** which is also very cost efficient but can be slow. This mode is also restricted to use between locations that are served by rail lines.

(iii) **Pipelines** can be very efficient but are restricted to commodities that are liquids or gases such as water, oil, and natural gas.

(iv) **Trucks** are a relatively quick and very flexible mode of transport. Trucks can go almost anywhere. The cost of this mode is prone to fluctuations though, as the cost of fuel fluctuates and the condition of roads varies.
Airplanes are a very fast mode of transport and are very responsive. This is also the most expensive mode and it is somewhat limited by the availability of appropriate airport facilities.

Electronic Transport is the fastest mode of transport and it is very flexible and cost efficient. However, it can only be used for movement of certain types of products such as electric energy, data, and products composed of data such as music, pictures, and text. Someday technology that allows us to convert matter to energy and back to matter again may completely rewrite the theory and practice of supply chain management.

Given these different modes of transportation and the location of the facilities in a supply chain, managers need to design routes and networks for moving products. A route is the path through which products move and networks are composed of the collection of the paths and facilities connected by those paths. As a general rule, the higher the value of a product (such as electronic components or pharmaceuticals), the more its transport network should emphasize responsiveness and the lower the value of a product (such as bulk commodities like grain or lumber), the more its network should emphasize efficiency. [Essentials of Supply Chain Management, 2006]

Information

Information is the basis upon which to make decisions regarding the other four supply chain drivers. It is the connection between all of the 15 activities and operations in a supply chain. To the extent that this connection is a strong one (i.e., the data is accurate, timely, and complete), the companies in a supply chain will each be able to make good decisions for their own operations. This will also tend to maximize the profitability of the supply chain as a whole. That is the way that stock markets or other free markets work and supply chains has many of the same dynamics as markets. [Muckstadt, J.A, Murray, D.H, Guidelines for Collaborative Supply Chain System Design and Operation, Information Systems Frontiers, 2001]
Information is used for two purposes in any supply chain:

(i) **Coordinating Daily Activities** related to the functioning of the other four supply chain drivers: production; inventory; location; and transportation. The companies in a supply chain use available data on product supply and demand to decide on weekly production schedules, inventory levels, transportation routes, and stocking locations.

(ii) **Forecasting and Planning** to anticipate and meet future demands. Available information is used to make tactical forecasts to guide the setting of monthly and quarterly production schedules and timetables. Information is also used for strategic forecasts to guide decisions about whether to build new facilities, enter a new market, or exit an existing market.

Within an individual company the trade-off between responsiveness and efficiency involves weighing the benefits that good information can provide against the cost of acquiring that information. Abundant, accurate information can enable very efficient operating decisions and better forecasts but the cost of building and installing systems to deliver this information can be very high. [Muckstadt, J.A, Murray, D.H, Guidelines for Collaborative Supply Chain System Design and Operation, Information Systems Frontiers, 2001]

Within the supply chain as a whole, the responsiveness versus efficiency trade-off that companies make is one of deciding how much information to share with the other companies and how much information to keep private. The more information about product supply, customer demand, market forecasts, and production schedules that companies share with each other, the more responsive everyone can be. Balancing this openness however, are the concerns that each company has about revealing information that could be used against it by a competitor. The potential costs associated with increased competition can hurt the profitability of a company. [Muckstadt, J.A, Murray, D.H, Guidelines for Collaborative Supply Chain System Design and Operation, Information Systems Frontiers, 2001]
2.3 Objectives of Supply Chain Management

The fundamental objective is to add value. That brings us to the example of the fish fingers. During the Supply Chain Management '98 conference in the United Kingdom this fall, a participant in a supply chain management seminar said that total time from fishing dock through manufacturing, distribution, and final sale of frozen fish fingers for his European grocery-products company was 150 days. Manufacturing took a mere 43 minutes. That suggests an enormous target for supply chain managers. During all that time, company capital is almost literally in this case—frozen. What is true for fish fingers is true of most products. Examine any extended supply chain, and it is likely to be a long one. James Morehouse, a vice president of consulting firm A.T. Kearney, reports that the total cycle time for corn flakes, for example, is close to a year and that the cycle times in the pharmaceutical industry average 465 days. In fact, Morehouse argues that if the supply chain, of what he calls an "extended enterprise," is encompassing everything from initial supplier to final customer fulfilment, could be cut to 30 days, that would provide not only more inventory turns, but fresher product, an ability to customise better, and improved customer responsiveness. "All that add value," he says. And it provides a clear competitive advantage.

Supply Chain Management becomes a tool to help accomplish corporate strategic objectives:

(i) Reducing working capital,
(ii) Taking assets off the balance sheet,
(iii) Accelerating cash-to-cash cycles,
(iv) Increasing inventory turns, and so on.

2.4 Supply Chain Principles, Methodology & Solutions

Supply-Chain Principles

If supply-chain management has become top management's new "religion," then it needs a doctrine. There are important principles that have to be adhered to in Supply Chain Principles and Methodology.
The seven supply chain principles are as follows:

(i) **Segment customers based on service needs**
Companies traditionally have grouped customers by industry, product, or trade channel and then provided the same level of service to everyone within a segment. Effective supply-chain management, by contrast, groups customers by distinct service needs—regardless of industry—and then tailors services to those particular segments. [Supply Chain Management, Innoregio project, S. Zygiaris, 2000]

(ii) **Customize the Supply Chain Management network**
In designing their Supply Chain Management network, companies need to focus intensely on the service requirements and profitability of the customer segments identified. The conventional approach of creating a "monolithic" Supply Chain Management network runs counter to successful supply-chain management. [Supply Chain Management, Innoregio project, S. Zygiaris, 2000]

(iii) **Listen to signals of market demand and plan accordingly**
Sales and operations planning must span the entire chain to detect early warning signals of changing demand in ordering patterns, customer promotions, and so forth. This demand-intensive approach leads to more consistent forecasts and optimal resource allocation. [Supply Chain Management, Innoregio project, S. Zygiaris, 2000]

(iv) **Differentiate product closer to the customer**
Companies today no longer can afford to stockpile inventory to compensate for possible forecasting errors. Instead, they need to postpone product differentiation in the manufacturing process closer to actual consumer demand.

(v) **Strategically manage the sources of supply**
By working closely with their key suppliers to reduce the overall costs of owning materials and services, supply-chain management leaders enhance margins both for
themselves and their suppliers. Beating multiple suppliers over the head for the lowest price is out, Andersen advises. "Gain sharing" is in.

(vi) Develop a supply-chain-wide technology strategy
As one of the cornerstones of successful supply-chain management, information technology must support multiple levels of decision making. It also should afford a clear view of the flow of products, services, and information.

(vii) Adopt channel-spanning performance measures.
Excellent supply-chain measurement systems do more than just monitor internal functions. They adopt measures that apply to every link in the supply chain. Importantly, these measurement systems embrace both service and financial metrics, such as each account's true profitability. The principles are not easy to implement, the Andersen consultants say, because they run counter to ingrained functionally oriented thinking about how companies organize, operate, and serve customers. The organizations that do persevere and build a successful supply chain have proved convincingly that you can please customers and enjoy growth by doing so. [Supply Chain Management, Innoregio project, S. Zygiaris, 2000]

The best supply-chain management common characteristics
For one, they focus intensely on actual customer demand. Instead of forcing into the market product that may or may not sell quickly (and thereby inviting high warehousing costs), they react to actual customer demand. And by doing so, these supply-chain leaders minimize the flow of raw materials, finished product, and packaging materials at every point in the pipeline.

To respond more accurately to actual customer demand and keep inventory to a minimum, leading companies have adopted a number of speed-to-market management techniques. The names by now have become part of the Supply Chain Management vernacular JIT manufacturing and distribution, quick response, efficient consumer response, vendor managed inventory, and more. These are the tools that help build a comprehensive supply-chain structure.
Participants in the Supply Chain Cycle

In its simplest form, a supply chain is composed of a company and the suppliers and customers of that company. This is the basic group of participants who create a simple supply chain. Extended supply chains contain three additional types of participants. First there is the supplier’s supplier or the ultimate supplier at the beginning of an extended supply chain. Then there is the customer’s customer or ultimate customer at the end of an extended supply chain. Finally there is a whole category of companies who are service providers to other companies in the supply chain. These are companies who supply services in logistics, finance, marketing, and information technology. [Mentzel and others, 2001]

In any given supply chain there is some combination of companies who perform different functions. There are companies who are producers, distributors or wholesalers, retailers, and companies or individuals who are the customers, the final consumers of a product. Supporting these companies there will be other companies that are service providers that provide a range of needed services.

