Mapping the flow Of Apparel in a Wholesale Company

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Abstract

Globalization that diminishes the barriers to trade worldwide has transformed the structure of production and increased the global competition in the textile and apparel industry. Especially, the elimination of quotas on January 2005 has totally changed the whole scenario of the apparel industry. A boom has been noticed in the emerging markets. Buyers shift their maximum orders to the low cost countries to increase their profit margins. China has gained its popularity among the European and American buyers because of the cheap labor and large scales of production and has become the world’s largest exporter of textile and apparel.

The traditional competitive factor among the buyers is the lower cost of the product but the changing markets trends and demand volatility pushes the buyers to focus also on quality and lead times in addition to price. Due to the huge competition among the cluster of brands, retailers and wholesalers, lead time is becoming critical as longer lead times increases the risk of bottleneck to sales. China is the most important apparel supplier for the EU (especially Germany, the UK, and France) because it provides the cost benefit to the sourcing companies, but at the same time, it increases the lead times and also has more environmental impact in terms of pollution because of the long geographical distance.

This thesis highlights that there is a remarkable rise of the labor cost in China, noticed for the last couple of years, which has reduced the competitive factor of price while sourcing from China. This is also an upcoming challenge for the whole world with regards to sourcing strategies. Many sourcing companies are shifting their shares away from China in order to achieve their desired profit margins. Turkey may be an alternative sourcing destination for the European apparel buyers and wholesalers because of its competitive labor cost, favorable government policies, flexibility, sustainability, and proximity to Europe. In this thesis, a pilot study is carried out to determine the relationship and effects of lead times on sales.

This thesis also describes the effects of relationships among the business partners on the supply chain flow. It is noted through several pilot studies that the organizations who work in collaboration with their supply chain partners can significantly improve their supply chain efficiency by reducing the inventories, markdowns, lead times, lost sales, and increasing forecast accuracy. There are several tools in use for collaboration such as Vendor Managed Inventory (VMI), Electronic Data Interchange (EDI), Just in Time (JIT), Customer Relationship
Management (CRM), and Collaborative, Planning, Forecasting, and Replenishment (CPFR). In this paper the CPFR implementation steps, benefits, and hindrances are discussed in detail.

**Key words:** Supply chain & logistic management, lead time management, Global outsourcing, and Collaborative, Planning, Forecasting, and Replenishment (CPFR).
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1 Introduction

The sourcing decisions are generally carried out from the “low-cost country” because of the lower manufacturing cost, but due to several factors considering “low cost country” as a foremost cost-mitigation strategy is going to be changed. One reason for this is a shift of low-cost countries to the emerging markets. This shift increases the expectations of the labor for “globally fair” wages, for example the labor cost in China is increasing radically, which will raise the cost of goods produced there, resulting in squeezing the profitability of buyers and therefore they require to revise their sourcing strategy (Berg, Hedrich, Kempft, & Tochtermann, 2011, p. 4; Ellis, 2008).

The “total supply chain cost” is another reason, due to which low-cost country sourcing is losing the potential. Most of the time the initial cost advantage may be achieved by manufacturing the product in low-cost country, but a “total supply chain cost” perspective provides a sensible approach to making sourcing decisions. The focus of this concept is on total cost of the product including manufacturing and transporting as well as the cost of obsolescence, forced markdowns, and inventory carrying cost (Mattila, n.d., pp. 29-31; Christopher, Lowson, & Peck, Creating Agile Supply Chains In The Fashion Industry, n.d., p. 6).

Mean while, quick response is also considered to be an important competitive factor. Sometimes the trading companies have to respond fast in order to gain an advantage over competitors. For them sourcing from a low-cost country, especially from Asian countries doesn’t make sense because the lead time considerations may actually be of a higher priority than the initial cost of the product, which actually affects the total cost of the supply chain. Due to longer lead times, sourcing companies may experience huge markdowns or lost sales, which is why for sensible sourcing the total costs and lead times are taken into account. For some companies, this may mean that the most profitable is to do nearby sourcing (Ellis, 2008).

At the manufacturing end, it is noted that most of the logistic operations and factors like cost, quality, and lead time are becoming a challenge. The rise of raw material costs makes the criterion of the price tough. The continuous growing and changing of customer demands and preferences, increases the supply chain complexity. Therefore, it is difficult for only manufacturers to deal with the supply and demand
challenges by keeping up consideration of the factors like cost, quality and lead time (Ellis, 2008).

The approach of “profitable proximity sourcing” is now under consideration for the trading companies. As it is noted that the term “total supply chain cost” is not just a total landed cost but it also includes the hidden cost like inventory carrying cost, the cost of obsolescence (lead-time cost), and mark downs. The hidden cost and sourcing trends act as indicators due to a number of reasons, such as increase in labor cost; the advantage of sourcing from China in term of low cost manufacturing is reduced and it is almost of same cost to manufacture in Turkey. This enables the sourcing companies to adopt a profitable proximity sourcing strategy, as it becomes more profitable to source from nearby—because the shorter lead times and shorter cycles will provide an opportunity to the sourcing companies to control their inventory and obsolescence costs. The reduction in lead time also increases the forecast accuracy and flexibility of the sourcing companies and also provides a better control over the supply chain (Ellis, 2008).

Supply chains consist of several activities, e.g. planning, forecasting, manufacturing, transporting, retailing, and replenishment. For many years, organizations have been trying to improve the supply chain activities, to achieve an efficient and effective supply chain flow. Generally, it is difficult for a single organization to have absolute control over all of the supply chain functions. Thus, the arm’s length relationship among the organizations, where the focus is to increase individual profit and organizations are trying to cover most of the supply chain processes alone, affects severely the supply chain efficiency. Collaboration provides an opportunity to the organizations, as the supply chains, that are managed through collaboration to integrate supply and demand considerably improve the performance of supply chain in several core areas, including increased sales, improve forecasts, more accurate and timely information, reduced costs, reduced inventory, and improve customer service level (Barratt, 2004). Due to which the importance of Collaboration, Planning, Forecasting and Replenishment (CPFR) becomes even greater, as it provides an opportunity to the organizations to have a complete control over the supply chain functions. CPFR also provides core expected benefits like increased forecast accuracy of demand forecast and replenishment plans, which is necessary to reduce the inventories across the supply chain and achieve high customer service levels by transferring the right products in the right locations, at right time (Whipple & Russell, 2007).
1.1 Problem Statement

The apparel industry is a highly competitive business sector and the current sourcing trends to purchase products and materials offshore, has led in many cases to substantially longer lead times and increased the complexity and difficulty to the management and its logistics operations. Most of the time companies gain initial cost advantage particularly in manufacturing, through sourcing from low cost country, but at the same time the effect on lead-times can be severe, as it includes the transportation lead time as well as the delays and variability caused by internal processes at both ends and trading procedures in between. This leads to delay in the supply chain pipeline, due to high inventory level the risk of obsolescence, the markdowns, and lost sales, will increases the forecasting error (Christopher, Lowson, & Peck, Creating Agile Supply Chains In The Fashion Industry, n.d., p. 3). Most of the buyers consider sourcing from China is a solution to gain initial cost advantage. For many years, China was almost always the hands-down answer to all buyers need, but those old times are shifting because of the increase in wages and labor shortage in China. Now buyers are thinking to have a shift in their sourcing strategy (Berg, Hedrich, Kempf, & Tochterrmann, 2011).

Most of the companies operate their supply chains in a traditional way, where the focus is to achieve individual profit and the supply chain functions, e.g. production orders and stock replenishment are carried out without considering the situation at either upstream or downstream supply chain members (Holweg, Disney, Holmström, & Småros, 2005). The lack of collaboration or partnership and communication gap between the manufacturer and the end consumer, increase the complexity and total cost of the supply chain. Developing an effective collaboration among the supply chain partners will reduce cost; improve service, and forecasting (Lambert, Emmelhainz, & Gardner, 1996). Collaboration also helps to reduce supply chain complication because of the balance in supply and demand. Collaborative, Planning, Forecasting, and Replenishment (CPFR) is the supply chain model, gaining popularity because it provides a framework based on collaborative efforts between the value chain partners both upstream and downstream. Companies can increase the efficiency and effectiveness of their supply chain by improving information sharing among the supply and demand chain partners, and by reducing overall costs, inventory cost and therefore increasing the forecast accuracy (Barratt, 2004).
Malik Moden GmbH is a small importing wholesale trader’s, located in Dreieich, Germany. There are only seven permanent employees. Three of them are involved in taking the apparel sourcing decisions. The main criterion is to source low price apparel. Therefore, the main focus is to reduce and negotiate on the initial product cost. Since they have a very traditional sourcing approach, they source their continuous and seasonal-basic apparel from the Chinese suppliers, to achieve the low-cost advantage. While sourcing from China, the dimension of speed and other risk are not considered. Sourcing from China provides them an opportunity to gain cost advantage, but on the other hand they have to face a challenge of hidden cost like cost of obsolescence (lead time cost), mark downs, and inventory cost. The long geographical distance between the supplier (China) and buyer (case company) widen the lead time. At the same time, the longer lead times also increase the forecast error of the case company. The lead times, while sourcing from China are 3-4 months and may increase to 4.5-5 months, depending on the variability and postponements from the supplier side. Due to the longer lead times, they have less time to make profit and have higher risk of obsolescence. Thus, they have to experience huge markdowns and lost sales, resulting in the increase of total supply chain cost. In addition, as it is mentioned above, in China the labor cost is increasing, therefore, the case company may face challenges regarding their sourcing strategy and may also lose the benefit of the lower product cost, in the future. Currently they are sourcing their seasonal fashion products from Turkey. Due to the shorter lead times of about 1-1.5 month, the forecast error, markdowns and lost sales percentage is low.

The current supply chain structure with regards to the suppliers from China is very traditional. As the main goal during sourcing is to keep the cost of the product as low as possible, therefore they are usually searching for the new suppliers to gain an initial cost advantage. They have an arm’s length relationship with their suppliers and buyers. The only information shared with their up-stream supply chain members is the purchase order sent by the case company. The other reason, that the case company is facing the dilemma of forecast error, markdowns and lost sales, is due to the lack of information sharing, collaboration and trust among the trading partners.

Fashion is fad and forecasting accuracy does not match the geodemographic conditions currently. In fashion we need to look for the right product, at the right price, at the right quality, right quantity and at the right time to be successful.
Companies should make sure that the channels of distribution and supply chains satisfy the demand at all stages. It is very important to have flow of data and product in both ways in the supply chain so that it matches the demand-driven supply and a sustainable system can be developed. By building right integration model of demand and supply chain through sharing of information the companies can reduce the forecast error and minimize stock-outs (Sparks, 2010).

With new tools in supply and demand chain we can develop the right strategies which can fit into fashion industry accordingly.

1.3 Research Question

The above discussion may leads to the following question.

Why are lead time, sourcing strategy, and collaboration considered to be the important factors for an apparel supply chain?

In order to get the answer for the above question in detail, the following two sub-questions are proposed.

- How are the current sourcing strategy, buying trends, and lead time affecting the efficiency of Malik Moden (the case company) and how is it improved?

- How can the current supply chain structure be improved to get a better control on lead times, markdowns, forecast error and lost sales?

1.4 Research Purpose and Approach

The purpose of the research is to examine and identify the effect of lead time and sourcing strategy over sales and supply chain efficiency of Malik Moden. Therefore, in the analysis part, hypotheses of the factors like, lead time and forecast error are tested to check the relationship of these factors. The author tries to propose some suggestions, alternatives, and new business model to improve forecast accuracy, markdowns, and lost sales, which may help the company to work in more efficient and effective way. The proposed suggestions are based on the author’s analysis, after examining related theories and cases and by understanding the current supply chain and business operations of Malik Moden.

The author used a single case study approach, to understand the up and downstream processes, current sourcing strategy, and the business model of the
The position of the case company in a supply chain is given below in Figure 1.

![Diagram of supply chain](image)

**Figure 1**: Position of Malik Moden in supply chain

### 1.5 Delimitations

The case study scope is limited to the factors associated with markdowns, forecast errors, and lost sales of companies similar in characteristics to and in similar situations as Malik Moden and how these factors have to manage in order to achieve an efficient flow in a supply chain.

### 1.6 Structure of Thesis

The thesis report consists of six chapters, the structure of thesis is as follows.

