ST. MARY'S UNIVERSITY COLLEGE
SCHOOL OF GRADUATE STUDIES

SUPPLY CHAIN MANAGEMENT PRACTICES OF PHARMACEUTICALS MANUFACTURING COMPANIES OF ETHIOPIA: THE CASE OF ETHIOPIAN PHARMACETUCIALS MANUFACTURING SHARE COMPANY

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WONDIMIENEH SEWUYE

APRIL 2013
ADDIS ABABA, ETHIOPIA

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LIST OF ACRONYMS

APIs: Active Pharmaceutical ingredients

EPHARM: Ethiopian Pharmaceuticals Manufacturing

FMHACA: Food, Medicine and Health Care Administration and Control Authority

FMOH: Federal Ministry of Health

GMP: Good Manufacturing Practices

PFSA: Pharmaceutical Fund any Supply Agency

SCM: Supply Chain Management

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ABSTRACT

Supply chain management (SCM) practices in pharmaceutical manufacturing companies are one of the focus areas to get competitive advantage over competitors. Pharmaceuticals manufacturing is not relatively attractive area for investors in Ethiopia, since there are stringent regulatory controls, very high technical standards need to meet and lacks of skills in SCM in pharmaceutical sectors. Most pharmaceuticals manufacturers have low level of capacity compared with their foreign counterparts.

The objective of this research is to investigate the SCM practices of pharmaceuticals manufacturing companies of Ethiopia by studying the SCM practices of Ethiopian pharmaceuticals manufacturing (EPHARM) Share Company as a unit of analysis. Descriptive and quantitative methods of research were used and data were collected by interview questions, document review and questionnaires. Interview questions were used to study the suppliers' relationship and the SCM practices in EPHARM. Document review was conducted to study the capacity utilization. Based on the questionnaires data were collected from distributors and retail outlets to measure the supply chain activities.

It was found that there is no long term relationship with most of the suppliers, there is information sharing between departments of EPHARM but not with suppliers and distributors. The capacity utilization of the machines is low (only 56.42%). There are no on-time and direct delivery to most of its customers. The customers' satisfaction with flexibility and customers query time is very low. But there is considerable performance with post sales customers' satisfaction.

From this study it is concluded that the SCM practices of pharmaceuticals manufacturing companies in Ethiopia is weak due to both internal capacity limitation and external factors including infrastructure such as transportation, information technology, financial sectors and regulatory enforcements. It is recommended to select best suppliers and distributors and establish long term relationship, increasing the capacity of the firm, strengthening the marketing unit of the firm and introduce direct delivery services.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Supply chain management (SCM) is the 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 (Simichi-Levi D., Kaminiski P. and Simichi-Levi E., 2008).

In today's world, SCM is a key strategic factor for increasing organizational effectiveness and for better realization of organizational goals. So SCM can achieve the organization goal through enhancing competitiveness, better customer care and by increasing profitability. The era of both globalization of markets and outsourcing has begun, and many companies select supply chain and logistics to manage their operations (Gunasekaran, Patel and Tirtiroglu, 2001).

The integration of supply chain processes can provide an effective means by which costs can be reduced and customer service levels improved. To achieve it, organizations should become part of an extended, integrated supply network can also expect that this will require an infrastructure enabling effective information flows and streamlined logistics. The most effective network therefore is the mix of information requirements, physical logistics and collaboration right, providing shared benefits to a majority of partner organizations (Power, 2005).

One of the focus areas taken during redesign and restructure of pharmaceutical industry is SCM. To get competitive advantage over rivals, supply chain emerged as a core capability for most pharmaceutical companies (Lurquin, 1996).

The Ethiopian pharmaceutical market is estimated to be 190 million USD. Almost 85% of pharmaceuticals consumed are imported from other countries. The pharmaceuticals manufacturing companies of Ethiopia are not more than 13 and only cover 15% of the

country's pharmaceutical markets. More than 90% of the inputs used for producing pharmaceuticals are imported. A few inputs are locally procured. Raw materials account for 40% of total costs. Most packaging materials are imported, except for carton packaging and empty capsules, which is manufactured domestically. Most of the companies are engaged in formulation of products using raw materials and group as secondary manufacturing companies (Sutton and Kellow, 2010; UNCTAD, 2011b).

Pharmaceutical manufacturing is not a relatively attractive area for investors in Ethiopia, since there are, quite appropriately, stringent regulatory controls, and very high technical standards need to be met. The sector has been in difficulty over the past five years and four companies were foreclosed by two state-owned banks for failure to service their loan obligations. The companies face fierce competition from Asian pharmaceutical manufacturing companies. Also the limited market size of the sector with high investment needed for building pharmaceutical plants are also one of the challenges that make most of the companies bankrupted. There are also lacks of skills in SCM in pharmaceutical sector; the schools are focused more on clinical skills (Sutton and Kellow, 2010).

Ethiopian Pharmaceutical Manufacturing (EPHARM) was established in 1972 as a public company by the Ethiopian government and investors from England. During the Derg regime it was fully nationalized. In 2002, it was reorganized as Ethiopian Pharmaceuticals Manufacturing Share Company. Currently, EPHARM has eight product lines and is engaged in the production of about 62 varieties of medicines for the local market. As far as the Supply and marketing chain is concerned almost all the inputs used in the production process are imported from abroad through open tender from approved suppliers. It supplies all of its production output to the local market using both private and state-owned intermediaries (Pharmaceutical Fund and Supply Agency, PFSA). The latter accounts for 65% of total demand, and distribute the products to government hospitals and health centers (Sutton and Kellow, 2010).

This paper will explore the SCM practices of EPHARM Share Company.

1.2 Statement of the Problem

The government of Ethiopia is focusing to increase the number of manufacturing companies by 13 according to the five years growth and transformation plan of Food, Medicine and Health care Administration and control Authority of Ethiopia (EPA, 2011). There are different supports such as the Engineering Capacity Building Program is a facility designed by the Ethiopian and German governments to assist the standard and technological upgrading of manufacturing enterprises, including the pharmaceutical sector. The priority in the pharmaceutical sector is to assist selected local companies in complying with Good Manufacturing Practices (GMP) in accordance with Pharmaceutical Inspection Co-operation Scheme (UNCTAD, 2011a).

Though there are different actions to be taken, the SCM practices of Ethiopia pharmaceutical manufacturing companies seems weak. Most of the companies including EPHARM procure their raw materials using open tender rather than backward integration (Sutton and Kellow, 2010). There are some companies in Ghana that select its suppliers. Asamoah, Ananan and Nyarko (2012) found that the criteria used to select supplier are quality which is the most favored, followed by reliability/capacity and price. Almost all local production of medicine in Ethiopia is limited to secondary manufacturing that involves combining various active ingredients and processing bulk medicines into dosage forms. This exposes the firms to a high level of foreign exchange risk and long lead-times for raw materials. Most pharmaceutical manufacturers have a low level of capacity compared with their foreign counterparts that leads to the company not to achieving economies of scale. This lead to low level production capacity and high production costs (Sutton and Kellow, 2010).

Different distributors and wholesalers of pharmaceuticals claimed that pharmaceutical manufacturing companies don't have an interest to have sole distributors. Also the selection of distributors and wholesalers seemed not based on selection criteria like capacity, geographic coverage or financial strength.

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In addition, it is stated that many small and medium-sized pharmaceutical producers in Ethiopia cannot cope with the severe competition of the low cost exports of large-scale Asian producers (Sutton and Kellow, 2010). Though the government gives preferential treatment to local manufacturers in its own procurement agency i.e. PFSA, and has put in place a system of paying a 30% advance payments, still the companies cannot compete in the market with such companies (EPA, 2011).

According to Sutton and Kellow (2010), pharmaceutical manufacturers were recently exempted by the government from duty tax payment on 80% of their imported raw materials (previously they used to pay up to 35% duty tax on all imported materials). The manufacturers have asked the government to extend the range of exemptions to cover packaging materials. There are still raw materials that need tax exemptions compared with what they import.

Therefore, this research focused on to study SCM practices of pharmaceutical manufacturing companies including suppliers, the firm, distributors and retail outlets relationships of EPHARM Share Company.

1.3 Research Questions

Based on the previous statement of research problem, the following main research questions were formulated.

  i.   How does the firm measure the major suppliers' delivery performances of raw materials?
  ii. What are the major factors affecting order fulfillment lead time for raw materials?
  iii. What are the SCM practices of Ethiopian pharmaceutical manufacturing share company?
  iv. What are the major factors that affect the capacity utilization of the company?
  v.   How is the performance of delivery lead time of the company to its customers?
  vi. What are the parameters that are affecting the supply chain response time?
  vii. What are the parts of inventory affecting the total inventory carrying cost most?
  viii. What are the satisfaction levels of customers for the company's products?

1.4 Objectives

1.4.1 General Objective

The general objective of the research is to investigate the SCM practices of pharmaceuticals manufacturing companies of Ethiopia.

1.4.2 Specific Objectives

The specific objectives of the research are:

- ➢ To evaluate the suppliers delivery performance for raw materials
- ➢ To investigate factors affecting order fulfillment lead time for raw materials
- ➢ To describe the SCM practices of Ethiopian pharmaceutical manufacturing share company
- ➢ To evaluate the efficiency of production capacity utilization of the company
- ➢ To identify those factors increasing supply chain response time
- ➢ To assess the company's delivery lead time for its customers
- ➢ To explore the part of inventory that affect the total inventory carrying cost
- ➢ To evaluate the customer satisfaction of the company

1.5 Hypotheses

As mentioned earlier by different authors, most of the raw materials are imported that lead to high foreign exchange need. Also there is no long term relationship with raw materials suppliers. Most of the pharmaceutical manufacturing companies including EPHARM have low level of capacity that lead to high production cost. Based on the literature the following null hypotheses were drawn to test the customers' satisfaction of EPHARM with its distributors and retail outlets.

H_{01}: The supply chain flexibility of EPHARM with its distributors is strong

H_{o2}: EPHARM responses on the customer query time with its distributors is very quick

H_{03}: The supply chain flexibility of EPHARM with retail outlets is strong

H_{o4}: EPHARM responses on the customer query time with retail outlets is very quick

H_{o5}: Post sales customers' satisfactions of EPHARM products with distributors and retail outlets are the same

1.6 Operational Definition of Terms

➢ **Pharmaceutical manufacturing companies**: Are those companies that produce drugs for humans, medical supplies, laboratory reagents from raw materials.