(i) Producers

Producers or manufacturers are organizations that make a product. This includes companies that are producers of raw materials and companies that are producers of finished goods. Producers of raw materials are organizations that mine for minerals, drill for oil and gas, and cut timber. It also includes organizations that farm the land, raise animals, or catch seafood. Producers of finished goods use the raw materials and subassemblies made by other producers to create their products.

Producers can create products that are intangible items such as music, entertainment, software or designs. A product can also be a service such as mowing a lawn, cleaning an office, performing surgery, or teaching a skill. In many instances the producers of tangible, industrial products are moving to areas of the world where labor is less costly. Producers in the developed world of North America, Europe, and parts of Asia are increasingly producers of intangible items and services. [Mentzel and others, 2001]
(ii) Distributors

Distributors are companies that take inventory in bulk from producers and deliver a bundle of related product lines to customers. Distributors are also known as wholesalers. They typically sell to other businesses and they sell products in larger quantities than an individual consumer would usually buy. Distributors buffer the producers from fluctuations in product demand by stocking inventory and doing much of the sales work to find and service customers. For the customer, distributors fulfill the “Time and Place” function—they deliver products when and where the customer wants them.

A distributor is typically an organization that takes ownership of significant inventories of products that they buy from producers and sell to consumers. In addition to product promotion and sales, other functions the distributor performs are inventory management, warehouse operations, and product transportation as well as customer support and post-sales service. A distributor can also be an organization that only brokers a product between the producer and the customer and never takes ownership of that product. This kind of distributor performs mainly the functions of product promotion and sales. In both these cases, as the needs of customers evolve and the range of available products changes, the distributor is the agent that continually tracks customer needs and matches them with products available. [Mentzel and others, 2001]

(iii) Retailers

Retailers stock inventory and sell in smaller quantities to the general public. This organization also closely tracks the preferences and demands of the customers that it sells to. It advertises to its customers and often uses some combination of price, product selection, service, and convenience as the primary draw to attract customers for the products it sells. Discount department stores attract customers using price and wide product selection. Upscale specialty stores offer a unique line of products and high levels of service. Fast food restaurants use convenience and low prices as their draw. [Mentzel and others, 2001]
(iv) Customers
Customers or consumers are any organization that purchases and uses a product. A customer organization may purchase a product in order to incorporate it into another product that they in turn sell to other customers. Or a customer may be the final end user of a product who buys the product in order to consume it.

(v) Service Providers
These are organizations that provide services to producers, distributors, retailers, and customers. Service providers have developed special expertise and skills that focus on a particular activity needed by a supply chain. Because of this, they are able to perform these services more effectively and at a better price than producers, distributors, retailers, or consumers could do on their own.

Some common service providers in any supply chain are providers of transportation services and warehousing services. These are trucking companies and public warehouse companies and they are known as logistics providers. Financial service providers deliver services such as making loans, doing credit analysis, and collecting on past due invoices. These are banks, credit rating companies, and collection agencies. Some service providers deliver market research and advertising, while others provide product design, engineering services, legal services, and management advice. Still other service providers offer information technology and data collection services. All these service providers are integrated to a greater or lesser degree into the ongoing operations of the producers, distributors, retailers, and consumers in the supply chain. [Mentzel and others, 2001]

Supply chains are composed of repeating sets of participants that fall into one or more of these categories. Over time the needs of the supply chain as a whole remain fairly stable. What changes is the mix of participants in the supply chain and the roles that each participant plays. In some supply chains, there are few service providers because the other participants perform these services on their own. In other supply chains very efficient providers of specialized services have evolved and the
other participants outsource work to these service providers instead of doing it themselves. [Mentzel and others, 2001]

2.5 Aligning the Supply Chain with Business Strategy

A company’s supply chain is an integral part of its approach to the markets it serves. The supply chain needs to respond to market requirements and do so in a way that supports the company’s business strategy. The business strategy a company employs starts with the needs of the customers that the company serves or will serve. Depending on the needs of its customers, a company’s supply chain must deliver the appropriate mix of responsiveness and efficiency. A company whose supply chain allows it to more efficiently meet the needs of its customers will gain market share at the expense of other companies in that market and also will be more profitable.

There are three steps to use in aligning your supply chain with your business strategy. The first step is to understand the markets that your company serves. The second step is to define the strengths or core competencies of your company and the role the company can or could play in serving its markets. The last step is to develop the needed supply chain capabilities to support the roles your company has chosen.

(i) Understanding of the Markets the Company Serves

Begin by asking questions about your customers. What kind of customer does your company serve? What kind of customer does your customer sell to? What kind of supply chain is your company a part of? The answers to these questions will tell you what supply chains your company serves and whether your supply chain needs to emphasize responsiveness or efficiency. Chopra and Meindl have defined the following attributes that help to clarify requirements for the customers you serve. These attributes are: [Chopra and Meindl 2007]

(a) The Quantity of the Product Needed in Each Lot—Do your customers want small amounts of products or will they buy large quantities? A customer at a convenience store or a drug store buys in small quantities. A customer of a discount warehouse club, such as Sam’s Club, buys in large quantities.

(b) The Response Time That Customers Are Willing to Tolerate—Do your customers buy on short notice and expect quick service or is a longer lead
time acceptable? Customers of a fast food restaurant certainly buy on short notice and expect quick service. Customers buying custom machinery would plan the purchase in advance and expect some lead time before the product could be delivered.

(c) *The Variety of Products needed*—are customers looking for a narrow and well-defined bundle of products or are they looking for a wide selection of different kinds of products? Customers of a fashion boutique expect a narrowly defined group of products. Customers of a “big box” discount store like Wal-Mart expect a wide variety of products to be available.

(d) *The Service Level Required*—Do customers expect all products to be available for immediate delivery or will they accept partial deliveries of products and longer lead times? Customers of a music store expect to get the CD they are looking for immediately or they will go elsewhere. Customers who order a custom-built new machine tool expect to wait a while before delivery.

(e) *The Price of the Product*—How much are customers willing to pay? Some customers will pay more for convenience or high levels of service and other customers look to buy based on the lowest price they can get.

(f) *The Desired Rate of Innovation in the Product*—How fast are new products introduced and how long before existing products become obsolete? In products such as electronics and computers, customers expect a high rate of innovation. In other products, such as house paint, customers do not desire such a high rate of innovation. [Chopra and Meindl 2007]

(ii) **Defining Core Competencies of the Company**

The next step is to define the role that your company plays or wants to play in these supply chains. What kind of supply chain participant is your company? Is your company a producer, a distributor, a retailer, or a service provider? What does your company do to enable the supply chains that it is part of? What are the core competencies of your company? How does your company make money? The answers to these questions tell you what roles in a supply chain will be the best fit for your company.
When you are serving multiple market segments, your company will need to look for ways to leverage its core competencies. Parts of these supply chains may be unique to the market segment they serve while other parts can be combined to achieve economies of scale. For example, if manufacturing is a core competency for a company, it can build a range of different products in common production facilities. Then different inventory and transportation options can be used to deliver the products to customers in different market segments.

(iii) Developing the needed Supply Chain Capabilities
Once you know what kind of markets your company serves and the role your company does or will play in the supply chains of these markets, then you can take this last step, which is to develop the supply chain capabilities needed to support the roles your company plays. This development is guided by the decisions made about the five supply chain drivers. Each of these drivers can be developed and managed to emphasize responsiveness or efficiency depending on the business requirements.

(a) Production—This driver can be made very responsive by building factories that have a lot of excess capacity and that use flexible manufacturing techniques to produce a wide range of items. To be even more responsive, a company could do their production in many smaller plants that are close to major groups of customers so that delivery times would be shorter. If efficiency is desirable, then a company can build factories with very little excess capacity and have the factories optimized for producing a limited range of items. Further efficiency could be gained by centralizing production in large central plants to get better economies of scale.

(b) Inventory—Responsiveness here can be had by stocking high levels of inventory for a wide range of products. Additional responsiveness can be gained by stocking products at many locations so as to have the inventory close to customers and available to them immediately. Efficiency in inventory management would call for reducing inventory levels of all items and especially of items that do not sell as frequently. Also, economies of scale
and cost savings could be gotten by stocking inventory in only a few central locations.

(c) Location—A location approach that emphasizes responsiveness would be one where a company opens up many locations to be physically close to its customer base. For example, McDonald’s has used location to be very responsive to its customers by opening up lots of stores in its high volume markets. Efficiency can be achieved by operating from only a few locations and centralizing activities in common locations. An example of this is the way Dell Computers serves large geographical markets from only a few central locations that perform a wide range of activities.

