An Evaluation of Supply Chain Management- A Case Study on Kallol Enterprise Limited of Kallol Group of Companies

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Statement of the writer

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Abstract

The Supply Chain is not a business function, it is a network of companies and Supply Chain Management is the implementation of cross-functional relationships with key customers and suppliers in that network. It is a new business model necessary for an organization's success and every function needs to be involved. Management must recognize that the ultimate success of an organization depends on the ability to integrate the company's network of business relationships in a mutually beneficial way. The management of this network of relationships is supply chain management. Successful supply chain management requires cross-functional integration within the firm and across the network of firms that comprise the supply chain. It is focused on the improvements in performance that result from better management of key relationships. By understanding the supply chain management processes and how they should be implemented, management will better understand the value of more integrated supply chains and how this integration will lead to increased shareholder value and a sustainable competitive advantage.

Entire network of entities, directly or indirectly interlinked and interdependent in serving the same consumer or customer. It comprises of vendors that supply raw material, producers who convert the material into products, warehouses that store, distribution centers that deliver to the retailers, and retailers who bring the product to the ultimate user. Supply chains underlie value-chains because, without them, no producer has the ability to give customers what they want, when and where they want, at the price they want. Producers compete with each other only through their supply chains, and no degree of improvement at the producer's end can make up for the deficiencies in a supply chain which reduce the producer's ability to compete.

Objective of this thesis is to evaluate supply chain management of Kallol Enterprise Limited. Is Kallol maintaining the process and procedures of SCM to go to its goal or to achieve its business objective? If so how? If not, why? What will be suggestions for maintenance of SCM? The focus in the thesis is only on KEL in the Supply chain. This company is managing its Supply chain based on what is best for their own. Collaboration with other companies in the Supply chain will present win-win situations for this company and for other companies in the Supply chain.

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Chapter 1: Background of the Story.

Introduction:

This thesis focuses on evaluation of supply chain management of Kallol Enterprise Ltd, of Kallol Group of Companies. Since, performance and cost are the most important area of supply chain management, I tried to find the performance measurement and cost measurement of Kallol Enterprise Ltd, considering the standard supply chain management. How is efficiency measured in a Supply chain and does it exist a simple model or index for measuring efficiency in a company are questions that will be investigated and evaluated in this thesis. The focus in the thesis is on KEL in the Supply chain. This company is managing its Supply chain based on what is best for their own. Collaboration with other companies in the Supply chain will present win-win situations for this company and for other companies in the Supply chain (cf. Christopher (1998)). The company has difficulties to measure the whole Supply chain; the customers, the suppliers, the suppliers' suppliers etc. There are other actors in the Supply chain that focus on their own business. Therefore the focus in this thesis is on evaluation for the individual company in the Supply chain. Supply Chain Management (SCM) has received an increased amount of interest both from researchers and in the industry. The SCM concept came up just before the 1960s according to Huan et al. (2004). The study of SCM increased in the 1980s and had a dramatic increase in the 1990s (cf. Huan et al. (2004)). More and more companies have to focus on their Supply chain in order to be successful in their business. Already in 1997 top managers had recognized the importance of having effective Supply chains to create competitive advantage according to Higginson and Alam (1997) and Cooper et al (1997). The margins for many companies are becoming smaller and smaller due to increasing demand from the customers on lower prices. To be able to survive on the market the companies have to cut cost in all areas and focus on SCM. An interesting question related to this is what should a company aim for when designing a Supply chain? Companies are working with improvements in the Supply chain and are aiming for Supply chain excellence and World-class Supply, but what does this mean? Is Supply chain excellence to have short lead-time and high delivery precision or is it to achieve a low cost for the Supply chain? This differs a lot between different companies and also at different times. A trend has been that a company is focusing on cost one year and the next year they focus on performance. In the beginning of the eighties the focus was on cost effective Supply chains. During the coming years quality was in focus and then in the end of eighties the focus went back to cost. In the beginning of the nineties it was high availability that gave market shares. The strategy was to combine cost effectiveness to the breakeven point between forecast driven flow and customer order drive flow. In the end of the nineties many companies had reached high availability and then shorter lead-time came in focus. The same factors quality, cost, availability and lead-time are considered, but the priority differs. A company needs to have performance measurements to be able to evaluate the efficiency of the Supply chain. If a company only measure internal performance measurements as for example order handling time and yield in production the measurements can't be used for evaluating the efficiency in a company. This thesis will evaluate the performance measurements in the Supply chain used today and identify if efficiency can be measured.

1.1 Introductory definitions

Some definitions need to be discussed for this thesis.

Supply chain: “the network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hand of the ultimate customer.” by Christopher (1998)

Supply Chain Management: “the integration of control and planning of materials and product flow from supplier to customer” by Ellram (1991).

Simchi-Levy (2000) defines Supply Chain Management as “ a set of approaches utilized to efficiently integrate suppliers, manufactures, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system wide costs while satisfying service level requirements.”

Supply Chain Cost: Supply Chain Cost is the total cost in the Supply chain related to:

- Order handling
- Purchasing
- Cost for stock handling
- Cost for systems needed to handle the Supply like for example the order system.
- Manufacturing cost

Supply chain efficiency: “the measure of how well the measurement of how well the resources expended are utilized” according to Beamon (1994).

Logistics: “Logistics is that part of the Supply chain process that plans, implements, and controls the efficient, effective flow and storage of goods, services, and related information from the point of origin to the point of consumption in order to meet customer’s requirements” according to Lambert et al (1998).

1.2 Undertaking.

This research project is initiated to fulfil an aim for more knowledge about evaluation of the Supply chain. The focus in this study is to evaluate Supply Chain of KEL considering the Cost and Supply chain performance and to suggest to improve efficiency based on both cost and performance. I have been working with Supply Chain Management at Kallol Enterprise Ltd, since 2010. Evaluation of SCM was interesting areas during my work. As I am working in SCM, It is my great inspiration to do such thesis. Naturally the environment and the daily work at KEL influence me; but by strong supervision, a literature review, many discussion with other professionals working in other companies, I hope I have broadened myself and can avoid general categorical statements based only on my intuition and experience unknown for readers outside KEL.

1.3 Objectives

This report is written within the Supply Chain Management area and focus will be on the evaluation of the Supply chain and to be more specific the cost and the customer aspect. Supply Chain Management has a wide scope in the literature on SCM and there are a lot of describing area the Supply chain from different perspectives. Price, Quality, lead time are the importance area of SCM. It is also important to consider customer service aspects. Since the traditional objective of Supply Chain Management is to minimize the total Supply Chain Cost and to meet the given demand. Cutting costs in the Supply chain most likely affect the performance like for example delivery precision and lead-time. It is easier to get a short lead-time by having buffers, but buffers cost and therefore the Supply Chain Cost is increasing. The challenge for a company is to combine the cost and performance and optimize both of them to get the best result for the company. The main objective for a company is to provide service to the final customer, but at the same time minimize the cost. Is KEL doing business considering the same? If not what are the weaknesses of SCM in KEL? How can KEL rebuild its weakness? What will be performance measurement system of KEL? Evaluating the overall SCM of KEL considering main objective of SCM will be the objective of this thesis. The most efficient Supply chain is the one that has the lowest possible cost and at the same time meet the customer's expectations on service like delivery precision and lead-time. My experience from working in the industry is that to achieve both high customer service and low cost is a challenge for companies. The company has to be good in measuring performance and cost to be able to know it they work with the right things in their aim to be more efficient within Supply Chain Management. The following objectives can be included for this thesis:

- To present ways of measuring performance of the Supply chain.
- To present ways of measuring cost in the Supply chain.
- To suggest a quantitative method to evaluate how efficient a Supply chain is and combining the cost concept with the performance concept.
- To discuss and evaluate on which organization level in the individual company the Supply chain efficiency preferably should be measured.

1.4 Method

This study has been performed within the subject Evaluation of Supply Chain Management of KEL. The study was divided into four steps.

The first step in the study was to generate a theoretical framework of an acceptable SCM of a retail industry. Searches for books and articles have been performed for this thesis. The following search words have been used: Supply Chain Management, Supply chain, Performance measurements, Evaluation of Supply Chain Management, Supply chain efficiency.

The second step included the present overall scenario of SCM of Kallol Enterprise Limited within theoretical framework based on web page and practical experience as I have been working in KEL.

The third step was to generate a findings of Supply chain of KEL. This has been based on conclusions from the acceptable theoretical framework of SCM and present overall scenario of KEL, but also based on findings and ideas gathered from practical work within the Supply chain area at Kallol Enterprise Limited.

The last step was to evaluate the findings, draw conclusions and recommendation for the improvement of SCM of KEL.

1.5 Limitations

Supply Chain Management has a wide scope and includes a lot of theories about how to evaluate the chain. The thesis is not going into details regarding everything included in the term Supply Chain Management. The aim for this report is to give a view of methods that can be used to evaluate if a Supply chain is efficient or not, and in the end suggest a model or index that combine different measurements. SCM practices vary from company to company according to size of the company, business of the company, rules regulation imposed by local government. The second part of the empirical study is done at one single company (Kallol Enterprise Limited), which not can be seen as a representative for all companies. This means that the result of this study must be considered with this in mind. The result from this part of the empirical study has to be presented without real figures due to respect for confidential information. It was not possible to present the actual practices of SCM in KEL.

1.6. Organization or the Report

Chapter 1 consists of the Background part of the report and describes definitions used in the report, Undertaking, Objectives, Method, Scope & limitations and Organization of the Report. A standard and acceptable Supply chain, Supply Chain Management and efficiency are described in chapter 2. Chapter 3 includes present overall scenario of SCM of KEL. Supply Chain Cost is described in chapter 4. Chapter 5 presents a summary of the literature review presented in chapter 2, 3 and 4. A literary review to measure Supply chain performance and efficiency is presented in chapter 6. In chapter 7 the common measurement for efficiency is discussed and propose for KEL. Chapter 8 includes conclusions and recommendations on this work.

Chapter 2: Supply Chain Management.

2.1 Introduction

In order to discuss Supply chain excellence, the scope of a Supply chain and Supply Chain Management has to be known. In this chapter a Supply chain from a general perspective as well as the management of a Supply chain is described. Questions being discussed include how a Supply chain should be managed in order to be considered excellent, i.e. be the most efficient Supply chain, and what models support the management of a Supply chain.

2.2 Supply chain

Currently a lot of definitions of a Supply chain exist. Different people define the term "Supply chain" in different ways. For instance, Christopher (1998) defines the Supply chain as "the network of organizations' that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hand of the ultimate customer." Ballou (2004) says that Supply chain "refers to all those activities associated with the transformation and flow of goods and services, including their attendant information flows, from the sources of raw materials to end users." Many aspects of Supply chain may be discussed. Some discussed aspects are: the number of companies involved in the chain, Supply chain versus Demand chain, chain perspective versus the own company and which parts of a company are involved in the Supply chain According to certain definitions of Supply chains there has to be more than one company involved in the chain in order for it to be defined as a Supply chain. Holmberg (1997) claims that at least two organizations' are required to form a Supply chain. Shapiro (2001) says that a Supply chain comprises geographically dispersed facilities where raw material, intermediate products or finished products are acquired, transformed, stored or sold and transportation links that connect facilities along with products flow. The facilities can be operated by the own company or by vendors, customers, third party providers or with other companies with which the company has business arrangements. The definition Supply chain may not be depending on the number of companies involved in the chain, but rather on what functions are involved. To be able to discuss Supply Chain Management and Supply chain cost it is very important to define what parts of the company that should be considered to be a part of the Supply chain. Common functions in a company are:

- Research and Development
- Marketing and Sales
- Supply
- Service
- General administration and business controlling

Research and Development (R&D) is the function of the company in which products are developed. The ways the products are developed have a deep impact on the Supply. Thus, it is very important with a close co-operation between R&D and Supply to get the lowest possible Supply chain cost. For example, if the product developers develop a product in different variants that the customer can choose from, this has the effect of a higher Supply cost in the end. The company that manufactures the product needs to have more variants of components to build the products with in stock to be able to manufacture the different variants. More variants of components in stock gives more inventory cost.

What is contained within the function marketing and sales differs between different companies. For a telecom company that deliveries base stations, this function includes the people who are out selling the product and all activities related to marketing. Marketing activities may include commercials in newspapers, events and so on. For a company selling groceries M&S also includes advertising activities. For such companies, the cost for the store and the personal working in the store is related to Supply.

The Supply function includes inbound logistics, outbound logistics, sourcing, production and distribution. In the Supply part, claims and warranty handling is also included. Inbound logistics is taking care of material flows going into the company and outbound is taking care of material flows going out from the company. Sourcing is responsible for contract agreements with the suppliers of material.

Service is the function of the company taking care of after sales activities. This means that they take care of selling spare parts and providing technical support after the end of warranty period of the product. General administration and business controlling is the function within the company taking care of activities that cannot be related to the other four parts.

The general management is part of this. Business controlling and other administrative support functions are also a part of this if they cannot be related to any of the other. A person working with business control for the Supply part is a part of Supply.

Out of these five functions of a company, Supply is part of the Supply chain, but also parts of the other functions may be included in the scope of the Supply chain. The Supply chain structure differs between different types of products and services.