➢ **Distributors**: Distributors are those wholesalers that distribute EPHARM products to retail outlets

➢ **Drug or pharmaceutical preparation: A** drug or pharmaceutical preparation is any substance or mixture of substances manufactured, sold, offered for sale or represented for use in the diagnosis, treatment, mitigation or prevention of disease, abnormal physical state or the symptoms thereof in man; (and for use in) restoring, correcting or modifying organic functions in human only.

1.7 Significance of the Study

SCM for pharmaceutical companies can be used as one of the core competencies to compete with the competitors. The intention of the study is to assess the current SCM practice in the pharmaceutical manufacturing companies in general and EPHARM Share Company in particular. The effective implementation of the SCM by such companies will produce core competencies so that they can compete with the importing companies. Therefore, the study will have practical significance to assess the practice of the SCM as well as the challenges faced in it. The result of the study will be useful the EPHARM share company. Also it is useful for other pharmaceutical manufacturing companies owners and managers and government agencies especially FMHACA. Since the sector is get attention by the government in growth and transformation plan and by respective stakeholders, it will be useful to know the practice and challenges related to SCM in the sector. When the

challenges will be addressed, there will be better SCM of local pharmaceutical manufacturing companies that compete with those importing companies. In addition, the study will contribute on the limited knowledge in the area of SCM of pharmaceutical manufacturing companies of Ethiopia.

1.8 Scope of the Study

The scope of the research is EPHARM Share Company and only addresses the SCM practices including deliver performance of suppliers, capacity utilization; deliver lead time and customer satisfaction of the company. The study will not include the supplier's supplier and the ultimate customer of the product due to time and budgetary constraints.

1.9 Limitation of the Study

The limitation of the study is it only focuses on the case of EPHARM Share Company and draw conclusion for other companies. The data only collected from Addis Ababa market. Assessing the practices of other pharmaceutical manufacturing companies, supply chain relationship outside Addis Ababa and detail analyzing of data quantitatively is needed for further conclusion. Also detail depth interview and focus group discussion with all relevant stakeholders in the sector are needed.

CHAPTER TWO: LITERATURE REVIEW

2.1   Supply Chain Management Defined

The known authors Heizer and Render (2011) define SCM as the integration of the activities that procure materials and services, transform them into intermediate goods and final products, and deliver them to customers. These activities include purchasing and outsourcing activities, plus many other functions that are important to the relationship with suppliers and distributors. SCM includes determining transportation vendors, credit and cash transfers, suppliers, distributors, warehousing, and forecasting and production information. Also the Council of Supply Chain Management Professionals (CSCMP, 2012); consider supply chain management encompasses the planning and management of all activities involved in sourcing and procurement 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, SCM integrates supply and demand management within and across companies. Also some studies expand that SCM also encompasses recycling or reuse stated by Baatz cited in Tan (2001).

According to Awad and Nassar (2010), to success in such highly digitalized economy organizations must manage the integration of business, technology, people, and processes not only within the enterprise but also across extended enterprises. SCM system facilitates inter-enterprise cooperation and collaboration with suppliers, customers, and business partners. Although this system can bring benefits and competitive advantage to organizations, the management and implementation of this system pose significant challenges to organizations.

1.10 Evolution of Supply Chain Management

Though there are different thought SCM were emerged from the term Logistics. Before the 1950s, logistics was thought of in military terms (Ballou, 2007). According to Tan (2001), the primary operation strategy to minimize unit production cost is mass production

in 1950s and 1960s. It had to do with procurement, maintenance, and transportation of military facilities, material, and personnel. The study and practice of physical distribution and logistics emerged in the 1960s and 1970s. Then physical distribution and logistics were envisioned to have broad responsibilities for managing activities associated with product flow from the points of raw material acquisition to the end consumer (Ballou, 2007). In the 1970s however, material requirements planning was developed and managers realized the impact of huge work in process inventories on manufacturing cost, quality, product development and delivery lead time (Tan, 2001). Also Rushton *et al.,* (2000) stated that in 1970s development of distribution concept that was included in the functional structure of the organization. According to Ballou (2007), Logistics were emerged by integrating different fragment activities of material management and physical distribution in such period. The intense global competition of the 1980s forced world class organizations to offer low cost, high-quality, and reliable products with greater design flexibility. Manufacturers utilized just in time and other management programs to improve manufacturing efficiency and cycle time (Tan, 2001).

The concept and need for integrated logistics systems were organized by some companies. The concept of SCM emerged in 1990s due the need of focusing not only on organization's boundaries but also those function outside the boundaries that contribute to the provision of the product to the final customer. In addition to the procurement professionals, logistics experts carried the concept a step further to incorporate the physical distribution, transportation, and warehousing functions. The evolution of SCM continued into the 1990s as organizations further extended best practice in managing corporate resources to include strategic suppliers and the logistics function in the value chain (Rushton *et al.*, 2000; Tan, 2001). Since the issues of logistics were mainly considered as inbound and to some extent are taking some activities if outbound, SCM were emerged in 1990s by including activities such as strategic planning, information services, marketing/sales and finance (Ballou, 2007).

As stated by Oliver and Webber cited in Lambert and Cooper, (2000), the term SCM was originally introduced by consultants in the early 1980s and has subsequently gained

tremendous attention. Also the interest in SCM has steadily increased since the 1980s when firms saw the benefits of collaborative relationships within and beyond their own organization. Firms are finding that they can no longer compete effectively in isolation of their suppliers or other entities in the supply chain (Lummus and Vokurka, 1999).

Also the research of Lambert and Cooper (2000) shows that managing the supply chain involves three closely interrelated elements: the supply chain network structure; the supply chain business processes; and the management components. They suggested that the structure of activities or processes within and between companies is vital for creating superior competitiveness and profitability, and that successful SCM requires integrating business processes with key members of the supply chain. The implementation of SCM involves identifying the supply chain members with whom it is critical to link, what processes need to be linked, and what type/level of integration applies to each process link. The objective of SCM is to create the most value, not simply for the company, but for the whole supply chain network including the end customer (Lambert and Cooper, 2000).

1.11 Benefit of Supply Chain Management

SCM has been growing in importance, from the early practice of concentrating on internal processes to the web-linking of supply chain partners. Firms have been pressed to increase their operational efficiencies to stay competitive. Companies have begun to see the value in effective supply chain relations. Benefits found resulting from electronic SCM include lower inventory levels, quicker response to problems, higher quality levels, higher customer satisfaction, and more diverse product offerings. As internal processes have been improved, external relationships have been examined as the next area of business improvement. Yet, the supply chain must also become more open with its information sharing, and supply chain partners will need to develop a greater degree of trust. Clearly, the benefits of a pull-based operation are there if companies are willing to collaborate. Electronic SCM allows for the entire supply chain to become a community, dedicated to efficient operations and customer service (Lancaster *et al.*, 2006).

Kim, (2006) studied effect of SCM practices, integration and competition capability on performance. It was found that the role of supply chain integration as an intervening variable means that even if a firm has excellent SCM practices and competition capabilities, close strategic alignment and coordination with its supply chain partners are indispensable for linking such SCM practices and competition capability to firm performance improvement. Accordingly, the strategic integration approach which properly utilizes partners' existing facilities and technologies by the way of short-term lease or contract may be advisable rather than the new investments on transaction-specific assets with partners.

Making a SCM a competitive advantage requires meeting two main challenges, the strategic challenge and the integration challenge. Developing deeper insight into how to determine what to outsource and when to partner is the key to addressing the first, and the ability to align interests, develop partnership networks and manage complexity and risk across the extended enterprise is crucial to meeting the second. Companies that can rise to both will set themselves apart (Leavy, 2006).

SCM appears to treat all organizations within the value chain as a unified and virtual business entity. It includes activities such as planning, product design and development, sourcing, manufacturing, fabrication, assembly, transportation, warehousing, distribution, and post-delivery customer support. In a truly and integrated supply chain, the final consumers pull the inventory through the value chain instead of the manufacturer pushing the items to the end users (Tan, 2001).

According to Booth (1996), since pharmaceutical industries are under considerable change, SCM has considerable roles for the re-engineering. It was found that excellence in SCM is essential if the priorities of the pharmaceutical industry are to be addressed. Also in the case of mergers and accusation, supply chain increase performance and reduction in costs since it is rationalized. Hence SCM are being recognized as a unifying theme that underpins the implementation of corporate strategy.

SCM often is the basis for a firm's competitive strategy, which is driven by increased outsourcing, expanding global operations, and heightened need for logistics customer service. Not only has managing supply chain costs become more important, as these costs are used in tradeoff with production costs, but supply chain strategy is increasingly viewed as a source for contributing to the revenues of the firm (Ballou, 2007).

1.12 Global Strategy of Supply Chain Management

Some recent study regarding supply chain integration in European firms show that many firms have adopted enterprise resource planning systems and also established some electronic links with their supply chain partners. Enterprise resource planning systems generally support internal coordination across functional activities; however it is less supportive in decision-making across organizational boundaries. The results from the survey also confirm that supply chain integration is more a rhetoric than reality in most industries in Europe. Regarding transparency of inventory and sensitive data, most companies are quite cautious when it comes to sharing such data. Very few companies have established joint decision-making with their key suppliers or customers. However, a majority of the respondents confirmed that some consultation took place with their supply chain partners (Bagchi, 2005).

In the same year there are researches that compared the supply chain integration and performance of US and East Asian Companies. The variables used are information sharing, internal integration and external integration with suppliers. It was found that US companies tend to use various means in ensuring information sharing process is smooth and share the information to the extent production plans and systems. But East Asian firms are using internal integration via internal control primarily to reduce costs, but the US firms emphasized on operational integration of physical process flows between a company and its suppliers and customers. Regarding external integration both East Asian and US firms show long term partnership with suppliers and customers that lead to achieve competitive advantage (Zailani and Rajagopal, 2005).