(d) Transportation—Responsiveness can be achieved by a transportation mode that is fast and flexible. Many companies that sell products through catalogs or over the Internet are able to provide high levels of responsiveness by using transportation to deliver their products, often within 24 hours. FedEx and UPS are two companies who can provide very responsive transportation services. Efficiency can be emphasized by transporting products in larger batches and doing it less often. The use of transportation modes such as ship, rail, and pipelines can be very efficient. Transportation can be made more efficient if it is originated out of a central hub facility instead of from many branch locations.

(e) Information—The power of this driver grows stronger each year as the technology for collecting and sharing information becomes more widespread, easier to use, and less expensive. Information, much like money, is a very useful commodity because it can be applied directly to enhance the performance of the other four supply chain drivers. High levels of responsiveness can be achieved when companies collect and share accurate and timely.

2.6 Processes involved in the Supply Chain Management
The Modern Supply Chain Management has been classified into main 8 fundamental processes that elaborate clearly how the supply chain management effectively works.
2.6.1 Customer Relationship Management

The customer relationship management process provides the structure for how the relationship with the customer is developed and maintained. The customer relationship management process provides the structure for how the relationship with the customer is developed and maintained. Management identifies key customers and customer groups to be targeted as part of the firm’s business mission. Customer teams tailor Product and Service Agreements (PSA) to meet the needs of key accounts and segments of other customers. Teams work with key accounts to improve processes, and eliminate demand variability and non-value-added activities. Performance reports are designed to measure the profitability of individual customers as well as the firm’s financial impact on those customers. [Mentzel and others, 2001]

2.6.2 Customer Service Management

The customer service management process is the firm’s face to the customer. It provides the single source of customer information, such as product availability, shipping dates and order status. Strategic customer service management has four subprocesses. In the first, the customer service strategy is developed for the set of PSA features identified in the customer relationship management process. The team identifies the deliverables of the customer service process, operationalises the triggers for initiating action, and defines the staffing needs. The deliverables of the process are standardized responses to standardized events that occur while administering the PSA. The output of this first sub-process is a list of events with its corresponding triggers and deliverables. In the second sub-process, the team develops response procedures for objective of customer service management at the strategic level is to develop the necessary infrastructure and coordination means for implementing the PSA and providing a key point of contact to the customer. [Mentzel and others, 2001]

2.6.3 Demand Management

The demand management process needs to balance the customers’ requirements with the firm’s supply capabilities. This includes forecasting demand and synchronizing it with production, procurement, and distribution. “Demand Management coordinates
all acts of the business that place demand on manufacturing capacity”. The process is also concerned with developing and executing contingency plans when operations are interrupted. The demand management process needs to balance the customers’ requirements with the firm’s supply capabilities. [Mentzel and others, 2001]

2.6.4 Order Fulfillment

A key to effective supply chain management is to meet customer requirements in terms of significant influence on the cost and performance of the system. It has been estimated that up to 80% of the total cost of the final product is determined in the design of the network. It is necessary to evaluate the network including: which plants produce which products; where warehouses, plants, and suppliers are located; and, which transportation modes should be used. Important input to this sub-process comes from the demand management and returns processes. The resulting network is provided to the manufacturing flow process.

The next strategic sub-process is to define the plan for order fulfillment, determining how orders from various customers or segments of customers will be filled. The process team communicates with the customer relationship management process team to make sure that all customer expectations are met.

In the final sub-process, a framework of metrics is developed and communicated to the customer relationship management process. Typical process measures might include order-to-cash cycle time, order fill rate, and order completeness. [Mentzel and others, 2001]

2.6.5 Manufacturing Flow Management

The manufacturing flow process deals with making the products and establishing the manufacturing flexibility needed to serve the activities necessary for managing the product flow through the manufacturing facilities and for obtaining, implementing and managing flexibility. The degree of flexibility established in the previous sub-process leads to the determination of the push-pull boundaries. The customer tolerance time (the time the customer is willing to wait for an order) and the
customer service goals constrain the extent to which manufacturing can be postponed in the supply chain. Postponement promises to be beneficial to the supply chain, but might lead to longer delivery times. The degree to which the firm postpones manufacturing and logistics activities depends on a great extent on the design of the products; therefore, the product development and commercialization process provides input for setting the push-pull boundaries. In order to determine the push-pull boundaries for the supply chain, the team identifies the decoupling point separating the part of the supply chain operating in a make-to-order environment from the part of the supply chain based on planning, which is the typical make-to-stock operating environment. The push-pull boundaries help to determine the stocking points in the supply chain for servicing manufacturing facilities, distribution centers and customers. These stocking points, referred to as decoupling points, permit the downstream section of the supply chain to operate independently from the upstream section. The decisions made in this sub-process are communicated to the supplier relationship management team since the push-pull boundaries affect the interactions with the suppliers. Similarly, coordination with order fulfillment is necessary for establishing lead-times and stocking requirements. [Mentzel and others, 2001]

2.6.6 Supplier Relationship Management

Supplier relationship management is the process that defines how a company interacts with its suppliers. As the name suggests, this is a mirror image of customer relationship management. Just as a company needs to develop relationships with its customers, it needs to foster relationships with its suppliers. As in the case of customer relationship management, a company should forge close relationships with a small subset of its suppliers, and maintain more traditional relationships with the others. Each supplier agrees to a PSA that defines the terms of the relationship. Supplier relationship management is about defining and managing these PSAs.

It is important for the supplier relationships to be win-win. If both parties do not gain from the relationship, the incentive to be in the relationship is diminished and it will likely dissolve. The supplier relationship management process team must develop
guidelines for sharing process improvement benefits with the suppliers. A key to this step of the process is finding ways to easily quantify benefits in financial terms.

2.6.7 Product Development and Commercialization

Product development is critical to the continuing success of the firm. Developing new products quickly and getting them to the marketplace in an efficient manner is a major component of corporate success. Time to market is a critical objective of this process. Supply chain management includes integrating customers and suppliers into the product development process in order to reduce time to market. As product life cycles shorten, the right products must be developed and successfully launched in ever-shorter timeframes in order to remain competitive. The first step in the strategic portion of the product development and commercialization process is to review the sourcing, manufacturing and marketing strategies to determine how those plans will likely impact product development. The marketing strategy contains the needs assessment of customers. [Mentzel and others,2001]

Next, the process team develops the idea generation and screening processes. This stage can include determining sources for ideas, considering incentives for developing new products for the focal firm and their suppliers and customers, beginning to develop formalized customer feedback programs, and establishing guidelines for strategic fit. At this point, the product development and commercialization process interfaces with the customer relationship management process to provide the product development and commercialization process. The team examines constraints to determine which resources the firm can utilize on specific new product projects.

The fourth step is to develop product rollout issues and constraints. The team identifies pinch points that could hamper the product development and commercialization process. Activities within this sub-process include market and promotion planning, sales force training, inventory deployment planning, and transportation planning. In this stage of the process, each of the internal functional silos have to be involved to avoid poor product rollouts. In addition, the team obtains
input from the order fulfillment team to assess how new products will impact the network flow.

Next, the team establishes new product project guidelines. This includes determining time-to-market and profitability expectations, and estimating the drain on human resources resulting from new product projects. The team establishes guidelines for examining the strategic fit of potential new products and for making the make/buy decision. [Mentzel and others, 2001]

The final step to the strategic product development and commercialization process is to develop the framework of metrics. Typical process metrics might include time to market, time to profitability and first year sales. The metrics are communicated to the customer relationship management team to assure they do not conflict with other metrics or the firm’s objectives.

2.6.8 Returns Management

Effective returns management is a critical part of supply chain management. While many firms neglect the returns process because management does not believe it guidelines. Team members need to understand laws that apply to used products and products planned for disposal. They also need to recognize rules associated with recall campaigns and packaging issues.

The team develops return avoidance, gate-keeping and disposition guidelines. Return avoidance means manufacturing and selling the product in a manner such that returns are minimized. This avoidance can be derived from improved quality or better instructions to the consumer as to how to properly operate the product. Gate-keeping is the screening of defective and unwarranted returned merchandise at the entry point into the reverse logistics process. Improved gate-keeping is a critical factor in making the entire reverse flow manageable and efficient. It assures that only product that should be returned to a specific point in the returns network is indeed returned to that point. Disposition guidelines define as clearly as possible the returned item’s ultimate destiny. Typical disposition options include return to supplier, refurbish or remanufacture, recycle, and landfill. The team can examine potential secondary
markets including Internet-based auctions or retailers that specialize in returned goods or “seconds”.

A firm should be able to make disposition decisions quickly. The team develops the rules in conjunction with other members of the supply chain, as well as with input from other processes, such as customer relationship management, product development and commercialization, and supplier relationship management. Disposition and return reason codes compliant with company policy are developed during this stage of the process.