**Chapter 1** gives a brief introduction and highlights the aim of this study. Furthermore, it provides an explanation of the problem associated with the company. Then the research questions and the purpose of this study are presented. The chapter ends with the delimitation of the research and the brief outline of the structure of thesis.

**Chapter 2** contains the literature review which is related to the topic of this research and is used to support the analysis.

**Chapter 3** explains the research methods and the selection of the single case study, data collection methods, reliability, and validity of the study.

**Chapter 4** provides the empirical findings and a description of the supply chain structure including inbound and outbound logistics and information sharing policy.

**Chapter 5** gives the hypothesis testing of the lead time and forecast error. The analysis part is based on the empirical findings and the literature review. Furthermore, the author presents the suggestions to resolve current problems faced by the company.

**Chapter 6** presents the conclusion of the whole research and findings.
2 Theoretical Framework

2.1 The Supply Chain

2.1.1 Description

A supply chain includes the range of functions which starts from basic commodities to selling the final product to the end consumer. One of the most clear, specific definitions available for understanding the supply chain functions is given by Christopher (1998) “…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 hands of the ultimate consumer.”

Figure 2 gives the more realistic representation of the supply chain and describes the activities of buyers and suppliers within supply chain, how the final product reaches to the final customer, while passing through different phases and stages. The downstream direction shows the activities which are related to the customers and upstream direction indicate the activities associated to the suppliers (Stadler & Kilger, 2008).

![Figure 2: Activities in supply chain](http://indiastudypoint.com/images/ignou/solved/mba/clip_image009_0024.jpg)
2.1.2 Supply Chain Management (SCM)

Supply chain management refers to the handling of the activities and operation of the supply chain. The supply chain activities may include varieties of firms, starting from the processing of raw material to those engaged in wholesaling and retailing. The functions which are to be performed throughout the supply chain include sourcing, procurement, manufacturing, order processing, inventory management, warehousing, and customer service (Bewer & Speh, 2000). Supply chain management may be defined as:

“Supply chain management is the integration in the business processes from end user through original suppliers that provides products, services and information that add value for customer.” (C. Cooper, M. Lambert, & D. Pagh, 1997, p. 2)

In an integrated supply chain, coordination of logistical activities is effectively extended to encompass source, make, and delivery processes in collaboration with channel partners and suppliers. Intra-firm coordination of sourcing, production, and logistics activities enhances the ability to respond to market volatility by eliminating redundant activities and reducing response time by facilitating seamless flow of demand information, supply materials, and finished goods (Bowersox, Stank, & Daugherty, 1999, pp. 558-559).

The focus of an integrated supply chain is to manage relationships, information, and material flow across organizational border to reduce cost and improve the flow (Carter & Narasimhan, 1996).

The firms which are following the concept of SCM find the ways to integrate and improve their logistics, information sharing, operations, and marketing functions with the other entities of supply chain so that information, materials, component parts, and finished goods flow smoothly from the starting point to the end customer at low cost and high service level (Martha & Ram, 1996).

As Figure 3 portrays, the four vital objectives of SCM are: 1) reduction of waste; 2) compression of time; 3) flexible response; and 4) unit cost reduction. These four objectives have been articulated in several contexts related to SCM, which emphasize the significance of both inter-functional and inter-firm coordination (Bewer & Speh, 2000, p. 78).
The core of SCM philosophy is that waste reduction and improving the performance of supply chain which can be obtained by coordination and integration of marketing, sourcing, production, logistics, and sales. When production and logistic processes are executed in less lead time, all activities in a supply chain can able to operate more efficiently (Bewer & Speh, 2000, p. 79).

2.1.2.1 Supply Chain of Clothing and Apparel Industry

The supply chain in the textile clothing and apparel sector is illustrated in Figure 4. The flow of products is indicated by solid lines, while the dotted lines represent the information flow. The direction of arrows indicates the demand-pull-driven system of the supply chain of apparel. Mostly, the flow of information is initiated from the consumer side. The production procedure is carried out on the forecasted demand to provide the desired product at right time and right place. In Figure 4 there are usually several participants to the left of the distribution center. In order to obtain a smooth flow of production, transportation, and logistics, it is important to have
logistics, business services, and information sharing among members (Nordås, 2004, pp. 3-4).

**Figure 4**: The supply chain in textile and clothing sector (Source: (Nordås, 2004, p. 4)

### 2.2 Logistics Management

Logistics management is the part of SCM that refers to the management of the flow of goods and services between the point of origin and the point of use in order to meet the requirements of customers or corporations. Logistics involves the integration of information, transportation, inventory, warehousing, material handling, and packaging, and even security. Logistics management plays a vital role in satisfying customer’s needs.

Logistics management is defined by the Council of Logistics Management (CLM) as:

“The process of planning, implementing and controlling the efficient, effective flow and storage of goods, services, and related information from point of origin to point of consumption for the purpose of conforming to customer requirement.”

(Stock & Ellram, 1998, p. 3)

Novack, Rinehart and Wells (1992, p. 236) defines logistics management as:

“Logistics management involves the creation of time, place, quantity, form and possession utilities within and among firms and individuals through strategic management, infrastructure management, and resource management with the goal
of creating products/services that satisfy the customers through the attainment of value.”

In short logistics is defined by Harrison & Van Hoek (2008, p. 7) as:

“The Task of coordinating material flow and information flow across the supply chain.”

There are two types of logistic procedures carried out across the supply chain:

- Inbound logistics
- Outbound logistics

### 2.2.1 Inbound Logistics

Inbound logistics deals with the links between the focal firm and its upstream (‘buy side’) suppliers (Harrison & Hoek, 2008, p. 10).

### 2.2.2 Types of Flow in Logistics Management

Many times logistics systems are considered to only involves physical movements done by transportation companies. However, one of the other components is the movement of information (Novack, Rinehart, & Michael V. Wells, 1992). The following are two important components and flows for managing logistics functions, which are clearly stated in the above definitions:

- Flow of material
- Flow of information

### 2.2.2.1 Flow of Material

Material moves from the supply side towards the customer side of the supply chain. The main goal is to achieve a continuous flow of materials from source to the customer within the supply chain (Harrison & Hoek, 2008, p. 12). Time is the most critical factor, so the product should flow in a smooth way and the customer desired product will reaches on right time. The important goals of material flow defined by Harrison & Van Hoek (2008, p. 12) are:
“The goal is continuous, synchronous flow. Continuous means no interruptions, no dropping the ball, no unnecessary accumulations of inventory. And synchronous means that it all runs like a ballet. Parts and components are delivered on time, in the proper sequence, exactly to the point they’re needed.”

2.2.2.2 Flow of Information

Flow of information should follow physical flows within a facility. In most of the cases, the information will actually precede the physical flow (Novack, Rinehart, & Michael V. Wells, 1992). Information flow is usually moved from the demand side towards the supply side as well as from the supply side towards the demand side. Nowadays, information technology is used for the rapid sharing of information of demand and supply data. The information flow gives a clear picture of the nature of business processes, market growth and end customer’s demand (Harrison & Hoek, 2008).

Information sharing in the supply chain is the sharing of knowledge among partners to serve the end users effectively and efficiently. This sharing of information includes the production status and planning process as well as the changes in the business environment and the objectives of the companies (Lamming, Caldwell, & Harrison, 2004). These information flows between alliance partners may lead to a better coordination of the stock levels (Freedman, 1994). The information sharing is to be done at different levels and stages. The operation integration is shifted towards transaction efficiency improvements; integration at the strategic level requires shared or matching objectives (Lamming, Caldwell, & Harrison, 2004).

2.2.3 Competing Through Logistics

There are various ways through which products compete in the market. Logistics is one of the most vital competitive factors because it supports the availability of product in the market place at the right time. There are three important components which provide advantages to the process of logistics (Harrison & Hoek, 2008, pp. 16-17) which are as follows:

- Quality of a product & service
- Cost of the product
- Lead time
2.2.3.1 Quality of a Product and Service

The primary objective is to provide the desired level of quality product to the end-customer. Quality is the most important factor which affects the supply chain performance. The factors regarding quality may be defects in product, incorrect quantities, and wrong items delivery; all of these factors influence the customer’s loyalty negatively. Controlling the issues of quality, improves the performance of the supply chain and for the organization it helps to reduce the costs by eliminating waste and errors (Harrison & Hoek, 2008, pp. 16-17).

The quality of service refers to the selecting of the right amount of product quantity in the right sequence, so that the desired amount of goods reaches to the customer (Harrison & Hoek, 2008, pp. 16-17).

2.2.3.2 Cost of the Product

The cost of the product is the most important factor of the supply chain processes. The low manufacturing cost is interpreted as an advantage in a market because of lower prices of the final product. Therefore, the organizations can achieve higher profit margins (Harrison & Hoek, 2008, p. 18).

The prime motive of outsourcing is to reduce the cost of the final product. The Boston Consulting Group (1991) studied more than 100 key companies doing extensive outsourcing procedures and concluded that, “most Western companies outsource primarily to save on overhead or induce short-term cost savings” (The Economist, 1991). The low manufacturing and labor cost is the main reason for outsourcing. In Western Europe the labor cost is very high compared to the Far East and even Eastern Europe. As the labor cost plays an important role to produce the product in less cost, countries like China, India, Bangladesh, and Turkey are used mainly for outsourcing by most of Western European buying companies (Mattila, n.d., p. 6).

2.2.3.3 Lead time

Lead time is also one of the main competitive factors among organizations. In today’s highly competitive market place, short lead time differentiates a company from its competitors. The ability to respond quickly enhances export, sales, and revenue. The term, “lead time” normally includes all activities from start to end. It begins, firstly, with the customer order receipt and ends with the customer receipt of the product or services. Everything which involves in between this procedure is
the lead time. Lead time refers to the time lag between order placing and receiving it (Nuruzzaman & Haque, 2009).

Total lead time is a combination of time devoted to order processing, to sourcing, and manufacturing items, and to deliver items between the various stages of the supply chain (Nuruzzaman & Haque, 2009). There are two main components of lead time:

- Information lead time
- Order lead time

### 2.2.3.3.1 Information Lead time

It is a time which is taken to process an order. The information lead time can be minimized by using a modern and sophisticated communication system among the supply chain partners (Nuruzzaman & Haque, 2009, p. 619).

### 2.2.3.3.2 Order Lead time

Order lead time is the time it takes to manufacture and deliver the items. This can be reduced by efficient supply chain management (Nuruzzaman & Haque, 2009, p. 619).

The conventional approach to cope with the uncertainty and risks of markdowns and lost sales is by improving the quality of the forecast. In the current market situation, demand volatility and the shorter life-cycle of the products it is difficult to develop a forecasting method which predicts the demand consistently and accurately. Therefore, it is necessary that organizations must focus on lead-time reduction to achieve the maximum efficiency in demand forecasting. Shorter lead-times mean that the forecasting horizon is shorter—hence the risk of error is lower (Christopher, Lowson, & Peck, Creating Agile Supply Chains In The Fashion Industry, n.d., pp. 3-4).

### 2.2.4 Forecast Error and Lead Time Relation

Logistics becomes more dependent on forecast because of long lead times. The lead time has a direct relation with the forecast: The longer the lead time, the further ahead (broader) we need to forecast. The Figure 5 shows the effect of lead times on the forecast error. The forecast error may be positive or negative, which means an organization should face a problem of excess stock or stock out. There is
a rule of thumb saying that a reduction of the lead time by 50% will reduce the forecast error by 50% (Christopher & Peck, Marketing Logistics, 2003).

**Figure 5**: Relationship between the lead time and the forecast error [Source: (Lowson, King, & Hunter, 1999, p. 94)]

In Figure 5, the central horizontal axis shows the predictions of design and color are made numbers of months ahead of the season and lower curve shows estimates of the forecast error. Generally, there is a basic principle of forecasting: the shorter the lead time, the better the forecast. If lead time is cut down from 12 months to 6 months in an apparel industry, the forecast error squeezes from ±40 percent to ±19 percent. (Lowson, King, & Hunter, 1999, p. 93). In addition, the forecast error grows more linearly as time to forecast increase, forming a familiar shape known as “trumpet of doom” (Song, Yang, & Luo, 2011, p. 8).

