A STUDY ON "SUPPLY MANAGEMENT"

(WITH REFERENCE TO ANBESSA SHOE SHARE COMPANY)

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DECLARATION

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ABSTRACT

THIS PAPER FOCUSES ON SUPPLY CHAIN MANAGEMENT NETWORK DISTRIBUTION AND RISK MANAGEMENT AND REMEDIES. SUPPLY CHAIN MANAGEMENT IS A VITAL ISSUE FOR THE GLOBAL COMPETITIVENESS WIN SITUATION AND STAY IN THE MARKET. HERE IN THE CASE OF ANBESSA SHOES SHARE COMPANY (ASSC), RAW MATERIALS ARE PROCURED AND LADIES, CHILD AND MEN SHOES ARE PRODUCED AT ITS FACTORY, SHIPPED TO WAREHOUSES FOR INTERMEDIATE STORAGE, AND THEN SHIPPED TO RETAILERS OR CUSTOMERS. THE SUPPLY CHAIN, WHICH IS ALSO REFERRED TO AS THE LOGISTICS NETWORK, CONSISTS OF SUPPLIERS, MANUFACTURING CENTERS, WAREHOUSES, DISTRIBUTION CENTERS, AND RETAIL OUTLETS, AS WELL AS RAW MATERIALS, WORK-IN-PROCESS INVENTORY, AND FINISHED PRODUCTS THAT FLOW BETWEEN THE FACILITIES IN THE ABESSA SHOE FACTORY. THE COMPANY HAS EXPERIENCED PROBLEMS OF MARKET ASSESSMENT, MARKET RESEARCH AND DEVELOPMENT CENTER AND PRODUCT DISTRIBUTION METHODS FACED AS BIG CHALLENGE LEADING TO PRODUCE SUPPLY CHAIN RISK SOURCE AT DIFFERENT POINT WHICH LEADS THEM OUT OF GLOBAL COMPETITION. THE MAIN OBJECTIVES OF THE RESEARCH ARE THAT TO INVESTIGATE THE MAIN PROBLEMS AND SHOW HOW TO ANALYZE THE SUPPLY CHAIN MARKET OPERATION SO AS TO ENHANCE THE COMPETITIVE STRENGTH IN THE GLOBAL MARKET WITH THE FINAL SHOES PRODUCT. THE STUDY METHODOLOGY ENCOMPASSES DATA COLLECTION FROM THE COMPANY, REVIEWING RELATED LITERATURE, INTERVIEWING SELECTED COMPANY SUPERINTENDENTS AND GROUP DISCUSSION THE RESEARCH METHODOLOGY MANUFACTURING CENTER SURVEY, GROUP DISCUSSION IN THE COMPANY AND DOCUMENT RESOURCES WERE ALSO EXPLOITED.IN THE DISCUSSION AND ANALYSIS PART. AT THE END, THE PAPER PUT CONCLUSION AND RECOMMENDATION WHICH LEAD THE NEXT INTENSIVE RESEARCH TO BASE ON THIS INITIAL WRITTEN DOCUMENT.

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CHAPTER-1

1.1) INTRODUCTION

TODAY ALL COMPANIES (EITHER PRIVATE OR PUBLIC) IN THE NATIONAL AND INTERNATIONAL BUSINESS AREA ARE CONTINUOUSLY PERFORMING ACTIVITIES TO PROVIDE CAPABILITIES FOR SATISFYING CUSTOMER NEEDS (I.E., DEMAND). THE ACTIVITIES INDEED INCLUDE MANY SOPHISTICATED INTERRELATED FUNCTIONS AND PROCESSES SUCH AS DECISION MAKING, MANAGEMENT, NEW PRODUCT DEVELOPMENT, PRODUCTION, MARKETING, LOGISTICS, FINANCE, QUALITY CONTROL AND ETC. WHICH, ALL TOGETHER COMPOSE DYNAMIC AND COMPLEX STRUCTURE CALLED SUPPLY CHAIN NETWORKS. THESE COMPLEX STRUCTURES WITH ALL INTERRELATED FUNCTIONS HAVE TO BE DESIGNED AND MANAGED PERFECTLY POINTING US TO THE WELL-KNOWN TERM SUPPLY CHAIN MANAGEMENT. AS PART OF A WELL-DESIGNED COMPETITIVE STRATEGY, SUPPLY CHAIN MANAGEMENT IS "THE INTEGRATION OF KEY BUSINESS PROCESSES FROM END USER THROUGH ORIGINAL SUPPLIERS THAT PROVIDES PRODUCTS, SERVICES, AND INFORMATION THAT ADDS VALUE FOR CUSTOMERS AND OTHER STAKEHOLDERS".

A SUPPLY CHAIN CONSISTS OF ALL PARTIES INVOLVED, DIRECTLY OR INDIRECTLY, IN FULFILLING A CUSTOMER REQUEST. THE SUPPLY CHAIN NOT ONLY INCLUDES THE MANUFACTURER AND SUPPLIERS, BUT ALSO TRANSPORTERS, WAREHOUSES, RETAILERS, AND CUSTOMERS THEMSELVES. WITHIN EACH ORGANIZATION, SUCH AS MANUFACTURER, THE SUPPLY CHAIN INCLUDES ALL FUNCTIONS INVOLVED IN RECEIVING AND FILLING A CUSTOMER REQUEST. THESE FUNCTIONS INCLUDE, BUT ARE NOT LIMITED TO, NEW PRODUCT DEVELOPMENT, MARKETING, OPERATIONS, DISTRIBUTION, FINANCE, AND CUSTOMER SERVICE.

FIERCE COMPETITION IN TODAY'S GLOBAL MARKETS, THE INTRODUCTION OF PRODUCTS WITH SHORTER LIFECYCLES, AND THE HEIGHTENED EXPECTATIONS OF CUSTOMERS HAVE FORCED BUSINESS ENTERPRISES TO INVEST IN, AND FOCUS ATTENTION ON, THEIR SUPPLY CHAINS. THIS, TOGETHER WITH CONTINUING ADVANCES IN COMMUNICATIONS AND TRANSPORTATION TECHNOLOGIES (E.G., MOBILE COMMUNICATION, INTERNET, AND OVERNIGHT DELIVERY), HAS MOTIVATED THE CONTINUOUS EVOLUTION OF THE SUPPLY CHAIN AND OF THE TECHNIQUES TO MANAGE IT EFFECTIVELY.