The team develops the returns network and flow options. During this stage, the team develops plans for transporting and holding returned products until they reach their final disposition. For some firms, products may be routed to central returns centers where returned items are consolidated and examined. The team also determines what transportation programs the firm will employ. In the fourth step, the process team develops credit rules governing the returns process. At this stage, the finance organizations of the focal firm, and key suppliers and customers negotiate how returned merchandise will be credited. The team establishes credit authorization guidelines and credit policies. Since this involves both suppliers and customers, supplier relationship management and customer relationship management are involved in determining the rules. The last step of the strategic returns process is developing the framework of metrics and communicating it to the customer relationship management team. Possible metrics are return rates and financial impact of returns. As part of this sub-process, the team develops procedures for analyzing return rates and tracing the returns back to the root causes. [Mentzel and others, 2001]

**Implementing Integrated Supply Chain Management**

The implementation of supply chain management involves identifying the supply chain members with whom it is critical to link, the processes to be linked with each of these key members, and the type/level of integration that applies to each process link. The objective of supply chain management is to create the most value for the entire supply chain network, including the end-customer. Successful supply chain management involves the coordination of activities within the firm and between
members of the supply chain. Consequently, supply chain process integration and reengineering initiatives should be aimed at boosting total process efficiency and effectiveness across the supply chain.

2.7 Empirical Literature Review

Empirical Literature review is the literatures, or previous studies that relate or argue positively with your studies hypothesis and variables. This shows what others have stated to be obvious after an experimental observation of the phenomena (Krishnaswami,j.(2006)

According to The Council of Logistics Management, May 2013, council has identified the Benefits of integrated supply chain management. There are countless benefits to the sharing of information and integrated supply chain management. Not only does it make for shorter lead-times to a customer and improved planning and forecasting capabilities for all partners of the supply chain, it also leads to cost savings and efficiency optimization. Costs are saved when inventory across the supply chain can be cut. Inventory is really a very big deal for most companies and most companies would love a daily replenishment cycle like Toyota has. That would mean virtually no safety stock and thus little to no inventory carrying costs. It also reduces dead or slow moving stock and eventually removes it from a system with careful planning. Supply chains can also offload such stock at other companies who have access to their data warehouse or e-procurement sites (The Council of Logistics Management, May 2013).

Since this means that all activities are measured and all costs can be isolated (sometimes with a lot of effort), suppliers can improve their service by only reacting to those areas where they seem to be having problems. Continuous improvement through small steps (kaizen) can be used to improve billing accuracy since the cost this is generating as well as the frequency thereof will be visible to both the supplier and the manufacturer or wholesaler or even the consumer (The Council of Logistics Management, May 2013).
Supply chains have bargaining power. Supply chains can all negotiate a better transportation rate from the same third party carrier. This also goes for most other services - they can combine warehousing locations and share costs at facilities. With opposing suppliers of identical products this isn't easily negotiated because of the traditional competitive markets created in the markets, but local suppliers banding together can compete against their lower cost global competitors more effectively by doing this sometimes. Partnerships like this have been known to work extremely well (Chen and Paulraj (2004), “Towards a theory of supply chain management, the constructs and measurements).

There are many more untapped benefits to this way of running a business and more and more measurements are thrown into the mix, such as SER measurements, social and environmental responsibility. It is to be expected and much more will be heard of this before long as there are even conferences with this as its main focus. There is much to learn and much to gain (Chen and Paulraj (2004), “Towards a theory of supply chain management: the constructs and measurements.)

Supply Chain Management is experiencing a period of rapid change and influence within organizations. It is no longer simply about reducing costs, but more importantly, it is about enhancing business value and embracing proven disciplines to leverage the supply chain for competitive differentiation, financial return, and demand driven operational and innovation excellence.

Experience shows that the benefits of a well designed and implemented Supply Chain Management strategy is substantial. Successfully implemented projects have provided benefits such as:

(i) Reduction of Transportation, Warehousing, and Distribution Costs
(ii) Lean Processing from Supplier to Customer
(iii) Reduced Direct and Indirect Labor Costs
(iv) Optimized Stock Levels
(v) Increased Material Flow Velocity
(vi) Accurate Job Costing and Scheduling
(vii) Streamlined Purchasing Control
Increased Decision Making Speed and Responsiveness to Demand Change

Increased Customer Service

Increased Inventory Availability, Customer Order Fill Rates, Accuracies and Services

Reduced Operations Support Costs

Reduced Inventory Carrying Costs

Improved Productivity of Procurement Operations

Improved Quality of Products and Services

Responsible supply chain management can generate value for companies by:

**Improving supplier collaboration:** Dialogue and collaboration to improve social and environmental conditions will strengthen ties with suppliers and may help reduce costs resulting from increased productivity and reduced resource consumption

**Improving product quality:** For many companies, responsible supply chain management helps to ensure product quality and develop more sustainable products

**Ensuring compliance with customer expectations and demands:** More and more companies are facing demands from customers to manufacture their products under decent social and environmental conditions.

**Reducing the risk of negative perception:** Responsible supply chain management can protect the company against negative perception resulting from social and environmental problems in the supply chain. Worst case, responsible supply chain management can act as a safeguard against possible human rights violations

**Attracting and retaining employees:** A good reputation is increasingly important for companies seeking to attract and retain qualified employees. When a company outsources, it is particularly important to signal to employees that it prioritizes social and environmental conditions

**Providing security for investors and lenders:** More and more investors include ethical profiles in their assessments of companies. Their assessments also include the company’s supply chain management
Creating new market opportunities: Responsible supply chain management can be used proactively to brand the company and create new market opportunities.

Since the concept of supply chain management was introduced, there has been a great deal of confusion about what it actually involves. While some managers and researchers continue to use supply chain management interchangeably with logistics, there is an increasing understanding that it is much more than logistics. In recent years, many authors have stressed the importance of implementing supply chain management as part of a process orientation to management. However, most of what is written about supply chain management advocates business process reengineering and integration without specifying the processes that are to be included in these efforts. It would be much easier for management to implement a process orientation within their firm if there were clear guidelines as to what the processes ought to be, what sub-processes and activities are included, and how the processes interact with each other and with the traditional functional silos.
CHAPTER THREE

RESEARCH METODOLOGY

3.1 Introduction
This chapter described the research methodology which has been used by researcher in carrying out the study, types of data collected and sampling techniques. It has also covered sources of data collection and sampling procedures expected, result processing and data analysis. In general this chapter clearly discussed the methods through which different data were collected and processed.

3.2 Research Paradigms [Philosophy]
Paradigms or “schools of thought” in research scholarship are expected ways of looking at reality and the consequent approaches/methods to generate knowledge that is held by a group of intellectual who have the wide influence in that subject area. The basic premise behind the paradigm is based on how people view reality. The researcher had to move from place to place and interviewed a sample of employees and their supervisors about what they experience at work place particularly in Supply Chain Management.

3.3 Research Strategy
In this study, the researcher used “case study” approach in conducting his research. According to Krishnaswami,2006, a case study is an in-depth comprehensive study of a person, a social group, an episode, a process, a situation, a community, an institution or any other social unit.
3.4 **Data Collection Methods**

The data were collected through direct interview, observations, company records and questionnaires, reading company’s books, journals and manuals.

3.4.1 **Research Population**

The study was conducted within all the 7 Sites of IHI located in Dar es Salaam, Bagamoyo, Ifakara [Mororgoro], Rufiji, Mtwara, Kigoma and Dodoma.

3.4.2 **Sample Size**

Throughout the all seven branches of IHI in Tanzania, the sample of 50 staff was selected due to the fact that only two branches that is Bagamoyo and Dar es Salaam had the Purchasing department with the rest having store departments but all the purchasing activities were being initiate by the administration units.

3.4.3 **Sampling Techniques**

In order to avoid biasness the researcher used probability sampling techniques in order to give an equal and independent chance for the element to be selected. As such simple random sample method was used to select respondents from required members such as procurement management unit, heads of department, chief executives and other staff.

Random sampling ensured the law of statistical regulatory which states that if on an average the sample chosen is a random one, the sample has the same composition and characteristics as the universe. (Kothari, 2004)

3.5 **Research Instruments**

3.5.1 **Interviews**

This is the most prominent method of data collection. It may be defined as a two way systematic conversation between the investigator and the informant, initiated for obtaining information relevant to a specific study. The respondents were interviewed from time to time so as to gather the needed information. This was very important since with direct interview the researcher could even see the reaction of the respondents. This method was very effective in collecting primary data.
3.5.3 Observation
Observation is defined as a systematic way of viewing a specific phenomenon in its proper setting for the specific purpose of gathering data for a particular study. Observation method includes both seeing and hearing and that is why the researcher used this method at times since other information could just be gathered from mere observing what was happening.