2.3 Supply Chain Management

The term Supply Chain Management came up around 1980 by the Boston Consulting Group, but came in focus in the beginning of 1990. There is according to Mattson (2002) and Paulsson et al. (2003) no clear definition of the term SCM. Mattson (2002) says that the definition is not clear, neither in the literature nor in the practical use. Paulsson et al. (2003) says that there is a lack of a clear definition of SCM and the term has developed over time. There are according to Cooper and Ellram (1993) three reasons for companies to engage in SCM. The reasons are to reduce inventory holding cost, increase customer service and increase competiveness of the Supply chain.

2.3.1 Supply Chain Management and Logistics Management

Mattson (2002) writes that the terms Logistics management and SCM are used as synonyms in many cases. Christopher (1998) says that the scope of logistics spans the organisation from the management of raw materials, through to the delivery of the final product. The mission of logistics management is to plan and co-ordinate all those activities necessary to achieve decision levels of delivered service and quality at lowest possible cost according to Christopher (1998). Supply Chain Management is an extension of Logistics management. Logistics management is primarily concerned with optimization of flows within the organization while SCM wider external. The concept SCM has been derived from logistics management. LaLonde and Maters (1994) discuss that a Supply chain strategy should always include two or more firms in a Supply chain entering into a long-term agreement.

2.3.2 Supply Chain Management definitions

There are many definitions of SCM in the literature. The definitions focus on different things. There are cost focus, customer service and inventory cost focus and the flow focus. Shapiro (2001) writes that the traditional objective of SCM is to minimize the total Supply Chain Cost to meet fixed and given demand. This total cost may include the following:

- Raw material and other acquisition costs.
- Inbound transportation cost
- Facility investment costs
- Direct and indirect manufacturing cost.
- Direct and indirect distribution cost
- Inventory holding cost
- Interfaculty transportation cost
- Outbound transportation cost

Christopher (1998) defines SCM as the management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the Supply chain as a whole. Johnston (1995) defines SCM as the process of strategically managing the movement and storage of materials, parts and finished inventory from suppliers through the firm to customers. Kranz (1996) defines SCM as the effort involved in producing and delivering a final product from a supplier's supplier to the customer's customer. Carter et al. (1995) define SCM as a coordinated approach for managing the flow of goods from suppliers to ultimate customers, and that the goal is to meet customer service objectives while minimizing inventory and related costs. Simchi-Levy (2000) says that "Supply Chain Management is a set of approaches utilized to efficiently integrate suppliers, manufactures, warehouses and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system wide costs while satisfying service level requirements"

2.3.3 The scope of Supply Chain Management

Why Supply Chain Management? Many companies are discovering that efficient Supply Chain Management is what they need to focus on in order to increase profit and market share. There are companies that have reduced their manufacturing cost as much as is practically possible and then the key issues is SCM. The company has to focus on the whole Supply chain to find new areas where cost can be reduced. Chandra and Kumar (2000) mention that many firms have moved aggressively to improve SCM to balance customers demand with the need for profitable growth. Hoover et al. (2001) mean that a difficult part of SCM is to offer better value to the customer and at the same time reduce costs.

Hoover et al. (2001) state that the objective of SCM is efficiency improvements of the product delivery process from raw material suppliers to the end customer in accordance with. The primary purpose for the efficient Supply chain is to fulfil demand at the lowest possible cost. The objective of SCM is efficiency improvements of the product delivery process from raw material suppliers to the end customer according to Hoover et al. (2001). SCM can also impact the important customer value of price by significantly reducing costs. Customer value is also important for determining the type of Supply chain required to retain customers. A customers Supply chain strategy is determined by the type of products or services it offers and the value of various elements of this offering to the customer.

SCM has a wide scope. Simchi-Levy(2000) say that Supply Chain Management takes into consideration every facility that has an impact on cost and plays a role in making the product conform to customer requirements. The objective of Supply Chain Management is to be efficient and cost effective across the entire system. Cost efficiency means consideration of the total system wide costs, from transportation and distribution to inventories of raw materials, work in process and finished goods and that the cost is minimized. Supply Chain Management is not simply about minimizing transportation cost and reducing inventories, but rather on taking a system approach to find improvement areas.

The theories within the SCM area are connected to many different areas. There is a need to move from atomistic theory generation towards holistic and cross disciplinary theory generation beyond the traditional boundaries of SCM according to Svensson (2003). SCM should be considered to come from

economics, engineering, operation management, production management and logistics. This requires a holistic theory generation writes Svensson (2003). SCM spans over all levels in a company.

The strategic level deals with decision that have long–lasting effect on the firm. This includes decisions regarding the number, location and capacity of warehouses and manufacturing plants and flow of material through the logistics network.

The tactical level includes decisions that are typically updated anywhere between once every quarter and once every year. These include purchasing and production decisions, inventory policies and transportation strategies including the frequency with which customers are visited.

The operational level refers to day-to-day decisions such as scheduling, lead-time quotations, routing and truck loading.

Most research has tended to focus on specific operational and tactical aspects of the Supply chain such as client-contractor relations according to Love (2004). SCM includes activities from purchasing, order handling, production and distribution. All these areas include other activities. All these activities have to be considered when setting up a Supply chain

It is important that the top and highest management in a company understand what Supply Chain Management is and it's importance. These people are deciding about the strategies and focus areas for the company. They have to show interest for SCM and make it visible within the own company to get the right focus for all employees within the company and get a good result. The Supply chain has in the industry for a long time been something that just should work and nothing that the management has to put focus on. The managers in the Supply chain are the critical dimension writes Van Hoek et al. (2002). A survey undertaken by Price-Waterhouse Coopers of 400 of the largest European companies found that the biggest barrier to change in European Supply chain projects was culture and not language or IT systems as one may expect according to Van Hoek et al. (2002). Fernie (1995) carried out an international comparison of SCM in the grocery retailing industry. He found significant differences in inventory held in the Supply chain by the US and European grocery retailers, which could be explained by their SCM adoption. The European had come further in the Supply development and had been able to reduce inventory. Companies are on different levels of Supply knowledge. The levels differ between different lines of business and in different parts of the world. An example of a company that are good in SCM or particularly in Supply chain collaboration is Zara. The company is a fashion retailer and they have synchronized its global production networks with customer requirements so that it would be able to respond quickly to the changing tastes of fashion-conscious customers according to Walker et al. (2000). Supply chain collaboration can be defined as two or more independent firms jointly working to align their Supply chain processes so as to create value to end customers and stakeholders with greater success than acting alone describes Horvath (2001). When chain members involve in collaboration, there can be a dilemma between accommodating decisions that take into account the interest of the Supply chain as a whole and preserving decisions in the interest of an individual firm. Companies benefit from focusing on identifying the constraint that prevent the chain members from achieving overall profitability. The constraint can be either physical or non-physical and internal or external. According to Mentzer et al. (2001a) Supply Chain Management were still in the early 2000s a very popular development area among companies. The importance is especially significant in the area of high tech industry. To set up an excellent Supply chain strategy requires high knowledge in the SCM area.

Profit maximization, maximum competitive advantage, select service level and minimal asset deployment is part of the strategy to set up the Supply chain defines Bowersox (1996). Christopher (1998) means that the whole purpose of logistics strategy is to provide customers with the level and quality of service that they require and do so at less cost to the total Supply chain.

There are a lot of factors to consider when deciding how to set up a Supply chain. Mattson (2002) mention:

- Number of suppliers
- Number of sub suppliers. Module suppliers or many sub suppliers
- Distance to supplier
- Size of supplier
- Co-operation with the supplier
- Direct shipments
- Storage location local, regional or central
- 3PL (third-party logistics) distributors (provides logistics services to other companies)
- Number of distribution alternatives.

There are three types of flows to consider when starting up on improving the Supply chain according to Paulsson et al. (2003). The three types are product flow, information flow and monetary flow. Holmes (1995) has also described the three flows in SCM.

It might be difficult for Supply managers in the industry to understand all theories and methods. This makes it difficult to choose the right things. A lot of strategies and methods are under the Supply Chain Management umbrella. In the production area Lean production and agile manufacturing are two strategies that are in focus. Schonberger (1996) describes agile manufacturing as being able to respond quickly to shifts in the life-cycle. Lean production is according to Paulsson et al. (2003) based on the Japanese aim to reduce unnecessary time stoppers and work assignments. In automotive industry the term just in time has been in focus. Textile and retail industry have worked with quick response. The telecom industry lead-time improvements, delivery precision and outsourcing have been key areas within SCM. Other common terms within SCM are:

- 6 sigma:
- Vendor managed purchasing:
- Direct shipments:
- RFID:
- Yield improvements:
- ITO: ITO is Inventory Turn Over, which is the number of times the stock in a company turns around
- 3PL: 3PL is third part logistics and means that an external part takes care of the distribution services
- VMI: VMI is Vendor Managed Inventory and means that the supplier managed the stock for the customer
- E-commerce: E-commerce is selling and buying of products and services over electronic systems like Internet

- Cross docking..... Cross docking is a term for unloading materials from an incoming truck and loading these materials in outgoing trailers with no or little storage in between.

The objective of Supply Chain Management is to be efficient and cost effective across the entire system according to Simchi-Levy (2000), but what does efficient and cost effective mean?

2.4 Efficiency in the Supply chain

What are Supply chain excellence and an efficient Supply chain? According to Christopher (1998) will the future market leaders be the ones that have sought and achieved the twin peaks of excellence. They should have gained both cost leader ship and service leader ship. The purpose of Supply Chain Management is to support the company to earn as much money as possible. This means as low cost as possible and at the same time sell as much as possible. Low cost means that the Supply Chain Cost shall be as low as possible. To achieve a low Supply Chain Cost the company need to have best possible internal and external performance. Internal performance can be for example yield, production lead-time. External performance is effecting the customers. Examples of parameters for external performance are delivery precision, lead-time, customer service and price. To achieve market leadership in the world of networks competitors have to focus on network management as well as upon internal processes according to Christopher (1998). To remain competitive in the new global environment companies will have to seek ways to lower cost and service enhanced in accordance with Christopher (1998). This means that Supply chain efficiency and effectiveness will become even more critical.

Effectiveness is defined by Mentzer (1991) as the extent to which goals are accomplished. Efficiency is the measure of how well the resources expended are utilized according to (Beamon 1999). Efficiency in these thesis is used as describing how well a company optimize the Supply chain to maximize profitability. The overall objective of any logistics system is to maximize profitability writes Dornier (1998). When having an excellent Supply chain the company can provide products to its customers that are of high quality (De Meyer et al,1989), at low cost (Goonatilake, 1990), within short lead-times (Haug, 1985) and give the requested customer support, (Hoover et al., 2001). Collin (2003) says that it can be concluded that the success of Supply chains are composed of three different dimensions:

- Customer service
- Capital employed
- Total cost

Customer service and cost are opposite poles, which have to be balanced to get the best result for a company. Cutting cost in the Supply chain can result in for example a longer lead-time due to that the company cannot have buffer stock. Improvements of lead-time can be done by putting up a buffer stock, but this cost money both in tied-up capital and risk of scrapping. It is very important for a company to find the balance between Supply Chain Cost and performance towards the customers. There is no general balance that can be used for all companies and all products. Each company have to find their own balance to maximize the profit for the company. Some companies have different balance situations for their product portfolio. Some customers require very high customer service and are willing to pay for that. For other customers is the cost the most important factor and these companies tolerate reduced customer service.

Christopher (1998) means that in examinations of the efficiency of Supply chains it is often found that many of the activities that take place add more cost than value. The consideration of both cost and level of customer service is essential when setting up a Supply strategy. Bowersox (1996) says that it is necessary to evaluate the relationship between customer services levels and associated cost when finalizing a logistical strategy. The total cost concept is one of the central fundaments of today's SCM.

If the consumer is excluded any generated theory of SCM will not reflect the real world since the consumer is the crucial key for the outcome of successful SCM.

What is then customer service in the Supply chain perspective? Customer service is all activities and performance that adds value for the customer. Low price, short lead-time and accurate delivery dates are three important areas that are important for a customer. According to Bowersox et al. (2000) there are at least three perspectives to create value for customers through Supply chains:

- Economic value
- Market value
- Relevancy value

There are a lot of different measurements that can be used to evaluate the efficiency of a Supply chain. This will be discussed more in detail in the next chapter which is about Performance measurements.

Collin (2003) describes that one of the most used performance indicators to analyze the effectiveness of a Supply chain is the inventory rotation that indicates how fast the material is moving further in the Supply chain. According to Collin (2003) internal states and processes of organizations' need to be contingent upon environmental characteristics for a Supply chain to be efficient. There is not a single Supply chain that suits all customers. Customer's environmental requirements should determine the appropriate structure for a Supply chain. It is not enough for a company to have competitive products and the right Supply chain for the average customer. Hoover et al (2001) means that the Supply chain has to be right for the individual customer as well To reduce cost and improve service levels, efficient Supply chain strategies must take in account the interactions at the various levels in the Supply chain according to Simchi –Levi (2000). The Supply chain can also be referred to as the logistics network. The Supply chain consists of suppliers, manufacturing centres, warehouses, distribution centres and retail outlets, as well as raw materials, work-in-process inventory and finished products that flow between the facilities. In a Supply chain with external actors is it important to think about that efficiency improvements have to consider the whole Supply chain. There is no good solution when the own company makes profit at the expense of another part for example a supplier. This is short-term profit and will for sure result in an increase of price in the long term. An individual, when optimizing its own success has to consider both how it best utilizes its internal resources and how it best benefits of collaborative efforts in the Supply chain. There are two important parts for efficiency and that is Supply Chain Cost and performance measurements. Performance measurements will be described in chapter 3 and Supply Chain Cost in chapter 4.