Kannan and Tan (2005) studied the linkages between just in time, total quality management and SCM in business performance, According to the study, at strategic level, linkages exist between just in time, total quality management, and SCM. While some companies may understand the inherent relationships between the three and actively exploit their synergy, those that do not maybe inadvertently achieving the benefits of synergy. By explicitly and effectively integrating just in time, total quality management, and SCM practices into operations strategy, the potential exists to add value and to better position oneself to respond to competitive pressures. At an operational level, just in time, total quality management, and SCM practices can be deployed together to create value. The extent to which various practices correlate with each other and with performance is evidence that while the three may have distinct characteristics and goals, there are elements of each that are common and which can be successfully reinforced by each other. Lastly, in addition to having a focus on quality, understanding supply chain relationships is a key driver of performance. Whether it is by coordination and integration of activities throughout the supply chain or by recognizing the capabilities of immediate suppliers, understanding supply chain dynamics has a significant impact on performance. As the trend towards outsourcing and focusing on core competencies increases, organizations will be under greater pressure to effectively leverage supplier and customer relationships. The results demonstrate that doing so be a significant driver of a firm's success (Kannan and Tan, 2005).

According to the study on SCM practices of the Hong Kong manufacturing companies, it shows that there is little progress towards SCM implementation. SCM is immature and not fully recognized in the city. The main reason may be due to the application of information and communication technologies and insufficient skills (Chin *et al*., 2004).

McMullan, (1996) studied the SCM practice in Asia Pacific region. It addresses the SCM practice from four key areas namely; management issues, roles and responsibilities, competitive strategies and performance management. The result of the study show that; many firms will be required to change their organizational structures, relationships with supply chain members and performance measurement systems to achieve this. New

information technology to enhance communication throughout the supply chain will be required as well in order to increase service levels and reduce operating costs. Supply chain management managers will have to decide which areas offer the greatest strategic value for the supply chain. Over time, these capabilities will become an entry requirement for those wishing to compete. However, first movers are likely to continue to benefit from their pioneering efforts, and continue pushing forward seeking further differentiation.

1.13 Developing Countries Experience

Asamoah *et al*., (2011) studied the pharmaceutical supply chain for anti-malarial drug in Ghana. It was found that there are two main supply channels i.e. private and public channels. But both chain lack information technology leading to disruption and delay in the Supply chain system. These lead huge implication in drug security and affordability. To achieve availability of drugs at the right time and place the availability of information infrastructure is mandatory for the supply chain.

Msimangira, (2003) studied the SCM practices of Botswana companies. The result of the study shows that supply chain management is not as such a strategic rather it is a clerical and operational activities only. Top managers don't recognize its importance and also there are very limited trainings and education are available for SCM as a profession.

Voordijk (1999) studied obstacles and precondition of logistics and manufacturing as case study of the East African country of Eritrea, The result showed that each element of the supply chain network causes problems. The basic condition for logistics and manufacturing are well developed infrastructure: such as transport system and telecommunication network, enabling environment: such as sound industrial policy and educational system for skill development, and at firm level: such as purchasing materials, manufacturing capabilities and export and distribution. Such factors impede the efficient logistics and manufacturing of the country. To solve such obstacles the government has to follow two types of policy. On the one hand, it has to reduce its own role by giving public firms more autonomy and by eliminating the remaining regulatory and legal obstacles that constrain private (domestic and foreign) enterprises from investing. On the other hand, the

government has to strengthen its role in the national economy by increasing investments in the transport and communication infrastructures. Also firms have to improve their local linkages in order to decrease their supply, production and distribution problems. The institutional infrastructure just mentioned can be important in getting to know local business partners. In addition, firms have to seek co-operation with foreign companies in order to solve their supply chain problems.

One study regarding logistics management of South Africa shows that there is still in the quarter of supply chain confusion. The position close to the center can possibly be explained by the fact that South Africa is still in the early phases of integration of logistics activities. Understanding for logistics has increased but the practice still lags behind. Logistics management is still fragmented. Logistics activities are still managed with a functionally fragmented approach. The major advantage of the integrated logistics concept is the higher efficiency that stems from integrated management. The other challenges are that there is lack of holistic management. The fact that management in South Africa is primarily functionally oriented resulted in a lack of holistic management. In addition, there is lack of integrative systems. Owing to the lack of a holistic approach, integrative systems will naturally lag behind (Cilliers and Nagel, 1994).

1.14 Ethiopian Experience

SCM practices and challenges in different industry of Ethiopia were studied in different dissertations. The results of different researches in the practices of SCM in different commercial sectors of Ethiopia are poor. Admaw (2010) studied the practice of SCM for Ethiopian textile firms. It was found that, SCM practices in Ethiopian textile firms are weak and not considering SCM as a strategic tool for competition. Business managers of the textile firms didn't give attention for SCM theories and practices. Also Dereje, (2012) studied the impact of SCM practices on the organizational performances in metal and engineering industries. The result of the study shows that the implementation of SCM in this industry is weak. Also the SCM practices don't have any relationship with organizational performances except internal lean practices. In addition, Belay, (2011)

studied the practices of SCM in cement industries. The result of the thesis shows similar to other industries in the country i.e. the practice of SCM in cement industry is almost poor. There seems that since the demand outweighs the supply of the cement, which contributes for not using SCM as a competitive strategy.

Mesfin (2007) also studied the SCM and model development study as a case study of Mesfin Industrial Engineering plc. The result of this study shows that most of the employees of the company don't have awareness of SCM. The company also don't use supply chain cost analysis rather than using the traditional accounting system. Also there are problems in their warehouses. Besides to the above machine handling problem, ageing, poor preventive maintenance, lack of proper operation, and wear of spare parts are the main reasons for the breakage of machines in Mesfin Industrial Engineering.

Based on the assessment of FMOH for monitoring and evaluation of national drug policy, there was only one local pharmaceutical manufacturing plant in 1993 G.C that is owned by the government. Currently, drug production activity is being under taken by 13 local pharmaceutical manufacturing plants: One government owned, eleven private (unaffiliated with multinationals) and one private (affiliated with multinationals). Three of the factories are engaged in medical supplies production, one on empty gelatin capsule production and nine on finished product formulation using imported raw materials (FMOH, 2003).

According to Sutton and Kellow (2010), and different experts the pharmaceutical supply chain of Ethiopia have two wings. The first is addressing those of the public health facilities through PFSA. The second is addressing the private health facilities through different importers, wholesalers and also PFSA to some extent. PFSA was established in 2007 based on pharmaceutical logistics master plans implementations designed by FMOH. The mandate of PFSA is; it is a sole provider of forecasting, procurement, storage, inventory management and distribution of pharmaceuticals to the public health sector in Ethiopia. PFSA's current supply chain starts with the import of most drugs via the port of Djibouti. These products are then trucked into central PFSA based in Addis Ababa, before being distributed to the various distribution centers (Hubs) and on to the hospitals and

health centers. Today, there are approximately 750 Health Centers operating in Ethiopia, with a planned expansion to 3,500 (1,500 are planned to be operational by July 2010). There are also 6,000 Health Posts operating, with a planned expansion to 15,000. The ultimate goal of this expansion is to have a Health Facility within a two hour walk of every Ethiopian citizen. The system is still largely push system as demand profiles that are used for pull system are unknown with the exception of HIV and AIDS drugs and supplies (World Bank, 2009).

Recently PFSA has established pull system known as integrated pharmaceutical logistics system primarily using the essential data items reported from health facilities regularly every other month. Using its 11 distribution centers (Hubs), PFSA will distribute drugs and supplies to public health facilities throughout the country (PFSA, 2012).

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

1.15 Research Design

The research design of the study is mix of quantitative and qualitative methods. Based on the qualitative methods, it describes the SCM practices of Ethiopian pharmaceutical manufacturing companies by studying EPHARM practices. Quantitative methods are used to assess production capacity of the machines and customers' satisfactions of EPHARM products.

1.16 Unit of Analysis

The unit of analysis for the case study was EPHARM Share Company engaged in manufacturing pharmaceuticals from raw materials and distribute to PFSA and different wholesalers in the country.

1.17 Sample and Sampling Technique

1.17.1 EPHARM Share Company

To study about the suppliers of raw materials, the purchasing division head was interviewed to get data about the suppliers. Since it is difficult to get suppliers from abroad, this method was gave us highlights about suppliers.

To discuss on different issues of SCM practices of the company; technical manager and marketing and sales division head were interviewed. Since technical manager is involved in all technical operation including production and sales, quality assurance research and development and engineering division and marketing and sales division head for relationship with the customers; they are selected for interview using purposive sampling.

1.17.2 Distributors

The distributors of EPHARM products are PFSA mainly for public health facilities and different wholesalers for private health facilities. The study area is in Addis Ababa since most of the pharmaceuticals are consumed in Addis Ababa. Since majority of the firm's products are procured by PFSA, PFSA was selected for the study by purposive sampling. Regarding private distributors (wholesalers) there are selected using simple random sampling. There are 83 wholesalers working in Addis Ababa based on the data of FMHACA. At a confidence level of 95% the sample size for analysis of the wholesalers was 69 wholesalers. The sample size was determined by the statistical formula (Israel, 2009):

$$n = N/ (1 + N*e^2) = 83/ (1 + 83 * (0.05)^2) = 83/1.535 = 69$$

Where N: population, n: sample size and e: level of precision.

The 69 wholesalers were selected by random sampling techniques using their name alphabetically. Questionnaires were filled by technical manager, since the technical manager is responsible for managing all pharmaceutical activities and also certified by the regulatory authority to technically manage the firm.

1.17.3 Retail Outlets

There are 6 Addis Ababa city administration health bureau hospitals, 5 federal hospitals and 30 private and NGO hospitals. Since most of the pharmaceuticals of the city are mainly consumed by hospitals, 41 hospital pharmacies were taken as a sample to see the practices of supply chain of EPHARM products. All private and NGO hospital pharmacies are run by licensed pharmacists that are technical managers of the firms that filled the questionnaire. For public hospitals there are pharmacy head that are pharmacists responsible for managing supply of pharmaceuticals that filled the questionnaire.