IN ANBESSA SHOES SHARE COMPANY (ASSC), RAW MATERIALS ARE PROCURED AND LADIES, CHILD AND MEN SHOES ARE PRODUCED AT ITS FACTORY, SHIPPED TO WAREHOUSES FOR INTERMEDIATE STORAGE, AND THEN SHIPPED TO RETAILERS OR CUSTOMERS. THE SUPPLY CHAIN, WHICH IS ALSO REFERRED TO AS THE LOGISTICS NETWORK, CONSISTS OF SUPPLIERS, MANUFACTURING CENTERS, WAREHOUSES, DISTRIBUTION CENTERS, AND RETAIL OUTLETS, AS WELL AS RAW MATERIALS, WORK-IN-PROCESS INVENTORY, AND FINISHED PRODUCTS THAT FLOW BETWEEN THE FACILITIES IN THE Abessa shoe factory.

In this work, it is to present and explain concepts, insights, practical tools, and decision support systems important for the effective management of the supply chain and the main logistic network, distribution of products to different ports in Anbessa Shoes S.C.

Supply chain management is a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system wide costs while satisfying service level requirements. Having this definition, it is considered as driving force to conduct this study on Anbessa Shoes S.C shoes production supply chain.

The global market faces a fierce competition today. The introduction of products with shorter life cycles and the heightened expectations of customers have forced business enterprises to invest in, and focus attention on, their supply chains. This, together with continuing advances in communications and transportation technologies (e.g., mobile communication, internet, and overnight delivery), has motivated the continuous evolution of the supply chain and of the techniques to manage it effectively. Recently, the pressure of the competitive market and new information technologies has affected the structures of the production systems, calling for:

I.) **Reduction of time to market**
II.) **Higher flexibility of the systems**
III.) **Drastic reduction of costs**
IV.) **Extended quality concept**

1.2) OBJECTIVES OF THE RESEARCH

General Objective

The main objective of the research is to assess and analyze Anbesa shoes share company supply chain system.

Specific Objective

The specific objectives of the research are:

I.) To assess the supply chain management system of Anbesa shoe company.

II.) To analyses the current situation of Anbesa Shoe Company supply chain and logistics management system.

III.) To analyze the supply chain management activities of Anbesa shoes company and show the risk emanating at the company.

IV.) To put the recommendation to the problems evolved in the company concerning the supply chain management system.

1.3 RESEARCH METHODOLOGY

Literature Survey: - Literature survey of relevant materials on supply chain, supply chain risk management, Ethiopian footwear sector. Electronic media, journals, books, Central Statistics Reports, United Nations Industry Development Organization UNIDO, other government reports, etc. were assessed.

Data Collection: - from primary and secondary sources: Data collected from primary sources by visiting and interviewing personnel's in ASSC. And by discussing and interviewing experts in the area. Secondary data will be referred from previous related research studies, existing statistical data, etc.

Data Analysis: - After collecting primary and secondary data, the data will be analyzed accordance with the objective of the research.

Discussion, Conclusion and Recommendation: - After data is analyzed the results will be discussed in detail. Discussion of the result and the analysis will be accompanied by conclusions and recommendations for implementations and future actions that need to be accomplished by different factors.

1.4 SCOPE OF THE RESEARCH

The paper focuses on the supply chain management considering a case of Anbessa shoe Share Company for its local and foreign market.

1.5 LIMITATION

The paper to be completed has faced problems such as data availability and lack of visibility on the company.

CHAPTER-2

2.1 SUPPLY CHAIN MANAGEMENT

Organizations do not exist in isolation. Any organization, whether a large corporation, public body, or small business, which aims to meet the needs of its various customers and stakeholders will need resources in order to do this, and will acquire many of its materials, equipment, and supplies from other organizations. The performance of an organization is thus influenced to a greater or lesser degree by the actions of the organizations that make up the Supply Chain

Invalid source specified: - As defined by University of North Florida, (1994) supply chain is, "A selected and stable set of entities, which are autonomous and independent from an ownership point of view, but they operate together by integrating some of their business processes, in order to provide value-added products, services and information, from final consumers up to raw material manufacturers". It is a set of synchronized activities for integrating suppliers, manufacturers, transporters, and customers efficiently so that the right product or service is delivered at the right quantities, at the right time, to the right places.

Supply chain council defines supply chain management as "SCM encompasses every effort involved in producing and delivering a final product or service, from the supplier's supplier to the customer's customer. Supply chain management includes managing supply and demand, sourcing raw materials and parts, manufacturing and assembly, warehousing and inventory tracking, order entry and order management, distribution across all channels, and delivery to the customer" Invalid source specified.

The central idea of SCM is to apply a total system approach to managing the flow of information, materials, and services from raw materials suppliers, through factories and warehouses, to the end customers, in order to create a higher value compared to competitors supply chain. SCM has been a major component of competitive strategy to enhance organizational productivity and profitability Invalid source specified. It has become common practice across industries since it addresses long-term strategic alliance, supplier-buyer partnerships, cross-organizational logistics management, joint planning, control of inventory, and

information sharing. Effective supply chain management will lead to a lowering of the total amount of resources required to provide the necessary level of customer service to a specific segment and improving customer service through increased product availability and reduced order cycle time Invalid source specified.

Generally, in order to operate a supply chain efficiently in a cooperative manner, all related functions across the supply chain must operate in an integrated manner in which the various partners within the supply chain must be efficient with respect to every aspect including risk management. This is causing increasing reliance on more collaboration supported by better integration within the supply chain Invalid source specified.

SCM focuses on the different business processes, by managing these processes, throughout the supply chain, the different partners in the supply chain try to achieve lower costs, increased customer value and satisfaction, and ultimately competitive advantage.

Successfully managing a supply chain consists, according to Lambert and Cooper (2000), of three interrelated elements: the supply chain network structure, the supply chain business processes and the SCM components. Risks that might be present in the supply chain are influenced by the way the partners in the supply chain deal with these different elements.

Supply chain management (SCM) is the oversight of materials, information, and finances distributed from supplier to consumer. The supply chain also includes all the necessary stops between the supplier and the consumer. Supply chain management involves coordinating this flow of materials within a company and to the end consumer.

The Council of Supply Chain Management Professionals defines supply chain management as follows:

"Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities". Importantly, it also includes

coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies.

Supply chain management is an integrating function with primary responsibility for linking major business functions and business processes within and across companies into a cohesive and high-performing business model. It includes all of the logistics management activities noted above, as well as manufacturing operations, and it drives coordination of processes and activities with and across marketing, sales, product design, and finance and information technology.

SCM is also called the art of management of providing the right product, at the right time, right place and at the right cost to the customer.

Supply chain management can be divided into three main flows:

I.) **The Product flow includes moving goods from supplier to consumer, as well as dealing with customer service needs.**

II.) **The Information flow includes order information and delivery status.**

III.) **The Financial flow includes payment schedules, credit terms, and additional arrangements.**

Supply chain management is a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system-wide costs while satisfying service level requirements.

A supply chain is a system of organizations, people, technology, activities, information and resources involved in moving a product or service from supplier to customer.

A supply chain is a network of retailers, distributors, transporters, storage facilities, and suppliers that participate in the production, delivery and sale of a product to the consumer.