### 2.3 Lead Time Management

Lead time is an important factor that affects the operational cost, service level, and forecast uncertainty in a short-life-cycle-product supply chain (Song, Yang, & Luo, 2010). In business, lead time terminology is commonly used for time required for the processes between supplier and customer: the product passes through several stages and processes and due to which lead time management becomes a crucial aspect. Fisher (1997, p.108) point out that flexibility and speed of the supply system can help to overcome the impact of uncertainty and the speed of the supply chain is depend on the lead time management.
Globalization propels the apparel industry to be flexible and responsive in order to gain a competitive advantage of time. Christopher & Peck (2003, pp. 70-71) demonstrate three predominant lead times that must be managed in an integrated and coherent way, which helps the organization to become flexible, responsive, and more profitable. These lead times are:

- Time to market
- Time to serve
- Time to react

### 2.3.1 Time to Market

Time to market involves the time taken by the company to grasp the situation, making designs accordingly, to achieve the product done, and the time for the product to be served in the targeted market. In any market innovative and timely new product development is the important source of competitive advantage. (Christopher & Peck, Marketing Logistics, 2003).

Companies that are slow to market can suffer in two ways. Firstly, they miss a significant sales opportunity that probably will not repeat. Secondly, the supplier is likely to find that when the product finally arrives in the marketplace, demand is starting to fall away leading to the likelihood of markdowns and lost sales (Christopher, Lowson, & Peck, Creating Agile Supply Chains In The Fashion Industry, n.d., p. 5). The difficulty faced by the organizations that are slow to market is illustrated in Figure 6.

![Figure 6: Shorter life-cycles making timing crucial](Source: (Christopher, Lowson, & Peck, Creating Agile Supply Chains In The Fashion Industry, n.d., p. 5))
The strategy to gear up time to market, is the ability to be as close to the customer as possible. Continuous contact with the customer is a good source to gather ideas, then to respond according to the demand. This also helps to understand the market trends and behaviours which are extremely beneficial for the organizations (Christopher & Peck, Marketing Logistics, 2003).

2.3.2 Time to Serve

The term “time to serve” defined as how long it will take to transfer a customer´s order into the product or service in the hands of the consumer. This will also give an important competitive advantage due to the shorter order cycles. The quick response to the demand of customer and shorter delivery time makes the supplier more reliable (Christopher & Peck, Marketing Logistics, 2003).

The sourcing which is carried out from offshore required a considerable time, especially the time consumed in preparing documentation, in consolidating full container loads and inbound clearance and transportation (Christopher, Lowson, & Peck, Creating Agile Supply Chains In The Fashion Industry, n.d., p. 6). Therefore, the companies can control their lead times by purchasing the product from nearby.

2.3.3 Time to React

How quick the company can make changes in the activities to react on the changing demand situations (Christopher & Peck, Marketing Logistics, 2003). The key factor for any fashion and clothing company is to keep their lead time as less as possible. A company who can’t serve its product to the customer on a right time can be affected by the problems of markdowns and lost sales.

Time to respond has a similar barrier as mentioned in the previous two types of lead time. Some of the companies who focus on getting responsive fail to recognize the fluctuating market demand. A typical apparel supply chain places the order in the form of economic order quantity and add-on reorder quantity implies that the upstream supply chain companies are unable to judge the changing market situations by forecasting as it has to be judged on real time demand. The real demand is what the consumer is purchasing or requesting hour-by-hour, day-by-day. As shown in Figure 7, the upstream members of the supply chain have no real visibility of the final market place, which actually hide the real demand at the upstream side (Christopher, Lowson, & Peck, Creating Agile Supply Chains In The Fashion Industry, n.d., p. 7).
2.5 Overview of Global Outsourcing

2.5.1 What is Global Outsourcing

The word outsourcing is made up of two words – ‘out’ and ‘sourcing’. There are different authors which defined the concept of outsourcing, one of the simple definition of outsourcing is as follows:

“…A contracting activity with a third service provider for the management and completion of a certain amount of work, for a specified length of time, cost, and level of service.” (Oshri, Kotlarsky, & Willcocks, 2009, p. 7)

In industrial society, outsourcing began with manufacturing. The manufacturers began to think of outsourcing the production procedures instead of building their core competencies by controlling all of the supply chain activities vertically. The prime motive behind outsourcing is to get a cost advantage. Outsourcing also helps companies to deliver new products to market more quickly and provide a cost-effective way to stay with the up-to-date technology and latest procedures, and concentrate on improving business ability and increase a global reach (Yu, Yan, & Cheng, 2001, p. 186).

Global outsourcing will help companies to find new sources such as low labor cost, unique materials, and new market opportunities as well as encourage companies to improve their flexibility, through which companies can increase their market shares and profits (Yu, Yan, & Cheng, 2001, pp. 187-188).
Globalization and saturated markets increase the levels of competition. Many companies are facing difficulties in maintaining and manufacturing, the range of skills and expertise are needed to compete effectively. The emergence and new entrant of third world countries like China and India has created a competitive environment and due to the developments in information technology, many companies are engaged in the activities of outsourcing, offshoring, and nearshoring, to sustain in a competitive market (Oshri, Kotlarsky, & Willcocks, 2009).

2.5.2 Types of Global Outsourcing

Global outsourcing mainly includes nearby and offshore outsourcing.

In nearby outsourcing the work procedures or service performed by the people in neighboring countries (Kathawala, Zhang, & Shao, 2005, p. 189). Many apparel companies in Western Europe outsource production to Turkey, Czech Republic, and Romania etc (Mattila, n.d.). The benefits are low cost, similar time zones, flexibility and compatibility (Kathawala, Zhang, & Shao, 2005, p. 189).

In offshore strategy companies outsource and conduct their several operations, mostly manufacturing from overseas to compete with potential rivals in terms of cost. The offshore outsourcing has become the main stream of global outsourcing because of the low labor cost, flexible working schedule: 24/7 operating time, and an educated labor (Kathawala, Zhang, & Shao, 2005, p. 189). The western European clothing companies do offshore outsourcing from Asia, normally from China, India, and Bangladesh because of the low labor cost as compared to the Western Europe (Mattila, n.d.).

2.5.3 Level of Global Outsourcing

The outsourcing decision are made on the basis several factors like the price of the product, labor cost or innovativeness. Trent and Monczka (2002) describes the five levels of global outsourcing, which are:

2.5.2.1 Level 1

Local sourcing, there is no reason to go for offshore outsourcing, when the local supplier meets the criteria.
2.5.2.2 Level 2
Global outsourcing, is usually performed on an ad hoc or reactive basis. Mostly, the companies go globally for outsourcing because of a lack of suitable local suppliers, or most of the times the competitors have a significant cost advantage.

2.5.2.3 Level 3
In this level, making global sourcing is a part of the sourcing strategy of the firm. The primary focus is to obtain a cost advantage.

2.5.2.4 Level 4
In this level, integration between the global sourcing location occurs, which requires worldwide information system, the personnel with multinational management skills, extensive coordination and information sharing.

2.5.2.5 Level 5
Companies should have integration between the global sourcing location, that are mentioned above and functional department (e.g. sourcing, development, production and marketing). The integration usually includes the coordination and information sharing in the several sets of activities like during the development of new product, establishing the right specification based on customer specification, and during sourcing of items to fulfill existing customer demand.

2.5.3 Risks and Disadvantages of Global Sourcing
Adaptation of outsourcing strategies involves several risks and disadvantages.

The organizations with huge outsourcing operation have resulted in loss of critical skills and strength and now become highly reliant on outside organizations, which are their suppliers and manufacturers. The important business operations which are carried out outside the organization evolve into significant threats to the company.

The major risk involve, is the security of the confidential data (Oshri, Kotlarsky, & Willcocks, 2009). This is the big danger that Apparel firms in now facing. The numbers of clothing items have surged in the number of counterfeit clothing and accessories. Mostly, the contra-ban items are originating from countries of which the material is outsourced by the retailers (Christine, Louise, Richrad, & Helen, 2005). This is the most critical factor as the buyer’s core competency is the main thing to entry in the marketplace. Sometimes it happens that after attaining
expertise, the suppliers may attempt to bypass the buyer directly in the market (Oshri, Kotlarsky, & Willcocks, 2009).

Language is also another challenge related with outsourcing. It is critical and important that the organizations involved in the supply chain can understand each other’s language properly and with a full command. Different time zones, cultural differences and language are definitely the barriers that need careful consideration. The communication barrier may lead to the quality issues which are the most serious factor, which play an important role in creating an image of company among customers (Qudrat-Ullah, 2009).

Lead time is also one of the risks that are associated with global offshore outsourcing. Normally, the lead times of the most of the low cost countries are longer, especially in the Far East (including China, Bangladesh and India). Longer lead times usually associated with transportation from sea (Fitzgerald, 2005).

The most important issue of environmental sustainability is becoming more important. Currently, carbon dioxide emissions are considered probably the most relevant criterion for environmental sustainability (Logman). On one hand, offshore outsourcing in China and India provides a solution of low cost product for the buyers of Europe and America but on the other hand, the freight transportation increases the carbon footprint and has an adverse effect on the climate. Due to climate changes, the instability and frequency of “natural disaster” like floods and hurricanes are increasing (Center for Climate and Energy Solutions). According to the concept of Natural Capitalism, sustainability can be achieved by reducing the use of natural resources (John Cairns, 2000). The nearby outsourcing because of the less geographical distance and less transportation between buyers and manufacturers, considerably reduce the carbon footprint as well as lessen the use of natural resources (fossil fuel).

Rottman and Lacity (2006) give a list of risk associated with the outsourcing, includes; the risk related to Business, legal, political, workforce, social, and logistical (J Power, C Desouza, & Bonifazi, 2006).
2.5.4 Outsourcing Destinations

2.5.4.1 China as Outsourcing Destination

2.5.4.1.1 Introduction

Since 1994, China has been the biggest textile and apparel exporter in the world, occupying 40% of world export in 2010. China dominates the global low to medium end market through mainly engaging in Original Equipment Manufacturing (OEM). The Chinese textile and apparel market (excluding fibers) shrank by 1.1% in 2009 to reach a value of USD 270 billion. China’s total textile and apparel exports decline 9.65% year-on-year to USD 171 billion in 2009 (EU SME Centre, 2011, pp. 1-3). Meanwhile, the continuous increase in labor cost decreased the attractive profit margin of the outsourcing companies (Berg, Hedrich, Kempft, & Tochterrmann, 2011).

2.5.4.1.2 Geographical Location

China is located in Southeast Asia along the coastline of the Pacific Ocean. China is the world’s third largest country, with an area of 9.6 million square kilometers and coastline of 18,000 kilometers. The border of China is connected with 14 countries—Korea, Vietnam, Nepal, India, Pakistan, Russia, Afghanistan, Tajikistan, Kyrgyzstan, Laos, Burma, Bhutan, Kazakhstan, and Mongolia (12Ju2).

There are mainly three modes of transportation are available for trade between China and Europe that are: Road, Seaports, and Airports.

Silk Road was the most enduring trade route of human history, being used for about 1,500 years. The name of the road is also taken from Chinese textile that flowed from the Middle East and Europe, as shown in the Figure 8. Because of harsh conditions, security reasons, and also ships being able to transport commodities faster and cheaper, this trade mode is not more in use (Rodrigue, Comtois, & Slack, 2006, pp. 15-16).
The trade from the sea is usually carried out in China, as it is an economical and faster way to transfer goods as compare to the transportation through road. The trade route is shown in Figure 9 and Figure 10. The trade between China and Europe carried out by using Pacific Ocean and then from Suez Canal till Europe. By using Suez Canal the journey in between Asia and Europe, is reduced by 6,000 km (Rodrigue, Comtois, & Slack, 2006, p. 21). But still approximately a month or more than a month is required to transfer goods from China till Europe.

Figure 9: Geographical location of China and sea trade route (Source: www.apl.com/services/document/sells_mkt_ae_LP3eb.pdf)
The airport transportation as trading mode is expensive and normally not so much used for exporting the large quantity of goods.

2.5.4.1.3 Outsourcing from China is Still Cost effective or not

China has been the low-cost manufacturing country for the past 20 years. Due to the several factors like lower capital investment, domestic sourcing cost, favorable government policies and low cost of labor, helps China to become a huge manufacturing hub. Since 2008, the cost differential by sourcing from China has narrowed. The global rise of raw material cost and Government policies in China (including currency revaluation and an increase in labor wage) is reducing the profit margins of the sourcing companies (Wright, 2011, p. 8).