1.18 Sources and Tools for Data Collection

There are two types of data i.e. primary and secondary data that were used in the study. The primary data that was collected are by using interviews and questionnaires. Using interview questions the data were collected from EPHARM technical manager, marketing and sales division head and purchasing division head. Purchasing division head was interviewed to get data regarding suppliers' relations and response in availing raw materials. Questionnaires were used to collect primary data from 69 wholesalers and PFSA and from 41 hospital pharmacies. The secondary data were collected by document review from EPHARM to measure some of the supply chain variables and other sources for benchmarking and comparison purposes.

Also interview of technical manager and sales and marketing division head were conducted to assess the overall practice of SCM of EPHARM. The major factors affecting raw materials availability, the major factors affecting utilization of the capacity of machines, parameters affecting the overall supply chain response time, challenges faced in the SCM and possible recommendation for the challenges are also collected.

The purchasing division head was interviewed to get data regarding suppliers' selection for raw materials, delivery performance for raw materials, and factors affecting delay of the delivery of raw materials and relationship with suppliers.

Questionnaires were used to assess the customer satisfaction with regard to flexibility, customers' query time and after post transaction customer service.

The secondary data were used to evaluate the supply chain performance of the company with respect to industry's performance. Company records are used to the capacity utilization of the machine and inventory carrying costs. In addition, other supply chain variables and bench marks of the industry are used for comparison purposes.

1.19 Procedures of Data Collection

The procedure for the data that was collected using questionnaires was first the respondents are communicated to get their consent. Once their consent was known, the prepared questionnaires are distributed to each participant by appreciating their participation and devoting their precious time for the research. The questionnaires were collected by checking the completeness of the data. Finally the activities were accomplished by appreciating the respondents.

The data that was collected using structured interview; first the interviewees were communicated and arrange appointment to give the interview. The interviews were started by appreciating the interviewee for giving their precious time. When the respondents are ready, questions were forwarded accordingly. If there is misunderstanding of the question, elaborate the questions accordingly. Finally, the interview was adjourned by appreciating the respondents for the participation.

1.20 Method of Data Analysis

The data that were collected are analyzed by different methods. The practice of SCM of the country and EPHARM, the factors affecting in SCM, factors that delay delivery performance and total supply chain response time are described qualitatively by comparing it with SCM practices presented in the literature.

The capacity utilization of the machine was analyzed by calculating the percentage of efficiency with respect to the design and planned capacity of the machines. Also the performance between each production line is compared.

The customer satisfactions of EPHARM with respect to distributors and retail outlets are analyzed using descriptive statistics including mean, standard deviation and frequency. Also inferential statistics are used including one sample and paired sample t-test and Spearman's correlation.

4 CHAPTER FOUR: RESULTS AND DISCUSSIONS
4.1 Results/Findings of the Study
4.1.1 Introduction

In this part data that were collected using interview, questionnaires and document review are presented. The data was vital to investigate the SCM management practices of EPHARM, challenges related to the supply chain and to forward recommendations based on the identified findings. Interviews were used to collect data from purchasing division head, technical manager and marketing and sales division head of EPHARM Share Company. Questionnaires were used to collect the data from different wholesalers that distribute EPHARM products and hospitals that dispense or use the products of EPHARM. In addition, document is reviewed to assess some of the SCM practices of the company. The results are organized as follows.

4.1.2 SCM Practices with Suppliers

Since it is difficult to get data regarding the practices of SCM with suppliers, purchasing division head was interviewed to get the SCM practices and performance of suppliers. As per the result of the interview the selection criteria for suppliers for active pharmaceutical ingredients (APIs), additives and packaging materials are the same. But the criteria are tight in case of selecting suppliers for APIs. Based on the purchasing manual of the company; price of raw materials, payment term, delivery time, quality of products and certification including good manufacturing practice for APIs, certificate of ISO for packaging materials, certificate of analysis and origin are the criteria for selection. Also the technical manager added that the selection criteria is determined by the methods of procurement i.e., open tender, restricted tender, direct purchase and Performa. The selection criteria are influenced by which methods of procurement are selected.

According to purchasing division head and technical manager "the major criteria for selecting suppliers are price of the raw materials, quality of raw materials, good manufacturing practices (GMP) requirements especially for APIs, ISO certification for

packaging materials. However, there are times that there is only one supplier for specific products. In such case direct purchase is the only option so that all the major criteria can't be used".

The company has four methods of procurement for raw materials. These are open tender, restricted tender, direct purchase and Performa. The selection of each method of procurement depend on the value of the raw materials, the availability of suppliers, historical performance of suppliers and urgency of the new of the raw materials.

As per the interview result of both technical manager and purchasing division head, there is no long term relationship with suppliers, though some of them have best performances. Selecting the suppliers is based on tender by tender basis.

However, those suppliers that have supplied for long period exempted for trial order. Once the suppliers are selected by the committee of the company, trial order is initiated that cover up to 30% of the total tender quantity. The trial order will be tested by quality control and production team whether it fulfills the intended criteria. If it fulfills the criteria of the quality control and production units, the remaining 70% will be ordered. This method is applied for new suppliers. Restricted quotation is also applied only for known suppliers. Sometimes further selection criteria are implemented by technical team including inspecting the suppliers manufacturing plant.

But the technical manager argued that: the only source of empty capsule is Sino Ethiop Associate a joint Ethio-Chinese venture. There is strong coordination and collaboration between the two companies. Also there is a cartoon supplier from local sources in long term relationship.

Since the company is focusing on procuring raw materials in tender basis, there is not as such record for measuring suppliers' delivery performance. Due to different internal capacity issues and external challenges, it need from six to seven months to get raw materials from foreign suppliers.

According to the interview of the technical manager and purchasing division head, there are different factors that affect the order fulfillment lead time for raw materials. The major once are shortage of foreign currency. Since the sources of most of the raw materials are from aboard, foreign currency shortage made the challenges severe. Transportation of raw materials from the suppliers to the company is one of the problems. The company only uses Ethiopia shipping agency and the current multi modal system has its own effect in delay of raw materials. Customs authority is also one of the challenges for delay. Though most of the raw materials for manufacturing pharmaceuticals are said to be tax free, most of the time the customs didn't know all list of products that are tax free and asking to pay tax and need long term discussion to release the product.

Sometimes there is only one supplier for some raw materials. So there is no option to compare for selection. Cost of raw materials is the major factors for availability of the raw materials. Since there is stringent quality control by the regulatory body in the sector, those raw materials that are not fulfilling the specification is automatically removed from competition. In addition, capacity of the suppliers and current good manufacturing certification requirement for APIs is its own influence on availability of raw materials.

4.1.3   SCM Practices in EPHARM Share Company

Based on the interview result of the technical manager and marketing and sales division head of EPHARM, the SCM practices of the company started from market research. Based on the market demand collected from the pharmaceutical market, market plan is prepared. The market plan identified the product needed by the market. Based on the product needed, list of raw materials including APIs, excipients, packaging and labeling materials to produce the needed products by the market are prepared. These lists of products are communicated to plan division. The plan division communicates the need for procurement division considering the budget issues. Based on the prepared plan, the procurement division assesses their stock in store by inventory control unit. Also those raw materials found in the pipeline are also considered. Once the gaps of raw materials are identified the

remaining quantities are known and cost breakdown for each product is prepared to determine the total budget needed to procure the needed raw materials.

The company has its own purchasing manual and committee to approve or revise the prepared raw materials to be procured. Since, it will spend up to 100 million ETB annually; the budget is approved by board of directors. Once the budget is approved, method of procurement is also determined. Based on the selected method of procurement, purchasing is initiated to get raw materials needed by the company in the budget year.

Production is started if it fulfills the quality parameters of the quality control department. The finished products that are manufactured are distributed to the customers through different distributors and wholesalers including PFSA and MEDTECH Ethiopia.

The technical manager said that the company measures the capacity of the machines regularly and their status is recorded and reported. Each machine has designed capacity set by the manufacturers of the machine. The company set the machines planned capacity to smoothly function its activities considering its practical capacity. The actual performance or attainable capacity is recorded during operation of the machines. By measuring the performance of each machine using each production line, the efficiency of each machine is recorded and documented. As per the document review the table below shows that efficiency of the machines for 2004 EC.

Table 4.1: Production capacity of the machines by the production line for the year 2004 EC

Production line	Unit	Design capacity (DC)	Planned capacity (PC)	Attainable capacity (AC)	AC/DC *100	AC/PC*100
Tablet	No	459,000,000	431,000,400	349,412,030	76.12	81.07
Capsule	No	248,000,000	223,250,000	140,186,500	56.53	62.79
Vials	No	13,000,000	10,000,000	7,448,600	57.3	74.49
Ampules	No	10,000,000	7,5000,000	1,675,600	16.76	22.34
Syrup	Liter	284,000	231,050	163,448	57.55	70.74
Ointment	Kilo	85,000	63.050	41,371	48.67	65.62
IV fluid	Liter	1,000,000	883,200	539,474	53.95	61.08
Oral powders	Kilo	137,000	130,065	115,797	84.52	89.03
Average					**56.42**	**65.89**

According to the 2004 EC report of the machine capacity, the average percent of attainable with respect to design capacity is 56.42%. However, if it is calculated on attainable capacity versus planned capacity is its 65.82%. Based on the report the capacity of the machine utilization is low.

According to the interview result, the following are the major factors that decrease the production capacity of the machines. Since the company is 50 years old, most of the machines are very old and their efficiency is decreasing with time. Shortages of inputs or raw materials are also one of the factors that decrease the efficiency of the machines. In addition, machine breakdown is common and machine maintenance is the major problem. Though the company has maintenance team, the capacity of the personnel's and limitation for maintaining the machines affect the efficiency of the machines.

According to the purchasing division head interview, the inventory management across the pharmaceutical supply chain is performed by the inventory control team. They regularly control the inventory and determine reorder level for raw materials. The team gives special attention for those raw materials that have short shelf life. The inventory are consumed based on first expires first out and first in first out procedure for those products that don't have expiry date. Due to different reasons the raw materials purchase is in bulk that finishes at least for six months. Comparing the inventory of the raw materials with in-process and finished products, it carries largest proportion of the inventory cost. The main reason is that since the source of most of the raw materials are from abroad and need long period of time to procure it, bulk purchase lead to high inventory carrying cost due to raw materials. Also the transportation of raw materials, foreign currency and gaps in communication methods contributed for bulk purchase.