- **These activities are associated with the flow and transformation of goods from the raw materials stage to the end user, as well as the associated information and funds flows.**
- **Supply chain activities transform natural resources, raw materials and components into a finished product that is delivered to the end customer.**
- **In simple terms, a supply chain is the link between a firm or business and its suppliers and customers.**

The supply chain, which is also referred to as the logistics network, consists of suppliers, manufacturing centers, warehouses, distribution centers, and retail outlets, as well as raw materials, work-in-process inventory, and finished products that flow between the facilities.
A supply chain strategy refers to how the supply chain should operate in order to compete in the market. The strategy evaluates the benefits and costs relating to the operation. The supply chain strategy focuses on the actual operations of the organization and the supply chain that will be used to meet a specific goal.

The supply chain integrates, coordinates and monitors the flow of materials, information, and funds.

A supply chain has three key parts:

I.) **Supply which focuses on the raw materials supplied to manufacturing, including how, when, and from what location.**
II.) **Manufacturing which focuses on converting these raw materials into finished products.**
III.) **Distribution which focuses on ensuring that the products reach the consumers through an organized network of distributors, warehouses, and retailers.**

2.2 SUPPLY CHAIN MANAGEMENT BENEFIT

Now a days, business enterprises face an increasing pressure of customers' requirement in product customization, quality improvement and demand responsiveness and also the enterprise want to reduce production costs, shorter lead time, and lower inventory to ensure and enhance profitability. Managers recognize that getting products to customers faster than the competition will improve company's competitive position. To remain competitive, companies must seek new solutions to important Supply Chain Management issues such as modal analysis, supply chain management, load planning, route planning and distribution network design. Companies must face corporate challenges that impact Supply Chain Management such as reengineering globalization and outsourcing.

A study by the A.T. Kearney Management Consulting Company estimates that Supply Chain costs can represent more than eighty percent of the cost structure in a typical manufacturing company. These numbers indicate that even slight improvement in the process eventually can translate into millions of dollars on the bottom line. These costs include lost sales due to poor customer service or out of stock retail products. For every dollar of inventory in a system, there are one to two dollars of hidden supply chain costs: working capital costs, asset costs, delivery costs, write downs and so on.

Distribution is the steps taken to move and store a product from the production stage to the customer stage in a supply chain. Distribution directly affects cost and the customer experience and therefore drives profitability. There is a system of intermediaries between the producer of goods and/or services and the final users. A strong and efficient distribution network is one of the most important assets a manufacturer can possess.

The distribution is one of the four elements of the marketing mix. The other three parts of the marketing mix are product, pricing, and promotion.

Distribution is a key driver of the overall profitability of a company because it

directly impacts both the supply chain costs and customer experience.

Good distribution system serves the effectiveness of realizing marketing strategy. This strategy is aimed at reaching certain levels of customer service.

Distribution process involves each intermediary passing the product down the chain to the next organization, before it finally reaches the consumer or end-user. This process is known as the distribution chain or the channel. Each of the elements in these chains will have their own specific needs, which the producer must take into account, along with those of the all-important end-user.

A number of alternate channels of distribution may be available:

- **Distributor, who sells to retailers**
- **Retailer (dealer), who sells to end customers**
- **Advertisement typically used for consumption goods**

Distribution channels may not be restricted to physical products from producer to consumer in certain sectors. Both direct and indirect channels may be used. Hotels, for example, may sell their services directly or through travel agents, tour operators, airlines, tourist boards, centralized reservation systems, etc.

There has been some sort of innovations in the distribution of services. For example, there has been an increase in franchising and in rental services. There has also been some evidence of service integration, with services linking together, particularly in the travel and tourism sectors. For example, links now exist between airlines, hotels and car rental services.

Supply chain distribution often introduces middlemen into the economic market.

Historically, supply chains were primarily found in the manufacturing and production industries. These companies transform raw materials such as timber, minerals, steel, and fabric into valuable goods ready for use by consumers.

Manufacturing and production companies may not have resources available for delivering products into retail stores where consumers can safely shop and purchase items, so they depend upon supply chain

distribution to complete the process.

> **There is an increasing number of complicated supply chains. So, the distribution network design plays a key role in controlling the cost of doing business.**

The distribution network design involves:

- **locating production plants and distribution warehouses**
- **determining the best strategy for distributing the product from the plants to the warehouses and from the warehouses to the customers**

The aim is to select the optimum numbers, locations and capacities of plants and warehouses to open so that all customer demand is satisfied at minimum total costs of the distribution network (including transportation and production costs).

Since, controlling of the cost of doing business is an important factor; it can put supply chain network optimization goals ahead of competitors. The choice of distribution network can achieve supply chain objectives from low cost to high responsiveness.

At the highest level, performance of a distribution network should be evaluated along two dimensions:

- **customer needs that are met (influence the company's revenues)**
- **cost of meeting customer needs (decide the profitability of the delivery network)**

Elements of customer service influenced by network structure are:

Response time: the time between when a customer places an order and receives delivery.

Product variety: the number of different products/configurations that a customer desires from the distribution network.

Product availability: the probability of having a product in stock when a customer order arrives.

Customer experience: includes the ease with which the customer can place and receive their order.

Order visibility: the ability of the customer to track their order from placement to delivery.

Returnability: the ease with which a customer can return unsatisfactory merchandise and the ability of the network to handle such returns.

Generally, a customer always wants the highest level of performance along with the above dimensions. However, in practice, this is not always the case. For example, customers ordering a book at Amazon.com are willing to wait longer than those that drive to a nearby store to get the same book. On the other hand, customers can find a far larger variety of books at Amazon compared to the nearby store.

There can be customers who can tolerate a large response time. The firms target these customers and require few locations that may be far from the customer. They focus on increasing the capacity of each location. On the other hand, firms that target customers who value short response times need to locate close to them. Such firms must have many facilities, with each location having a low capacity. Thus, a decrease in the response time, which the customers desire, increases the number of facilities required in the networks. For example, ABC provides its customers with books on the same day but requires about 400 stores to achieve this goal for most of the country. Amazon, on the other hand, takes about a week to deliver a book to its customers, but only uses about 5 locations to store its books.

Distribution network design options must be compared according to their impact on customer service and the cost to provide this level of service. There are two key decisions while designing a distribution network:

- **Will product be delivered to the customer location or picked up from a predetermined site?**
- **Will product flow through an intermediate location?**

The distribution networks have their relative strengths and weaknesses. Based on the choices for the two decisions,
there are five distinct distribution network designs that are classified as follows:

Manufacturer storage with direct shipping (Drop shipping)

The product is shipped directly from the manufacturer to the end customer, bypassing the retailer (who takes the order and initiates the delivery request). All inventories are stored at the manufacturer. Information flows from the customer, via the retailer, to the

manufacturer, while product is shipped directly from the manufacturer to customers.