3.5.4 Questionnaire
The researcher prepared a number of questions in a written form which were distributed to respondents requiring them to answer on their own by putting a tick (✓) using 3 point’s likert scale index (High, Medium and Low] in the appropriate box provided. The type of question closed ones were used. The questionnaires were used since the key respondents had enough time to answer. The cost involved in this method was relatively low.

3.6 Type of Data
The researcher collected data using both primary and secondary sources depending on the availability of required sources and demand nature. It was important to collect both types of data since some information could only be gathered through visiting some books, journal and organizational publications and some could be gathered just from the field of research.

3.6.1 Primary Data
Primary data are original sources from which the researcher directly collects data that have not been previously collected. The researcher collects primary data from the respective department/unit in its original nature.

3.6.2 Secondary Data
These are sources containing data which have been collected and compiled for another purpose. The secondary data consists of available data and already compiled statistical statement and reports whose data may be used by researcher for their study purposes. Journals, publications and IHI books were used in collecting data.
3.7 Validity and Reliability of the Instrument

3.7.1 Validity of the instrument
Validity is the accuracy and meaningfulness of inferences, which are based on the research results. In other words, validity is the degree to which results obtained from the analysis of the data actually represent the phenomena non under study (Mugenda, 2003).

Validity referred to the extent to which a concept one wishes to measure was actually being measured by a particular scale or index.

The researcher ensured that data and information to be obtained through questionnaires are valid to the best knowledge’s of the researcher. These have to be administered and collected from authorized personnel at the respective entities. Guidance from supervision has to be adopted also various experts were consulted to ensure data collected was valid.

3.7.2 Reliability of the Instrument
According to Krishnaswami, 2006, reliability means the ability of a measuring instrument to give the accurate and consistent result. Reliability has two aspects: stability and non-variability or equivalence. An instrument is stable if it gives consistent results with repeated measurements with the same instrument.

3.7.3 Data Analysis Techniques
Data were be processed and analyzed using both qualitative and quantitative methods, which involved the use of percentage, tabulation, graphs and bar charts when possible. Data analysis and interpretation enabled the researcher to address the research problem and eventually recommended possible policy implications in a constructive manner.
CHAPTER FOUR

PRESENTATION AND FINDINGS, ANALYSIS AND DISCUSSION

4.1 Introduction
This chapter presented the data that had been gathered through various means such as questionnaires, interviews, group discussions as long as they were all used in the gathering of data. Analysis was made reflecting the findings and a brief discussion was made from different perspectives.

4.2 Presentation, Findings and Interpretation of Data
Taking into consideration the background and statement of the problem, the objectives of the study, research questions stated out, the researcher attempts were to find the responses from different respondents.
For a competitive advantage to exist several key attributes have to exist in a supply chain. Five guiding principles are necessary for effective supply chains. Each principle is detailed below, including an illustration of practical application from an actual client’s experience.

4.2.1 Key Players of Supply Chain Management at IHI
Supply Chain Management involves a list of coordinated key players who when all connected form an effective supply chain cycle. These key players are categorized in the following manner

IHI being a service oriented Institute is a bit different from other tangible-products-oriented organizations in the sense that many of IHI activities are intangible and in this way to allocate the produces, distributors, retailers, customers and finally service providers of her consumables is difficult.
All in all PMU is the purchasing department at IHI that has been given teeth to execute all matters relating to procurement and supplies. There are a number of pre-qualified suppliers who have entered into a framework contract with IHI to supply items like:

(i) Stationeries  
(ii) Tyres and Tubes [for the cars]  
(iii) Clearing and Forwarding Activities [for the imports and exports]  
(iv) Cartridges and Consumables [Printers and Photocopiers]

Basically, IHI has sub-contracted all the non-core activities leaving only the core activities in their hands. All the sub-contracted suppliers work hand in hand with the PMU team so as to facilitate all activities whenever the need be. [IHI Admin Manual 2012-2013]

Apart from the PMU, there is also a TENDER BOARD COMMETTEE assigned to execute all matters relating to tenders, selling and buying of IHI assets, disposal of the fixed assets, of course in close work line and constant to-and-from advice from PMU. [IHI Admin Manual 2012-2013]

The IHI management has to seek constant advice from these two heavy bodies to execute all matters relating to procurement.

4.2.2 Effectiveness of Supply Chain Management at IHI

The best companies around the world are discovering a powerful new source of competitive advantage. It's called supply-chain management and it encompasses all of those integrated activities that bring product to market and create satisfied customers.

The Supply Chain Management Program integrates topics from manufacturing operations, purchasing, transportation, and physical distribution into a unified program. Successful supply chain management, then, coordinates and integrates all of these activities into a seamless process. It embraces and links all of the partners in
the chain. In addition to the departments within the organization, these partners include vendors, carriers, third party companies, and information systems providers. IHI may have spent a fortune in establishing good processes and implementing technology solutions to automate and enable them realize effective supply chain, but does IHI have an effective supply chain? What is an effective supply chain anyway? This is the most important question that the researcher found very crucial to understand. [Source: Research Questions]

The major ways to measure the effectiveness of supply chain management are many. But to get a sense of how well the supply chain is really designed to work, the researcher needed to take a step back and evaluate the supply chain along these three dimensions:

(i) Cost: IHI’s supply chain management has to be cost effective. Being cost effective means taking a wholesome view of the costs across integrated processes to arrive at cost-levels that provide a cost-advantage for the Institute. Some purchases have been done at IHI where the cost of the items is significantly higher adding to the poor planning of the purchase right from day one. In this case IHI is not effective enough in implementing supply chain management.

(ii) Agility: Was IHI’s supply chain capable of handling variability? When demand changes, how long does it take IHI to change the supply plans? Does IHI actively collaborate with suppliers so that they can make the institute successful? The case is IHI suppliers are not enabled or even empowered to react to address the demand changes in the supply chain. This is another factor making IHI supply chain management less effective.

(iii) Sustainability: Were IHI’s supply chain processes sustainable? The researcher did not mean “green” here, but talked about the repeatability and consistency of the processes. IHI’s processes are not established through an ad-hoc reactive impulse and not well thought-out and proactively designed to achieve the objectives of the business function. The cost and labor
efficiencies achieved through ad-hoc processes are generally a one-time wonder, but a well designed process could create a sustainable competitive advantage. This is another factor making IHI supply chain management less effective. [Vivek Sehgal, 2012, Supply Chain Management]

While cost has been the primary focus and imperative to drive supply chain initiatives in the past, the pioneering companies have long since discovered that agility and sustainability is where their supply chains create true competitive advantages for them. The cost-based supply chains have become the table stakes, the cost that must be paid to play. The operational efficiencies gained through traditional supply chain thinking have gained parity across many players in most industries. Agility is the ability to react in response to changes in the environment and sustainability is the ability to react in a consistently effective fashion. These new supply chains are not stove-piped and siloed, but integrated and responsive. [Vivek Sehgal, 2012, Supply Chain Management]

The Five Principles of Supply Chain Operational Excellence as compared to IHI Performance:

(i) **Know the customer**

Without a clear understanding and definition of customer requirements, a supply chain cannot be effectively constructed. To gain this understanding requires the use of classical market research techniques, the construction of an information infrastructure to capture customer transaction data, and the storage and analysis of these data from an operational perspective. The objective is to obtain a clear statement of the customer’s requirements. A supply chain’s requirements vary by customer, product, and location. These requirements must be thoroughly understood and be the foundation for constructing an efficient and effective supply chain.