Chapter 3: Overall scenario of Kallol Enterprise Ltd.

3.1 Introduction:

Kallol was floated back in 1972 as a distribution company of few leading local brands with an ambition to become one of the most successful industrial and commercial business group in Bangladesh. Major step towards business development was taken in 1987 when Kallol became the licensee of Fay International Ltd. UK and started producing wide varieties of Tissue products in Bangladesh. In 1994, Kallol stepped into Distribution of internationally reputed FMCG and consumer durable. In 2006, Kallol acquired Jet the very old famous and leading brand in detergent powder category. Kallol's next milestone was in the year 2010, when two joint venture was signed, one with Jyothy Laboratories Ltd. and another with Thai President Foods (BD) Ltd.

Head office of Kallol

Now Kallol has 2 leading international brands and almost 117 SKU in FMCG and 25 international leading Watch and writing instrument brands in its product list and a distribution reach in all 64 districts of the country with 146 sub-distributors servicing 92000 plus outlets for it's FMCG and 35 authorized dealers for watches.

Kallol has its own manufacturing facilities for, Tissue Paper products, Detergent powder, fabric whitener and instant noodles.

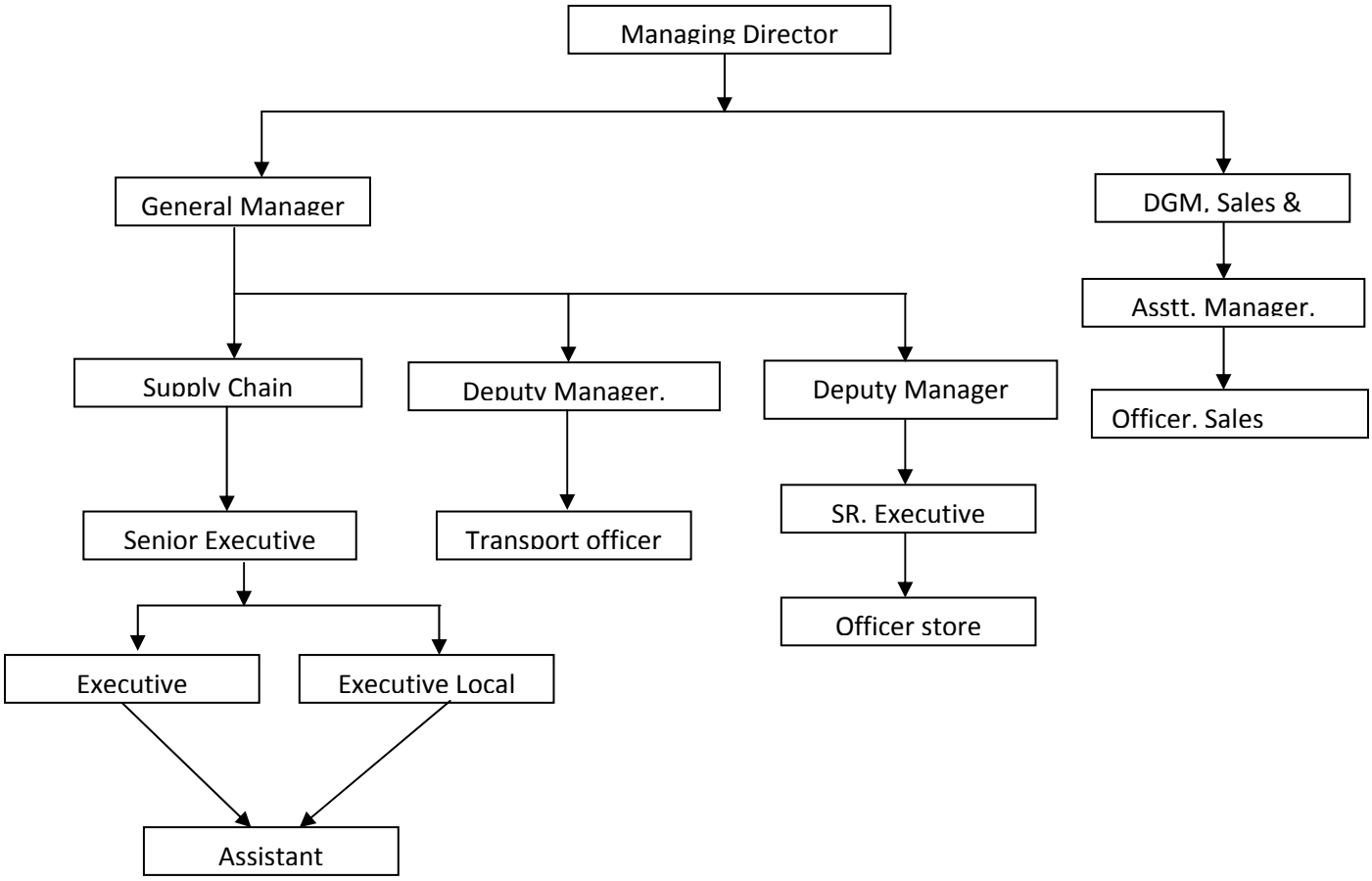
With an annual turnover of 60 million US Dollars, a team of more than 718 members and a nationwide network are aiming to provide uncompromising highest level of service to its customers.

3.1.1 **Kallol Enterprise Limited,** a sister concern of Kallol Group of Companies engages in trading business. 25 international renowned watches and writing instruments are in its products list. KEL is regularly importing these brands from more than 10countries and selling throughout the country through exclusive outlets named as Time Zone. As a leading trading business house KEL is doing its business maintaining quality and customer satisfaction. Tissot, Rado, Longines, Swatch, CK, Credence, Cellox, Cairnhill, Montrex, Casio, Pierre Cardin, Titan, Timex, Citizen, Westar, Esprite, Continental, Everswiss, Obaku, Olympia, Romanson, Cross, Parkar, Waterman, Sheaffer are the most popular brands that are traded by KEL.

3.2 Supply Chain of KEL.

Supply chain of KEL is complex and supply chain department is trying to maintain efficiency because its main aim is to achieve organizational goal by reducing cost and maintaining the 5 R (To ensure to procure the right product at the right price in the right time with the right quality and deliver to the right place). The team of supply chain is responsible for procurement all items required by the concern departments coordinating with sales and marketing, finance, store & logistics and other functional department. KEL imports 25 brands of watches and writing instruments. The supply chain of KEL involves procuring all the items and stores those items to warehouse. Planning, warehousing, inventory management, distributions and logistics support are also involved some way with supply chain.

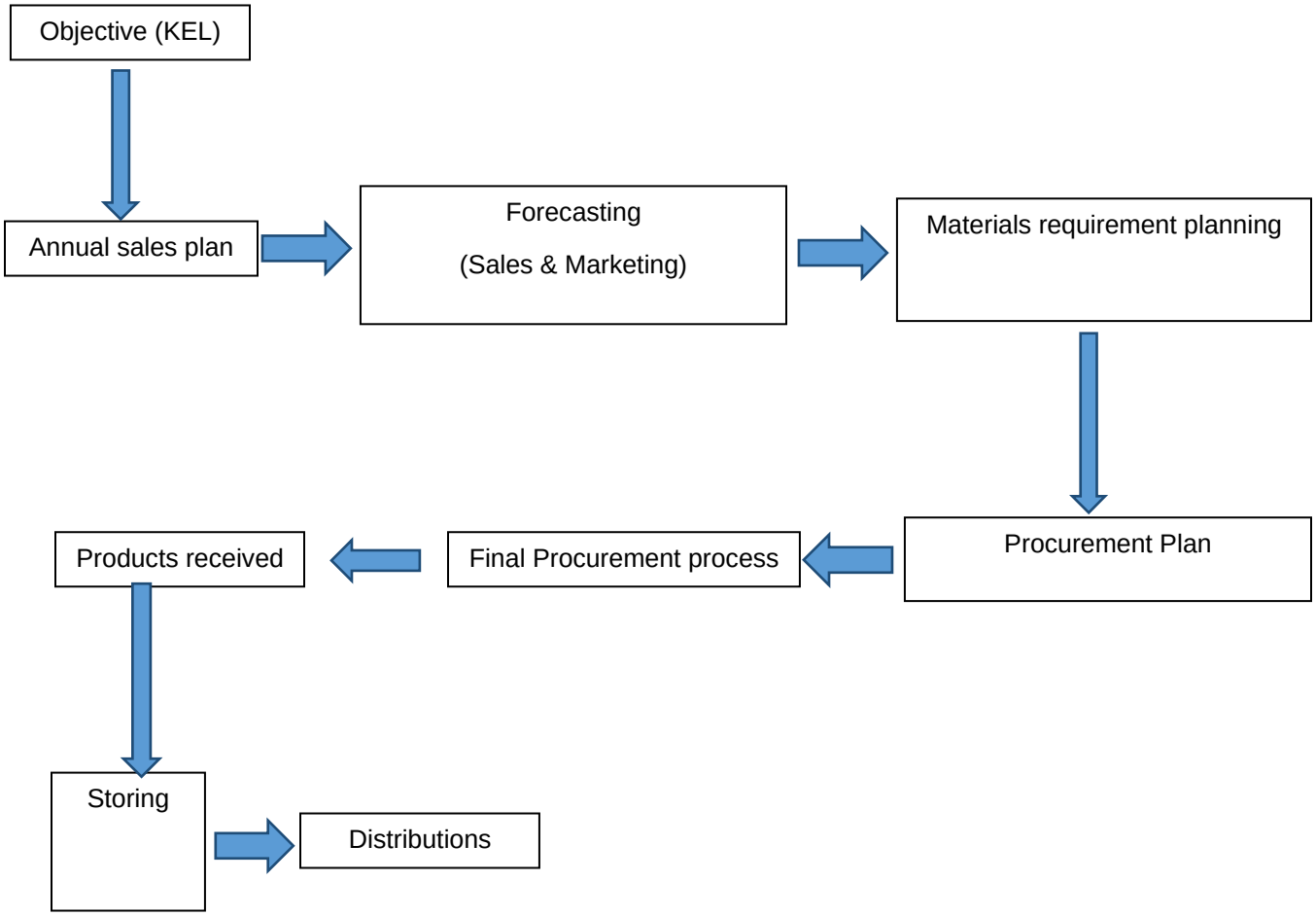
3.2.1 Supply Chain Diagram of KEL (Hierarchy)



3.2.2. Process flow of the supply chain activities:

The process flow of supply chain activities of KEL begins with demand of the organization. Having and informing demand of the organization top management and sales department together prepare annual sales plan considering previous sales and present trend of sales. After having the forecasting from sales & marketing, the supply chain department prepares materials requirement planning. Then it is time to place order and procure goods and supply chain department of KEL conducts final procurement process. Receiving procured goods as per procurement plan it is needed to store. Store department issues the goods as per inventory method (FIFO) based on demand of the.

3.2.3. Process flow of the supply chain activities of KEL:



Objective of KEL: The supply chain process of KEL starts when the goal is set by the management. The organizational goal is set by the management discussing with the head of the functional department and approved by the monthly Executive Committee meeting.

Annual Sales Plan: Based on the organizational goals of the company, Sales and Marketing department set their annual sales plan.

Forecasting: Sales and Marketing department prepare rolling forecast every month based on market demand and sales trend. They update this rolling forecast and send to supply chain department. Supply Chain Department prepare the material requirement planning.

Material Requirement Planning: The Material requirement planning is a report containing the requirement of major items as per monthly consumption. Usually the minor Materials are not mentioned in this report.

Procurement Plan: Based on the Material Requirement Planning the Supply Chain department prepares the procurement plan. As per the company policy all imported materials are kept stock for 2.5 months and local materials are kept stock for 07- 30 days based on the availability, lead time and nature of the goods.

Procurement process: Considering the inventory status and sales forecast the supply chain starts the procurement process and places order for the materials and ensures uninterrupted supply of all materials.

Receiving & Storing: Purchased materials are received by Stores and arrange to store after ensuring the quality of goods as per our requirement by the concern department.

Distributions: KEL has a wide range of distributions network. Based on the market demand and sales forecast and storage then distribute goods through its own cover van. Connection between Planning, Commercial, Procurement, Warehouse, Logistics and overall supply chain.

3.2.4. How each unit is connected and works as an overall supply chain.

A simple supply chain is made up of several elements that are connected the movement of products along it. In our organization KEL, each unit is connected such as planning, commercial, procurement, warehouse, logistics works as an overall supply chain

Planning: The requirement triggered by the customer's sales order will be combined with other orders. The planning department will create an annual plan and procurement plan to procure and to make stock the products to fulfill the customer's orders.

Commercial: The commercial department works considering the demand of supply chain. To meet the goal of supply chain this department works together with the supply chain. It is a part of supply chain department. The responsibilities of this department are the responsible for supply chain activities.