The biggest advantage of drop shipping is the ability to centralize inventories at the manufacturer. A manufacturer can aggregate demand and provide a high level of product availability with lower levels of inventory than individual retailers.

The benefits from such sort of centralization are highest for high value, low volume items with unpredictable demand and vice versa. Thus, drop shipping would not offer a significant inventory advantage to an online grocer selling a staple item like detergent.

Transportation costs are high with drop shipping because the average outbound distance to the end consumer is large and package carriers must be used to ship the product that have high shipping costs per unit compared to truckload carriers.

With drop shipping, a customer order with items from several manufacturers will involve multiple shipments to the customer. This loss in aggregation in outbound transportation further increases cost.

Supply chains save on the fixed cost of storage facilities when using drop shipping because all inventories are centralized at the manufacturer.

There can be some savings of handling costs too because the transfer from manufacturer to retailer no longer occurs. Handling costs can be significantly reduced if the manufacturer has the capability to ship orders directly from the production line.

A good information infrastructure is needed so that the retailer can provide product availability information to the customer even though the inventory is located at the manufacturer.

The information infrastructure requirement is simpler for direct sellers like Dell because two stages (retailer and manufacturer) do not need to be integrated.

Response times tend to be large when drop shipping is used because the order has to be transmitted from the retailer to the manufacturer and shipping distances are on average longer from the manufacturer's centralized site. Also, the response time need not be identical for every

manufacturer that is part of a customer order.

Manufacturer storage with drop shipping allows a high level of product variety to be made available to the customer.

Drop shipping provides a good customer experience in the form of delivery to the customer location. The experience, however, suffers when a single order containing products from several manufacturers is delivered in partial shipments.

Unlike drop shipping where each product in the order is sent directly from each manufacturer to the end customer, in-transit merge combines pieces of the order coming from different locations so that the customer gets a single delivery. Information and product flows for the in-transit merge network. For example, when a customer orders a PC from ABC along with a XYZ monitor, the package carrier picks up the PC at the ABC factory, the monitor at the XYZ factory and merges the two together at a hub before making a single delivery to the customer.

The ability to aggregate inventories and postpone product customization is a significant advantage of in-transit merge.

As from above example, in-transit merge allows ABC and XYZ to aggregate all their inventories at the factory. This approach will have the greatest benefits for products with high value whose demand is hard to estimate.

The transportation costs are lower than drop shipping because of the merge that takes place at the carrier hub prior to delivery to the customer.

An order with products from many manufacturers thus requires only one delivery to the customer. Fewer deliveries save transportation cost and simplify receiving process.

Overall supply chain facility and handling costs are somewhat higher than drop shipping.

Sophisticated information infrastructure is needed to allow the in-transit merge.

The information, operations at the retailer, manufacturers, and the carrier must be coordinated.

Response times may be higher because of the need to perform the merge

Customer experience should be better than drop shipping because the customer receives only one delivery for their order instead of many partial shipments.

The main advantage of in-transit merge over drop shipping is the lower transportation cost and improved customer experience.

The major disadvantage is the additional effort during the merge.

Under this option, inventory is not held by manufacturers at the factories but is held by distributors or retailers in intermediate warehouses and package carriers are used to transport products from the intermediate location to the final customer. Information and product flows when using distributor storage with delivery by a package carrier.

Transportation costs are somewhat lower for distributor storage compared to manufacturer storage because an economic mode of transportation (e.g. truckload) can be employed for inbound shipments to the warehouse, which is closer to the customer.

Unlike manufacturer storage where multiple shipments may need to go out for a single customer order with multiple items, distributor storage allows outbound orders to the customer to be bundled into a single shipment further reducing transportation cost.

For faster moving items, transportation savings from distributor storage relative to manufacturer storage increase.

Compared to manufacturer storage, facility costs are somewhat higher with distributor storage because of a lack of aggregation. From a facility cost perspective, distributor storage is not good for extremely slow-moving items.

The information infrastructure needed with distributor storage is significantly less complex than the manufacturer storage.

Response time with distributor storage is better than with manufacturer storage because distributor warehouses are closer to customers and the entire order is aggregated at the warehouse on shipping.

Distributor storage can handle somewhat lower variety than manufacturer storage.

Last mile delivery refers to the distributor / retailer delivering the product to the customer's home instead of using a package carrier. Peapod and Albertson's have used last mile delivery in the grocery industry. Unlike package carrier delivery, last mile delivery requires the distributor warehouse to be much closer to the customer, increasing the number of warehouses required.

Distributor storage with last mile delivery requires higher levels of inventory because it has a lower level of aggregation.

Transportation costs are highest using last mile delivery. This is because package carriers' aggregate delivery across many retailers and are able to obtain better economies of scale than available to a distributor or retailer attempting last mile delivery.

Last mile delivery is cheaper in dense cities.

Transportation costs are reasonable for bulky products where the customer is willing to pay for home delivery. For example, home delivery for water and large bags of rice has proved quite successful in China, where the high population density has helped decrease delivery costs.

Facility and processing costs are very high using this option given the large number of facilities required. For example, a grocery store doing last mile delivery performs all the processing until the product is delivered to the customer's home unlike a supermarket where there is much more customer participation.

The information infrastructure with last mile delivery requires the additional capability of scheduling deliveries.

Response times are faster than the use of package carriers.

Product variety is generally lower than distributor storage with carrier delivery.

In this approach, inventory is stored at the manufacturer or distributor warehouse but customers place their orders online or on the phone and then come to designate pickup points to collect their orders. Orders are shipped from the storage site to the pickup points as needed.

Inventory costs using this approach can be kept low with either manufacturer or distributor storage to exploit aggregation.

Transportation cost is lower than any solution using package carriers because

significant aggregation is possible when delivering orders to a pickup site.

Facility costs are high if new pickup sites have to be built.

A significant information infrastructure is needed. A good coordination is needed between the retailer, the storage location, and the pickup location.

The main advantage of a network with consumer pickup sites is that it can lower delivery cost, thus expanding the set of products sold as well as customers served online.

The major hurdle is the increased handling cost at the pickup site.

2.3 SUPPLY CHAIN PROCESSES FRAMEWORK

There are several organizations trying to set cross-industry standard process such as Global Supply Chain Forum. (GSCF), SCOR (Supply Chain Operation Reference Model), CPFR (Collaborative planning, Forecasting and Replenishment), and Rosetta Net, which can help members of supply chain integrate efficiently.

The following eight key SCM processes are included in the framework: -

1. Customer relationship management

2. Customer service management

3. Demand management

4. Order fulfillment

5. Manufacturing flow management

6. Supplier Relationship management

7. Product development and commercialization

8. Returns management

The eight key business processes run along the SC and cut across the supply firms and functional silos within each firm. Although, functional expertise remains in place, implementing SCM requires making a transition from a functional organization to one focused on business processes, first within a company and then across the companies in a supply chain.