As per the best supply chain strategy, the researcher found out that IHI has succeeded to identify the key customers in the market segment since the main area of interest for IHI is in the health sector whereby all individuals in the locality where the IHI Centers were operating were responsible. [Zygariis, 2000, Supply Chain Management]
(ii) **Adopt lean philosophies**

During the past two decades, operationally excellent companies have focused on creating lean organizations. As a consequence, these companies have shortened internal lead times and made them more predictable and repeatable, reduced work-in-process inventories from months of supply to days, implemented just-in-time delivery strategies for their most costly component materials, and have worked to dramatically reduce setup times. These actions have substantially reduced indirect costs and improved use of physical space. More importantly, they have created cross-trained, empowered and more highly motivated workers. For maximum supply chain efficiency, all partners must engineer, align, and execute their processes so that the entire chain has the aforementioned attributes. Lean supply chains must also be designed as a system that quickly and profitably responds to market demand fluctuations. Therefore, lean philosophies must be extended beyond a company’s internal operations to the entire supply chain. No combination of software systems can compensate for a poor physical operating environment. [Zygieris, 2000, Supply Chain Management]

As per this best practice IHI has also succeeded to adopt herself in terms of services and availability to her customers almost all over the country. IHI, after seeing the needs of her customers in the country, managed to establish several Health Centres in almost sven regions in the country. These regions are Morogoro, Pwani, Dodoma, Mtwara, Kigoma, Zanzibar and Dar es salaam which is the Administrative Head Quarters of the institute. [Zygieris, 2000, Supply Chain Management]

(iii) **Create a supply chain information infrastructure**

An effective information infrastructure, both intra- and inter-organizationally, is necessary for a supply chain to achieve competitive advantage. Today, B2B collaboration via the Internet makes it much easier for supply chain partners to share timely demand information, inventory status, daily capacity usage requirements, evolving marketing plans, product and process design changes, and logistics requirements, to mention just a few. However, true collaboration requires more than just data exchange between successive supply chain partners. Rather, it requires joint
planning of inventory and production strategies, and the reliable execution of operational plans on a continuing basis. How capacity is used daily must be considered from a systems perspective and not just a local viewpoint. Simply passing data (even customer demand data) among partners does not realize the true economic potential of collaboration. A traditional collaborative planning forecasting and replenishment initiative is merely a starting point that barely scratches the surface of the true financial rewards and competitive advantages that are possible through a truly collaborative supply chain. What is recommended is much more substantive and comprehensive.

By a great extent IHI has managed to create and maintain on-going supply chain information with all her key players within and outside the institute. Sharing of different information between the parties, starting from during the formation of different supplier strategies and policies to govern the institute, different to and from information regarding new market strategies, new marker products, new markets challenges are all shared to and from the suppliers. This has helped IHI to have good and general view of their suppliers and the market knowledge at large.

(iv) **Integrate business processes**

Business processes must be established both intra- and inter-organizationally to support the supply chain’s strategic objectives. These processes, coupled with the information infrastructure, support the efficient flow of material through the supply chain. While much attention has been placed on understanding business processes within organizations, it is essential to understand what processes must be built inter-organizationally to leverage and enhance partners’ capabilities. These inter-organizational processes must be designed to take advantage of the increased information that drives daily supply chain decisions.

IHI has created a forum/platform where all the suppliers can air their views and opinions on many issues arising from the day to day operations of the institute. This gave a room for IHI to analyse her processes and try to integrate them to suit the
current market demands and supplies without jeopardizing the health of the institute at large.

(v) **Unite decision support systems.**

Academics and software providers have designed and built Decision Support System (DSS) environments for individual companies and supply chains. These environments were based on different philosophical models. Also, they differ in how they forecast demand, and how they drive production and allocation decisions. Their goal was to generate plans that simultaneously consider all elements of the supply chain. No matter which approach is taken, these systems and their embedded rules drive many daily supply chain activities. Therefore, they have a substantial impact on the operating behavior, and consequently, on overall supply chain performance. How much they enhance this performance depends on both the accuracy of their input data and the modeling approaches employed. These decision support systems need to address uncertainty in an explicit manner and most do not. [Zygiaris, 2000, Supply Chain Management]

IHI was organizing the monthly meetings for every department involved in the supply chain management to give their view and opinions on how the SCM has been managed within that respective month. This helped IHI to unite all the units responsible for decision making and execution within a pre-defined period of time.

**The objective of presenting and analyzing data was to be able to:**

(i) Provide facts of the research work carried out.
(ii) Find answers to the research questions and questions provided in the questionnaires.
(iii) Form basis of discussion, conclusion and recommendation made in the next chapter.

The findings of this research paper are consistently based on research questions. The result of this study discovered valuable information and data were collected through questionnaires. The totals of 50 questionnaires were distributed to Procurement Management Unit, Stores Unit and to user departments. Out of 50 questionnaires
distributed, all were returned. Therefore the returned questionnaires were 100%. All questions were responded by the interviewee. The interviewees were very much cooperative after comprehending that the research works will be used to improve the situation at the Institute.

Effective supply chain management requires simultaneous improvements in both customer service levels and the internal operating efficiencies of the companies in the supply chain. Customer service at its most basic level means consistently high order fill rates, high on-time delivery rates, and a very low rate of products returned by customers for whatever reason. Internal efficiency for organizations in a supply chain means that these organizations get an attractive rate of return on their investments in inventory and other assets and that they find ways to lower their operating and sales expenses.

The next step was to define the role that IHI plays in these supply chains. Is IHI a producer, a distributor, a retailer, or a service provider? What did IHI do to enable the supply chains that it is part of? What were the core competencies of IHI? How has IHI been making money? The answers to these questions revealed what roles in a supply chain was the best fit for IHI.

### 4.2.3 Advantages Accrued From Effective Implementation of SCM

Supply Chain Management (SCM) is an integrated business model that takes a process-based view of how all of the business functions need to work together and how a business relates to its suppliers and customers. The framework we have developed focuses on finding the right level of partnership with customers and suppliers and creating cross functional teams that make decisions based on a holistic view of the business. A number of advantages can be harnessed from the effective implementation of SCM.
There are six elements of supply chain strategy, which, if employed collectively and managed closely, will deliver significant advantages across the organization.

(i) **Leverage**

Despite the size and revenue of an organization, reduction and management of spending while continuously improving upon service levels is a significant benefit of managing leverage. Leverage has typically been applied based on historical usage trends and market expectations. However, the more powerful means to initiate leverage is through solid and supported predictions of future growth potential. Several of our best clients are high-growth companies who have grown both organically, as well as through acquisition. Unfortunately, in many instances, their focus has remained solely on growth, and not on leveraging the potential spending power of the organization to further improve profitability. [Zygaiaris, 2000, Supply Chain Management]

(ii) **Communication:**

A significant component of any business is the support provided by external resources, be they service providers or product and component suppliers. Obtaining value from these external resources to meet evolving company objectives requires a communication strategy. One such example is the development and implementation of a "supplier feedback" model to effectively ensure external parties supporting organizational operations and growth are aware of challenges, opportunities, and threats to business viability. Developing these models is an important component of managing information in a form that supports organizational strategy. [Zygaiaris, 2000, Supply Chain Management]

(iii) **Efficiency**

Process and operating efficiency is a fundamental component of any high performing company, and the supply chain often impacts this efficiency either directly or indirectly. For example, improvements in production efficiency require increased volumes of supply of both components and maintenance equipment; improvements in process efficiency require increases in volume and timeliness of support from external suppliers and contractors; increased speed to market requires the support of
accurate and timely freight management. Here again, building the right strategy to support organizational efficiency is key to meeting objectives and improving efficiencies. [Zygiaris, 2000, Supply Chain Management]

(iv) **Innovation**
Managing daily operations while initiating innovation are not mutually exclusive events. Building innovation in any organization requires significant input and support from external suppliers and service partners, both of whom must be willing to provide insight and support and take potential risks in pursuing innovative solutions. Organizations such as Apple would not have reached their pinnacle levels of success if it were not for the engagement and support of their suppliers such as Samsung (interestingly also one of their largest competitors at the time of this writing, an obviously unplanned result of their supply chain strategy).

(v) **Risk Management**
Those organizations that represent and support company operations externally (i.e. suppliers) present the greatest, most unmanageable degrees of risk to an organization. External risk is often also the most disregarded risk as it is not as prevalent or visible as other internal risk factors. Supply chain management is the function most in-tune with external support groups, and is able to identify potential risks as well as mitigating solutions to protect the organization's interest. Developing an effective and all encompassing risk management strategy requires the support and input from key Supply Chain professionals.

(vi) **Continuous Improvement**
The greatest performing organizations engage continuously in improving their performance. Considering that most improvements have an impact on external support groups (either directly or indirectly), supply chain management is the tool to identify and manage improvement opportunities. Continued updates to Apple software for iPhones, iTunes, and other products are the direct result of supplier involvement in continuous improvement that results in the rapid resolution of immediate for foreseen challenges, in turn creating enhanced customer satisfaction.
and brand loyalty. Continuous improvement also provides significant opportunities to reduce cost, and supply chain management is often the most adept and knowledgeable party relative to reducing cost through internal and external efficiency.

Viewing supply chain management as a strategic tool through the application and management of these six elements can deliver significant reductions in working capital and organizational risk, and change perspective relative to the value inherent in the role. Anything less would be tactical by nature and result in less than satisfactory results.