Regarding forward integration with distributors both technical manager and marketing and sales division head agreed that it is started but not strong. The company classified its distributors in to two namely for public sectors and for private sectors.

For public sectors PFSA is the distributor and contributed for 60-70% sales of the company. The relationship with PFSA is mainly on tender basis. When PFSA initiate both open and restricted tender, EPHARM competes with local and international manufacturers. If the company wins the tender, agreement is signed by the two bodies. But there is no long term relationship or integration with PFSA. The relationship focuses only on tender by tender basis. PFSA favor the company by giving advance payment up to 30% of the total tender price. Sometimes, price protection using restricted tender is used for local manufacturers to protect them from international manufacturers' competition.

For private sectors, EPHARM uses wholesalers to distribute its products. By assessing and inviting potential distributors, the company selects sole distributors for 19 products. The selected distributor is MEDTECH Ethiopia. It has sole distributor for 19 products for private sectors. But for the remaining products different wholesalers are involved in distributing its products.

As per the interview there are different factors that affect the total supply chain response time from getting raw materials. These are capacity of the machines, raw materials availability, and quantity to be produced, foreign currency, logistics and transportation system of the country, and information and telecommunication technology.

So far the company does not have an experience to share best experiences from other companies even from local pharmaceutical manufacturers. For instance direct purchase from known and reliable supplier is best to get raw materials timely. But since the company is the government institution, it is preferred to have open tender than direct purchase from reliable sources. But other companies have such experiences. However, there are trials by the association of Ethiopian pharmaceuticals manufacturing to share best experiences among them and to pool raw materials in coordination from reliable sources.

According to technical manager and marketing and sales division head, there are different challenges faced so far with suppliers and distributors regarding SCM. There are limited suppliers from some raw materials. Most of the raw materials are imported from other countries that lead to long procurement lead time and bulk purchase. As a result it increases supply chain response time. The capacity of the company is also one of the challenges to respond based on the need of the market. Also the current logistics and transit system of the country has its own input on delaying of transporting of raw materials from port to the manufacturing plant. In addition, it is difficult to get information from the pharmaceutical market for further planning. There are not as such well recorded national data to know the market share of the specific product or the company share in the market. At last the limited infrastructure of the country including transportation, information communication technology and financial sectors has its own influence of the SCM practices of the pharmaceutical sector.

4.1.4   Results of Questionnaire of Distributors

To assess the performance and practice of SCM of EPHARM with its distributors; 69 wholesalers were selected using simple random sampling. From the total of 69 questionnaires distributed, 32 (46.4%) wholesalers fill and send the questionnaires, 16

(23.2%) wholesalers respond that they are not distributing EPHARM products so far. The remaining 21 (30.4%) wholesalers don't respond or refusing to fill the questionnaire. The completed questionnaire were coded and inserted into SPSS 17.0 software for analysis. Based on the descriptive statistics; percentage of response, mean, standard deviation and frequency are summarized.

Table 4.2: Summary of responses for measuring flexibility of EPHARM with its distributors

	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)	Mean	SD[*]
The products manufactured by EPHARM fulfills your need in terms of quality	37.5	46.9	15.9	0	0	1.78	0.71
The products manufactured by EPHARM fulfills your need in terms of quantity	6.3	6.3	31.3	46.9	9.4	3.47	0.98
The company notify the list of products in the stock for your company regularly	3.1	31.3	34.4	28.1	3.1	2.97	0.93
All drugs produced by the company are available all the time	0	0	18.8	68.8	12.5	3.94	0.56
The manufacturer has arranged flexible payment system	12.5	21.9	21.9	34.4	9.4	3.06	1.22

[*] SD: Standard Deviation

As indicated in Table 4.2 46.9% respondents agree that the products manufactured by EPHARM fulfill their need in terms of quality. Also 37.5% of respondents strongly agree

on quality of products. This implies that the qualities of EPHARM products are acceptable by most of its distributors. Whereas, 46.9% respondents disagree that the products of EPHARM fulfills the need of its customers in terms of quantity. While 31.3% respondents are neutral and 9.4% are strongly disagree on it. From the analysis it can be deduced that: though most of the distributors believed that the qualities of products of EPHARM are very good, it is not fulfilling their need in terms of quantity.

The analysis of Table 4.2 also shows that 34.4% respondents are neutral with the company's activities on notifying the available stock to its customers regularly. Also 31.3% respondents are agreeing, but 28.1% respondents are disagreeing on such activities. This implies that the company mainly focuses on some group of customers to notify its stock, but there are considerable numbers of customers not communicated. 68.8% respondents disagree that the products of EPHARM are available all the time. Though 18.8% are neutral on this issue, 12.5% respondents strongly disagree on it. By considering the mean value of 3.93 and standard deviation 0.56, it can be concluded that EPHARM products are not available continuously or sustainable all the time in the market.

As observed from the table, 34.4% respondents disagree that EPHARM have flexible payment system while purchasing its products. But 21.9% respondents each are agree or neutral on it. From this one can conclude that the company arranged flexible payment system for bulk purchase or long term customers but not for all distributors that demands it.

Table 4.3: Percentage of responses of distributors for measuring customers query time of EPHARM

	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)	Mean	SD
The company delivers on-time directly to customer's point of use	0	3.13	6.25	50.0	40.63	4.28	0.73
It responds quickly on the customers response if the drugs are stock out	0	18.75	18.75	40.63	21.88	3.66	1.04
It notify stock out products timely for its customers	0	21.88	15.63	40.63	21.88	3.63	1.07
There is clear mechanism of communication used by the company to inform its customers	0	56.25	25	12.5	6.25	2.69	0.93

As shows in Table 4.3, 50% of the respondents disagree that EPHARM delivers on-time directly to its customer's entity. Also 40.63% strongly disagree on it. From this it can be concluded that EPHARM didn't give delivery service to most of the distributors. Also 40.63% of the respondents disagree on the EPHARM response for its customers when the products are stock out. In addition, 21.88% of the respondents' strongly disagree on this issue. However, 18.75% of the respondents agree that the company responds for stock out products. From this we can deduce that, the company response when there is stock out products are weak or delay on response.

Though there are times that the products are stock out, it shows that 40.63% of the respondents disagree for the notification of EPHARM for stock out products timely to its customers. Also 21.88% each of respondents agree and strongly disagree for this

notification. By observing the mean value of 3.65 and standard deviation of 1.03, it can be concluded that most of the time EPHARM don't inform its customers for stock out products but there are some customers that are prioritized and informed timely.

As shown in Table 4.3, 56.25% of the respondents agree that there is clear communication mechanism between EPHARM and its customers. Also 25% of the customers are neutral on it. This shows that there is communication mechanism in place between EPHARM and its customers.

Table 4.4: Percentage of responses of distributors for post transaction measures of EPHARM

	Strongly agree (%)	Agree (%)	Neutral (%)	Disagre e (%)	Strongly disagree (%)	Mean	SD
It collects those products that have quality problems timely	15.63	40.63	43.75	0	0	2.28	0.73
It has clear methods for refunding or substituting products having quality problems	15.63	46.88	37.5	0	0	2.22	0.71
The company contacts with customers to measure customers satisfaction on its products	0	25.0	25.0	34.38	15.63	3.41	1.04

As shown in Table 4.4, 43.75% are neutral, 40.63% agree and 15.63% are strongly agreed that EPHARM collects those products that have quality problems. This implies that due to enforcement by the regulatory authority, EPHARM collects those products that have quality problems.

In addition, Table 4.4 displays that 46.88% of respondents agree that EPHARM has clear methods for refunding or substituting those products that have quality problems. Also 37.5% are neutral and 15.63% respondents strongly disagree on refunding or substituting methods. From this one can conclude that the company has clear procedures for refunding or substituting those products having quality problems. Also the table shows that, 34.38% of respondents disagree, 15.63% strongly disagree and 25% each are neutral and agree on the company's performance on the post marketing measurement of customers satisfaction on its products. The result implies that there are not as such strong customer relationship activities done by the company. They are mainly focusing on sales activities only.
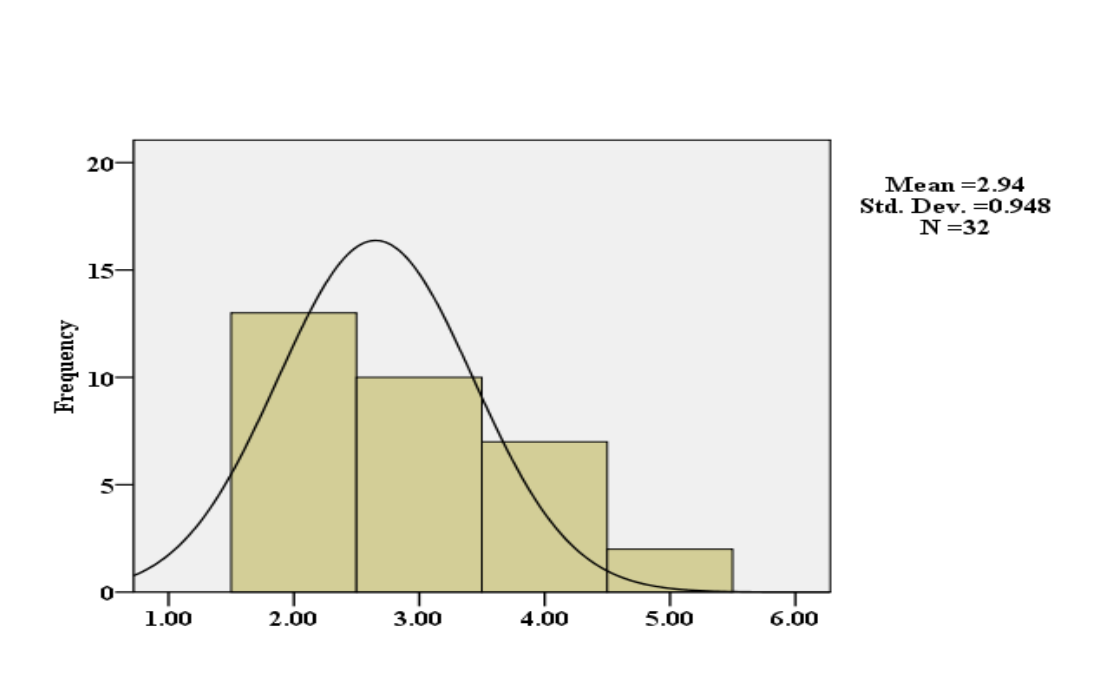
Figure 4.1: Number of responses on the overall supply chain performance of EPHARM with its customers.