SCM involves designing the supply chain network, planning the supply chain processes, and then executing the operation in a manner consistent with the overall strategy. Network configuration determines the number, location and function of each facility at each stage in the transformation process.

The Supply Chain council developed a framework called Supply-Chain Operation Reference model (SCOR). This process model is designed for effective communication among Supply Chain Partners.

2.4 SUPPLIER AND CUSTOMER RELATIONSHIP MANAGEMENT

Supplier relationship management (SRM) is a value capture and creation process based on strategic planning by which a company manages its suppliers to gain competitive advantage through increasing supplier knowledge, benefiting from supplier relationships and improving supplier management business practices. Customer relationship management (CRM) is a people- and technology-driven value creation process based on strategic planning by which a company manages its customers to gain competitive advantage through increasing understanding of customer behavior, benefiting from customer relationships and improving customer management business practices.

SRM can be seen as a process by which a company manages preferred suppliers and finds new ones whilst reducing costs, making procurement repeatable and predictable, pooling buyer experience and exploiting partnerships. SRM can be also understood as a process that can both capture and create value in the organization. Instead of seeing SRM as the realm of procurement, business executives should be committed to implement SRM strategy into practice by being responsible for key supplier relationships. CRM can be described as a process involving people and technology. The purpose of CRM is to maximize the customer information and to use it to increase loyalty of the customer and to retain customers' business over their lifetimes. It is an integrated approach of focusing on customer retention and relationship development.

The integration of SRM and CRM through SCM can provide competitive advantage in the forms of 1) dramatic cost savings, 2) increased flexibility and responsiveness to customer requirements and 3) substantially faster cycle times. SCM is operating as an integrating factor between SRM and CRM, the role of SCM can be seen as the glue that holds the extended enterprise together

and improves the agility and responsiveness of an organization.

2.5 SUPPLY CHAIN RISK MANAGEMENT

There are various conceptualization of risk depending on the discipline and the context. Waters (2007) defines risk as a threat that something might occur to disrupt normal activities and stop things happening as planned. According to Paulsson (2004), it is an event with negative consequences, or "the probability that a particular adverse event occurs during a stated period of time, or results from a particular challenge". In the context of supply chains, risk is defined in terms of interruption caused by resource unreliability and uncertainty. Considering all definition for this research its defined as the potential occurrence of an incident or failure that inhibits the free and undisrupted flow of material and information, thereby causing interruption in the supply chain.

Risk management is the function responsible for managing risks in organizations, meaning taking actions that reduce the consequences or probability of an unwanted occurrence or failure. It can also be defined as taking "actions to shift the odds in your favor. The aim of supply chain risk management is to identify the potential sources of risk and implement appropriate actions in order to avoid or contain supply chain vulnerability.

Intensifying competition since the 1990s has forced companies to improve efficiency in many aspects of their business. While getting rid of the 'slack' in their supply chains they expose themselves to greater uncertainty, and this is what supply chain risk management aims to control.

According to Brindley (2004), supply chain risk management is the management of supply chain risk through coordination or collaboration among supply chain partners so as to ensure profitability and continuity. The aim therefore is to control the risks and uncertainties caused by, or impacted on, logistics-related activities or resources. It is executed collaboratively with partners in a supply chain by applying risk-management-process.

Supply chain risk management starts from the identification and computation of probable risks and their possible impact on operations in the supply process. The first stage is to identify the direct risks to its operations, and then to consider the potential causes of risk at every significant link in every step of the

chain. (Lysons and Farrington, 2006) Different literatures presents supply chain risk management process as 1) risk identification, 2) risk analysis, 3) risk control and 4) risk monitoring. Supply chain risk management could thus be viewed as a strategic management activity given that it can affect the operational, market and financial performance of firms.

Carlo R. et al. propose a methodology to analyze risk in healthcare sector using four progressives' steps; 1) context analysis, 2) Process Mapping, 3) Risk Identification and assessment and 4) Failure mode and waste analysis. In context analysis, a given process is selected and detail investigation is done. In this activity various actors will be involved to perform the analysis. Working procedures, organizational charts, responsibility maps, and shift plans, the working team gets a first knowledge of process activities and related flows of both quantitative data and organizational information. The process is then divided into phases that are analyzed and in turn decomposed into activities; Activity Breakdown Structure (ABS) may be use. The third step is to understand and analyze the process to identify the related risk and Risk Breakdown Structure (RBS) may be used and finally, each failure mode associated with an activity is characterized by using failure mode and waste analysis tables. The following information can be used; failure mode code, failure mode description, risk sources, description of causes determining the failure, effects, most effective methods to detect the failure, suggested improvement actions and degree of success of already taken measures [Anna C.C., Sabrina G., Carlo R.,]

2.6 IMPORTANCE OF SUPPLY CHAIN MANAGEMENT

The importance of supply chain management comes into picture if there is sharp focus on the loss due to the absence of an effective supply chain strategy and / or the benefit due to an effective supply chain for any firm.

Basically, it refers that how good is the integration of supply chain that matters for any firm. The importance of having a robust supply chain management can be depicted from the following example:

Suppose, ABC is any company that manufactures the cycle chains for a cycle manufacturing company XYZ. Another company PQR manufactures bits used in the cycle chain manufactured by ABC. Now, in coming days, as per the market forecast, XYZ shall need 50,000 units of cycle chain, information that is not available with ABC. Accordingly, PQR also does not know how many bits to produce in order to meet ABC's requirement. The result would be either both ABC and PQR hold high safety stock inventory or lose business respectively with XYZ and ABC. Now, if in this example showing only three supply chain partners, absence of a critical information among the partners, that is of production forecast at XYZ firm results into either a higher inventory level or loss of future business.

The importance of supply chain management is to:

- **reduce inventories along the chain**
- **share better information among the partners**
- **plan in consultation rather than in isolation**

2.7 ACTIVITIES OF SUPPLY CHAIN MANAGEMENT

There are three levels of activities of supply chain management that different parts of the company will focus on:

Strategic: At this level, strategic decisions concerning the whole organization, such as the size and location of manufacturing sites, partnerships with suppliers, products to be manufactured and sales markets are taken. Such decisions have a long-lasting effect on the firm. This includes decisions regarding product design, what to make internally and what to outsource, supplier selection, and strategic partnering and the flow of material through the logistics network.

Tactical: Tactical decisions focus on adopting measures that will produce cost benefits such as using industry best practices, developing a purchasing strategy with favored suppliers, working with logistics companies to develop cost effect transportation and developing warehouse strategies to reduce the cost of storing inventory. Such decisions are typically updated anywhere between once every quarter and once every year. These include purchasing and production decisions, inventory policies, and transportation strategies, including the frequency with which customers are visited.