Benefits of Effective Supply Chain Solutions Effective supply chain management was about delivering the right product in the right quantity and in the right condition with the right documentation to the right place at the right time at the right price. Globalization of the business in its real essence depends on how efficiently an enterprise can reach out to the geographically spread customer base. With the growing complexities of trade, supply chain solutions are getting increasingly sophisticated. For improved flexibility and future growth and fueled by global competition and changing market dynamics, supply chain managers are seeking new solutions that better position their organizations. When dealing with a global supply chain a business usually needs to address a number of issues. It is essential to have a transparent and a well-structured process, as a flexible and integrative system leads to efficient supply chain management.

**Observed advantages of Effective Supply Chain Management at IHI**
Competent supply chain solutions provide best practices to ensure that the entire business is handled as a consistent unit. IHI has not yet realized the actual effectiveness of supply chain management but to some extent has enjoyed [and still is] a number of advantages as per the implementation of supply chain strategies. [Source: Research Questionnaires]
Some of these advantages are like:

(i) Supply chain solutions at IHI fundamentally were aimed at reducing inventory, increasing the speed of transactions with real-time exchange and increasing by efficiently fulfilling customer demands.

(ii) Effective Supply chain implementation has helped IHI in getting the right things to the right places at the right time.

(iii) A successful supply chain implementation contributed to business performance by finding out ways to get goods to the customer better, faster and cheaper.

(iv) Proper supply chain management has helped IHI in lowering operational expenses with timely planning for procurement for different projects and departments within the institute.

(v) An effective supply chain management provided competitive advantage for all users departments. With complete visibility, there have been reduced costs that enabled the institute to work smarter, to remove non-essential activities, and to shorten lead times.

(vi) Effective supply chain implementation coordinated the different pieces of the chain without losing any of the quality, to gain a competitive advantage while keeping costs down.

(vii) An effective supply chain implementation at IHI has been flexible enough by customizing the processes to meet the business requirements hence bring the institute’s visions and missions into the light.

4.2.4 Challenges of Effective Supply Chain Management at IHI

The researcher encountered the following challenges that are the major challenges impeding the proper flow of effectively implementation of supply chain management at IHI. The following are five key supply chain management challenges and how we help supply chain professionals address them. [Source: Research Questionnaire]

(i) Customer service

Effective supply chain management at IHI is all about delivering the right product in the right quantity and in the right condition with the right documentation to the right
place at the right time at the right price. If only it were as simple as it sounds, supply chain at IHI would not be a big problem as how it is happening right now.

(ii) Cost control
Supply chain operating costs at IHI are always under pressure mainly from rising freight prices, more global customers, technology upgrades, rising labor rates, expanding healthcare costs, new regulatory demands and rising commodity prices. To control such costs there are thousands of potential measures that supply chain organizations can and do measure. Managers need to zero in on the critical few that drive total supply chain costs within their organizations. [Source: IHI Procurement Reports 2012-2013]

(iii) Planning and Risk Management
IHI should periodically be assessing and redesigning its supply chain strategies in response to market changes, including new product launches, global sourcing, new acquisitions, credit availability, the need to protect intellectual property, and the ability to maintain asset and shipment security. In addition, supply chain risks must be identified and quantified. This is not the case with IHI as there is no constant assessment or redesigning of the supply chain strategies. [Source: IHI Procurement Reports 2012-2013]

(iv) Supplier/partner relationship management
Different organizations, even different departments within the same organization, can have different methods for measuring and communicating performance expectations and results. IHI has a number of suppliers both nationally and internationally. Truly speaking the researcher observed that there is a big gap between IHI and some of their suppliers. This is greatly affecting the efficiency of smooth flow of supply chain activities within the institute.

(v) Talent
Senior and knowledgeable workers are in most cases very mobile moving from one company to another just looking for some greener pasture. This tendency creates a
significant vacuum within the organization. IHI has been experiencing this phenomenon for a good number of years now. This is a very destabilizing situation especially when the institute does not have enough young specialists to carry on where those who have left the situation ended.

The need is evident; the power to respond is problematic and uncertain. The dispersion of nodes in the supply chain across the continents offers new business opportunities to freight handling companies and third party logistics providers. But these interventions cannot be described as constituting “supply chain management” in the holistic senses described in the early part of this paper. There are wider forces at play – outsourcing, global sourcing, volatile customer demand, heightened competition, shorter product life cycles, and customization. Then there is the shift to virtuality – leased merge centers, contract manufacturers, innovators who market a concept and have others make it and so on. The pretence that “supply chain management” is a mode of intervention or a self contained discipline which is effectively grappling with these forces is an exaggeration. This is not an arena where a neatly managed activity is underway. That said, the change of mindset triggered by the constellation of forces as described in this paper and elsewhere could provide the opportunity for sophisticated and capable managers to engage in practices which approximate to the vision as described above. There could be a professionalization opportunity here, or at least a pathway for further occupational development. [Source: IHI Procurement Reports 2012-2013]

The sum of these decisions will define the capabilities and effectiveness of a company’s supply chain. The things a company can do and the ways that it can compete in its markets are all very much dependent on the effectiveness of its supply chain. If a company’s strategy is to serve a mass market and compete on the basis of price, it had better have a supply chain that is optimized for low cost. If a company’s strategy is to serve a market segment and compete on the basis of customer service and convenience, it had better have a supply chain optimized for responsiveness. Who a company is and what it can do is shaped by its supply chain and by the markets it serves.
CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction
This chapter elaborated on the summary of all the activities done from the problem identification to the solution, give out a brief conclusion finally suggest the possible recommendations as a means to make the supply chain management better at the institute.

5.2 Summary
The goal or mission of supply chain management can be defined using Mr. Goldratt’s words as “Increase throughput while simultaneously reducing both inventory and operating expense.” In this definition throughput refers to the rate at which sales to the end customer occur. Depending on the market being served, sales or throughput occurs for different reasons. In some markets customers value and will pay for high levels of service. In other markets customers seek simply the lowest price for an item.

The researcher had one general question with three specific research questions. He also developed one general research objectives supported by three specific research objectives respectively. The main theme of the researcher was to find out the advantages that could be gained by application of effective supply chain procedures casing Ifakara Health Institute as a Case Study.

A number of advantages have been spotted out, some being reducing lead times, getting the right quantity from the right source and at the right quality have easily been realized. Far much more, so much unnecessary expenses have been reduced to a minimum level possible, a function of effective implementation of supply chain management.
Also there have been a number of challenges associated with the proper implementation of supply chain management, some of them being, taking care of supplier relationship management, planning and risk management, succession planning within the Institute to mention but a few.

The researcher found out that IHI is not very much functional in implementing effective supply chain strategies in the sense that first of all the PMU unit is not that much well given the teeth and power to exercise all the processes with full support from other user departments.

As we saw in the previous section, there are five areas where companies can make decisions that will define their supply chain capabilities: Production, Inventory, Location, Transportation and Information. Chopra and Meindl define these areas as performance drivers that can be managed to produce the capabilities needed for a given supply chain.

Effective supply chain management calls first for an understanding of each driver and how it operates. Each driver has the ability to directly affect the supply chain and enable certain capabilities. The next step is to develop an appreciation for the results that can be obtained by mixing different combinations of these drivers. Let’s start by looking at the drivers individually.

5.3 Conclusion
How can Supply Chain Management (SCM) be applied to IHI? Companies like IHI that needed to improve their competitive position by reducing their order-to-delivery cycle looked to supply-chain management to help them achieve that goal. Because SCM encompasses all processes involved in producing and delivering a product to the customer, it offered the opportunity to identify bottlenecks that slowed down activities along the entire supply chain.
The researcher found a number of observations on his way carrying out the research. Starting from how IHI is executing her supply chain activities to the challenges encountered along the execution process.

The researcher found the following observations as far as the research questions are concerned.

IHI is not effective enough in the supply chain management considering a good number of reasons, the cost of their purchases being too high with no clear justification as to why the prices are very high.

In terms of agility, IHI is still lagging behind in the sense that it has some internal purchasing procedures that are very slow hence hindering the fast moving of other processes within the cycle. Moreover, IHI suppliers are not enabled or empowered to react to the demand changes happening in the supply chain.

Despite all that IHI has been benefiting from the supply chain management in a number of ways.

Benefits of Effective Supply Chain Solutions Effective supply chain management was about delivering the right product in the right quantity and in the right condition with the right documentation to the right place at the right time at the right price. Globalization of the business in its real essence depends on how efficiently an enterprise can reach out to the geographically spread customer base. With the growing complexities of trade, supply chain solutions are getting increasingly sophisticated.