According to Harold L. Sirkin, a BCG senior partner “All over China wages are climbing at 15 to 20 percent a year because of the supply-and-demand imbalance of skilled labor” (Boston Consulting Group, 2011). The increase in the average hourly wage rate in China, in the last couple of year is indicated in the Table 1. According to the IMF, China’s labor is now the third most expensive in emerging Asia, after Malaysia and Thailand (Jennings, 2011).
Table 1: Labor cost per hour in USD [Source: (Republic of Turkey, Prime Ministry Investment Support and Promotion Agency, 2010, p. 11)]

According to the survey from Berge, Hedrich, Kempf, & Tochermann (2011, p. 5) “because of the wage increases and capacity pressure, the chief purchasing officers (CPOs) of leading apparel in Europe and the US moving their sourcing away from China, 54 percent of CPOs plans to decrease their sourcing activities in China up to 10 percent and 32 percent stated that they sought to decrease their share of sourcing in China by more than 10 percent over the next five years.”

In privately owned companies in China, wages are expected to rise 17 percent annually in the next three years. The rapid increase in wages, raise the unit cost of the product as well as end price and margins for the sourcing companies (Wright, 2011, p. 8).

2.5.4.1.4 Drivers of Increasing Labor Cost in China

In China, the increases in wages have been driven by numerous forces. Shortage of skilled workers in Eastern China is one of the factors, as the majority of the manufacturing takes place in eastern China. The cost of living is also rising in the big cities like Shanghai and Beijing. For example, in Oct 2010 the consumer price index (CPI) reached at the record peak level in the last two years (4.4%) (Wright, 2011, p. 11).

Secondly, the increasing education levels among the new generation workers have made it more difficult for companies to negotiate in salaries with the workers.
(Wright, 2011, p. 11). Workers are also demanding higher salaries by force and insisting to increase the salaries from 15000 Yuan to 2000-2500 Yuan (Yuen & Y. Ang). Mean while, the labor shortage in the coastal regions are impacting the RMG industry in China, as workers are continue moving on to more attractive industries and better jobs (Berg, Hedrich, Kempf, & Tochtermann, 2011, p. 5).

Thirdly, China’s one-child policy significantly reduced fertility and by keeping it low most years since the 1970s. This is also one of the reasons for labor shortage in China (China manufacturing hourly labor rate, compensation costs impact EMS, 2011).

Lastly, the gradual currency appreciation against U.S. Dollar. The Yuan has appreciated by 18 percent since the announcement of China’s move away from its Dollar peg in July 2005, after a decade of fixed uniformity of 8.28 RMB per Dollar, as shown in the Figure 11 (Ceglowski & Galub, 2011, p. 2). This is also one a reasons of increase of labor cost in China.

![Figure 11: China’s exchange rate (Yuan per Dollar) [Source: (Ceglowski & Galub, 2011, p. 2)]](image)

2.5.4.2 Turkey as Outsourcing Destination

2.5.4.2.1 Introduction

The Turkish clothing industry is the 6th largest exporter in the world and 2nd largest exporter to the EU. Textiles and clothing is the core of the Turkish economy in
terms of GDP contribution, accounting for about 8-10% of the GDP together. There are more than 40,000 textile and clothing companies in Turkey with an estimated workforce of 750,000 employees. In 2011 the total value of clothing exports was US$ 13.5 billion. In Turkey, the established capacity of the woven production is around 1,350,000 tons. In knitted clothing sector T-shirts and pullovers are the most important export product. In 2011, the export of t-shirts and pullovers were US $ 4.3 billion. The EU is the most important market for Turkey’s clothing export. In 2011 Turkey exported clothing of US$ 11 billion to the EU, which is equal to 81.6% of Turkey’s total clothing exports. Germany and the UK are the main markets in EU for Turkey. Clothing export to these countries were US$ 5.2 billion, which is almost the half of Turkey’s clothing exports to the EU (Republic of Turkey -- Ministry of Economy, 2012, pp. 1-3).

2.5.4.2.2 Geographical Location

Turkey is a Gateway to Europe and Central Asia (Eryuruk, Kalaoğlu, & Baskak, 2011, p. 15). Turkey west of the Bosphorus is geographically part of Europe, by bordering the Black Sea, between Bulgaria and Georgia, and they are bordered with Asia from the Aegean Sea and Mediterranean Sea, by Greece and Syria (Central Intelligence Agency [CIA]). Turkey has an importance with respect to the logistic point of view i.e. there are a multi-mode connection facilities: Seaports/Free Zones/Railways/Airports and Truck, between Europe and Middle East, as shown in Figure 12 (Eryuruk, Kalaoğlu, & Baskak, 2011, p. 15).

![Figure 12: Geographical location of Turkey](https://www.cia.gov/library/publications/the-world-factbook/maps/maptemplate tu.html)

Turkey generally uses about 50% sea and about 35% road transport for foreign trade. Airway transport is rarely used because of high transportation costs
In the European Union the transportation from the truck is preferred because of its flexibility, availability, cost and ease arrangement (Tan, 2001).

2.5.4.2.3 Turkey Apparel Industry Key Drivers

Knowles (2012) and Ayling (2011) mentioned several advantages that are the key drivers to source from Turkey.

Firstly, the buyers decrease the complexity in buying process, as Turkey offers a range of products of clothing, so the buyers can source most of the items within the country (Knowles, 2012).

Secondly, the buyers can also source the activities other than manufacturing because there are certain manufacturers and suppliers offering value-added services like product development and design to their customers (Knowles, 2012).

Thirdly, the country’s proximity to Europe provides fast and responsive supply chain (Knowles, 2012). Turkey has a logistic advantage as compared to other competitors, such as China, India and Pakistan (Eryuruk, Kalaoğlu, & Baskak, 2011, p. 17). The buyers can repeat best-selling styles in season, providing an opportunity to maximize sales and reducing lead time and forecast error as well. The proximity also decreases the carbon footprint, which is usually generated through transportation. Hence, sustainability can also be achieved through proximity.

Ersa Tasoren, former general manager of Tesco International says: “the labor cost is higher in Turkey than in Bangladesh, Sri Lanka and India, but we have proximity here, together with know-how and Innovation.” Furthermore she says “And you often don’t markdown anything you ship out of Turkey though, because it ships in a week’s time and the lead time is four to six weeks. And you can guarantee there won’t be any markdown on that product because you are quite spot-on with quality, style and color. Interestingly enough, for bulk quantities Turkey is quite competitive, and we often compete head to head with the Far East.” (Ayling, 2011)

Alan Wintanley, executive director for menswear, children wear and beauty mentioned that lead times from China had been slipping and it was taking eight months to receive some products in store from the initial decision. “Producing in Turkey does dramatically shorten that period, and the cost is actually not that much more than doing in China. And if you want a quality product and you want it
quickly, you can repeat in season from Turkey you can’t do that from China.” (Knowles, 2012)

Lastly, the competitive edge of China is reduced in term of cost, as the labor cost in China in the last couple of years increased and therefore, Turkey is becoming a popular destination for European fashion brands (Ayling, 2011).

2.5.4.3 Lead times Comparison

As it is mentioned above in the key drivers, that one of the key success factors for Turkey is its geographical location. It is located in between Europe and Asia and newly developing markets in Russia. The easy access to Europe is a major advantage over the competitors in the Far East. The main transportation mode is “Truck” as the road system is quite well connected. It takes average four days, for a truck to travel from Istanbul to Germany, which is the largest apparel market for Turkey (Tan, 2001, p. 44).

Ghemawar and Baired (1998) compares the delivery times, including the transportation and production times to the European Union. The comparison shows that Turkey has an edge over the competitors in Asia and Europe, due to shorter manufacturing and transportation lead times (Tan, 2001, p. 45). The comparative delivery lead times to EU is shown in Figure 13.

![Figure 13](image)

**Figure 13:** Comparative delivery times to European Union [Source: (Tan, 2001, p. 45)]

Sung (1994) also provides a lead time comparison between China, Turkey, Far East, and European countries. The table below gives a clear picture that the Turkish
apparel exporter has an advantage in European market over the competitors like in China and In the Far East, because of their shorter lead times (Tan, 2001, p. 45).

<table>
<thead>
<tr>
<th>Source</th>
<th>First order</th>
<th>Repeat Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easter Europe, Maghreb, Turkey, Greece</td>
<td>3-6 weeks</td>
<td>3-6 weeks</td>
</tr>
<tr>
<td>Other EC</td>
<td>2-4 weeks</td>
<td>2-4 weeks</td>
</tr>
<tr>
<td>China</td>
<td>6-7 months</td>
<td>3 months</td>
</tr>
<tr>
<td>Other Far East</td>
<td>4-5 months</td>
<td>3-5 months</td>
</tr>
</tbody>
</table>

Table 2: Comparative lead times in European market [Source: (Tan, 2001, p. 45)]

2.6 Sourcing Channels and Market Actors

2.6.1 Sourcing Channels

The different sourcing channels with different sales intermediaries are shown in Figure 14. The channels include exporting manufacturers, agents, importing manufacturers, wholesalers, and retailers. It is also possible for the given channel to take over (some of) the function latter, to gain competitiveness (vertical integration).

Figure 14: Outwear trade and distribution channels (CBI, 2009, p. 15)

The different sales intermediaries and their functions in the supply chain are explained in detail below:
2.6.1.1 Importing Wholesalers

They are importing and purchasing the products and apparels on their own account; the wholesalers take title to the apparels and are responsible for their further sale and distribution. The wholesaler is familiar with the local market and can provide considerable information and guidance to the exporting manufacturer. The high level of cooperation with regards to the appropriate designs, new trends for the market, material and quality requirement can be obtained by developing the successful working relationship between importing wholesaler and exporting manufacturer. The wholesaler purchases from the manufacturer and stock it at his own risk. They usually cater the specialist shops, department stores and multiple chains (CBI, 2009, pp. 15-16).

2.6.1.2 Importing Manufacturer

Retailers are considering the stages before retailing and make their business vertically integrated and have their own designers to give their own collection a more unique look. Clothing manufacturers are also entering in the retail business by opening their own retail store. This provides them an opportunity to have better control over their outputs and margins (CBI, 2009, p. 16).

2.6.1.3 Agents

The agent is an independent intermediary between the manufacturer and retailer. The agent covers a limited geographical area. They receive a commission from the manufacturer. Most of the agents represent more than one manufacturer. The agents starting to sell from stock, to fulfill their clients short term demands. Stock forming occurs on a consignment basis. Another type of sale agent is buying agent, the buying agency for these types of agents is normally located in supplying country. They usually work on commission basis with different retail organization and brands (CBI, 2009, p. 16).

2.6.1.4 Importing Retailer

They are generally bigger retail organizations with more than 20 outlets, departments and home-shopping companies. They usually import the finished products through their own buyers, mainly from low wage countries and sourcing products made according to their own design. The retailers bypass the domestic wholesaler and manufacturer and this cut out the intermediaries and extra cost (CBI, 2009, pp. 16-17).
2.7 Collaboration

Supply chain contains several activities like purchasing, manufacturing, transportation, retailing etc. In a supply chain there are a number of companies that are participating to complete these activities. The aim is to deliver the products or services to the end users. On the other hand, the number of participant in the supply chain may lead to the complications and which most of the time affect the time to market factor. As lead time is one of the important aspects of competitiveness. The effective and efficient supply chain requires, the partners in the supply chain, should design by mutual discussion a standardized model and which based on common goals. Each of them considers the supply chain optimization rather than individual advantage. When the players in the chain recognized each other as a partner and make combine effort to satisfy the customer requirements, this will assist them to create an effective and efficient supply chain flow. This joint effort may include planning, sharing goals, forecasts, future plans and risks with the partners. Collaboration is the term commonly uses to define the above mentioned efforts. The supply chains which are managed and handle through collaboration to integrate supply and demand, deliver significantly improved performance and further closer relationship may create more opportunity for greater and continuous improvement (Barratt, 2004, p. 31).

Supply chain collaboration is undoubtedly a beneficial and the target is to create jointly the common pace of information sharing, replenishment, and supply chain synchronization in the system to reduce excess stock or inventory and also controls the fluctuating demand from the customers (Holweg, Disney, Holmström, & Småros, 2005, p. 179). Collaboration is a very broad and encompassing term. In simple words it is mutuality of benefits, rewards and risk sharing together with the exchange of information as the foundation of collaboration (Barratt, 2004, p. 30).