Operational: Decisions at this level affect how the products move along the supply chain. Operational decisions involve making schedule changes to production, purchasing agreements with suppliers, taking orders from customers and moving products in the warehouse. Such decisions refer to day-to-day decisions such as scheduling, lead time quotations, routing, and truck loading.

2.8 DECISION PHASES IN A SUPPLY CHAIN

Successful supply chain management requires many decisions relating to the flow of information, product, and funds. These decisions fall into three categories or phases, depending on the frequency of each decision and the time frame over which a decision phase has an impact. The design, planning, and operation of a supply chain have a strong impact on overall profitability and success.

I.) Supply chain strategy or design

- During this phase, the supply chain is structured and configured.
- It is designed that, how resources will be allocated, and what processes each stage will perform.
- Strategic decisions made by companies include:
  - location and capacities of production and warehouse facilities
  - products to be manufactured or stored at various locations
  - modes of transportation to be made available along different shipping legs
  - type of information system to be utilized

II.) Supply Chain Planning

During this phase, the time frame considered is a quarter to a year. It starts with a forecast of demand in the coming year.

As a result, the supply chain's configuration determined in the strategic phase is fixed. The configuration establishes constraints within which planning must be done. Planning establishes parameters within which a supply chain will function over a specified period of time. Companies start the planning phase with a forecast for the coming year of demand in different markets.

Planning decisions include those regarding markets to which a given production facility will supply and target production quantities at

different locations.

The companies must include uncertainty in demand, exchange rates, and competition over this time horizon in their decisions.

Given a shorter time horizon and better forecasts than the design phase, companies in the planning phase try to incorporate any flexibility built into the supply chain in the design phase and exploit it to optimize performance.

As a result, companies define a set of operating policies that govern short-term operations.

Following are the planning decisions undertaken in supply chain:

- **which markets will be supplied from which locations**
- **planned buildup of inventories**
- **subcontracting, backup locations**
- **inventory policies**
- **timing and size of market promotions**

III.) SUPPLY CHAIN OPERATION

The time horizon is weekly or daily, and during this phase companies make decisions regarding individual customer orders.

At the operational level, supply chain configuration is considered fixed and planning policies are already defined.

2.9 BARRIERS OF SUPPLY CHAIN MANAGEMENT

The obstacles of supply chain management include:

- **lack of top management support**
- **non-aligned strategic and operating philosophies**
- **inability or unwillingness to share information**
- **lack of trust among supply chain members**
- **unwillingness to share risks and rewards**
- **inflexible organizational systems and processes**
- **cross-functional conflicts**
- **inconsistent or inadequate performance measures**
- **resistance to change**
- **lack of training for new mindsets and skills**

2.10 SCOPE OF SUPPLY CHAIN ACTIVITIES

The scope of supply chain activities includes:

- **sourcing and procurement**
- **production scheduling and manufacturing**
- **order processing**
- **inventory management**
- **warehousing**
- **customer service**
- **distribution**

2.11 OBJECTIVE OF SUPPLY MANAGEMENT

A supply chain is a global network of organizations that cooperate to improve the flows of material and information between suppliers and customers at the lowest cost and the highest speed. The final objective of a supply chain is customer satisfaction.

The supply chain management takes into consideration every facility that has an impact on cost and plays a role in making the product match to customer requirements: from supplier and manufacturing facilities through warehouses and distribution centers to retailers and stores.

The main purpose of the supply chain is to maximize overall value generated. Value is the difference between what the cost supply chain incurs and the worth end product has to the customer. Value of the commercial supply chain is correlated with its profitability generally known as supply chain surplus.

For example, A customer purchase a personal computer from IBM at $2,000, which indicates the revenue supply chain achieved. All the stages incur costs to make sure the efficient transfer of funds, information, storage of the product, transportation to the final consumer etc. The difference between the supply chain cost and revenue generated from personal computer represent the supply chain surplus or profitability.

Supply chain surplus can be defined as the total profit shared by all the stages and intermediaries of a supply chain. The greater the supply chain surplus the more successful is supply chain. But Supply chain success is measured by its overall surplus not by the profit at each stage.

The supply chain management has to be efficient and cost-effective across the entire system; from transportation and distribution to inventories of raw materials, work in process, and finished goods, are to be minimized. The emphasis is not on simply to minimize transportation cost or reducing inventories but, rather, on taking a systems approach to supply chain management.

The objectives of supply chain management can be listed below:

- **enhancing customer service**
- **expanding sales revenue**
- **reducing inventory cost**
- **improving on-time delivery**
- **reducing order to delivery cycle time**
- **reducing lead time**

CHAPTER-3

3.1 CASE COMPANY BACKGROUND

The profile and overview of the Anbassa Shoe Share Company (ASSC) including its capability, supply, market and distribution channel, export condition and production process is presented as follows.

Anbessa Shoe, formerly known as the Darmar Shoe Factory, was established in 1939 by an Italian owner. The factory was run by its Italian founder for only three years and was sold in 1942 to an Armenian citizen, who ran the factory for 33 years as the Darmar Shoe Factory. Darmar was initially engaged in both tannery and shoe making. In 1975, Darmar was nationalized and organized as two public enterprises: Anbessa Shoe Factory and Awash Tannery. The firm started to export shoes, in small quantities, in the early 1980s. In 1993, following the issuance of a new proclamation, Anbessa Shoe Factory was restructured as a share company. The factory is located in two premises in the capital

3.2 NATURE OF THE BUSINESS AND SPECIFIC COMPANY OBJECTIVES

Anbessa shoe factory is engaged in both manufacturing (production) and distribution (sales) of various types of shoes. The objective is with a view of making the profit motive a central theme in general and to enable the factory achieve the following specific objectives in particular:

- **Producing all kinds of leather shoes and shoe uppers which will meet the requirement of market.**
- **Developing better designs of shoes, shoe uppers and components to local & international markets.**
- **Developing alternative means of replacing imported raw materials by suitable local components.**

3.3 VISION AND MISSION OF THE COMPANY

The vision of the factory is to be a leading one producer of high-quality leather footwear and leather articles using natural leather, the latest technology and the skill of experienced personnel's for both local and export market.

The mission of the factory is to add value to livestock resource through processing natural leather in to various leather-footwear, leather-articles and leather-shoe-upper that meet the requirements of both local and export market and utilize the revenue derived from it to boost profitability of the organization which in turn ensures the government its deserved dividend and provide job security for the firm's employees.

3.4 PRODUCTION ACTIVITY

ASSC has made renovation of old equipment with the installation of new and advanced machineries which enabled the company to increase its capacity. This has enabled the factory to increase its capacity. Following with the expansion project, now the designed production capacity of the company has reached 4500 pairs of shoes per day (single shift). Its machineries and layout are the best in the country. It produces finished shoe and other leather articles for both local and international market.