Effective supply chain implementation has helped IHI in reducing the operational expenses with timely planning for procurement for different projects and departments within the institute. Moreover an effective supply chain management provided competitive advantage for all users departments. With complete visibility, there have been reduced costs that enabled the institute to work smarter, to remove non-essential activities, and to shorten lead times.
This did not mean the researcher did not observe any challenges as long as SCM is concerned. Supply chain operating costs are high and always under pressure mainly from the rising challenges from the market. Customer service is another challenge facing IHI. Not all customers would be satisfied with all the services being rendered by IHI. So many complaints were being shot that the SCM was not good enough hence replenishment was the only remedy.

Planning and risk management was another impeding criterion observed by the researcher. Management of risk has always been a blocking stone towards the smooth operations of the SCM. Not being able to anticipate what would happen in future has greatly affected the execution of SCM at IHI.

Globalization, highly competitive markets, and the rapid pace of technological change are now driving the development of supply chains where multiple companies work together, each company focusing on the activities that it does best. Mining companies focus on mining, timber companies focus on logging and making lumber, and manufacturing companies focus on different types of manufacturing from making component parts to doing final assembly. This way people in each company can keep up with rapid rates of change and keep learning the new skills needed to compete in their particular business.

Where companies once routinely ran their own warehouses or operated their own fleet of trucks, they now have to consider whether those operations are really a core competency or whether it is more cost effective to outsource those operations to other companies that make logistics the center of their business. To achieve high levels of operating efficiency and to keep up with continuing changes in technology, companies need to focus on their core competencies. It requires this kind of focus to stay competitive.

Instead of vertical integration, companies now practice “virtual integration.” Companies find other companies whom they can work with to perform the activities called for in their supply chains. How a company defines its core competencies and
how it positions itself in the supply chain it serves is one of the most important decisions it can make.

Manufacturing companies with sophisticated and complex supply chains that are willing to embrace change and look at their supply chain paradigm in an innovative way can positively impact bottom line results. By adopting new operating philosophies and adhering to the Five Principles, these companies will see new supply chain efficiencies that previously were not possible. Such desirable results are not likely, however, without an open-minded viewpoint to change and unless all five principles are adopted and applied in earnest.

Applying all Five Principles of Supply Chain Management is necessary for the effective design and execution of supply chain systems. By actively pursuing only a subset of the principles, companies will not likely succeed in achieving expected supply chain performance improvements. Installing advanced information systems and streamlining business processes will not overcome a poorly designed physical operating environment, and vice versa. Business processes and rules must be tailored to the specific nature of the operating environments and to the supply chain’s objectives. Finally, decision support systems and business processes must be capable of explicitly dealing with uncertainty.

5.4 Recommendations

IHI has been experiencing a number advantages and challenges on its path to effective implementation of supply chain management. All this up, challenges have emerged as an impediment towards the proper implementation of effective supply chain management. To reduce or solve these problems, the following recommendations were suggested:

(i) The first suggestion as a way to improve the supply chain activities at IHI is to make all people and key players understand their tasks and the contribution they could possibly bring as far as effective implementation of supply chain management is concerned. All players should play their role in the most efficient way and try as much as possible to minimize the unnecessary errors.
If this is effectively done, IHI will realize the advantages that could be harnessed by the supply chain management.

(ii) Another important means of rescuing supply chain management is by giving out seminars, trainings and workshops to the key players and the whole organization at large. Education will sensitize people to understand the importance of supply chain management as the hub of all achievements that are to be yielded as far as supply chain advantages are concerned.

(iii) Developed and maintained by Supply Chain Council that has members, who would provide framework for measuring and understanding current supply chain conditions and performance and creates a foundation for improvement. It can help supply chain managers evaluate cost/performance tradeoffs, develop strategies for meeting new customer expectations, and respond to domestic and global market growth.

(iv) IHI should have specific measures that will provide the basis for an organization to measure how successful it is in achieving its desired objectives. These measures are designed to be used in conjunction with supply chain performance attributes, making it easier to compare different supply chains and different supply chain strategies. For example, delivery performance is calculated as the total number of products delivered on time and in full based on a commit date.

(v) Organizations in all sectors including IHI, are using supply chain assessment and redesigning policy to plan and review the risk leading factors, which should aim at leading the faster implementation, more comprehensive identification of potential risks and easier coordination with customers, suppliers and other stakeholders. This will help users to establish rules and strategies, assign responsibilities, coordinate responses, and monitor current conditions.

(vi) IHI needs to make their supplier feel that they are part of IHI. This means, there has to be constant communications between the two sides so that should anything emerge, both parties can have a good ground of leveling the matter. The knowledge of supplier management and supplier appraisal should be well taught to all IHI staff who have a direct contact with suppliers in one way or
another. Using a common language and framework makes it easier for teams to communicate, speeds benchmarking efforts, and enhances the evaluation of best practices.

Supply chain alliances depend on close coordination between companies and effective coordination can only happen when all parties have easy access to the information they need to do their jobs. These alliances are much like a game whose goal is to achieve the predefined performance targets. In order to play this game people need to know what the score is at all times. They need to know if they are moving toward the goal or away from it. They need current information that reflects events as they happen, not batch reports delivered 30 days after the end of the last quarter. This allows them to make good, timely decisions and coordinate effectively.

For several years, it has been possible to correlate effective supply-chain management with above average market performance. It is therefore surprising to discover that many companies continue to underestimate the risks of supply-chain failure. The rules of effective supply-chain management can change if labor disputes, markets protection or utility failure were concerns for companies in the past, they have been well and truly replaced by factors such as currency and energy price fluctuations, doubts about customer confidence, supplier insolvency and protectionism.

In the face of such threats, it is noticeable that many companies are working on strategies to boost the resilience of their supply chains, such as supplier audits and sharing information with their peers. These strategies served to put savvy companies in a stronger position as the recession lifts. While there is clearly room for improvement in certain areas, this survey shows that many firms are taking supply-chain risk seriously. Certainly those that remain complacent do so at their peril.

5.5 The Perspective of Supply Chain Management Today
If we take the view that Supply Chain Management is what Supply Chain Management people do, then Supply Chain Management has a strong and firm hand on all aspects of physical distribution and materials management. Many
organizations perform the following activities as part of their company's Supply Chain Management department functions:

(i) Inventory management
(ii) Transportation service procurement
(iii) Materials handling
(iv) Inbound transportation
(v) Transportation operations management
(vi) Warehousing management

Moreover, the Supply Chain Management department was expected to increase its range of responsibilities, most often in line with the thinking that saw the order fulfillment process as one co-ordinate set of activities. Thus the functions most often cited as planning to formally include in the Supply Chain Management department were customer service performance monitoring, Order processing/customer service and Supply Chain Management budget forecasting.
REFERENCE


Internet sources, http://www.idhasoft.com 1st May 2013, at 10:00 am.

Joint Presentation by Vivek Sehgal and Chris Barnes in an APICS event held in Atlanta, GA on April 17, 2012.


Mentzer and others, (2001) Supply Chain Management


APPENDIXES

AN ANALYSIS OF THE ADVANTAGES OF EFFECTIVE SUPPLY CHAIN MANAGEMENT

1.0 QUESTIONNAIRE FOR PMU STAFF
1.1 What is the understanding of SCM to the PMU Staff?
   (i) High
   (ii) Medium [   ]
   (iii) Low

1.2 What is the advantage of effective implementation of SCM?
   (i) ________________________________________________
   (ii) ________________________________________________
   (iii) ________________________________________________

1.3 Are there any challenges encountered in the implementation of SCM?
   (i) ________________________________________________
   (ii) ________________________________________________
   (iii) ________________________________________________

1.4 How does the PMU deal with the encountered challenges?
   (i) ________________________________________________
   (ii) ________________________________________________
   (iii) ________________________________________________

2.0 QUESTIONNAIRE FOR STORE STAFF
2.1 What is the understanding of SCM to the stores Unit?
   (i) High
   (ii) Medium [   ]
   (iii) Low
2.2 How does the SCM add value to the Organization?
(i) _________________________________________________
(ii) _________________________________________________
(iii) _________________________________________________

2.3 How effective is the SCM implementation at IHI?
(i) Very effective
(ii) Moderately effective [ ]
(iii) Not effective

3.0 QUESTIONNAIRE TO THE MANAGEMENT

3.1 How does the management impact her staff with the necessary skills in implementing SCM?
(i) _________________________________________________
(ii) _________________________________________________
(iii) _________________________________________________

3.2 What are the organization’s sustainable plans to strengthen more the implementation of effective SCM?
(i) _________________________________________________
(ii) _________________________________________________
(iii) _________________________________________________

Thank You All For Your Co-Operation.
## Budget

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The Work Plan

The proposed work plan for the study will be as shown below. The final report will be out by August, 2013 and presented to the University for Approval.

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