Procurement: The procurement department receives a list of materials and sales forecast from the planning department and from sales and marketing department to complete customer's orders. The procurement department then starts process of procurement of materials.

Warehouse: The materials are received from suppliers, checked for quality and accuracy and moved into the warehouse. The supplier will then send an invoice to the company for the items they delivered. The materials stored until they are required by the sales department and distributors.

Logistics: When the materials are ready in warehouse, the shipping department determines the most efficient method to deliver products so that they are delivered on or before the date specified by customer. When goods are received by customer, the company will send an invoice for delivering products

3.2.5. Interaction of Supply chain department by other department:

Finance: Finance department ensures finances to generate works of supply chain. Procurement is the important part of supply chain and finance department ensures payment for procurements.

Marketing & Sales: Marketing and sales generate demand by publicizing the customer priorities that the products and services will satisfy. Marketing also brings customer input back to new products development.

Audit: Supply chain department have created many tools and frameworks to support the management of supplier risks, such as risk profiling techniques and use of financial modeling to understand the impact of supplier failure. These work best alongside internal audit teams who are close to the audit committee and executive on supply chain issues and helping to build right attitude to risk.

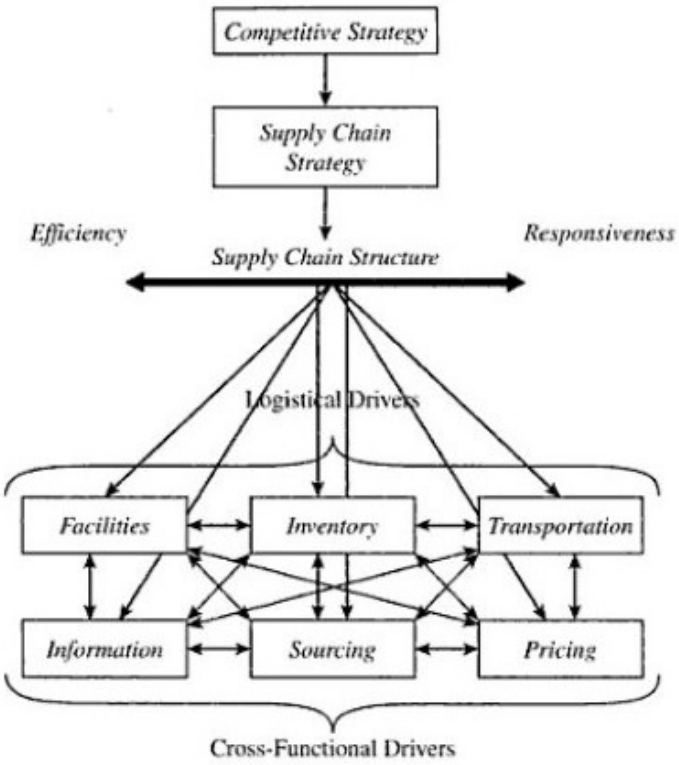
Legal & compliance: Supply chain of KEL doing its works maintaining the legal, government regulation and compliance of regulatory body. Practicing fair business, ethical importation, giving proper duties and taxes, using permissible route to import, delivering goods having proper permission, avoiding importing harmful product etc. are strategies of KEL supply chain to achieve the organizational goal.

3.3. Achieving its strategic fit:

i. Responsive Vs. Efficient

ii. Demand Certainty vs. Uncertainty.

To achieve strategic fit, KEL first understand the needs of the customers being served, understand the uncertainty of the supply chain, and identify the implied uncertainty. Secondly KEL tries to understand the capabilities of the supply chain in terms of efficiency and responsiveness. The key to strategic fit is ensuring that supply chain responsiveness is consistent with customer needs, supply capabilities, and the resulting implied uncertainty. Tailoring the supply chain is essential to achieving strategic fit when supplying a wide variety of customers with many products through different channels and KEL is trying to achieve strategic fit by tailoring the supply chain. In fact, a lack of strategic fit between the competitive and supply chain strategies can result in the supply chain taking actions that are not consistent with customer needs, leading to a reduction in supply chain surplus and decreasing supply chain profitability. Strategic fit requires that all functions within firm and stages in the supply chain target the same goal, one that is consistent with customer needs.



Ref: Supply Chain Management by Sunil Chopra.

KEL competitive strategy: KEL does not have any written competitive strategy like other local organization for supply chain but it follows the competitive strategy to be efficient with some extent of responsiveness. This strategy dictates that the ideal supply chain will emphasize efficiency but also maintain an adequate level of responsiveness in terms of product availability. KEL uses the three logistical and three cross-functional drivers effectively to achieve this type of supply chain efficiency and effectiveness.

Inventory: KEL maintains an efficient supply chain by keeping optimum level of inventory of major Brands and low inventory for other Brands that are available in market. It maintains inventory of imported Materials 2.5 months and local other materials for 30 days based on lead-time, availability and category of product. The other materials and supplies, KEL maintains the very good relationship with suppliers so that these can be made available within shortest possible time.

Transportation: KEL has its own transport facilities. It also uses 3PL for some extent. It maintains efficiency with responsiveness in logistics.

Facilities: KEL maintains the efficiency in facilities.

Information: KEL tries to run with the modern technology to compete with competitor having a high speed internet with backup facility with both head office and outlets to response quickly in any situation. Whole premises are under control of Close Circuit Camera to monitor the activity of work centrally both from outlets and from head office. Senior management are continuously monitoring this. Using Tally ERP 9.0 KEL is trying to ensure efficiency.

Sourcing: The supply chain of KEL always sources Materials, packaging materials to ensure quality of goods having the best value.

Pricing: **KEL** offers competitive price based on their both local and international competitors ensuring quality of the goods.

3.4. Warehousing

KEL has its own warehouse and logistics facilities.

Warehouse:

KEL believes own warehouse facilities helps to achieve organization goal. It is contributing to business expansion. KEL has the following warehouse facilities:

Area	SFT	Nature
Tejgaon 1	7000 sft	Watch, Pen
Tejgaon 2	1500sft	Display Materials

Logistics:

KEL has logistics facilities also. Based on logistics facilities KEL sets countrywide distributions network with more than 30 cover vans with its existing own exclusive 34outlets. KEL also uses third party logistics to ensure smooth distributions across the country.

3.5. Challenges of on time shipment/product flow: Some Challenges that are mentioned below:

- Legal, political, environmental and global challenges.
- Comprehensive customs procedures or formalities.
- Logistics cost.
- Delivery schedule.
- Proper documentation and product flow.
- Selecting International commercial terms.

- Ensuring fund availability.
- Planning and volume consideration.
- Maintaining single source.
- Weakness in planning to procure the goods from abroad.

3.6. Procurement Function:

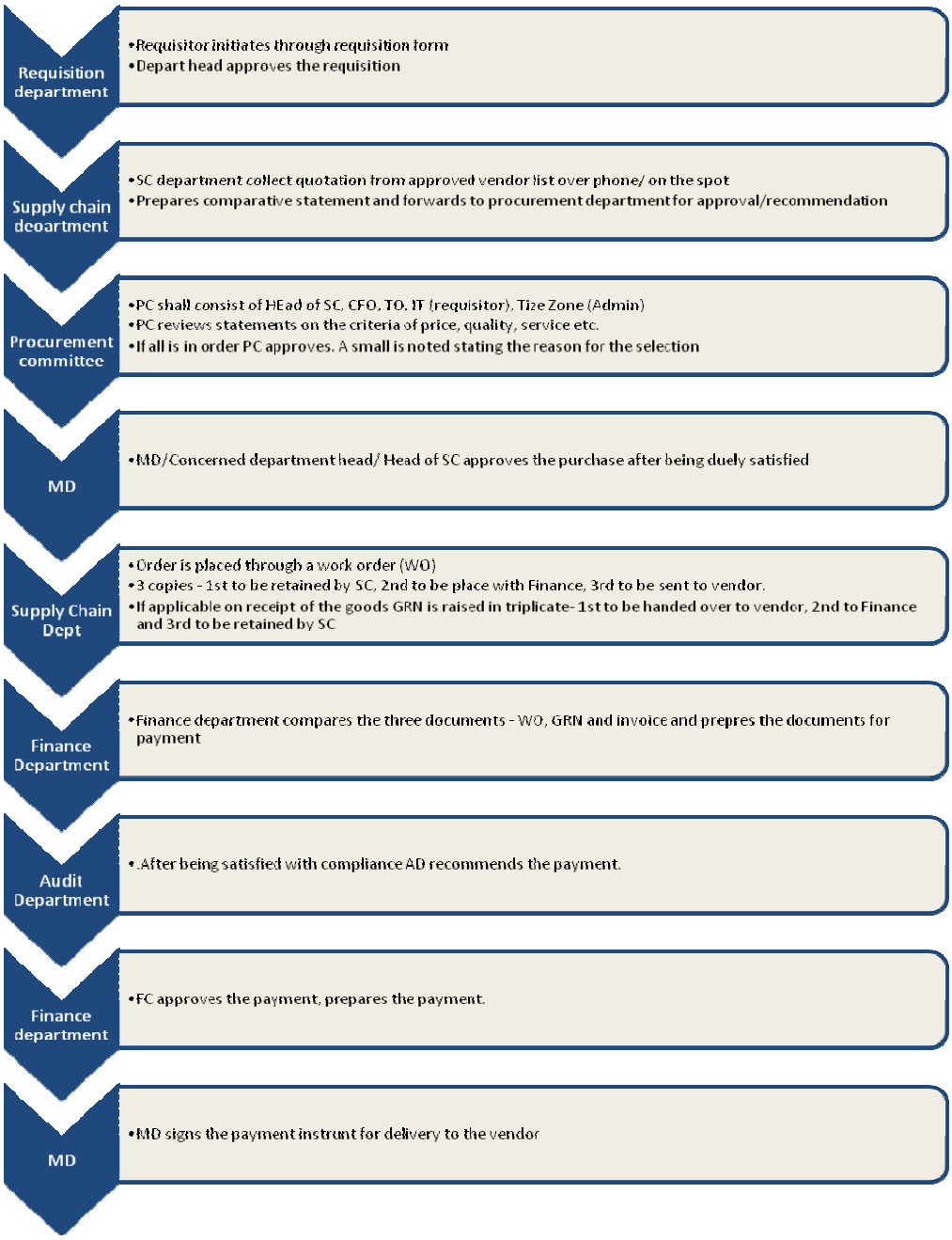
Generally, procurement function of KEL has been broken down in two major categories- Direct & Indirect. All of daily necessities of company like stationary and computer related items and other indirect materials that are not directly involved with main products line are usually bought in high volume to get cost benefit. Selecting 2/3 vendors such items are procured from local market. When volume of items are large, procurement officer collects quotation and finalizes order, preparing comparative statement.

Direct materials that are main products procure in a large volume from foreign Market. About 25 of Brands items related are imported from more than 10 countries. Getting the demand from customers and sales forecast, present stock and lead times procurement officer starts process to import from foreign market. Head of supply chain are involved to source goods and to place order informing Managing Director. After placing final order to suppliers procurement executives start next process considering lead times. All import items are being imported through L/C (100% site and deferred). KEL establishes L/C from local 5 banks.

One executive and one procurement assistant are always assigned to procure emergency items that are needed to purchase immediately when required. Technical person also involves procuring technical items (IT, electrical, mechanical, transport, etc).

KEL does not have any standard written process flow for procurement (foreign and local). The supply chain has recently prepared the following process flow which is under development.

Procurement Process Flow of KEL



3.6.1 Procurement policy.

KEL does not have any written procurement policy. But company is trying to develop a standard policy which is under development. Till today procurement functions of the company are conducted by verbal instruction of top management. Managing Director of the company approves all purchasing requirement directly and indirectly. The following common steps are implemented as mentioned:

- Concerned department raises requisition form with approval of concerned person and arranges final approval from top management.
- Supply chain department collects requisition and sits with concerned department and receives the specification.
- Supply chain department forms the procurement committee after taking final decision to procure goods.
- Procurement executive check the local & foreign market to procure goods.
- Procurement committee evaluates the quotation and selects supplier then gives advice to supply chain department to procure goods from the selected supplier.
- After completing necessary formalities supply chain department place order giving delivery schedule.
- Supply chain department issues work order for local procurement and establish l/c for import the goods from foreign countries.
- Supply chain department ensures delivery schedule, quality, quantity and price monitoring with the supply.
- Supply chain department arrange necessary funds to retire document from bank and necessary duties and taxes consulting with the finance department to clear goods from port.
- Supply chain department arrange transport to bring goods from port.
- Supply chain department primarily check the Bill against local procurement and request the finance department to release payment. After completing the audit finance department releases payment.
- Supply chain department does all the procurement activities ensuring ethical practices and supply chain department of KEL always welcomes Audit to provide information against their query.

3.6.2 Challenges of the procurement department:

Supply Chain of KEL faces some challenges to conduct procurement activities like other company. Some of the challenges that are faced by KEL are mentioned here:

- Sourcing and supplier selection challenge.
- Safety and quality challenges.
- Shorter lead time, less inventory and better throughout.
- Accessing to latest technology.
- New supplier selection, supplier switching.
- Transparency and communication challenge.
- Lack of resources, fund.
- Lengthy process and formalities.
- Environment, global and natural challenge.