Based on the presentation of the overall supply chain performances of EPHARM in Figure 4.1, 13 (40.6%) respondents agree, 10 (31.3%) respondents are neutral, 7 (21.9%) respondents are disagree and 2 (6.3%) respondents are strongly disagree that the overall supply chain performance of EPHARM are excellent. In addition, considering the mean value of 2.94 and standard deviation of 0.948 the overall supply chain performance of

EPHARM is not as such strong and not competitive compared with the bench mark companies.

4.1.5 Results for the Questionnaire of Retail Outlets

To assess the performance of SCM practice of EPHARM products in retail outlets, 41 hospital pharmacies that are found in Addis Ababa are selected owned by the government, NGO and private hospitals. Questionnaires were distributed for 41 hospital pharmacies. From the total questionnaires distributed 26 (63.4%) questionnaires were collected, 4 (9.8%) hospital pharmacies were not using EPHARM products; the remaining 11 (26.8%) hospital pharmacies were not responding.

All the 26 questionnaires collected are coded and inserted into SPSS 17.0 software. Using descriptive statistics; frequency, percentage, mean and standard deviation of the responses are summarized and presented as follows.
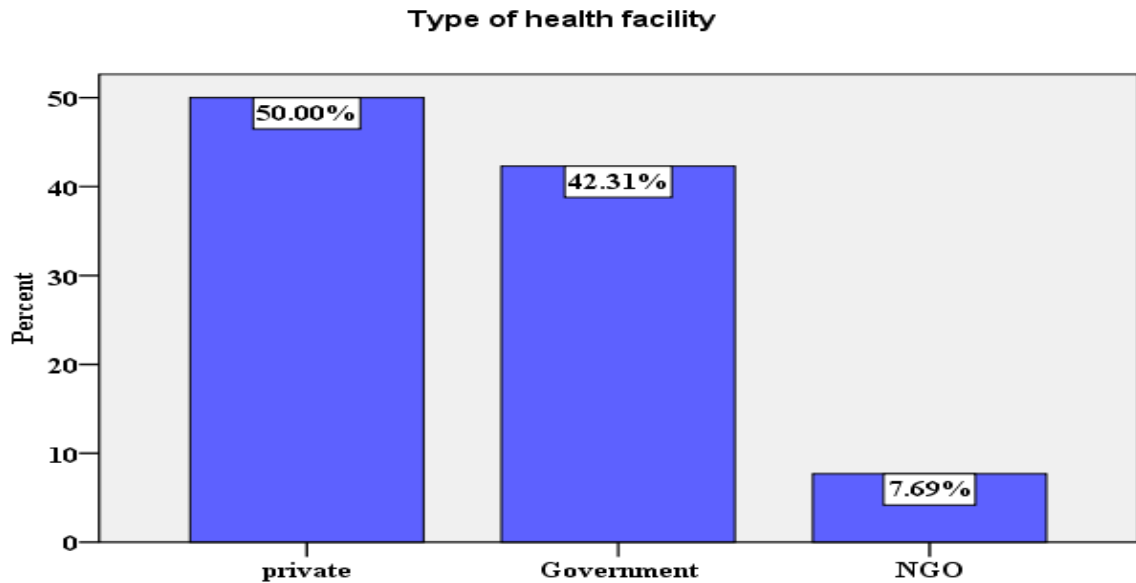
Figure 4.2: Percentage of health facilities filling questionnaires by type of owners

As shown in Figure 4.2, from the total of 26 hospital pharmacies responded; 50% are private hospitals, 42.31% are government and the remaining 7.69% are NGO hospitals.

Table 4.5: Percentage of supply chain flexibility of distributors with the retail outlets

	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)	Mean	Standard Deviation
The products manufactured by EPHARM fulfills your need in terms of quality	30.8	38.5	23.1	7.7	0	2.08	0.93
The products manufactured by EPHARM fulfills your need in terms of quantity	19.2	30.8	26.9	19.2	3.8	2.58	1.14
The supply chain that you get EPHARM's products are fulfills your need	3.8	26.9	42.3	26.9	0	2.92	0.84
All drugs produced by the company are available all the time	0	11.5	38.5	42.3	7.7	3.46	0.81
The distributors have arranged flexible payment system for EPHARM products	19.2	34.6	15.4	26.9	3.8	2.62	1.20

As shown in Table 4.5, 38.5% agree that the products manufactured by EPHARM fulfill the needs of retail outlets in terms of quality. 30.8% strongly agree in it. So, most of the respondents (69.2%) are either strongly agree on agree on the quality of the products with the mean of 2.0769 and standard deviation 0.934. Therefore, based on the respondents

response EPHARM products have acceptable quality both by the distributors and retail outlets.

Also 30.8% of the respondents agree that EPHARM manufacture products that fulfill their need in terms of quantity. 26.9% are neutral. But there are 19.2% responds strongly agree and disagree with the idea with a mean value of 2.57 and standard deviation of 1.13. The result shows that there is a varied response on the quantity of products of EPHARM, though the cumulative 50% are responded either strongly agree or agree on it.

The supply chain of EPHARM products that fulfills retail outlets need shows that most of the respondents (42.3%) are neutral on the supply chain, 26.9% are both agree and disagree on the fulfilling their need. Also the mean and standard deviation is 2.92 and 0.84. From the result it can be deduced that, the existing supply chain of EPHARM couldn't address the need of most of the retail outlets.

As per the presentation of Table 4.5, majority of the respondents 42.3% disagree on availability of all drugs manufactured by EPHARM all the time. Also 38.5% are neutral and 7.7% are disagreeing on it. Also the mean value is 3.46 and standard deviation of 0.82. The result shows that there are interruption of EPHARM products most of the time and stock out of products in most retail outlets.

Majority of respondents 34.6% agree that there are flexible payment systems by distributors. But 26.9% of respondents disagree, 19.2% respondents are strongly agreed with the flexible payment system. This shows that there are differences among distributors of EPHARM products regarding flexible payment system. There are considerable numbers of distributors that have flexible payment system; however, there are also some distributors that don't have flexible payment system. Also the standard deviation (1.2) shows that there are differences among distributors.

Table 4.6: Percentage of responses for measuring retail outlets query time of EPHARM products

	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)	Mean	SD
The distributors delivers on-time directly to customer's point of use for EPHARM products	3.85	34.62	26.92	26.92	7.69	3.00	1.06
Distributors responds quickly on the customers response if the EPHARM products are stock out	3.85	11.54	53.85	19.23	11.54	3.23	0.95
Distributors notify stock out products of EPHARM timely for its customers	0	19.23	42.31	19.23	19.23	3.4	1.0
There is clear communication mechanism used by the distributors to inform its customers	3.85	26.92	34.62	26.92	7.69	3.08	1.02

As per the description of Table 4.6, 34.62% of respondents agreed that distributors deliver on-time for EPHARM products. However, 26.92% of the respondents are both neutral and disagree on on-time delivery. Also considerable numbers i.e., 7.69% of respondents strongly disagree with it. From the result it can be concluded that there are great variation with distributors. Some distributors deliver EPHARM products on time but most of the distributed are not. Also it shows that 53.85% of the respondents are neutral on the distributors' response quickly for on customers' response when there are stocks out of products. 19.23% of the respondents disagree on it. This implies that distributors of

EPHARM are not responding for retail outlets request when EPHARM products are stock out.

As shown in Table 4.6, 42.31% respondents are neutral regarding the distributors to notify stock out products to its customers. Others have similar responses that 19.23% agree, disagree and strongly disagree. In addition to the previous responses in stock out products, this also shows that most distributors don't notify stock out products for their customers. In addition, most of the respondents (34.62%) are neutral on clear communication mechanism between distributors and retail outlets. 26.92% respondents both agree and disagree on it. Also considerable number of respondents (7.69%) strongly disagrees on the clear communication mechanism. As supported by the standard deviation 1.01 and mean value of 3.07, most of the distributors and retail outlets don't have clear communication mechanism that affect the supply chain performance of EPHARM products.

Table 4.7: Percentage of responses' on post transaction measures of retail outlets of EPHARM products

	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)	Mean	SD
It collects those products that have quality problems	3.85	23.08	34.62	19.23	19.23	3.27	1.15
The distributors have clear methods for refunding or substituting products having quality problems	7.69	23.08	34.62	26.92	7.69	3.04	1.08
EPHARM contacts the end users to get feedback	3.85	15.38	23.08	30.77	26.92	3.62	1.17

As observed from Table 4.7, 34.62% of the respondents are neutral and 23.08% agree that EPHARM through its distributors collect those products that have quality problems. However, 19.23% each of respondents disagree and strongly disagree on collection of products. This implies that though there are times that collect products that have quality problems, still some of the respondents are not convinced on the performance of EPHARM and distributors for collecting products. Though the regulatory body for pharmaceuticals enforced the manufacturers and distributors to collect those products that have quality problems, the performance is still very low.

To measure the performance of the distributors whether there are methods to refund or substitute products for those products that have quality problems, Table 4.7, shows that 34.62% are neutral, 26.92% disagree, 23.02% agree and 7.69% each strongly disagree and strongly agree. This implies that most of the retail outlets don't know the regulation that enforced the distributors and manufacturers that have obligation to collect those products that have quality problems and refund or substitute with other products by the exact amount it incurred.

In addition the table shows that, 30.77% and 26.92% strongly disagree and disagree on EPHARM activities to get feedback from customers respectively. Also 23.08% are neutral on it. This shows that this is one of the weakest link of the company that there is no marketing or promoting its products as well as getting feedback from its customers regarding the satisfaction level of their products.