Anbessa Shoe is recognized as a pioneer in modern shoe manufacturing in Ethiopia and is a well-regarded brand. It is equipped with modern machinery and employs relatively skilled labor. Its capacity has allowed the firm to be a substantial exporter. The firm has high overhead costs and faces a serious constraint on its working capital. In addition, it suffers the disadvantage of not having its own tannery. The firm relies on contact initiation from customers in its export markets, and does not have a formal marketing operation. Product design activity is limited; the design for export items is provided by the firm's customers.

3.5 SUPPLY, MARKETING AND DISTRIBUTION CHAIN

Processed leather, which constitutes almost 50% of input costs, is mainly sourced from Batu tannery, Ethiopian Tannery, Hafede Tannery and ELICO PLC. Other inputs (TR material for sole, shoe components and accessories) are imported on a competitive international open tender basis. The two major markets are the local market and the export market which the company is recently embarked on. It uses its 17 retailing shops which are found across the country in selected major towns to distribute its products for the local market. Some sales are made to government offices. Though the major market share has been dominated by the local market for the past many years, due to the export-oriented market strategy employed in recent years, the export market is taking the helm over the local. It uses a whole sale for distributing its products to the international market. Italy, Germany, France, Switzerland, Austria, Sweden, Canada and Sudan are the firm's major export destinations. Customers are usually the ones to initiate contact, by contacting the factory directly, so it can be said that the company follows pull system. In addition to the firm's website, customers get the firm's contact details from development partners such as UNIDO and GTZ and through Ethiopian embassies. Although the firm participates in trade fairs, orders obtained through such events are very limited.

3.6 RECENT DEVELOPMENTS AND DEVELOPMENT AGENDA

As it described before, the firm has recently gone through an expansion project, acquiring additional machinery. The main factory has been dedicated to exports. The firm is currently undergoing a BPR exercise, and is developing a resource planning system (ERP system). In addition, it is working towards achieving ISO certification (ISO 9001:2008). A tender to privatize the firm has been repeatedly considered over the years. It is expected that the company will be privatized in this or coming year. The firm aims to increase its export revenue by installing a more modern production system to increase its competitiveness. In addition, there are plans to increase productivity. The firm is working towards improving its design activities and has recently established a design team.

CHAPTER-4

4.1 DISCUSSION AND ANALYSIS

Footwear is a huge and increasingly diversified business, driven by a host of demographic, lifestyle and fashion trends. As a result, the industry is being segmented ever more finely as seen in the diversity of mainstream footwear trends- from casual comfort to luxury, and the fact that, in recent years, a far greater range of styles has become visible. The global footwear market is experiencing a stable growth rate due to changing fashion trends. This market has exhibited sustainable development owing to driving factors such as rising demand for innovative designs, growing awareness about healthy and active lifestyle, rising population and disposable income levels, and rise in retail culture. The footwear market is expected to grow at 1.8% from 2011 to 2018 to reach USD 84.4 billion by 2018. Various fashion trends in the market such as demand for innovative designs and styles, and celebrity endorsement is driving the footwear market.

The demand type, the demand of the product, the raw material demand and other set of demand opportunities, suppliers and delivery lead times are discussed below.

Anbessa shoe Share Company currently produces men's, ladies, children shoe and ladies' belt. Due to the less model changes the company mainly produces men's and children's shoe.

4.2 PRODUCTION PROCESS

The company produces men's, ladies and children shoes based on the customer order, according to the production principle the company uses pull type production process. Generally, Anbessa

shoe company production system has four major processes: cutting, stitching three lines, lasting two lines, bottom and finishing. The description of these major processes with some other

supportive processes are shown below.

I.) Cutting: Cutting of finished leather to different shoe components is done by modern hydraulic cutting machines.

II.) Unit sole preparation: different types of unit sole, tiles, sealing and so on are produced with the help of two press machines with four and three beds respectively.

III.) Insole preparation: Inside parts of shoe such as toe puff, counter, insole and stock lining are prepared by hydraulic cutting, insole forming, counter splitting and skiving, and insole trimming and so on.

IV.) Stitching: Assembly of the different components of the upper parts of shoes is done by different types of flat bed, post-bed, zigzag, eyeleting machines and others. Parts of shoes referred as an upper are vamp, tongue, apron, toecap, counter, quarter, and mudguard, etc.

V.) Lasting: Shaping the upper to the last is done by automatic counter molding machine, toe, and side and heel seat lasting machines.

VI.) Bottoming: this is a process of attaching lasted upper to the sole

VII.) Unit sole Attaching: this line is equipped with modern roughing, insole reinforcing, sole attaching, pressing and leveling machines.

VIII.) Finishing and Packing: Trimming, polishing, shoe lacing and packing is done by different shoe finishing machines. In addition to the main processing line, there are also auxiliary lines.

The firm's shoe production operation process is shown in the figure below and the description is as follow: Shop order will be released based on production order for cutting & stitching then loading these sections with the required raw materials; Load stitching and laired out stitching line; Cut upper parts then inspect the quality and if there is defect show for operator, record it and replace cutting else bundled the upper parts in to batch size and record. Then it will be transferred to stitching and stitched. If the ordered shoe needs moccasin stitching, stitching upper will be transferred to moccasin section and then manually stitched. Stitching upper will be transferred to mini store and then order will be checked whether it is for upper or finished shoe. If it is for upper, it will be stored for shipment else it will be transferred in to finished goods store and wait for lasting. When time for last reach, loading lasting conveyors and received necessary raw materials; lasting & recording production; finishing and bottomed shoe will be packed with shoe box and stored. Quality inspection is done at the end of each section (cutting, stitching, moccasin stitching, bottom lasting and finishing).