3.7 Warehouse process flow of KEL

Firstly officer of warehouse receives inventory and retrieved in FIFO, LIFO or expiration date, and tacked by ID, serial, batch number. Then, product can be hold to conduct inspection.

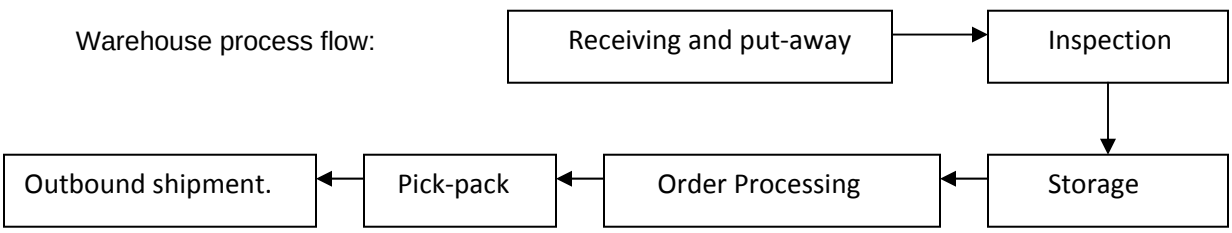
Goods as per specification or approved sample are identified after inspection. Through inspection damaged and defective items are also identifies through inspection.

After receipt order from sales person, officer of warehouse department starts process to deliver goods as per requirement. The necessary actions are needed to complete before delivery goods to distributions point.

Then, our warehouse management will manage picking of product at the unit level. Order can be consolidated or staged pending order completion and/or proper release date.

After completion of all procedures before deliver the goods, warehouse department arrange for outbound shipment to full fill customers demand.

Warehouse process flow:



Chapter 4: Performance Evaluation.

Performance Evaluation.

Performance measurements or evaluations are becoming more and more important when SCM is coming into focus. Neely (1999) presents 7 drivers for the increasing interest in performance measurements.

- The changing nature of work. The cost of direct labor related to cost of material has dropped rapidly since the 1950s.
- Increased competition
- Specific improvements initiatives ex JIT, TQM, BQR (Business process reengineering)
- National and international quality awards
- Changing organizational roles changing from control to empowering employees by management by objectives.
- Changing external demands. Firms in the public sector must present information about their performance.
- The power of information technology

What types of performance measurements are used today, are these measurements supporting system thinking and can we measure Supply chain excellence are questions that will be discussed in this chapter. There are a lot of different measurements for a company to choose from. Therefore it can be difficult to set up the right Performance measurements in a company. Some measurements are coming into more focus than others. Consultants companies working with Supply chain related questions are influencing companies with the terms they have chosen to work with. It is difficult to measure the performance in Supply chains according to Schmitz and Platts (2003). According to Harrison and New (2002) half of the companies they contacted in their research had limited possibilities to do performance measurements in their Supply chain. 19 percent couldn't measure at all. Chibba (2007) writes that large companies often measure the effectiveness by key performance indicators and that these are too broad to fully capture Supply chain effectiveness.

4.1 Types of performance measurements

Performance measurements based on financial accounting have for a long time been the primary tool according to Adams et al. (1995). The changes in the business environment from controlling of cost to customer value have changed the focus in performance management. The scope is larger writes Adams et al. (1995) and includes measurements in the customer service area like delivery precision and lead-time, in the internal efficiency area like ITO and yield and in the financial area like distribution cost and scrap cost. The main purpose of the traditional performance measure systems was to control costs and cash flows in the organization Vitale and Mavrinac (1995) describe. In the end of the nineties two types of performance measurements dominate in the literature according to Beamon (1999). These were cost and customer responsiveness. Customer responsiveness usually includes lead-time, stocking probability and fill rate. Cost is the sum of inventory and operating cost. Fill rate is a measure for in which grade a stock is filled. Keebler (1999) had the same thoughts and wrote that there are three principal categories of measurements, namely time, quality and cost. Both time and quality can be included in the customer

responsiveness scope. To summarise the development for SCM you can see that the way companies measure the quality of their product and services has evolved from internal quality assurance to external customer satisfaction and from there to customer value.

The types of performance measurements are discussed with different focus. The focus can be on:

- quantitative and qualitative measurements
- What level “SCM” should be measured
- financial and non-financial measurements
- What measurements should be included?
- Internal and external measurements

Beamon (1998) categorizes performance measures in existing literature into two groups qualitative and quantitative. Qualitative measurements can’t be quantified. Some examples of qualitative measurements are customer satisfaction and HCI (Human capital index). Customer satisfaction can be measured by asking the customers to rate the company from a scale 1-5. HCI measures the empowerment and other things related to the persons working on the company. Some examples of quantitative measurements are delivery precision and Inventory Turn over (ITO). Delivery precision measure how many orders that are delivered in time. In time means the date that has been stated on the order-acknowledgement. ITO measures how many times the inventory turns around per year. Gunasekaran et al. (2001) discuss on what level “SCM” should be measured and mean that the measurements shall include all three of strategic, tactical and operational levels. The highest management in a company can be interested in measuring “SCM” on a strategic level and consider the whole company. Management on level two or three can be interested in “SCM” measurements on a tactical level meaning that they measure on a part of the company. Measurements of “SCM” on operational level will be interesting for people working on operational level. ”SCM” measurements are a good tool for managing the daily work. Gunasekaran et al. (2001) say that the Supply chain performances should be measured beyond the organizational boundaries rather than focusing locally.

Holmberg (2000) and Van Hoek (1998) say that there is a lack of balanced approach to integrate financial and non-financial measures. Examples of financial measures are Supply Chain Cost and manufacturing cost per produced item. Supply Chain Cost is the total cost to run the whole Supply chain. Examples of non-financial measures are lead-time and yield. Lead-time means the time starting when a company receives an order and ends when the material on the order has been delivered to the customer. Yield is the amounts of items passing through the production process without any faults divided by the total amount of produced items. Atkinson et al. (1997) writes that in a time when customer value is an important driver for success companies can’t only use conventional financial information in their performance measurements. According to Atkinson et al. (1997) performance measurements are focusing on cost often in conflict with strategic goals and objectives. Shapiro (2001) says that a company should also concern about non-monetary objectives such as customer service, quality and time. Ghalayini and Noble (1996) say that areas like lead time, delivery precision and customer satisfaction most often are difficult to measure in monetary terms.

Another focus in the “SCM” performance measurement is what measurements should be included. Beamon (1999) identifies three types of measures resources, output and flexibility. Resources mean how efficient the personal resources in a company are used and how effective other resources like for example production equipment is. Output measures are for example number of products shipped and invoiced amount of money. The extend of differentiated lead-times and differential customer service levels can for example be flexibility measures. According to Keebler (1999) there are three principal categories of measurements, namely time, quality and cost. There are based on these three categories a

lot of different measurements. Bowersox (1996) describes the perfect order as a part of optimal operational performance. Quality in a Supply chain is to do everything right the first time. The order should be complete in terms of service from order receipt to delivery. Bowersox (1996) sees the concept of a perfect order is the logical extension of quality.

Another focus is on internal and external performance. Internal performance measures how a company perform from an internal perspective. Internal measures are important for detailed organizational monitoring. External performance measures how the company perform against the external customers. Bowersox and Closs (1996) say that External performance is important to understand to be able to maintain the focus on customer perspective. One way to perform the external measurements is to send surveys to customers. Examples of categories in internal performance measurements are according to Bowersox and Closs (1996):

- cost
- customer service
- productivity shipped/employee
- asset management
- ito
- quality claims

The term customer service include many factors. Service as a competitive factor includes the availability of the product, delivery speed and delivery reliability according to Dornier (1998). Simchi-Levy (2000) describes that improvements in internal performance normally lead to cutting of cost, but improvements in external performance normally lead to increased cost. Simchi-Levy (2000) is discussing conflicting objectives. Every system has conflicting objectives, which have to be balanced to achieve a good result. It can be lot size versus inventory, inventory versus transportation cost and production variety versus inventory. The most comprehensive tradeoff is between customer service and Supply Chain Cost.

Improving customer service often means that the total Supply Chain Cost increase. There are optimization models that can assist management in evaluating objectives. The Efficient Frontier is according to Christopher (1998) the curve for how the total cost increase with higher service level. Higher service level means more service for the customer. The service can for example be short order-acknowledge time and high delivery precision.

Beamon (1999) recommends a mix of measures; the measurements should cover the whole Supply chain. Vitale and Mavrinac (1995) say that the measurements systems focus on short term results. The ideal measurement system covers both short term and long term results. The risk with measurements covering only short term results is that the management of the Supply chain might not lead to the best result in the long term. An example is a company that focus on minimizing stock levels and gets a very result in the short term. The cost for tied up capital in stock is low and the company can still deliver material to their customers. In the long term the company runs into problems with low delivery precision and long lead-time.

4.2. Methods for performance measurements

Balanced scorecard, SCOR model and benchmarking are three methods that are used for performance measurements within the industry. These methods are also frequently discussed in the academicals world.

4.2.1 Balanced scorecard

The Balanced Scorecard is a framework for measurements of the performance in an organization. The scorecard includes both financial and non-financial data. There is no general definition of what measurements that shall be included in the scorecard. The measurement criteria differ between

companies and also between departments in the same company. Kaplan and Norton (1996) have identified four general categories:

- Financial measures
- Customer-related measures
- Internal performance
- Learning

Financial measures focus on economic value added and return on investment. Customer-related measures are customer satisfaction and market share. Internal performance includes quality, response time and cost measures. The learning category includes employment aspects such as skill development, retention and information technology. Schary and Skøjtt-Larsen (2001) describes a similar model.

The Supply chain mission shall be linked to the balanced scorecard framework. Management decides what shall be included in the scorecard. The scorecard can for example be divided into areas like financial, customer, competitive position, internal efficiency and employee.

4.2.2 SCOR model

The Supply chain Council has developed the SCOR model. The model is a reference model and SCOR stands for Supply Chain Operations Reference. The purpose for the model is to:

- Provide a standard language for SCM that can be used cross-industry
- Facilitate external benchmarking
- Establish a basis for analyze of Supply chains
- Compare the current Supply chain with the target for the future

The aim of SCOR is to provide a standard way to measure Supply chain performance and to use common metrics to benchmark against other organizations according to Christopher (1998).

The SCOR model is based on four management processes:

- Plan: balances Supply and demand
- Source: procurement of products and services
- Make: transforming of products and services into finished goods
- Deliver: delivery of products and services.

The SCOR model has three levels:

- Top level: defines the scope and content for the Supply chain.
- Configuration level: designs the Supply chain
- Process element level: gives detailed information on each process.

A process is composed of process elements and the elements are composed of tasks. Tasks are a set of activities. The activities are standardized to make comparison between Supply chains possible. The SCOR model has 12 performance metrics. The most effective way to develop a close customer relationship is by understanding customer behaviors and designing and sustaining a Supply chain tailored to deliver value to each customer segment.

The 12 metrics are according to Huan et al. (2004):

- Delivery performance
- Fill rate
- Order fulfilment lead time
- Perfect order fulfilment
- Supply chain responsiveness
- Production flexibility
- Total logistic management cost
- Value-added employee productivity
- Warranty cost
- Cash to cash cycle time
- Inventory days of Supply
- Asset turns

4.2.3 Benchmarking

A formal definition of benchmarking is that it consists of a systematic procedure for identifying the best practice and modifying actual knowledge to achieve superior performance according to Camp (1989). Benchmarking is a process for comparison against best practice. It is important with common metrics that can be used when comparing companies. Benchmarking has five basic purposes described by Splendolini (1992):

- Strategy: planning for short and long term
- Forecasting: predict trends
- New ideas: stimulate new thoughts
- Process comparisons
- Setting objectives and targets: base them on best practice

Benchmarking can be used both internally within the own company and externally. The internal benchmarking can be used to compare different departments, but also the check how one department change over time. External benchmarking can be used to compare the own company with competitors or with companies that have high performance.

4.3 System thinking in performance measurements

Are the performance measurements considering the whole Supply chain and do them support system thinking? Beamon (1999) discuss the weakness of single Supply chain measurements. Beamon concludes that the most common weakness of a measurement is that it not covering the whole scope. It must measure all related aspects of the Supply chain and not be sub optimized. If a company decides to use cost as the only measurement of its Supply chain performance this will probably result in a Supply chain operating under minimum cost, but with a high risk of poor customer response, poor tome

performance or lack of flexibility. Many researches are skeptical about the possibility to create a well-functioning Supply chain measurement system. The reasons for this are that it is difficult to measure Supply chain performance and some Supply chain performance are hard to quantify says Lambert (1998).

4.4 Measurements of Supply chain excellence

Supply chain excellence requires that the actors in the Supply chain know how to do performance measurements according to Keebler (1999). What is the reason for performance measurements? There are several reasons and they vary between different companies. Parker (2000) has identified the following reasons for measure performance within an organisation:

- Identify success
- Identify whether the organisation understand its processes
- Identify whether the company are meeting customer requirements
- Identify bottlenecks and where improvements are necessary
- Ensure decisions are based on facts
- Show if planned improvements actually happened

Geanuracos and Meiklejohn (1993) said that most business people are colored by the manufacturing environment rather than service focused business. Richard Schonberger does a performance measurement based on ITO. The companies are classified in different groups depending on their ITO improvements over the years. Some companies are doing well despite unimpressive ITO trends according to Schonberger (1996). An example is Coca Cola. This measurement gives information about the success in Inventory Turnover and with that decreasing tied up capital. An overall success for the whole Supply chain doesn't automatically follow this. A company can have a very high ITO and a good trend in improvements, but can still not be classified as a company that achieve Supply chain excellence due to for example very high transport cost and long lead-time. Having a comprehensive view is the essential thing in SCM and in the aiming for Supply chain excellence.