2.7.1 Forms of Collaboration

According to Barratt (2004, p.32), there are a variety of forms of potential supply chain collaboration, which can be divided into two main categories and is represented in Figure 15.

- Vertical Collaboration
- Horizontal Collaboration
2.7.1.1 Vertical Collaboration

This category could include the collaboration with customers, internally (across functions) and with suppliers. Internal collaboration can overcome the functional shortsightedness, and has the potential to enable internal integration. Internal integration that includes functions like: purchasing, manufacturing, logistic and marketing, normally done by sharing more information but the factors like joint goals, shared resources, and common vision are not considered. Therefore, internal and external collaboration are used together for developing closer relationships, integrating processes, and sharing information among customers and suppliers (Barratt, 2004, pp. 32-33).

2.7.1.2 Horizontal Collaboration

Horizontal collaboration could include collaboration with competitors, internally and with non-competitors, e.g. two manufacturers can share their manufacturing capacity (Barratt, 2004, p. 32).

2.7.2 Types and Categories of Collaboration

Integration provides a sustainable competitive advantage which increases organization’s efficiency both internally and externally. The integration in a supply chain may achieve by collaboration. Partnership is another word commonly used for collaboration. According to Lambert, Emmelhainz, & Gardner (1996, p. 2) “partnership is a tailored business relationship based on mutual trust, openness,
shared risk and shared rewards that yields a competitive advantage, resulting in business performance greater than would achieved by the firm individually.”

As shown in the Figure 16, relationship between the organizations can range from arm’s length, which consists of either one time exchanges or multiple transactions to vertical integration (Lambert, Emmelhainz, & Gardner, 1996, p. 2).

**Figure 16**: Types of relationships [Source: (Lambert, Emmelhainz, & Gardner, 1996, p. 2)]

The traditional form of business exchange has been based on transactional relation, where buyer and seller are involved in tough price negotiation and looked at their customers and suppliers as competitors that had to be squeezed in terms of price as much as possible to increase that individual company’s margin. This type of trading relationship is commonly termed as “Arm’s length relationship” (Larsen, Thernøe, & Andresen, 2003, p. 531). In arm’s length, the two organizations conduct business with each other but there is no sense of joint commitment or joint operation between organizations (Lambert, Emmelhainz, & Gardner, 1996, p. 2).

The collaboration or partnership is not same as a joint venture in which normally there is some degree of shared ownership across to the organizations. The collaboration can provide benefits to both partners and improve efficiency of the supply chain. For example, Coca-Cola has achieved integration and efficiency in a supply chain by making collaboration with McDonald’s (Lambert, Emmelhainz, & Gardner, 1996, p. 2).

There are three types of partnership (collaboration) indicated by Lambert, Emmelhainz, and Gardner (1996, pp. 2-3), which generally lie in between arm’s length and vertical integration are as follows:
• **Type 1.** The organizations involved, recognize each other as partners, and on a limited basis, coordinate activities and planning. The focus of the partnership is short term.

• **Type 2.** The organizations involved progress beyond coordination of activities to integration of activities.

• **Types 3.** The organizations share significant level of operational integration and each party view as an extension of their own firm.

Holweg, Disney, Holmström & Småros (2005, pp.172-176) describe four categories for collaborative arrangements in supply chain, focusing replenishment and forecasting dimensions. These four categories are:

**Type 0 —The Traditional Supply chain**
This type is similar to “arm’s length” relation. In this category the activities like production orders and replenishment of the stocks is carried out without considering the situation at either up- or downstream of the supply chain. There is no formal collaboration exist in between retailer and supplier. In this type, the only information that is available to the supplier is the purchase order issued by the retailer or wholesaler. Relying on purchase orders only, often increase the forecast error and bullwhip problem, as there is no visibility available for actual customer demand (Holweg, Disney, Holmström, & Småros, 2005, p. 172).

**Type 1—Information Exchange**
In this type, the retailer and supplier still order independently, yet exchange demand information and action plans in order to align their forecasts for capacity and long-term planning. The forecast at supplier level is generated by focusing on end customer sales. Information sharing not only helps to create more visible and predictable demand in the system, but it is also easier to implement than complete customer specific control processes (Holweg, Disney, Holmström, & Småros, 2005, p. 173).

**Type 2—Vendor Managed Replenishment**
In this category, the replenishment of the order is done by the supplier, who then takes responsibility for maintaining the retailer’s inventory. The benefit of centralizing decision making in the supply chain is obtained (Holweg, Disney, Holmström, & Småros, 2005, p. 174).
Type 3 – Synchronized Supply
In this type, the synchronized supply eliminates one decision point and merges the replenishment decision with the production and materials planning of the supplier. The supplier is responsible to maintain customer’s inventory replenishment, by using visibility to plan his own supply operations (Holweg, Disney, Holmström, & Småros, 2005, p. 175).

2.7.3 Business Models Use for Collaboration
There are several business models which are used for collaboration. In terms of external collaboration, there are numerous potential opportunities for vertical supply chain collaboration which include on the downstream side of the supply chain: customer relationship management (CRM); collaboration planning forecasting and replenishment (CPFR); and shared distribution. And on the upstream side of the supply chain: supplier relationship management (also referred to as supplier development, e.g. VMI); supplier, planning, and production scheduling; collaborative design (which could include new product introduction); and collaborative transportation (Barratt, 2004, p. 33).

2.8 CPFR (Collaborative Planning, Forecasting and Replenishment) Business Model

2.8.1 Introduction
The term CPFR defines the standards of collaborative operational process and information sharing in detail, which provides the opportunity to the partners to increase effectively the forecasting accuracy, and ultimately improve inventory control and management.

Larsen, Thernøe and Andresen (2003, p. 532) define CPFR as

“Collaboration where two or more parties in the supply chain jointly plan a number of promotional activities and work out synchronised forecasts, on the basis of which the production and replenishment process are determined.”

The typical “arm’s length” relations, which are often characterized by distrust and competition are replaced by “strategic partnerships”, characterized by a high
degree of information sharing. The high degree of information exchange, would lead to large cost reduction. The phenomenon of collaboration is based on a high degree of information sharing. In addition the synchronization in the business may be achieved by common planning of business processes and activities (Larsen, Thernøe, & Andresen, 2003, pp. 531-532).

The concept of Collaborative Planning, Forecasting and Replenishment (CPFR) was introduced in connection with the pilot project between Warner-Lambert, Wal-Mart, Benchmarking Partners, SAP, and Manugistics. CPFR has a more comprehensive focus including planning, forecast and replenishment processes as compared to Vendor-Managed Inventory (VMI) and Continuous Replenishment (CR). As the information sharing among is extensively exchanged and the coordinating meetings are more frequent, therefore integration becomes stronger (Larsen, Thernøe, & Andresen, 2003, pp. 531-532). It is widely accepted that creating a seamless, synchronized supply chain leads to increase responsiveness and lower inventory cost (Holweg, Disney, Holmström, & Småros, 2005, p. 170).

CPFR is a supply chain management tool use to integrate all members of the supply chain including wholesale, retail, and distribution activities. The point of collaboration by using CPFR, the retail level defines the demand forecast and with the help of which synchronize replenishment is done and production plans throughout the supply chain is managed (Fliedner, 2003, p. 14).

**2.8.2 Process of CPFR**

CPFR is a Web-based attempt with the help of which, the supply chain trading partners can coordinate in the various operations such as production, demand forecasting and inventory replenishment. The main target of this tool is to exchange the selected internal information on a shared Web server in order to provide the reliable and long term future demand views in the supply chain (Fliedner, 2003, p. 14).

Electronic data interchange (EDI) is replaced by CPFR, as there are two main disadvantages of EDI. First, EDI may require manual entering of identical data by both trading partners and it is typically done in a batch file transfer mode, which delays the exchange of information. Therefore, EDI is considered to be a slower approach. Second, the EDI technology is more expensive than CPFR, due to its proprietary nature, variety of standards, and the reliance on VANs. The software use in EDI technology is limit in use because it makes use of trading partners’
exact specifications or variety of industry standard. In contrast, CPFR is gaining acceptance, as the technology breakthroughs associated with Web-based communication (Fliedner, 2003, pp. 14-15).

VICS defines the guidelines to adopt and implement the CPFR management tool in a supply chain of a company. VICS revised the CPFR business model because of the global changing demands (VICS, 2004, p. 5). In 2004 the VICS committee, posted the new version of CPFR guidelines. The latest version is segmented into four main activities, which are; Strategy and planning; Demand and Supply Management; Execution; and Analysis (VICS, 2004, p. 7). The Figure. 17, shows the manufacturer and buyer, collaborate at any stage of the four activities. Each activity consists of two main tasks that specify the main activity (Pfeifer, Hensolt, Wolfinger, Kornas, & Erath, 2008, p. 7).

Figure 17: CPFR process model [Source: (VICS, 2004, p. 9)]
2.8.2.1 Collaboration Activities and Tasks

2.8.2.1.1 Strategy and Planning

In this activity, the ground rules for the collaborative relationship is set in between the manufacturer and the retailer or distributor. It determines both the product mix and placement and the event plans. The distributor may also be the participant of the process in the buyer or seller role, or both (VICS, 2004, p. 7).

2.8.2.1.1.1 Develop Collaboration Arrangement

The retailer or wholesaler and the manufacturer establish the ground rules and agreement for the collaborative relationship. This agreement specifies: the objectives including inventory reductions, lost sale elimination, and lower product obsolescence to be gain through collaboration; the required resources to communicate and integrate (e.g. hardware, software, performance metrics) which is necessary for the collaboration; and the expectations of confidentially concern with the prerequisite trust which is necessary to share the sensitive information of the company (Fliedner, 2003, p. 15).

2.8.2.1.1.2 Joint Business Plan

The participating partners agree upon the partnership strategies, replenishment strategies, managing strategies, operational plan, share operational goals, and strategies, and cooperation plans. The business plan established upon the shared information can enhance the quality of forecasting, reduce lead times, and improve the supply chain flow (VICS, 2004, pp. 7-9).

2.8.2.1.2 Demand and Supply Management

In this part of the CPFR model forecasts the customer demand, also referred to the consumer (point-of-sale) demand, as well as order and shipment requirements (VICS, 2004, p. 7).

2.8.2.1.2.1 Sales Forecasting

In this step, with the help of consumption data the point of sale is projected. It depends on the product, industry or trading partner. The consumption data could be the retailer POS data, warehouse withdrawals or manufacturer consumption data. It must be pointed out that planned events mentioned in the Business Plan have to embrace in the Sales Forecasting (Bozarth, 2011a).
2.8.2.1.2.2 Order/Planning Forecasting

This task determines future product ordering and delivery requirements, which is based upon the sales forecast, inventory and stock positions, lead times and other factors (VICS, 2004, p. 9).

2.8.2.1.3 Execution

This activity comprises all operational actions including placing orders, prepare and deliver shipments, receive and stock products, record sales transactions and make payments. These activities are often called as “order to cast” cycle (VICS, 2004, p. 7).

2.8.2.1.3.1 Order Generation

In this task, the process of generation of firm demand from agreed order forecast takes place (VICS, 2004, p. 10). The retailer, wholesaler or the manufacturer can handle the order generation depend on the capability, available sources, and systems. Regardless of who completes this task, the main focus is that the quantity created order must meet the ordered forecast.

2.8.2.1.3.2 Order Fulfillment

The process of order fulfillment includes: the production process, shipment, delivering and stocking products for the consumer purchase (VICS, 2004, p. 10).

2.8.2.1.4 Analysis

In this activity the main task is to identify deflections that lead to exception conditions. This is why; it is needed to monitor the planning and execution activities. The performance metrics is calculated by the results obtained by aggregate monitoring. The retailers and the manufacturer share their thoughts and set their plans and goals to achieve continuously improved results (Pfeifer, Hensolt, Wolfinger, Kornas, & Erath, 2008, p. 10). There are two tasks involves in this activity, which are as follows:

2.8.2.1.4.1 Exception Management

It includes the monitoring of planning and operations for out-of-bond conditions. These out-of-bond conditions could arise both in sales and order forecast (VICS, 2004, p. 10).
2.8.2.1.4.2 Performance Assessment

The calculation of key metrics is a most important task in Performance Assessment. The key metrics is divided into two segments; The operational measures, includes service level, lead times, forecast accuracy, stock level, and inventory turns and the financial measures would be total cost or category profitability. The result obtained from these calculations helps to assess the achievement of business goals, continuous improvement in business strategies, and to perceive new trends of market (Bozarth, 2011b).