Overall supply chain performance of EPHARM with your organization is excellent
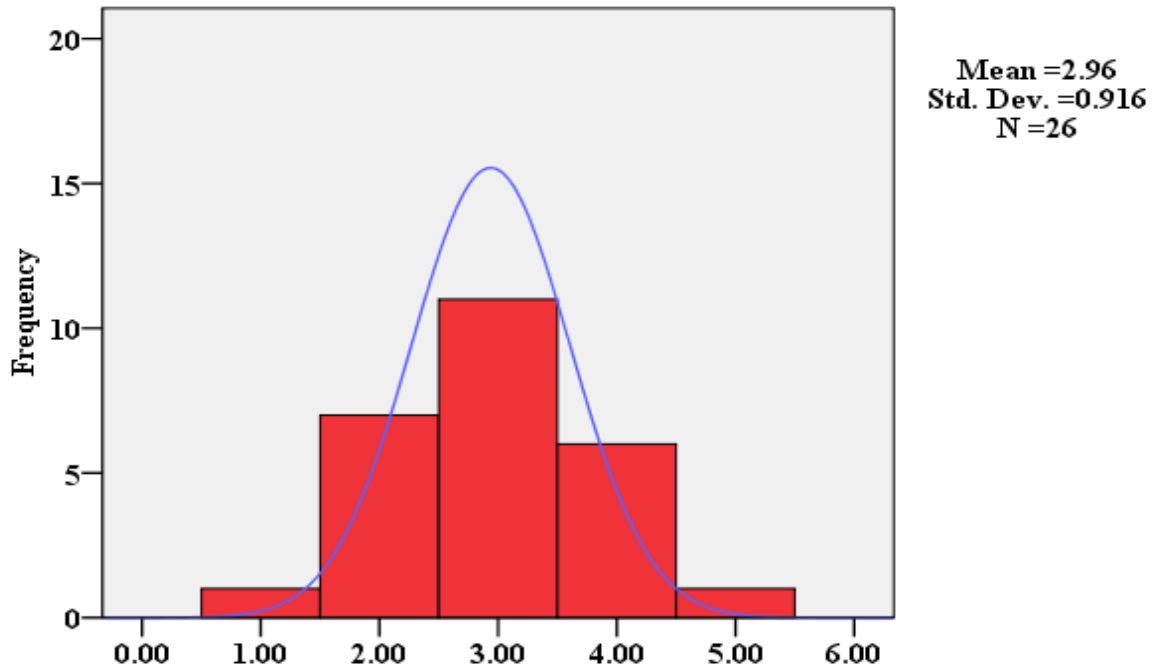
Figure 4.3: Number of respondents on the overall supply chain performance of EPHARM products

As shown in Figure 4.3, 11 (42.3%) of respondents are neutral on the overall supply chain performance of EPHARM products, 7 (26.9%) agree, 6 (23.1%) are disagree and the remaining 1 (3.8%) each are strongly agree and strongly disagree on its performance. With a mean value of 2.96 and standard deviation of 0.91, the overall supply chain performance of EPHARM products are not satisfactory as observed in previous measurement of flexibility, delivery performance and post customers service satisfaction.

Table 4.8: Percentage of responses on fill rates of EPHARM products

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 25%	2	7.7	7.7	7.7
	26 - 50%	7	26.9	26.9	34.6
	51 - 75%	13	50.0	50.0	84.6
	More than 75%	4	15.4	15.4	100.0
	Total	26	100.0	100.0	

As shown in the Table 4.8, 13 (50.0%) respondents agreed that the fill rates of EPHARM products are between 51-75%, 7 (26.9%) respondents said it is between 26-50%, 4 (15.4%) respondents said it is more than 75% and 2 (7.7%) respondents said that it is below 25%. With the mean value of 2.73 with standard deviation of 0.82 the overall fill rate of EPHARM products is around 50% which is not good enough.

4.1.6   Testing Hypothesis

To infer the samples for the general population hypotheses was prepared based on the current practices of the SCM of EPHARM. Hypotheses for supply chain flexibility and customers query time response between EPHARM and its distributors and with its retail outlets were tested by one sample T-test. By analyzing the practices of the company and the industry, the T-test for average mean value of the population is assumed to be 2.0. To measure post sales customers satisfaction for distributors and retail outlets, paired sample T-test is used. To analyze whether there is correlation between overall supply chain performance with fill rates of EPHARM, Spearman's correlation is used.

Testing Hypothesis 1:

H_{01}: The supply chain flexibility of EPHARM with its distributors is strong

H_{a1}: The supply chain flexibility of EPHARM with its distributors is not strong

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Table 4.9: One sample T-test for supply chain flexibility of EPHARM with its distributors

| | Test Value = 2 | | | | | |
| | | | | | 95% Confidence Interval of the Difference | |
	t	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
The products manufactured by EPHARM fulfills your need in terms of quality	-1.752	31	.090	-.21875	-.4734	.0359
The products manufactured by EPHARM fulfills your need in terms of quantity	8.450	31	.000	1.46875	1.1143	1.8232
The company notify the list of products in the stock for your company regularly	5.875	31	.000	.96875	.6325	1.3050
All drugs produced by the company are available all the time	19.419	31	.000	1.93750	1.7340	2.1410
The manufacturer has arranged flexible payment system	4.941	31	.000	1.06250	.6239	1.5011

Based on the Table 4.9, the one sample T-test from the five variable that are used to measure flexibility, the significance level are less than 0.05 (P<0.05) except for product quality (P= 0.09). Based on the analysis, the probability associated with statistics p<0.05 was significant. Therefore, the null hypothesis; "the supply chain flexibility of EPHARM with its distributors is strong" is rejected, whereas the alternate hypothesis "the supply

chain flexibility of EPHARM with its distributors is not strong" is accepted. From this, it can be concluded that EPHARM supply chain are weak in terms of flexibility with its distributors.

Testing Hypothesis 2

H_{o2}: EPHARM responses on the customer query time with its distributors is very quick
H_{a2}: EPHARM responses on the customer query time with its distributors is long

Table 4.10: One sample T-test of EPHARM for distributors query time

	Test Value = 2					
					95% Confidence Interval of the Difference	
	T	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
The company delivers on-time directly to customer's point of use	17.705	31	.000	2.28125	2.0185	2.5440
It responds quickly on the customers response if the drugs are stock out	9.051	31	.000	1.65625	1.2830	2.0295
It notify stock out products timely for its customers	8.590	31	.000	1.62500	1.2392	2.0108
There is clear mechanism of communication used by the company to inform its customers	4.177	31	.000	.68750	.3518	1.0232

As shown in the table 4.10, the one sample T-test value of all variables is less than the significance level of 0.05. So the null hypothesis "EPHARM responses on the customer query time with its distributors is very quick" is rejected and accepting the alternate hypothesis; "EPHARM responses on the customer query time with its distributors is too long". From this it can be concluded that EPHARM lack in responding for customers' query based on the listed variables.

Testing Hypothesis 3

H_{03}: The supply chain flexibility of EPHARM with retail outlets is strong
H_{a3}: The supply chain flexibility of EPHARM with retail outlets is not strong

Table 4.11: One sample T-test for supply chain flexibility of EPHARM with retail outlets

	Test Value = 2				95% Confidence Interval of the Difference	
	t	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
The products manufactured by EPHARM fulfills your need in terms of quality	0.420	25	.678	.07692	-.3006	.4545
The products manufactured by EPHARM fulfills your need in terms of quantity	2.586	25	.016	.57692	.1175	1.0364
The supply chain that you get EPHARM's products are fulfills your need	5.571	25	.000	.92308	.5818	1.2643
All drugs produced by the company are available all the time	9.184	25	.000	1.46154	1.1338	1.7893
The distributors have arranged flexible payment system for EPHARM products	2.609	25	.015	.61538	.1297	1.1011

As per the presentation of Table 4.11, the significance value of all the parameters are less than 0.05 except the product quality (0.678) similar to the distributors. So the null hypothesis "The supply chain flexibility of EPHARM with retail outlets is strong" is rejected and accepting the alternative hypothesis. It implies that the flexibility of EPHARM with its distributors as well as with retail outlets is not strong. However, the product quality of the company get acceptance by both the distributors and retail outlets.

Testing Hypothesis 4

H$_{o4}$: EPHARM responses on the customer query time with retail outlets is very quick

H$_{a4}$: EPHARM responses on the customer query time with retail outlets is long

Table 4.12: One sample T-test of EPHARM products on customers query time for retail outlets

	Test Value = 2					
					95% Confidence Interval of the Difference	
	t	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
The distributors delivers on-time directly to customer's point of use for EPHARM products	4.818	25	.000	1.00000	.5725	1.4275
Distributors responds quickly on the customers response if the EPHARM products are stock out	6.598	25	.000	1.23077	.8466	1.6149
Distributors notify stock out products of EPHARM timely for its customers	6.903	25	.000	1.3846	.971	1.798
There is clear communication mechanism used by the distributors to inform its customers	5.401	25	.000	1.07692	.6662	1.4876

As shown in Table 4.12, the one sample T-test value for customers query time is less than significance level of 0.05 for all variables that measures customers query time. So it can be

concluded to reject the null hypothesis; "EPHARM responses on the customer query time with retail outlets is quick" and accept the alternative hypothesis. Due to capacity of the company to produce the market driven product all the time, it is not responding as per the customers' request.

Testing Hypothesis 5

H_{o5}: Post sales customers' satisfactions of EPHARM products with distributors and retail outlets are the same

H_{a5}: Post sales customers' satisfactions of EPHARM products with distributors and retail outlets is different

Table 4.13: Paired Samples Test of post sales customers' satisfaction between distributors and retail outlets.

	Paired Differences					t	Df	Sig
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Aftersales - Aftersales ret	-0.602	0.979	0.192	-0.99	-0.206	-3.13	25	0.004

Table 4.13, results of paired samples T-test indicates that after sales customers' satisfaction between distributors and retail outlets. It shows that there is significant difference between distributors and retail outlets (P=0.004). So the null hypothesis "Post sales customers' satisfactions of EPHARM products with distributors and retail outlets are the same" is rejected. Since the regulatory authority enforces the pharmaceutical manufacturing companies and its distributors to collect those products that have quality problems. The company adheres to the regulatory authority's regulation.

Table 4.14: The Spearman's correlation of Overall supply chain performance with overall fill rates

			Overall supply chain performance of EPHARM	Overall fill rates of EPHARM products
Spearman's rho	Overall supply chain performance of EPHARM	Correlation Coefficient	1.000	0.453[*]
		Sig. (2-tailed)	.	0.020
		N	26	26
	Overall fill rates of EPHARM products	Correlation Coefficient	0.453[*]	1.000
		Sig. (2-tailed)	0.020	.
		N	26	26
*. Correlation is significant at the 0.05 level (2-tailed).				