Supply chain excellence is in this thesis a balance between Supply Chain Cost and customer service. Parasuraman et al. (1991) write that customer service expectations have two levels desired and adequate. The desired level is the service the customer hopes to receive. The adequate service level is what the customer finds acceptable. This is important to have in mind when setting up the Supply chain towards a customer. The purpose of SCM is to set up a Supply chain that meets the service level expected by the customer at as low Supply Chain Cost as possible. The desired level can be totally out in the blue and can lead to a very high Supply Chain Cost that will have an effect on the customer in the end. Therefore it is very important to understand the customer expectations and more focus on the adequate level. Paulsson et al. (2003) mean that some customers have higher expectations than others concerning for example a shorter lead-time. This expectations can in same cases be met depending on the situation and if it is profitable from a business perspective.

Dornier (1998) defines the performance criteria in two categories.

- Order winning criteria
- Qualifying criteria

In qualifying situations the supplier often is willing to have smaller margins meaning that the company can offer customer support that pass the line for what is profitable. The supplier requires higher margins in order wining situations. In this situation the supplier already has qualified as a supplier and in the future

business they require higher margins. The measurement system shall be designed to focus on strategically decisions and inspire action according to Vitale and Mavrinac (1995). The performance measurements shall support the linking of long-term strategy with short term actions. Kaplan and Norton

(1996) have designed the balanced scorecard due to the weakness in other performance measurements. The Balanced scorecard is frequently used in the industry, but it could be difficult to get a good Balanced Scorecard covering the overall performance in the company and that includes an efficiency measurement. There are a lot of criteria to think about when setting up the performance measurements.

Chapter 5 Supply Chain Cost.

Supply Chain Cost.

The difference between Logistics cost and Supply Chain Cost, what is included in Supply Chain Cost and difficulties measuring Supply Chain Cost are questions that will be discussed in this chapter. According to Schary and SkøjttLarsen (2001) revenue and cost describe the Supply chain. In their opinion cost data gives more information regarding the Supply chain than any other source.

5.1 Logistics cost versus Supply Chain Cost

Logistics cost and Supply Chain Cost (SCC) are two terms that are used both in the industry and the academic world. SCC cost has a wider definition than Logistics cost in accordance with the wider scope for Supply Chain Management compared to Logistics Management. Logistics cost is normally referred to as cost components related to distribution cost and cost for warehouse as reflected by the definition of logistics according to Lambert et al (1998). SCC is the total cost in the Supply chain.

Bowersox and Closs (1996) define SCC as cost components related to:

- Order handling
- Purchasing
- Stock handling
- Systems needed to handle the Supply like for example the order system.
- Manufacturing

Ayers (2001) writes that the SCC is sometimes considered being the same as Logistics Cost. Due to this, some misunderstandings regarding these two terms may exist.

5.2 Supply Chain Cost

In this thesis, Supply Chain Cost is defined as all cost in a Supply chain. Analysis of SCC can be performed in different ways. Different kind of grouping of cost can be found in the literature. Bowersox and Closs (1996), Chen (1997), Sachan et al. (2005) and Byrne and Heavey (2006) have done similar definitions. These definitions use for example different terms for the same thing like Production cost in the definition of Chen (1997) and Manufacturing cost in the Bowersox and Closs (1996) definition. Su et al. (2005) make a general definition without defining the cost types into different groups.

Chen (1997) says that SCC can be placed in the five categories:

- Production cost
- Transportation cost
- Warehousing cost
- Inventory carrying cost
- Internal material handling cost.

Sachan et al. (2005) have studied the total Supply Chain Cost in the Indian grain chain. They define the total Supply Chain Cost as the sum of farmer's price, total additional cost, total mark-up and total wastage. Farmer's price is the cost of growing and processing the grain and the margin for the farmer.

- Additional cost includes:
- Inventory holding cost
- Materials holding cost
- Transportation cost
- Order processing cost
- Packaging cost

Total mark-up cost is the amount added to the cost price to get the selling price. Each participant in the chain has his or her own mark-up percentage. Total wastage may be due to one or more of the following three reasons:

- Obsolete losses
- Transit losses
- Pilfering losses

Byrne and Heavey (2006) break down the SCC into five different categories:

- Transportation cost
- Order processing cost
- Production setup cost
- Inventory cost
- Backorder cost.

Transportation cost is the shipment cost between finished stock in Company A and the stocking location of the distributor. Order processing cost is the cost for processing the orders. Production set-up cost is the cost associated with an order being set-up in the processing areas. Inventory cost is the cost for holding stock for one period. The period can for example be one month or one year. Backorder is the cost for backorders for one period. Su et al. (2005) define the total Supply Chain Cost as the amortized fixed cost and the periodic operating cost.

5.3 Measurement of Supply Chain Cost

Solvang (2001) says that cost is one of the most important performances of a Supply chain. When measuring SCC it is important to know what you would like to measure. Quinn (1998) and Hoole (2005) describe measures of SCC that have been performed. Quinn (1998) describes a study the research and consulting firm of Pittiglio Rabin Todd and McGrath has performed. The firm found that companies considered to be best practice companies in moving product to market had a 45-percent Supply-chain cost advantage compared to the average competitor. The order-cycle time was half and their inventory days were 50 percent less compared to their competitors. Further, their delivery precision was 17 percent better. According to Hoole (2005), the total Supply Chain Cost can vary by 5 percent to 6 percent of annual revenues between companies in the same industry sector. This is based on a benchmarking of more than 500 Supply chains. Hoole found in his research that companies that have a mature Supply chain are reducing cost faster than less mature Supply chains. Researchers have focused on SCC

savings, conflicts between different units and new customers influence on SCC. Byrne and Heavey (2006) write that improved information sharing and forecasting techniques can lead to total Supply chain cost savings up to 9,7 %. Christopher and Gattorna (2005) discuss SCC savings as a result of creative pricing strategies combined with efficient Supply chain management. The SCC savings provide opportunities for increased profits. Hosang and Bongju (2005) discuss the conflict between different units in a Supply chain. They say that each unit tries to minimize its own cost and is not considering the whole Supply chain. An improvement in production that gives a lower production price is positive for the production department or company. The installation cost might increase more than the decrease in production and the total effect for the Supply Chain is negative Kumar and Kropp (2006) found in their study that new customers and new products could drive up the SCC. Product cost calculating is an important part to SCC. Alnestig and Segerstedt (1997) say product calculation is a comparison of revenue and costs. Product calculation is used to set a manufacturing cost, to estimate the value of items in inventory, to check if a product is profitable, to support the decisions of sales prices, and a part in analysis of customer profitability.

SCC is concentrating on the costs connected to the Supply chain as described above. However this cost can in practice be estimated in different ways and with different accuracy. Rough mark-ups can be used to cover for example transportation costs, order-processing costs etc. Actual costs can be reported directly to a customer order or a customer project. The latter is naturally to prefer if an accurate SCC is preferred and supports for correct decisions are wished. But even for the most accurate SCC a mixture of standard costs, from the companies' budgets and cost accounting systems, and actual invoiced costs is necessary. Some cost drivers must distribute indirect costs. Therefore measuring an accurate Supply Chain Cost can be difficult. One reason for the difficulties in measuring SCC is that the setup of the accounting systems in a company are not adjusted to SCC measurements. According to Christopher (1998), conventional accounting systems group costs into broad aggregated categories which do not allow more detailed analysis which is necessary to identify the true costs of servicing customers.

Chapter 6: Summery of Literature Review.

This chapter concludes the literature review. It also includes the motivation for conducted research.

6.1 Conclusions of the Literature review

The research in this thesis focuses on measurement of how efficient a Supply chain is. Most research has tended to focus on specific operational and tactical aspects of the Supply chain such as client contractor relations and there is a need to move from atomistic theory generation towards holistic and cross-disciplinary theory generation. The purpose of Supply Chain Management is to manage the Supply chain as efficiently as possible. This means that the Supply chain shall maximize the revenue for the company.

A difficult part of SCM is to offer better value to the customer and at the same time reduce cost. It is important to combine cost and customer service. The future market leaders are the ones that have sought and achieved the twin peaks of excellence. They should have gained both cost leadership and service leadership. It is difficult to measure or evaluate performance in a Supply chain. Furthermore half of the companies contacted in a research performed by Harrison and New (2002) had limited possibilities to perform performance measurements in their Supply chain. 19 percent could not measure at all.

Furthermore there are a lot of performance measurements to choose from. In the end of the nineties two types of performance measurements dominated in the literature. These were cost and customer responsiveness.

To be able to measure the efficiency in a Supply chain four topics have to be investigated:

- Determination of what measurements should be included in the performance measurements to provide a good measurement of how efficient a Supply chain is.
- Determination of how Supply Chain Cost and performance towards a customer should be combined in a measurement to give a good picture of the efficiency of a Supply chain.
- Determination of what should be included in the measurement of Supply chain cost.
- Determination of the possibility to measure performance for a company.

The research in this thesis will cover these four parts.

My literature review includes four focus areas. The first area was efficiency. To understand efficiency measurements I found it important to include Supply Chain Management in the literature review. SCM is the general picture you have to understand to be able to define efficiency measurements. Performance measurements and cost measurements are two important areas that were included because they are essential to be able to manage the Supply chain in a good way and measure efficiency. According to Sink and Tuttle (1989) you can't manage if you can't measure.

6.2 Motivation for conducted research

Based on the literature review the research in this thesis can be motivated as follows.

Empirical study:

It is difficult to evaluate performance in the Supply chain. The measurement of SCC is especially difficult because a normal set up of the accounting system in a company are not adjusted to SCC measurements. Various aspects on performance measurements, cost measurements and efficiency measurements in the Supply chain were found essential in my literature review. To understand how these theories are used within the industry my research progressed with an empirical study. The aim with the study is to get a picture of how companies are working with performance measurements, cost measurements and efficiency measurements. I couldn't find a clear efficiency measurement in the literature review. Therefore I decided to investigate how companies define efficiency in the Supply chain and if there is measurements that measure efficiency.

Index for measurement of the efficiency in a Supply chain:

There are a lot of strategies and methods to choose from when setting up a Supply chain and it is difficult to know if the best strategies and methods are chosen. The weakness of measurement in a Supply chain is that measurements do not cover the whole scope of SCM and that some performance measurements are hard to quantify.

Three common methods for measuring performance in the Supply chain are Balanced Scorecard, SCOR model and benchmarking. None of these methods have an explicit measurement for efficiency in the Supply chain. The SCOR model includes different kind of measurements, but no comprehensive measurement for efficiency in a Supply chain. The types of measurements included in the Scorecard differ between different companies, but also within a company. The Scorecard includes measurements that together can give a view of the efficiency, but there is no single measurement that measures efficiency. Benchmarking is a way to comparing best practice. Delivery precision and ITO are two examples of measurements that can be used for benchmarking, but I haven't been able to identify an efficiency measurement that has been used for benchmarking. The literature review identifies a theoretical gap regarding efficiency measurements. No model or index for efficiency was explicitly found in the literature review. I therefore decided and try to formulate an index for efficiency measurements combining several measurements. The result from the empirical study regarding if there are efficiency measurements or methods for measuring efficiency used in the industry is a base for the index formulation.

Examination of the index in a company: It is difficult to measure efficiency in the Supply chain. SCC can also be difficult to measure as discussed. The suggested index is tested on a company selling products and services all over the world and with companies in countries all over the words.

Chapter 7: Analysis and Interpretation.

This chapter includes an empirical study with the aim to investigate how KEL is performing performance measurements in the Supply chain and how they possibly define and measure efficiency in its Supply chain. KEL is continuously working with improvements in the Supply chain and is aiming for Supply chain excellence and World-class Supply, but what does this mean? Is Supply chain excellence to have short lead time and high delivery precision or is it to achieve a low cost for the Supply chain? This differs a lot between different companies and also at different times. The study is set-up to investigate how KEL with business in Bangladesh define an efficient Supply chain and is working with Supply Chain Management, Performance measurements and Supply Chain Cost.

7.1 Method

The study is based on answers from Supply Chain Management professional within KEL and other trading and manufacturing companies. More than 10 companies were contacted and interviewed by mail, phone or personal visit. The criteria for selection of these companies where that they should represent different sectors. Ten sectors were selected and three companies representing each sector were contacted. The sectors are:

1. Manufacturing industry

2. Pharmaceutical/ medical technology industry

3. Telecommunication industry

4. Commodity industry

5. Consumer products industry

6. Contract manufacturer

7. Materials

8. Automobile industry

9. Paper industry

10. Construction industry

All responding companies operate on the local and global market. Many of the suppliers are located in other countries. The reason for interviewing people from different sectors was to observe if the answers differed from different branches or sectors. Inside a branch different companies may naturally have different opinions and treatment about the Supply chain, therefore three companies from the same sector were interviewed. Only one Supply Chain Management professional, their names and positions are listed in the section of references, in this many relatively large companies were interviewed. I may have found another professional, top or middle management, also working with SCM in another part of the company answering to my questions a bit different. However, I argue that the strategy about Supply chain is one of the key strategy parts in a company and the information and the general thinking about it is mostly well distributed both in the formal and informal organization even if it is not formally documented. I also prioritized to interview people from several companies than many from one company. I tried to find out answer of some questions and tried to evaluate SCM of KEL considering those answer.