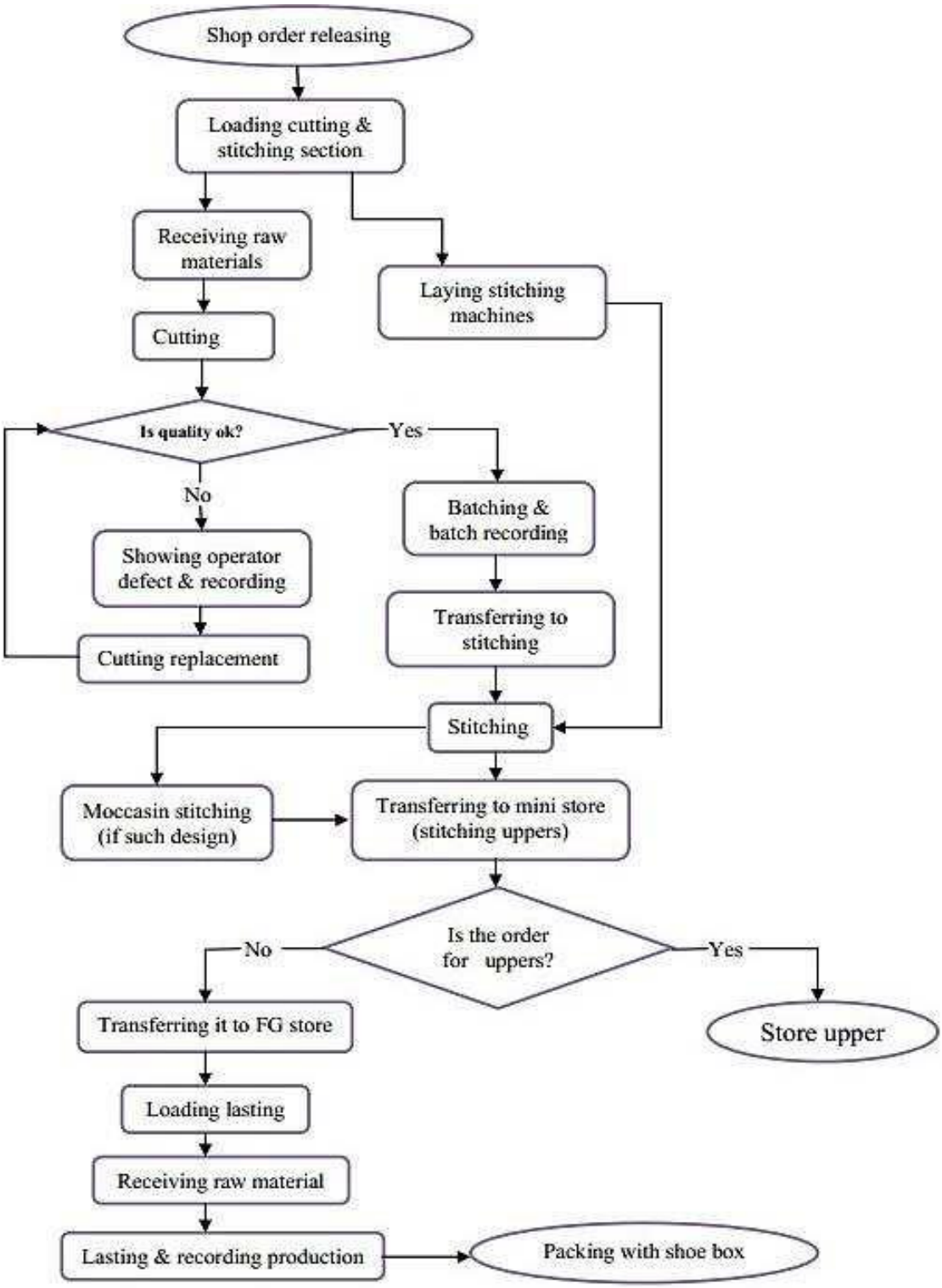

FIGURE 4.1. ASSC SHOE PRODUCTION PROCESS FLOW

4.3 INVENTORY CONTROL

Control of inventory, which typically represents 45% to 90% of all expenses for business, is needed to ensure that the business has the right goods on hand to avoid stock-outs, to prevent shrinkage (spoilage/theft), and to provide proper accounting. Many businesses have too much of their limited resource, capital, tied up in their major asset, inventory. Worse, they may have their capital tied up in the wrong kind of inventory. Inventory may be old, worn out, shopworn, obsolete, or the wrong sizes or colors, or there may be an imbalance among different product lines that reduces the customer appeal of the total operation.

In ASSC there are mainly two types of inventories, raw material and finished good inventory.

In raw material inventory the following are the main items:

- **Leather**
- **Leather lining**
- **Inner sole lining**
- **Last**
- **Sole or heel and**
- **Chemicals**

The maximum production level of the company is approximated to 600,000 pair of shoes with a safety stock of 10,000 pair of shoes of all type. Accordingly, the company produces 380,000 for men, 150,000 for ladies and 70,000 for children's pair of shoes.

4.4 EXPORT MARKET

Anbessa has accomplished a lot for the past few years and motivating results has also been achieved. Since the government of Ethiopia has made export market its priority, Anbessa is getting all the support it needs to export its products. Anbessa has designed and put in effect an expansion project with the aim to change its all-manufacturing facilities and layout so that it can produce export standard finished shoe using its full capacity. The company has now a newly established (via expansion project) factory employing state-of-the art technology with a designed production capacity of 3000 pairs of export standard leather footwear. In the past, the main export markets are Italy (90% of exports), Germany, Kenya, Uganda, Israel and the United States.

CHAPTER-5

5.1 CONCLUSION AND RECOMMENDATION

The paper has focused on the supply chain system for anbessa shoe. A supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request. The supply chain not only includes the manufacturer and suppliers, but also transporters, warehouses, retailers, and customers themselves. Within each organization, such as manufacturer, the supply chain includes all functions involved in receiving and filling a customer request. These functions include, but are not limited to, new product development, marketing, operations, distribution, finance, and customer service.

In Anbessa shoes Share company (ASSC), raw materials are procured and ladies, child and men shoes are produced at its factory, shipped to warehouses for intermediate storage, and then shipped to retailers or customers. The supply chain, which is also referred to as the logistics network, consists of suppliers, manufacturing centers, warehouses, distribution centers, and retail outlets, as well as raw materials, work-in-process inventory, and finished products that flow between the facilities in the Abessa shoe factory.

In ASSC there are mainly two types of inventories, raw material and finished good inventory.

In raw material inventory the following are the main items:

I.) Leather

II.) Leather lining

III.) Inner sole lining

IV.) Last

V.) Sole or heel and

VI.) Chemicals

The maximum production level of the company is approximated to 600,000 pair of shoes with a safety stock of 10,000 pair of shoes of all type. Accordingly, the company produces 380,000 for men, 150,000 for ladies and 70,000 for children's pair of shoes.

Anbessa shoe share company activities were selected as sourcing, making and delivery to look into the risk assessments and sources.

5.2 RECOMMENDATION

The study conducted on Anbessa shoe Share Company indicated the researcher to provide the recommendation that change the current supply chain management and logistic problems as follows.

・The company needs to develop market research center and strong strategic plan how to intrude to the global market in producing high product to satisfy the customer.

・Anbessa shoe Share Company should have supply chain management system function so that it can have effective material procurement system, smooth and continuous production system, and efficient ware housing and satisfied customers.

・Identification and determining of the supply chain management should be the immediate task of the company

・The multimodal system the company now implementing has been found to be ineffective.

Therefore, it would be advisable to follow efficient means of customer maintaining system instead.

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Annex A

Figure A-1: operator on operation

Figure A-2: warehouse arrangement

Figure A-3: activity line processes