2.8.2.2 CPFR Collaboration Lead Roles

In CPFR model, the manufacturer and retailer play a vital role in sales forecast, order forecast, and order generation. Options A, B, C and D in Figure 18, represents process variant, which may be determined by mutual planning, capability, resources, and information system of the trading partners. CPFR does not dictate who ultimately manages the forecast or replenishment processes (Collaborative Planning Forecasting and Replenishment (CPFR), 2002, p. 11).

<table>
<thead>
<tr>
<th>Alternatives</th>
<th>Sales Forecasting</th>
<th>Order Planning/Forecasting</th>
<th>Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option A (Conventional Order Mgmt)</td>
<td>Retailer</td>
<td>Retailer</td>
<td>Retailer</td>
</tr>
<tr>
<td>Option B (Supplier-Managed Inventory)</td>
<td>Retailer</td>
<td>Manufacturer</td>
<td>Manufacturer</td>
</tr>
<tr>
<td>Option C (Co-Managed Inventory)</td>
<td>Retailer</td>
<td>Retailer</td>
<td>Manufacturer</td>
</tr>
<tr>
<td>Option D (Retail VMI)</td>
<td>Manufacturer</td>
<td>Manufacturer</td>
<td>Manufacturer</td>
</tr>
</tbody>
</table>

**Figure 18: Key CPFR scenario lead roles [Source: (VICS, 2004, p. 17)]**

In each case, both trading partners have input into forecasting and planning processes, but one partner may take ultimate ownership. In option A, Retailer controls the sales forecast, order forecast, and order release. In this option conventional order management is used. In option B, the retailer provides a forecast of demand, while the manufacturer focuses on replenishment process. In this case, VMI is used and the manufacturer or retailer is responsible for order generation. In option C, the retailer is responsible for forecasting. In option D, the
supplier leads the demand forecast and order generation (Collaborative Planning Forecasting and Replenishment (CPFR), 2002, p. 11).

2.8.3 Levels in CPFR Collaboration

Larsen, Thernøe and Andresen (2003, p. 535-537) describe three level of CPFR collaboration, depending on the integration and extent of the collaboration.

- In **Basic CPFR**, there are business processes and a limited integration among business partners. In this level the types of relationship among the trading partners are transactional. The transactional costs determined through negotiating with the other independent firms. Transaction cost can be divided into searching costs (cost from establishing contact with new partner), bargaining cost, and control cost (cost related to monitoring the partner’s fulfillment of the contract). The basic CPFR collaboration have transaction theoretical approach to collaboration.

- In **Developed CPFR**, the collaborative parties start to co-ordinate and share information by making agreement about the type of information exchange and how they react to the exchange data. The focus of developed CPFR is to improve service level. The developed CPFR have a network approach, focusing on frequent sharing of information and creating trust in relationships.

- In **Advanced CPFR**, the business partners exchange data more extensively and they also co-ordinate in forecasting, replenishment and planning processes. The planning may include production planning, product development, transportation planning and marketing activities. By improve planning, increased in sales and cost minimization in the supply chain can obtain. The Advanced CPFR has resource and competence based approach, which emphasizes development of competencies and learning between firms.

The different dimensions and differences among the three level of CPFR are illustrated in Table 3 below:
<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Basic CPFR</th>
<th>Developed CPFR</th>
<th>Advanced CPFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared information</td>
<td>Sales orders and confirmation</td>
<td>Demand data, order planning data,</td>
<td>Demand data, order planning data,</td>
</tr>
<tr>
<td></td>
<td>Inventory data</td>
<td>promotion data, production data</td>
<td>promotion data, production data</td>
</tr>
<tr>
<td>Degree of discussion</td>
<td>No</td>
<td>Some</td>
<td>Frequently</td>
</tr>
<tr>
<td>Co-ordination/synchronization</td>
<td>No</td>
<td>Some</td>
<td>All activities</td>
</tr>
<tr>
<td>Competence development</td>
<td>No</td>
<td>No</td>
<td>Knowledge</td>
</tr>
<tr>
<td>Evaluation</td>
<td>No</td>
<td>No</td>
<td>Experiences</td>
</tr>
<tr>
<td>Type of relationship</td>
<td>Transactional</td>
<td>Information Sharing</td>
<td>Mutual learning</td>
</tr>
</tbody>
</table>

Table 3: Dimensions of the different levels of CPFR [Source: (Larsen, Thernøe, 
& Andresen, 2003, p. 537)]

2.8.4 CPFR Benefits

There are several benefits obtain from the implementation of CPFR and some of them are:

- It can reduce lost sales and inventories as well as increase forecast accuracy (Chen, Chang, Chang, & Chen, 2004, p. 321). The exchange of information among the trading partners can reduce the uncertainties in term of future demand and forecast. The exchange of information and visibility improves the whole system performance as each member in a supply chain can gain improvement from information sharing (Yu, Yan, & Cheng, 2001).

- Collaborative forecasting enables better customer service levels, or reduced inventory and it can control the fluctuating demand by linking the inventory and replenishment decision (Holweg, Disney, Holmström, & Småros, 2005, p. 176).

- The results of several pilot studies indicates the potential benefits of CPFR business tool, as it provides an opportunity to trading or business partners (retailer, wholesaler and manufacturer) to collaborate and communicate at every stage, which makes the supply chain transparent. The joint planning and single forecast for all of the supply chain partners, minimize the lead time, hence reduce the lost revenues and mark downs (Fliedner, 2003, p. 17).
2.8.5 Challenges for CPFR Implementation

There are few challenges and hindrances in the implementation of CPFR, which are:

- The first obstacle is; the lack of trust in sharing sensitive information, as sharing sensitive operating data may enable one trading partner to take advantage to the other (Fliedner, 2003, p. 18).

- The second challenge is; it requires a lot of effort and which increase the work load as well as it requires a lot of time in terms of learning new technology and then implementing (Chen, Chang, Chang, & Chen, 2004, p. 321).

- The third challenge is; to take the initiative steps of CPFR, such as, lack of attention to developing front end agreements as to specifically what organizations were going to collaborate over (Barratt, 2004, p. 39). The selection of a business partner is also difficult and the selection process may require investment as well as a lot of time.

- The final hindrance to implementation is; with regards to forecasting collaboration. As each company has its own system and use different forecasting method, to generate the demand forecast (e.g. Retailer use POS data for forecasting but manufacturer use the shipment data) (Fliedner, 2003, p. 18). Therefore, business partner should agree on a single forecast, generate by mutual planning and discussion, in order to gain advantage of forecast accuracy.
3 Methodology

This chapter contains outlines of the research approach, the selection of the research method and research strategy, the case study approach, the data collection and research assessment approach used in this thesis.

3.1 Research Method

Bryman (2008, p 31) defines that, “research method is a technique for collecting data. It can involve specific instruments such as questionnaire or interviews or a participant observation, where by the researcher listen to and watches there.”

3.2 Selecting a Research Approach

According to Bryman (2008, p 9) there are two type of research approach: Deductive and Inductive.

The deductive approach is illustrated in Figure 19 and it represents the relationship between theory and social research. The researcher, on the basis of what is known about a particular topic and of theoretical considerations in relation to that topic, deduces hypothesis that must then be subjected to empirical analysis. The researcher needs to specify how data is gathered in the relation to the concepts that make up hypothesis (Bryman, 2008, p. 9).

![Figure 19: Deductive approach](Source: [Bryman, 2008, p. 11])

The Inductive approach works in the opposite way to deductive approach as shown in Figure 20. In inductive reasoning, the researcher begin with specific observation and measures, then detect patterns and regularities, formulate some tentative hypotheses that the researcher explore, and finally end up by developing some general conclusions and theories (Web Centre for Social Research Methods).
Figure 20: Inductive approach [Source: (Bryman, 2008, p. 11)]

In this thesis, the author follows the deductive approach. Based on the collected theoretical data, the author proposed hypotheses including, the lead time management, sourcing strategy and collaborations which may decrease the markdowns and lost sales. In the analysis part, the hypotheses are checked and confirmed.

3.3 Selecting an Appropriate Research Strategy

Yin (2003, p. 5) describes five major types of research strategies that can be used in research work, which are: Experiment, Archival analysis, Survey, History and Case study.

There are three conditions that guide the researcher to select the accurate research strategy (Yin, 2003, p. 5):

1. The type of research question posted (e.g. who, what, where, how and why)
2. The extent of control an investigator has over actual behavioral events.
3. The degree of focus on contemporary as opposed to historical events.

The Figure 21 displays the three conditions and shows how each relates to the five major strategies.
### Figure 21: Relevant situations for different research strategies [Source: (Yin, 2003, p. 5)]

#### 3.3.1 Case Study Strategy

Yin (2003, p. 13) defines, “A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident.” Case study is considered to be a preferred research strategy when “how” and “why” questions are being asked about a contemporary set of events over which the researcher has little or no control. In order to understand and formulate the case study requires an extensive review of literature such as scientific books and scientific research papers that is related to the topic (Yin, 2003, p. 9).

A case study as a research strategy comprises an all-encompassing method—covering the logic design, data collection techniques, and specific approaches to data analysis (Yin, 2003, p. 14). The case study inquiry:

- *Copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result.*
- *Relies on multiple sources of evidence, with data needing to coverage in a triangulating fashion, and as another result.*
- *Benefits from the prior development of theoretical propositions to guide data collection and analysis.*

Yin (2003, pp. 85-94) describes the six types of sources of evidence that are extremely important for doing high-quality case studies. These six sources of evidence are:
1. Documentation: Includes letters, memoranda, agendas, and written reports of events, administrative documents, formal studies, newspaper clipping, and other articles appearing in the mass media or in community newsletters (Yin, 2003, pp. 85-86).

2. Archival records: Includes Service records, organizational records, maps and charts of geographical characteristics, lists of names etc. These are often taking in the form of computer files and records (Yin, 2003, pp. 88-89).

3. Interviews: This is the most important sources for the collection of information for case study. The interview will appear to be guided conversations rather than structured queries. It may be an open-ended or focused interview or surveys (Yin, 2003, pp. 89-91).

4. Direct Observation: The observation can range from formal to casual data collection activities. The direct observation might be made throughout a field visit (Yin, 2003, pp. 92-93).

5. Participant Observation: Participant observation is a special mode of observation in which researchers are not merely a passive observer. This technique has been most frequently used in anthropological studies of different cultural or social groups (Yin, 2003, p. 94).

6. Physical Artifact: Physical artifact have less potential relevance in the most typical kind of case study. It may include technological device, a tool or instrument, or some physical evidence and may collect or observe as part of a field visit. This source has been extensively used in anthropological research (Yin, 2003, p. 94).

The author uses multiple sources of evidence in order to investigate the effects of lead time and sourcing strategy on the supply chain efficiency of Malik Moden, for example, semi-structured interviews are conducted with the CEO and the Sourcing Manager of the company. The sales data of the last year is collected, which are basically archival records of the organization. Direct observation is carried out with the help of field visit at Malik Moden site.
3.3.1.1 Types of Variation in Case study Strategy

There are two types of variation within case study; it includes single and multiple case studies. Single and multiple case studies are in reality but two variants of case study designs (Yin, 2003, p. 14).

Yin (2003, p 39) indicate that, “A single-case study is an appropriate design under several circumstances. A single case study is analogous to a single experiment, and many of the same conditions that justify a single experiment also justify a single-case study”. In comparison to single-case, the evidence from multiple cases is often considered more compelling, therefore the overall study is regarded as being more tough. The decision to undertake multiple-case studies cannot be taken lightly, as it require extensive resources and time beyond the means of a single student one independent research investigator (Yin, 2003, pp. 46-47).

The author of this thesis used the single case study strategy to conduct the research project at Malik Moden GmbH. Single-case study helps the author to fully understand the research context and it provides a deep understanding about specific supply chain issues by confining the research scope.

3.3.2 Choosing the Suitable Research Purpose

There are three different purposes which can be used for each strategy. The three purposes for conducting case studies are; exploratory, descriptive, or explanatory (Yin, 2003, p. 3).