7.1.1 Data collection

The empirical study was initiated in November 2014. The interviews with Supply Chain Management professionals within the 10 companies including Kallol Enterprise Limited, were conducted between 5th November 2014 to 15th November 2014. The study was set up to get answers on the following questions:

- How is an efficient Supply chain defined?
- Is Supply Chain Cost measured?
- Which performance measurements are the most common?
- Correlation between Supply's position in the company and definition of efficient Supply chain
- Position of Supply in different sectors
- Measurement level

Five questions were set up to cover the mentioned focus areas above. The questions are:

Is Supply an own part of the organization?

What is an efficient Supply chain in your company?

Is the company measuring Supply Chain Cost, and how?

How is performance measured in the Supply chain?

On which organization levels are the measurements performed?

General Information about the companies was collected to get an overall picture of the participating companies with reference to the sector they work in and the size of the company. The size of the company is defined by Net Sales and Head count. Information about Net sales and Head count is coming from annual reports 2013 and information from the company.

The companies that participate in the empirical study has different conditions for measurements in the Supply chain due to the type of business and the tradition in the sector they have their business. I have therefore chosen different sectors to get a wider view of the performance measurements among companies in Bangladesh. For companies in the Automobile industry group and in the Telecommunication industry group purchasing, production and distribution are important parts in the Supply chain. This differs from the Materials group and Paper industry group where production must be considered the important part. The reason for production to be the important part is that the machine equipment used in production is very expensive to purchase. In comparison with material cost, administration cost, distribution cost and capital cost the cost for machine equipment is the dominant part. Therefore these companies focus on production and to maximize the utilization of the machinery. Purchasing is the important part for the Construction industry group. For this group is the purchased material the highest cost in the Supply chain and therefore the highest focus is on purchased material?

7.1.2 Analysis of data from the empirical study

Data concerning the five questions used in the interviews with the 10 companies participating in the study were gathered in a type of a database. The analysis of the data was performed in three steps. The first step included setting up the rules for quantifying the answers and identifying groups among the answers. In step two all answers were placed into the identified groups. Analysis of the result was performed in the third step. All three steps were performed for each of the five areas:

1. Definition of efficiency

2. Measurement of Supply Chain Cost

3. Measurement of performance

4. Measuring level in the company

5. Position of Supply in the organization

The data from the question about how the company defines an efficient Supply chain were divided into three groups. The first group is definitions including only cost. The second group includes definitions only relating to performance measurements, but no cost. Group number three includes efficiency definitions that consist of both performance measurements and cost. The representative of the company were asked to formulate how she/he defined an efficient Supply chain, from the answers I classified the company in one of these mentioned groups. The analysis for SCC is based on the definition that SCC should include administration cost, manufacturing cost, warehouse cost, distribution cost, capital cost and installation cost if this cost is applicable. The warehouse cost, distribution cost, capital cost and installation cost should be the actual cost as far as possible for the product, product group, customer order or other measurement object. Manufacturing cost can be based on a fixed manufacturing cost per product that has been defined by product calculation. Administration cost can be based on a mix of actual cost and on add on based on percentage share. Administration cost from general support functions and higher management in a company is in general coming from a percentage add on. Data from the question if the company is measuring Supply Chain Cost is divided into five groups. The first group is companies that don't measure SCC at all. These companies don't use the term SCC and don't measure any at all. Group number two measure parts of the components, but mainly based on manufacturing costs This means that a company for example measure distribution cost, but that the estimated cost is based on rough mark-ups, a percentage add on cost, and not the accurate actual cost as it should be when SCC is properly measured. The third group is measure parts of the components. This means that the company use the term SCC, but measure parts of the measurements that are included in SCC. To measure all parts in SCC all of administration cost, manufacturing cost, warehouse cost, distribution cost, capital cost and installation cost shall be included in the SCC measurement. Installation cost is only applicable when this cost is included in the Supply chain. Group number four includes an answer that doesn't use the term, but still measure all cost components. This means that the company doesn't use the term SCC, but measure all parts according to the definition above. The fifth group "use the term" means that the company use the term SCC and measure all parts that should be included according the definition above accurately. The answers from the question about which performance measurement the company use is divided into eight groups. The groups are:

1. Delivery precision: Material delivered in accordance with what is promised.

2. Lead-time: The tine from starting an order until it is ready.

3. Cost: All types of cost measurements. Example distribution cost and capital cost.

4. Inventory turnover: Measurements regarding tied up capital. Example ITO, tied up capital in money and number of days in stock.

5. Internal performance: Measurements regarding how internal performance. Example yield in production, ordering entry time and capacity utilization.

6. Customer satisfaction: All types of customer satisfaction measurements.

7. Quality: Quality from the customer's point of view. Example number of claims and number of replacement of goods.

8. Service grade: Measurements regarding service grade towards customers. Example fill rate and back order.

Data from the question about measurement level in the company is divided into 11 groups. Measurement level means what level in the company can the company measure on. The level can for example be product level. The 11 groups are:

1. Region: Measurement on region level. South, North, West.

2. Warehouse: Measurement for each warehouse the company has.

3. Business unit/division: Measurement on business unit level or division level.

4. Selling company: Measure meant for each selling company. Example the selling company in Singapore, Munich and Sao Paulo.

5. Order: Measurement for each order.

6. Supplier: Measurement for each supplier that supply material to the company.

7. Product: Measurement for different products or product groups in a company.

8. Department: Measurement for different departments within the company.

9. Production plant: Measurements for the production plant within the Supply chain.

10.Customer: Measurements for different customers the company have.

11. Company: Measuring the whole company. Example a total delivery precision for the company.

The answers from the question about the position of Supply in an organization were divided into three groups. Position of Supply means if there is a part of the organization including organizational parts belonging to the Supply chain. The first group is no and means that the organizational parts belonging to the Supply chain are spread in the company. Order handling can for example be part of Marketing & Sales department, production part of different divisions and distribution part of the Sourcing department. The second group is yes and means that the company has all parts in the Supply chain in one organizational part. Group three is partly and companies are classified into this group if they have some parts of the organizational parts belonging to the Supply chain together in an organization. Companies belonging to this group have for example purchasing, order handling and stock handling in one common organization, but production and distribution are included in another part of the organization.

Methodology.

7.2 Result

The result is presented in five areas. The areas are Efficiency, Supply Chain Cost, Performance measurements, and level of measurements and position of Supply in the organization.

7.2.1 Efficiency

The definition of an efficient Supply chain varies between different companies. Three groups are identified among the answers. The groups are performance, cost and a combination of performance and cost. Definitions of efficiency in terms of performance are for example high delivery precision and high customer satisfaction. No cost parts are included when the definition is classified as a performance based definition. Definition of efficiency in terms of cost means that the definition only relates to cost and no other parts. The analysis and conclusions are based on the answer from one person in each company. The answers could potentially be different if someone else from the company had answered the questions. This has to be considered when analyzing this study. One third of the companies in the study have both performance focus and cost focus in their definition. The most common definition is based on the performance. 53 percent of the participating companies are focusing on performance when they define an efficient Supply chain. Only 10 percent of the company's focus on cost only. One example from a company in the commodity industry group is that an efficient Supply chain keeps what is promised, delivery in time, right quantity, and right quality and to lowest possible cost. This definition includes both the performance focus and the cost focus. Definition of an efficient supply chain Cost 10% Performance and cost 37% Performance53%. The automotive industry sector, the telecom sector and the commodity industry sector are most into the combination of cost and performance thinking when defining an efficient Supply chain. An example of efficiency definition from the construction industry is A Supply chain with lowest cost and highest price towards the customer. This definition has cost focus. Another definition is total cost efficiency in the whole Supply chain and avoiding sub optimizing. This definition comes from a company in the consumer products sector. An example of performance focus is Material delivery in right time, quantity and quality. Manufacturing industry and Paper industry are the sectors with the highest performance focus in their efficiency definition. Companies with cost focus in their efficiency definition are from the consumer products sector and the Construction industry sector. To remain competitive in the new global environment companies will have to seek ways to lower cost and at the same time enhance the service towards customers according to Christopher (1998). This means that a company needs to have both cost focus and customer focus at the same time. The grade of cost focus and customer focus varies between different sectors. Some sectors have higher focus on cost depending on the market situation. Some sectors are still working with high margins and the cost focus is not as essential as for sectors with high requirements for lower prices.

7.2.2 Supply Chain Cost

Ways of handling measurements of SCC varies between the 10 companies including Kallol Enterprise Limited participating in the study. The study shows that it is only 3 companies out of 10 that say that they don't measure SCC at all. The rest is doing some kind of measurement of SCC. It is only one company that use the term SCC and measure all parts. More than two thirds of the companies are measuring parts of the components in Supply Chain Cost. Two companies measure parts of the components, but not based on actual cost. This means that for example the distribution cost is measured as a percentage of the total distribution cost in the company. The percentage figure is decided by earlier calculations. The study shows that most of the participating companies have started with the measurement of SCC, but there is still a long way to go to come up to complete measurements of SCC Use the term Doesn't use

the term, but measure all components Measure parts of the components Measure parts of the components, but not based on actual cost.

The sectors Materials, Telecommunication and Paper industry are the only sectors with companies that don't measure SCC in any form. The company that measure SCC is within the commodity industry sector. SCC as a measurement is more interesting for companies that have to focus on having a total view on the cost in the Supply chain to be able to reduce cost. For some companies the machinery in production and transportation cost are the most dominant costs in the Supply chain. Cost for tied- up capital and distribution are the highest costs within the Supply chain for other companies.

All other sectors are measuring parts of the SCC. The way of measuring for these sectors differs. Measuring SCC in the Paper industry has a focus on distribution cost. The focus in the SCC scope in Pharmaceutical/ medical technology industry is on production cost and distribution cost.

7.2.3 Performance measurements

Supply chain excellence requires that the actors in the Supply chain know how to do performance measurements according to Keebler (1999). The analysis of the answers is based on the metrics in the SCOR model, but with some adjustments. The aim of SCOR is to provide a standard way to measure or to evaluate Supply chain performance and to use common metrics to benchmark against other organizations Christopher (1998). The SCOR model has 12 performance metrics. The 12 metrics are according to Huan et al. (2004):

1. Delivery performance

2. Fill rate

3. Order fulfillment lead time

4. Perfect order fulfillment

5. Supply chain responsiveness

6. Production flexibility

7. Total logistic management cost

8. Value-added employee productivity

9. Warranty cost

10. Cash to cash cycle time

11. Inventory days of Supply

12. Asset turns

The metrics from the study are divided into eight groups:

1. Delivery precision

2. Lead-time

3. Cost

4. Inventory turn over

5. Internal performance

6. Customer satisfaction

7. Quality

8. Service grade

Delivery precision is corresponding to delivery performance, perfect order fulfillment in the SCOR model. Lead-time is corresponding to order fulfillment lead-time in the SCOR model. Cost covers total logistic management cost and warranty cost in the SCOR model. ITO covers asset turns and inventory days of Supply in the SCOR model. Internal efficiency covers fill rate, Supply chain responsiveness, production flexibility, value-added employee activity and cash to cash cycle time in the SCOR model.

Three extra metrics are added compared to the 12 metrics in the SCOR model. These are quality, customer satisfaction and service grade. The metrics from the study are also corresponding to the Balanced Scorecard. The Balanced Scorecard is a framework for measurements of the performance in an organization, see section 3.2.1.

Cost is a part of the financial measures group in the Balanced Scorecard. Delivery precision, lead-time, customer satisfaction and service grade are part of the Customer-related measures. Inventory turnover and internal performance are in the internal performance group. The Balanced Scorecard also has a learning part or as in some scorecards employee. This part is not covered in this study. The metrics are not exactly the same if you compare different companies. The denomination can differ, but the measurement is the same. Delivery precision is covering all measurements that measure if an order is delivered in confirmed delivery date. Lead-time is covering measurements of different lead-times like for example production lead-time and lead-time from orders receipt to delivery to customer. Cost is covering all kind of cost measurements for example SCC, manufacturing cost and distribution cost. Inventory turn over (ITO) covers all measurements related to tied-up capital. Internal performance covers all kind of measurements that are done to improve the efficiency within the company. Examples of measurements that are included in this measurement are fill rate, parts processed per man-hour, forecast precision and Supply chain responsiveness. Customer satisfaction is including all measurements related to customer satisfaction. Quality is covering measurements related to quality like for example faulty rate. Service grade includes all measurements related to the service level. Some examples are safety stock, back order and service level. The most common performance measurement according to the empirical study is delivery precision. 63 percent of the responding companies are measuring delivery precision. Next in line is ITO where 50 percent are measuring this metrics. As number three are 40 % of the companies that are measuring lead-time. Number 4 is cost and as number 5 comes quality and service grade. Only 17 percent of the companies are measuring Customer satisfaction.

Measuring of performance in the Supply chain can be difficult according to Schmitz and Platts (2003) and Harrison and New (2002). It is difficult to measure the performance in Supply chains Schmitz and Platts (2003). According to Harrison and New (2002) half of the companies they contacted in their research had limited possibilities to do performance measurements in their Supply chain. 19 percent couldn't measure at all. One of the findings in this empirical study is that all companies in this study are measuring performance. This is positive and indicates that measuring performance in a Supply chain is seen as natural part in the management of the Supply chain.

The performance measurements that are performed in the 10 companies including Kallol Enterprise Limited that are participating in this study are well corresponding to the measurement in the SCOR metrics and the Balanced Scorecard. The empirical study shows that the focus areas for performance measurements differ between the sectors. For companies within the Manufacturing industry sector are the focus on delivery precision, lead-time and ITO. The most common measurements for Pharmaceutical/ medical technology industry are ITO and service grade. Companies within the telecommunication industry delivery precision, lead-time and ITO are the most common measurements. Within the commodity sector

ITO and service grade are the most common performance measurements. The Contract manufacturer sectors most common measurements are delivery precision, lead-time, ITO and Service grade. Delivery precision is the most common measurement for the Materials sector and the Automobile sector. In the Paper sector delivery precision and ITO are the most common performance measurements. Within the Construction industry cost and customer satisfaction are the most common measurements.

7.2.4 Measurement level

The most common level to measure according to the 10 participating companies including Kallol Enterprise Limited in the study is on product level and production plant level. 53 percent of the companies are measuring on product level and on production plant level. Notable is that less than one third of the companies measure on company level.

Effective performance measurement should be related to strategic, tactical and operational levels of the company according to Gunasekaran et al. (2004). The strategic level measures influence the top-level management decisions. Operational level measurements assess the results of decisions of low-level managers. The reference to level in this case is considering aggregate level for the performance measurements. There are three general aggregate levels: low level, middle level and top level. Low level can be order, product customer, department and supplier. Middle level can be production plant, warehouse and selling company. Top level is Business unit level, region and company. The study shows that low-level measurements are dominating.

7.2.5 The position for Supply in an organization

The position for Supply in an organization is checked to investigate if there are any connections between position for supply and the way the company define efficiency and which measurements the company use to measure performance. The definition of Supply is based on the general definition of normal functions in a company. The functions are:

Research and Development

Marketing and Sales

Supply

Service

General administration and business controlling

The functions are described in section 2.2. Supply is in this definition including inbound logistics, outbound logistics, sourcing, production and distribution. In the Supply part, claims and warranty handling is also included. The position of Supply in an organization varies between the companies. In some companies production is the main department, in other is purchasing the main department and in others Supply. The question is Supply an own part of the organization is interpreted based on that all parts in the Supply are included in one organizational part. Partly means that the company has a Supply part, but all parts are not included. In some sectors it is common that production is an own part outside Supply and in others purchasing is the main name of the organization and other parts of Supply are sub units to purchasing. 33 percent of the companies have Supply as an own part in the organization. Half of the companies have Supply as a part of the company, but all parts are not included. 13 percent of the companies don't have Supply as an own part of the organization.

The empirical study shows that companies that have Supply as an own part in the organization have a wider definition of efficiency including both cost and performance focus. These companies also have a wider scope of performance measurements including more types of measurements. Companies that have supply as an own part of the organization have 3 to 8 different types of performance measurements.

Companies that don't have supply as an own part of the organization has 1 to 2 types of performance measurements. Companies that partly have supply as an own part of the organization are represented by a curve between with 2 to 4 types of performance measurements. Almost all companies defining efficiency as a combination of performance and cost also have supply as an own part of the company. Companies that don't have supply as an own part of the company define efficiency as cost or performance.

7.3 Conclusions

The overall finding from this study is that the 10 companies including Kallol Enterprise Limited participating in this study all have a Supply focus, but are on different development stages regarding Supply organization, measurements and efficiency thinking. The key findings from this empirical study are:

- There is more performance focus than cost focus.
- Supply Chain Cost is measured but few companies Including Kallol Enterprise Limited are using the term and measure all components included in SCC.
- Delivery precision, Inventory turnover and lead-time are the most common performance measurements.
- Supply is still not a natural part of all organizations including Kallol Enterprise Limited.
- The most common level to measure is on product level and production plant level

7.4 Key Findings

Key finding 1 is that 30 % of the participating companies are focusing on both cost and performance in their efficiency definition. 53 percent of the participating companies are focusing on performance in the definition of efficiency. In the beginning of the eighties the focus was on cost effective Supply chains. During the coming years quality was in focus and then in the end of eighties the focus went back to cost. In the beginning of the nineties it was high availability that gave market shares.

Key finding 2 is that Supply Chain Cost is measured but few companies are using the term and measure all components included in SCC. Two thirds of the companies are measuring parts of the components in Supply Chain Cost.

Key finding 3 is that delivery precision; Inventory turnover and lead-time are the most common performance measurements. The measurements vary between different sectors. Delivery precision is the most common measurement for the Materials sector and the Automobile sector. The measurements are not giving a full coverage for cost and performance in a company.

Key finding 4 is that Supply is still not a natural part of all organizations including Kallol Enterprise Limited. 33 percent of the companies have Supply as an own part in the organization. The way a company decides to set up their organization varies between different sectors. Within the paper industry sector is production the Supply part with highest focus. Production is a separate department and not included in a total Supply organization. Within the Construction industry sector is purchasing the main Supply unit. The purchasing part is the where the companies in this sector has to put most efforts to get

low prices for material they are purchasing. Low price for purchased material is the key factor for getting as good revenue as possible.

Key finding 5 is that common level to measure is on product level and production plant level. Less than one third of the companies measures on company level. Few companies are measuring on order level. The measurements are not performed on all three of strategically, tactical and operational level. To get a good picture of the performance in a Supply chain all three levels should be considered when setting up the measurement levels.

One improvement area based on these 5 key findings is that Supply needs to have a stronger position in the company to get the right focus on the total Supply chain. Another improvement area is to have a combined cost and performance focus in the efficiency definitions. One more improvement area is to focus on performance measurements that consider both cost and performance. The performance measurements shall give a good picture of how efficient the Supply chain is. Measurement level can also be improved by setting up measurements covering all three levels in a company. Measuring on all three levels operational, tactical and strategic gives a better picture of how the company performs.

Chapter 8: Conclusions and Recommendations.

This chapter presents the conclusions of this licentiate thesis, discussion and suggestions for future research.

8.1 Conclusions

This thesis has considered the topic of evaluation in the Supply chain and specific measurement of Supply chain excellence. This thesis has the following objectives:

Present ways of evaluation performance of the Supply chain of Kallol with other companies.

Present ways of measuring cost in the Supply chain.

To suggest a method to evaluate how efficient a Supply chain is and combining the cost concept with the performance concept.

Evaluate on which level of the Supply chain efficiency preferably should be measured.

Ways of measuring performance in the Supply chain is based on the literature review and the empirical study. The conclusions of the literature review were that it is difficult to measure performance in a Supply chain. In the end of the nineties two types of performance measurements dominated in the literature. These were cost and customer responsiveness. According to the empirical study are delivery precision, Inventory turnover and lead-time the most common performance measurements. The measurements vary between different sectors. Performance measurements related to the customer focus are delivery precision, lead-time and customer satisfaction. The measurements are not giving a full coverage for cost and customer related performance in a company. Ways of measuring cost in the Supply chain in the Supply chain is based on the literature review and the empirical study. The findings from the literature review are that there are a lot of different definitions of Supply Chain Cost. Study shows that it is only 3 companies out of 10 that say that they don't measure SCC at all. The rest including Kallol Enterprise Limited is doing some kind of measurement of SCC. It is only one company that use the term SCC and measure all parts. More than two thirds of the companies are measuring parts of the components in Supply Chain Cost. Two companies measure parts of the components, but based on rough mark-ups. The study shows that most of the participating companies including KEL have started with the measurement of SCC, but there is still a long way to go to come up to complete measurements of SCC.

The suggestion of a method to evaluate how efficient a Supply chain is and combining the cost concept with the customer focus concept is based on the literature review and the empirical study. The empirical study shows that the definition of an efficient Supply chain varies between different companies. One third of the companies in the study have both customer focus and cost focus in their definition. The most common definition is based on the customer focus. 50 percent of the participating companies are focusing on the customer when they define an efficient Supply chain. The conclusion of the literature review is that the purpose of Supply Chain Management is to manage the Supply chain as efficiently as possible. This means that the Supply chain shall maximize the revenue for the company. A difficult part of SCM is to offer better value to the customer and at the same time reduce cost. It is important to combine cost and customer service. The future market leaders are according to Christopher (1998) the ones that have sought and achieved the twin peaks of excellence. They should have gained both cost leadership and service leadership.

Delivery precision and lead-time can for example be measured on weekly basis, but customer satisfaction index only once a year. Measurements performed more frequently are easier to work with compared to measurements performed less frequently. To have an efficient Supply chain the company needs to have a low Supply Chain Cost at the same time as they have a high Performance.

8.2 Recommendations.

Kallol Enterprise Limited with other 10 companies are working with improvements in the Supply chain and are aiming for Supply chain excellence and World-class Supply, but what does this mean?

Answering this question is difficult due to all the different definitions of an efficient Supply chain. To be able to measure Supply chain excellence you need to define what an excellent Supply chain is. This thesis suggests to define excellence as an efficient Supply chain combining customer focus and cost focus. This means that the company shall achieve the best combination of customer focus and cost focus to earn as much money as possible.

Performance measurements in the Supply chain are necessary to be able to know how the Supply chain performs. Findings from the literature review and the empirical study in this thesis are that there are four criteria that shall be fulfilled to be classified as good methods or systems for performance measurements. The criteria are:

- Shall give an overall picture of how a Supply chain perform
- Shall indicate improvement areas
- Shall give guidelines about how the Supply chain shall be managed with focus on the goal for a company to be as profitable as possible
- Shall be general to allow benchmarking towards other departments, other companies and other Supply chains.

One common model for performance evaluation or measurements in any organization including Kallol Enterprise Limited is the Balanced Scorecard. The measurements in a Balanced Scorecard do not always cover the whole Supply chain and it is difficult for companies to find measurements giving an overall picture of how a Supply chain perform according to our experience. This is an interesting area with many possibilities for improvements.

Findings from this thesis are that the performance measurements should cover all three of internal performance, external performance and Supply chain cost. Internal performance measurements shall be used for finding improvement areas within the Supply chain. External performance measurements are customer related performance and shall be used to see how well the customer is served. SCC is important to measure to keep track of the cost in the Supply chain.

One improvement area based on the 5 key findings from the empirical study is that the function, process and organizational part Supply needs to have a strong position in the company to create the right focus on the total Supply chain.

There need to be a focus on Supply in a company to be able to present good quality in Supply Chain Management. Highest management in the company has to understand that Supply is important. There is a risk in companies where supply not is seen in the company structure that supply is seen as something minor.

An important finding from the empirical study is that the 10 companies including Kallol Enterprise Limited participating in this study all have a Supply focus, but are on different development stages regarding Supply organization, measurements and efficiency thinking.

An improvement area, for most of the interviewed companies and probably for most companies in general, is to have a combined cost and performance focus in the efficiency definitions. Therefore an improvement area is to focus on performance measurements that consider both cost and performance. The performance measurements shall present a good picture of how efficient the Supply chain is. Measurement levels can also be improved. Measuring on most organizational levels and by that over the time help to do decisions concerning all time horizons on an operational, tactical and strategic level, and then over the time create a follow-up of these decisions. These measurements will present an improved picture of how the company performs.

Combining cost and customer focus any company like Kallol Enterprise Limited can get benefits from measuring SCC and having a total view on the cost in the Supply chain. A complete measurement of SCC is a powerful tool to use to get the right focus in the work with SCM. Kallol and other companies should avoid prioritizing only one thing at a time, for example utilization of machinery, and after a while something else. The idea with the performance evaluation method is to “force” the companies to strive for several things at the same time: low costs, excellent customer relations, short delivery times and precise delivery dates, low inventories, high utilization of machinery and equipment, right quality etc. Because profitability is not created by financial goals but how well the company succeeds with its processes.

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Interviews

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2. Md Mogakkir Alam, Supply Chain Manager, Doreen Group.
3. Mir Jewel Ahmed, Manager, Logistics, MGH Group.
4. Mr. Moazzem Hossain, Sr. Executive, Store & Logistics, Kallol Group.
5. Mr. Shahidul Islam, Sr. Executive, Distributions, Kallol Group.
6. Mr. Shawkat Anowar, Vice President, Purchase, Kohinoor Chemical Co., BD Ltd.
7. Mr. Sabbir Ahmed, Store and Logistics, Kohinoor Chemical Co.,BD Ltd.
8. Ms Simky Afreen, Senior Officer, Procurement, Beximco Pharma.
9. Mr. Sagor Bishwash, Director, Meghna Enterprise Ltd.,
10. Mr. Fahim Mahboob, Manager, TLRA Holdings Ltd.,
11. Mr. Abid Rizbi, Director, Fabcom Ltd.