The exploratory case study seeks to define research questions of a subsequent study or to determine the feasibility of research procedures and these types of research involves field work and information collection prior to the definition of research question (Hancock & Algozzine, 2006, p. 33).

The descriptive case study attempts to present a complete description of a phenomenon within its context (Hancock & Algozzine, 2006, p. 33).

The Explanatory case study seeks to establish cause-and-effect relationships. The primary purpose is to determine how events occur and which ones may influence particular outcomes (Hancock & Algozzine, 2006, p. 33).

The author chooses explanatory case study, as the study recognizes the key variables and their relationships associated with the markdowns and forecast error problem in Malik Moden. The testing of the hypotheses are carried out considering
the two variables “lead time” and “forecast error” which act as a guideline to suggest solutions to the problem.

3.4 Selection of the Research Method

Generally, there are two type of research methods; quantitative and qualitative.

The quantitative research method is the investigation that seeks causal determination, prediction, and generalization of findings arrived at via statistical measures (Hancock & Algozzine, 2006, p. 86).

The qualitative research method is the research that produces findings not arrived at through statistical procedures or other means of quantification (Hancock & Algozzine, 2006, S. 86). In simple words, qualitative methods prominently feature three data collection techniques: observation, interviews, and the review and analysis of site generated or related documents (SAGE Publication Ltd, 2008, p. 218).

The author used qualitative research method as the data are collected from the Malik Moden by doing observation and unstructured interviews are conducted from the company’s staff members and the related theories and documents are collected from books articles and scientific journals.

3.5 Methods of Data Collection

Generally, there are two types of sources for data collection—the primary data and the secondary data. The primary data is the data collected for the first time and gathered by the investigator by direct observation, by interview, or by Survey method. The secondary data is the data which has already been collected and analyzed by someone else. The most common secondary sources are books, published works, scientific papers, and scholarly journal articles (Hox & Boeije, 2005, p. 593).

The author used both primary and secondary data for this case study. The empirical portion is based on interviews, observations, and data provided by the case company. The theory is included by using books, articles from journals, scientific papers, and online sources.
3.6 Assessing the Quality of Research Study

Validity and reliability are most critical aspects of the research study. Validity is another word for truth (Silverman, 2010, p. 275) and it is concerned with the integrity of conclusions that are generated from the research (Bryman, 2008, p. 32). There are two types of validity; Internal Validity and External Validity. Internal validity refers to establishing causal relationship between two variables or more (Yin, 2003, p. 34). External validity refers to establishing the domain to which the study can be generalized and theory is use to support single case study. Case studies rely on analytical generalization. In analytical generalization, the researcher is striving to generalize a particular set of results to some broader theory (Yin, 2003, pp. 34-37). The Reliability refers to the degree of accuracy of the collected data (Yin, 2003, p. 37). It is the degree of consistency with which instances are assigned to the same category by different observers or by the same observer on different occasions. In simple words, the basic principle of reliability is to provide high quality data (Silverman, 2010, pp. 275-286).

The main purpose of the thesis is to identify the relationship of factors like lead time and forecast error which are affecting the performance of company. The author obtained the internal validity by collecting the theory related to these factors from reliable sources and research papers.

In the analysis part the relationship between these factors is confirmed by testing the data provided by the company. The External validity is achieved by using appropriate theory and information from trustable sources and the particular set of results obtained from the research is generalized by relating it to the theory. As mentioned before, the data is collected from reliable sources and from the reliable personnel of the case company. Therefore, it is considered to be of high quality which increases the reliability of this research.
4 Empirical Findings

This chapter examines the significant difference in the lead times between China and Turkey which is currently affecting the efficiency and flow of supply chain of the company.

4.1 Company Profile

Malik Moden GmbH is a small sized Textile wholesale trading company which was established 9 years ago. The company started their business with a small range of products and assortments. They grew their business gradually and now they are offering a wide range of assortment including T-shirt, jeans, jackets, pullovers, pants, shirts, and underwear for people of every age group.

Malik Moden GmbH is located in Dreieich, Germany. There are only seven permanent employees, including the owner of the company. As they are an importing wholesaler, they import apparel from China and Turkey. They sell the products within Germany and abroad including: France, Austria and Switzerland. (Saleem, 2012)

4.2 Organizational Structure

The management structure of Malik Moden is illustrated in Figure 22. The owner of the company acts as a manager, while other employees coordinate with the owner, during the whole process of purchase and sale.

The owner, Malik Saleem Ahmad, is engaged in the purchasing, collaboration with the suppliers to design a product, and in making decisions regarding the order quantity. He is responsible for the overall business management and supervises all the other employees. According to Malik Saleem “we do forecasting and planning 1-1.5 years in advance to put an order in China and normally the forecast error is 30-40%. In case of purchasing from Turkey, we plan and create demand forecast 8-6 month prior to place an order and the forecast error is approximately 18-22 %” (Saleem, 2012).

There are two people in the purchasing and sales department: Sarfraz Ahmad and Nasir Ahmad. They coordinate with the managing director of the company. They usually make business trips to the supplier’s production plants in order to negotiate
and communicate with the suppliers in terms of product prices, quality, and delivery times. One of them usually stays in the production house of the suppliers in Turkey, to achieve good quality products at right price and time. The language used to communicate with the suppliers is Turkish, as both of the purchasing managers have command of Turkish. They are also responsible for making sales decisions. Nasir Ahmad is also responsible for making business trips in China to communicate and coordinate with the suppliers. The communication with the suppliers from China is carried out in the English language. Sarfraz Ahmad, purchasing and sales manager in Malik Moden mentioned while talking to the author that “We have no special contracts with our suppliers and buyers. The plight to make permanent contract is that the buyers needs on time delivery and you have to be lean regarding to the lead times and sometime in case of late deliveries, you have to give penalties” (Ahmad, 2012).

There are two people who are involved in warehouse operations. They usually unload and load the received items. They are also involved in providing service to the customers who visit the display site of the company.

One man coordinates with the owner to handle the logistic issues which consist of in-house inventory management, order processing, transportation arrangements for inbound and outbound logistics, the logistics provider selection and documents preparation.

There are also three consultants and their duty is to provide the forecast data for the upcoming trends, colors and designs. They attend several catwalks and seminars, through which they make the decision. The order is usually placed on the data provided by these people.

All products arrive in the central warehouse in Dreieich, Germany. From here, orders are divided for the different customers and distributed to the retailer within Germany and outside. The company has also a small warehouse available at the display site (Ahmad, 2012).
4.3 Malik Moden Supply Chain

Malik Moden outsources the apparels from the offshore and nearby countries. The offshore sourcing is done from China and nearby purchasing is carried out from Turkey. The primary focus is on the lower costs of product; this is why they usually change the suppliers from China and have no permanent supplier. Normally, they prefer direct sourcing from the manufacturer. In Turkey they have two permanent suppliers, which are basically the manufacturers. By direct purchasing from the manufacturers the cost advantage is achieved.

The focal firm and their warehouse are both located in Dreieich, Germany. The apparel is transferred from the warehouse to the retailers including departmental stores, discounters, franchise, and boutiques. The information flows downstream from the customers to the suppliers, and material flows upstream from suppliers up to customers.
Malik Moden is purchasing the continuous and seasonal basic apparel from Chinese suppliers. They are doing traditional sourcing and mostly do Up-front purchasing. They source the large quantity of apparels and work on Make to Stock (MTS) phenomena to obtain a cost advantage. Normally, the lead times vary from 3-4 months, but it may increase depending on the custom clearance or the postponements and delays from the upstream supply chain members.

 Suppliers from Turkey provide seasonal fashion apparels to Malik Moden. The company works with these suppliers in two major collections that are of summer and winter. While sourcing they are using the mix of upfront and replenishment. The lead time is approximately 1-1.5 months. Due to shorter lead time and by staying closer to the suppliers, they are able to manage their inventory and demand.

**Figure 23**: Supply chain structure of Malik Moden

### 4.3.1 Inbound Logistics

The suppliers from China and Turkey are responsible for delivering the apparels till warehouse. The garments delivered by the suppliers from China are in Full Container Load (FCL), which are shipped by sea and by truck till the Malik Moden warehouse (Ahmad, 2012).

The suppliers from Turkey transport the goods by trucks, using different transportation companies (Ahmad, 2012).
4.3.2 Out-bound Logistics

The apparels are distributed from the warehouse (Dreieich, Germany), through Deutscher-Paket-Dienst (DPD) service, which is used within Germany and outside. Some of the customers arrange the transportation by themselves. (Ahmad, 2012)

4.3.3 Information Sharing

The most common information shared with the trading partners of China is the purchase order. The purchase order is created with the last year sales data and by the predictions of new trends in the market. The company does this without involving upstream and downstream supply chain partners. Since, they are traditional wholesale traders, they have high inventory levels. The re-order and replenishment is done by considering inventory buffers and the orders received from the customers. The planning and forecasting to place an order is done 1.5 years in advance, which shows their communication gap and lack of information sharing with their supply chain partners and which increases the information lead time. Furthermore, it is an addition to the total lead time.

The company uses a very traditional way of communication with their supply chain members, mostly they communicate through internet, telephone and fax. The type of information exchange in case of China is very limited and in case of Turkey, they share information including forecasts, replenishment, and delivery lead times. They work as an intermediary and have communication scarcity with the downstream supply chain members. Therefore, it is difficult for the company to receive an actual demand of the consumer. The other reason, because of which they are suffering from markdowns and lost sales, is the lack of information on the consumer actual demand.
5 Analysis and Proposed Solutions

5.1 Lead Time and Forecast error

As mentioned in empirical findings chapter, Malik Moden is using two destinations for sourcing; China and Turkey. According to the data provided by the sourcing manager, last year “654,520 pieces” of continuous and seasonal basics products were sourced from China and “265,487 pieces” of seasonal fashion products were purchased from Turkey. The impact of lead time on markdowns and lost sales is shown in Table 4.

<table>
<thead>
<tr>
<th></th>
<th>Pcs purchased last season</th>
<th>Pcs sold on markdown</th>
<th>Pcs remain Unsold</th>
<th>Average purchase price of a piece (€) 2010</th>
<th>Average purchase price of a piece (€) 2011</th>
<th>Increase in purchase price of a piece (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>654520</td>
<td>242064</td>
<td>33752</td>
<td>3.25</td>
<td>3.75</td>
<td>15.38 %</td>
</tr>
<tr>
<td>Turkey</td>
<td>265487</td>
<td>52689</td>
<td>1227</td>
<td>5.90</td>
<td>6.0</td>
<td>1.69 %</td>
</tr>
</tbody>
</table>

Table 4: The impact of lead time on markdowns and lost sales

5.1.2 Comparison of Forecast error

Forecast error (%) = (forecast - actual)/(forecast) x 100

China

Actual Demand = Pcs purchased last year – Pcs sold on markdowns – Pcs remain unsold

Actual Demand = 378704

Forecast error (%) = (Pcs purchased last year – Actual Demand)/(Pcs purchased last year) x 100

Forecast error (%) = (654520-378704)/(654520) x 100

Forecast error (%) = 42, 14%
**Turkey**

Actual Demand = Pcs purchased last year – Pcs sold on markdowns – Pcs remain unsold

Actual Demand = 211571

Forecast error (%) = (Pcs purchased last year – Actual Demand)/ (Pcs purchased last year) x 100

Forecast error (%) = (265487-211571)/ (265487) x 100

Forecast error (%) = 20, 30%

The difference between the forecast errors between the two sourcing countries is displayed in the Figure 24.

**Figure 24:** Comparison of forecast error
## 5.1.3 Lead time comparison

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Pcs</th>
<th>Order Placement Date</th>
<th>Goods Ready Date</th>
<th>Transportation Time (Sailing &amp; customs at port of loading)</th>
<th>In Warehouse (Custom Clearance / Trucking in Germany)</th>
<th>Total No. of Days for Complete Cycle</th>
<th>In Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplier 1</td>
<td>55230</td>
<td>16-Sep-10</td>
<td>15-Dec-10</td>
<td>14-Jan-11</td>
<td>24-Jan-11</td>
<td>130</td>
<td>4,33</td>
</tr>
<tr>
<td>Supplier 2</td>
<td>62502</td>
<td>18-Oct-10</td>
<td>16-Jan-11</td>
<td>12-Feb-11</td>
<td>18-Feb-11</td>
<td>123</td>
<td>4,10</td>
</tr>
<tr>
<td>Supplier 3</td>
<td>60000</td>
<td>7-Nov-10</td>
<td>5-Feb-11</td>
<td>5-Mar-11</td>
<td>13-Mar-11</td>
<td>126</td>
<td>4,20</td>
</tr>
<tr>
<td>Supplier 2</td>
<td>55220</td>
<td>7-Dec-10</td>
<td>20-Feb-11</td>
<td>22-Mar-11</td>
<td>27-Mar-11</td>
<td>110</td>
<td>3,67</td>
</tr>
<tr>
<td>Supplier 3</td>
<td>51205</td>
<td>27-Dec-10</td>
<td>17-Mar-11</td>
<td>15-Apr-11</td>
<td>22-Apr-11</td>
<td>116</td>
<td>3,87</td>
</tr>
<tr>
<td>Supplier 4</td>
<td>61252</td>
<td>26-Jan-11</td>
<td>26-Apr-11</td>
<td>26-May-11</td>
<td>3-Jun-11</td>
<td>128</td>
<td>4,27</td>
</tr>
<tr>
<td>Turkey</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplier 2</td>
<td>21250</td>
<td>10-Nov-10</td>
<td>15-Dec-10</td>
<td>19-Dec-10</td>
<td>19-Dec-10</td>
<td>39</td>
<td>1,30</td>
</tr>
<tr>
<td>Supplier 1</td>
<td>15252</td>
<td>5-Dec-10</td>
<td>9-Jan-11</td>
<td>11-Jan-11</td>
<td>11-Jan-11</td>
<td>37</td>
<td>1,23</td>
</tr>
<tr>
<td>Supplier 3</td>
<td>24522</td>
<td>10-Nov-10</td>
<td>18-Dec-10</td>
<td>20-Dec-10</td>
<td>20-Dec-10</td>
<td>40</td>
<td>1,33</td>
</tr>
<tr>
<td>Supplier 2</td>
<td>11212</td>
<td>20-Dec-10</td>
<td>19-Jan-11</td>
<td>21-Jan-11</td>
<td>21-Jan-11</td>
<td>32</td>
<td>1,07</td>
</tr>
<tr>
<td>Supplier 1</td>
<td>15000</td>
<td>25-Dec-10</td>
<td>24-Jan-11</td>
<td>29-Jan-11</td>
<td>29-Jan-11</td>
<td>35</td>
<td>1,17</td>
</tr>
<tr>
<td>Supplier 3</td>
<td>25200</td>
<td>29-Jan-11</td>
<td>28-Feb-11</td>
<td>3-Mar-11</td>
<td>3-Mar-11</td>
<td>33</td>
<td>1,10</td>
</tr>
</tbody>
</table>

Table 5: The goods deliveries schedule
Figure 25: Lead time comparison

The above comparison and figures, gives a clear picture about the impact of lead time on forecast error. The longer lead time, affects the forecast accuracy, due to which the case company suffers from huge markdowns. The lead time plays a vital role in demand forecasting as well as to serve the customers on time. Manufacturing lead time can be reduced by making the production process efficient but the transportation lead time cannot be minimized by staying economical because of the geographical distance between China and Germany. Figure 25 and Table 5 show a large difference between the transportation lead time of China and Turkey. The transportation lead time from China is approximately 28 days, which is almost 14 times higher than from Turkey. As the author mentioned before, the proximity and geographical location of Turkey with respect to EU enable the suppliers to transfer the goods in less time. In contrast, the longer distance in between China and EU, affects and enlarges the transportation lead time.

5.1.4 Change in the Sourcing Strategy

Traditional sourcing is carried-out on the basis of the lower initial cost which is also the main aim of the case company. This leads to the decision of procuring their seasonal basic and continuous products from China. Malik Moden is facing a challenge in terms of hidden cost that is basically the large markdowns while sourcing from China. One of the key reasons behind the large markdowns and lost sales is the longer lead times. In contrary, markdowns and loss sales are less while
sourcing from Turkey. As the case company is the intermediary of manufacturers and retailers, they should control their lead times, in order to serve their customers on right time. The sourcing should be carried out by keeping in view the overall supply chain cost, therefore the case company has to modify their sourcing strategy by purchasing their continuous and seasonal basics products through nearby country (Turkey), so doing enabling the case company to become more flexible and able to decrease its markdowns and lost sales, resulting in the reduction of the overall supply chain cost.

5.1.5 Advantages of Changing Sourcing Strategy

There are several advantages the case company may obtain by changing their sourcing strategy.

The reason for sourcing from China is the low labor cost which increases the profit margins of the company. The author of this thesis highlighted before that due to a number of reasons the wages in China increased over the last few years and is forecasted to be augmented in the up-coming years too. This is why, the cost as a competitive factor is reduced between China and Turkey. The rapid increase in average purchase price from China is shown in Table 4. Generally, it is difficult to change the sourcing destination in a short time. Therefore, the case company should start searching among the manufacturers in Turkey for their basic and continuous apparel and might start with a small amount to see the difference in the pieces sold on markdowns. By sourcing from Turkey the case company will also achieve an advantage, as they may face the challenge in the coming few years regarding to their sourcing strategy, due to the continuous rising of labor cost in China.

The second advantage Malik Moden can achieve comes of language. The author of this thesis mentioned in the empirical findings that both of the sourcing managers can speak Turkish and that language plays an important role in transferring information and developing business relationships. It may also help in negotiations regarding to the product cost.

The third advantage comes of environmental sustainability which the case company can achieve because of the proximity of Turkey. Proximity reduces the environmental pollution resulted from transportation and thereby decreases the carbon footprint.
The last advantage the case company obtains is the improvement in overall efficiency of the supply chain. Due to the shorter cycles and lead times, the case company can gain an advantage of time to react and can transfer the products to the retailers quickly and in less time. This would also increase the flexibility of the case company and improves the control on supply chain operations, which would result in the enhancement of the supply chain efficiency.

5.2 Current Supply Chain Structure

The current supply chain structure of Malik Moden is represented in the figures below:

Figure 26: Supply chain structure of the Suppliers from China

Figure 27: Supply chain structure of the suppliers from Turkey
The supply chain structure of the focal firm, while sourcing from China is shown in Figure 27. The focal firm has an arm’s length relationship and has no transparency among their business partners, due to which the focal firm has less control over the supply chain processes. The only information shared is the purchase order sent by the focal company to their suppliers. Therefore, there are separate plans and several forecasts for supplier, focal firm and retailers, which results in the large forecast error, markdowns and lost sales.

The supply chain of the focal firm, while sourcing from Turkey is illustrated in Figure 28. The focal firm has a “Type 1” relationship with its suppliers. The focal firm coordinates, plans, and shares information with their suppliers on a limited basis. There is transparency among the focal firm and their suppliers, which is why they have markedly better control over the supply chain processes as compared to the China supply chain.

The other reasons due to which they suffer with the forecast inaccuracy, markdowns and lost sales in both cases of sourcing are:

- They are intermediary of supplier and retailer and have no collaboration with the downstream members, this is why they are unable to get the real demand data and therefore they have to generate forecast on the basis of their experience, history (sales data) and by judging the new trends.
- The main source for information sharing used by the company is the very traditional, normally by telephone, fax and email.
- The main goal of the focal firm is to cut company initial cost and achieve an initial cost advantage. Therefore, they change their upstream partners usually to minimize the cost of the product as possible.

5.2.1 New Supply Chain Business Model (CPFR)

The Collaborative, Planning, Forecasting and Replenishment (CPFR) business model can resolve the problems of the focal firm with regard to forecast inaccuracy and markdowns, by doing complete transparency, collaboration, and continuous information sharing among their business partners.

The proposed supply chain model is shown in Figure 29. The two way information sharing and data transparency among the supply chain members increases the customer service level. By coordinating and sharing information with the retailers provide the case company a real demand data and by having the transparency with
the suppliers helps them in replenishing and maintaining stock levels. By doing so, they can achieve synchronization in supply and demand, resulting in the reduction of lead times, markdowns and lost sales.

**Figure 28:** New supply chain business model

### 5.2.1 Benefits of New Supply Chain Business Model (CPFR)

There are several benefits the case company can achieve by using the CPFR business model and these benefits are:

1. **Improved forecast accuracy can be achieved with single shared forecast:** Sharing a single forecast along the supply chain enables the trading partners to benefit from the joint effort. Trading partners may have different views of the market, information, consumer data, and experiences, depending on their position in supply chain. The combined knowledge and effort of manufacturers, wholesalers and retailers guides to improve forecast accuracy.

2. **Relationship between trading partners is improved:** The collaboration among the trading partners will improve the relationship. By regularly exchanging information, the trading partners gain the understanding of their respective businesses and become to create “win-win” situations.

3. **Reduce lost sales:** The collaboration in planning and forecasting will reduce loss sale, and out-of-stock events, by transferring the right product at the right time at the right place.
4. **Cost reduction**: The overall supply chain cost is reduced by production scheduling on agreed forecast and by decreasing variation and set up times. The inventory reduction will reduce the capital costs of the case company.

**5.2.2 Challenges of Implementing CPFR**

The first and the most common challenge of implementing CPFR are to share sensitive information among business partners. The trading partner should develop a relationship on the basis of trust, therefore certain rules should be defined among the trading partners, while sharing confidential information.

The obstacle of time and effort required for the implementation of CPFR is very critical. Since much effort and time is required in taking initial steps, such as in selecting the trading partners and then agreeing on the business rules. This is why the time and effort is considered to be an obstacle. The case company needs a lot of time to implement and then work on CPFR business model. Therefore, they can initiate with the developed level of CPFR, by continuous sharing information among the business partners, leading to an improvement of the forecast.
6 Conclusion

The purpose of this thesis is to identify the effect of lead times and sourcing decision over sales and on the supply chain efficiency of the Malik Moden and how lead times can be managed, to enhance the performance and profitability of the company.

There are a number of problems being identified by investigating the current sourcing strategies and supply chain structure of the case company. There are mainly three problems associated with the sourcing strategy and the supply chain structure of the company that are affecting the company’s supply chain efficiency and due to which they experience markdowns and lost sales. These problems are:

- Longer lead times in case of sourcing from China and lack of knowledge of the current sourcing trends.
- Sourcing decisions are made on the basis of initial product cost.
- Lack of collaboration and information sharing among their trading partners.

By identifying the above mentioned problems, the author proposed two solutions which provide a framework to the case company to make their supply chain efficient, reduce their markdowns, and lost sales and increase their forecast accuracy.

- To consider nearby countries (Turkey) for sourcing their basic and continuous apparel.
- To collaborate with their trading partners by implementing and using CPFR as a supply chain business model.

By considering the nearby sourcing (Turkey) as their sourcing destination also for their basic and continuous apparel, enables the case company to reduce their lead times which will assist them to improve their forecast accuracy. Furthermore, they can transfer the right quantity of products at right place and at right time. They can achieve additional benefits in terms of sustainability, identical language and escapement from the forthcoming confrontation with the rising labor costs in China. Proximity to the suppliers also improves the control of case company over the supply chain and helps them to reduce their markdowns, forecast errors and lost sales.
The second solution of collaboration with their trading partners and the implementation of CPFR supply chain tool provides them to achieve a better control on overall supply chain activities. The adaptation of CPFR requires a lot of effort and time but it will extensively improve efficiency of supply chain activities like it improves forecast accuracy; by intense sharing of information and by having single forecast for all of the trading partners, reduce lead times; by having transparency and efficient flow of the apparel and reduce lost sale and markdowns; by receiving the product on right time and transferring them at right time and at right place. This leads to increase the profitability of the company.
7 Bibliography


Ellis, S. (2008). The case for "profitable proximity". *Council of Supply Chain Management Professionals (CSCMP's) Supply Chain [Quarterly]*.


Lowson, B., King, R., & Hunter, A. (1999). *Quick Response Managing the Supply Chain to Meet Consumer Demand*. West Sussex: John Wiley & Sons Ltd.


8 Appendix

Figure 29: Delivery note of Malik Moden GmbH for the retailers

Figure 30: Malik Moden warehouse, a view from outside
**Figure 31:** Malik Moden display Site, a view from outside

**Figure 32:** Display site of Malik Moden (internal view)
Figure 33: Small warehouse of the display site of Malik Moden