As shown in the Table 4.14, a Spearman's rank order correlation was run to determine the relationship between overall supply chain performance of EPHARM with its fill rates in retail outlets. There was a significant positive correlation between overall supply chain performance and fill rates which are statistically significant ($r_s(26) = 0.453$, P = 0.02).

4.2 Discussions

4.2.1 Supply Chain Management Practices with Suppliers

As stated in literature review section, the role of supply chain integration as an intervening variable means that even if a firm has excellent SCM practices and competition capabilities, close strategic alignment and coordination with its supply chain partners are indispensable for linking such SCM practices and competition capability to firm performance improvement (Kim, 2006).

However, the result of SCM practices of EPHARM indicated that there is weak relationship between suppliers and EPHARM except in case of empty capsule manufacturer (with Sino-Ethiop Plc.). The agreement between suppliers and EPHARM are tender by tender basis. That is there is no long term relationship with the suppliers even if there is only sole supplier. Due to lack of long term relationship the total supply chain response time as well as the suppliers' delivery response time is very long. Not only the transportation and logistics issue but also processing the tender and selecting suppliers all the time needs extra time which don't add any value for the supply chain.

As stated by different authors cited by Chen and Paulraj (2004) selecting suppliers for specific raw materials and services is a critical decision for most organization, since supply performance can have a direct financial and operational impact on the business. Strong and long term relationship with suppliers of raw materials have a lot advantages. As stated earlier; Asamoah *et al*., (2012) found that the criteria used to select supplier by some pharmaceutical companies are quality which is the most favored, followed by reliability/capacity and price.

Though there are no as such long term relations with suppliers, the company has its own selection criteria to select best suppliers for each tender. The selection criteria are similar with some of the companies stated earlier. The major criteria for selecting suppliers of EPHARM are price of the raw materials, quality of raw materials, good manufacturing practices (GMP) requirements especially for APIs and ISO certification for packaging materials.

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Though there is no company record to monitor the major suppliers' performance by the company, most of the delivery performances of the suppliers are too long. The average delivery times for raw materials are from 6 to 7 months. The major sources of most raw materials are from abroad since it is not produced in Ethiopia. Most of the raw materials are procured from abroad so that foreign currency interruption has major effect to procure the raw materials. Even if the government has preference to allocate foreign currency for pharmaceuticals, shortage or interruption of foreign currency has direct effect for purchasing.

As a government organization EPHARM transport its raw materials only by Ethiopia shipping lines and the current multimodal transportation system from the port to the plant. It is one of the major challenges faced in delaying transportation of raw materials from suppliers' source to the company's plant. Especially the problem is aggravated for those of APIs. Because for transporting raw materials Ethiopian shipping lines prefers to use containers. But APIs are very expensive and small in sizes that are difficult to use container for them. But they are the major raw materials to manufacture pharmaceuticals. These all lead to delay of transportation of raw materials from the sources to the plant.

Other factors that contribute for long delay of delivery performance are customs clearance procedure. Though almost all of raw materials for manufacturing pharmaceuticals are tax free, customs clearance officers don't know all those raw materials that are using for manufacturing pharmaceuticals. The capacity of the firm, the cost of raw materials and those products that fail in terms of quality parameters are also some of the factors that affect raw materials availability.

4.2.2 Supply Chain Management Practices in EPHARM

As stated in literature review section, SCM appears to treat all organizations within the value chain as a unified and virtual business entity. It includes activities such as planning, product design and development, sourcing, manufacturing, fabrication, assembly, transportation, warehousing, distribution, and post-delivery customer support. In a truly and integrated supply chain, the final consumers pull the inventory through the value chain

instead of the manufacturer pushing the items to the end users (Tan, 2001). According to Booth (1996), since pharmaceutical industries are under considerable change, SCM has considerable roles for the re-engineering. It was found that excellence in SCM is essential if the priorities of the pharmaceutical industry are to be addressed.

The result of assessment of the internal SCM of EPHARM shows that there are considerable coordination and relationship with different departments. Once the gaps of raw materials are identified, cost breakdown for each product is prepared to determine the total budget needed to procure the needed raw materials. There is very good communication and coordination within departments to share information for making company's level decision for the need of raw materials.

As part of the 2004 EC annual report of the company; the attainable production capacity of each production line with respect to the design capacity of the machine and planned capacity is determined. The result shows that the average attainable capacity of the machine with respect to design capacity and planned capacity is 56.42% and 65.89% respectively. The highest attainable production capacity with respect to planned capacity is for oral powders production lines (89.03%) and the lowest is for ampule production lines (22.34%).

Comparing the capacity utilization of EPHARM, the performance is lower. There is idle capacity to use without additional production line. Especially for product line of ampules it is very low compared with other production lines. As it is indicated; shortages of raw materials is one of the major factors that decrease the capacity utilization of the machines. This is the main challenges for ampule product lines faced in 2004 EC. The other major factors are most of the machines are very old and used for the last 50 years so that their efficiency are decreasing with time. Also there are common for machine failure; maintenance of the machines is one of the limitations. Though there are maintenance teams in the company, most of them lack the skill and knowledge to fix the failed machines accordingly. In addition, it also faces shortage of spare parts and need long period of time to acquire from international market.

Inventory management of the company is managed by inventory control unit. This unit determines reorder level of raw materials and report and monitor the stock and shelf life. It gives special attention for short shelf life products. All raw materials stored in pipeline and finished products are recorded. By assessing the stock status of each product, the unit reports to the responsible bodies and division for the appropriate action before stock out of products.

Since most of the sources of raw materials are from abroad and that need long procurement lead time, the company forced to have large inventory of raw materials by procuring bulk at least for six months of stock to prevent stock out of products. As most of the recent theories including just in time principles favors to have lower level of inventory, the company forced to accumulate to have large amount of raw materials. As a result the total inventory carrying costs to manage such bulk raw materials are very high.

To transport those finished products from the plant to its customers, EPHARM don't have regular delivery mechanism. It mainly delivers only for PFSA regularly but for the other distributors delivery is not regular. The delivery gap of the company are also identified using the questionnaire that 50% and 40.63% of customers are disagree and strongly disagree respectively on the EPHARM delivers its products directly to its customers. Therefore, direct deliveries of its products to its customers are one of the supply chain gaps of the company that need attention.

To identify the target market of the company; the products needed, determining customers' needs and competent marketing activities are essentials (Kotler, 2000). The analysis of marketing activities of the company with its customers shows that it is very low for both distributors and retail outlets. EPHARM don't' contact the end users to get their feedback regularly. EPHARM has Marketing and sales division under production and sales department that are responsible for the customers relationship after sales of its products. Since the unit doesn't have sufficient human resource to do its activities, there are no as such strong post marketing or after sales services with its customers. As a result, one of the pillars of SCM i.e. marketing is weak.

4.2.3 Supply Chain Management with Distributors

Measuring customer service and satisfaction are one of the core components to implement supply chain strategy. Performance measurement not only considers suppliers and capacity of manufacturing but also customers' satisfaction. To measure customers' satisfaction flexibility, the customer query time and post transaction measures of customers' services are used (Gunasekaran *et al.*, 2001).

The analysis of distributors shows that the quality of the products of the company is acceptable by most of its distributors. Though the quality of the products are acceptable, the company don't produce sufficient amount for its customers. To the extent that 68.8% of the distributors disagree that all drugs produced by the company are available all the time. In addition, there are gaps in flexible payment system by the company.

Also based on the analysis of hypothesis one, the supply chain flexibility of the EPHARM with its distributors is strong is rejected. Therefore, EPHARM produce quality products and recognized by its customers. But due to shortage of raw materials and the capacity limitation of the company, there are gaps in availing those products to its customers all the time. The demand of the product in the market are available, however, the company don't fulfill the supply of the product to the market. As a result the satisfying customers by evaluating flexibility, the company lacks in most of the indicators of flexibility.

The other metrics used to evaluate customer service and satisfaction is the customer query time. As the analysis shows, the company doesn't have direct delivery to most of its customers. Since transportation between intermediaries are crucial for interlinking all the components, gaps in transportation affect SCM of the company. The company uses telephone communication to get and disseminate information with its customers. However, the response for customers query and informing customers for stock out products are weak. Hence not only transportation but also communication between the company and its distributors is also one of the gaps in SCM of the company. As a result the company doesn't satisfy its customers by lacking on customer query time. The result is justified by

rejecting hypothesis 2 saying that EPHARM responses on the customer query time with its distributors is very quick.

As stated by Gunasekaran *et al.,* (2001) post transaction measures of customers' service play important role to get feedback from customers on customers demand, targeted markets and any complaints if there are product defects. As per the result 43.75% and 40.63% of the respondents are agree and strongly agree that EPHARM collects those products that have quality problems respectively.

As far as collection of products that have quality problems, the regulatory authority of the country enforces the manufacturers and distributors to collect those products that have quality problems to protect the safety of the public. So it is compulsory to collect those products that have quality problems once the regulatory authority identifies those quality problems. Also after collecting the products, the company should have to report for the authority regarding the collected product. Therefore, it is not the strength of the company; rather it is the enforcement of the regulation for such activities. But the company's performance is weak for communicating its customers to monitor their satisfaction. This is expected due to limited human resources and not as such strong marketing and sales department.

Based on above findings to measure customers satisfaction and the result of overall supply chain performance of EPHARM, it was found that the SCM practices in relation to customers satisfaction is not strong. Since there are capacity gaps by the company, shortage of raw materials, old machines and maintenance problems and transportation and information gaps; the SCM practices and relationships with its distributors are not expected to be strong.

4.2.4 Supply Chain Management of Retail Outlets

Similar to the distributors of EPHARM, final customers of the products are assessed to measure customers satisfaction.

Retail outlets agreed on the quality of the products EPHARM like the distributors. Most of the retail outlets either agree or strongly agree on EPHARM products fulfilling their need in terms of quality. However, the availability of products all the time and fulfilling their need in terms of quantity are weak and similar to distributors. However, since retail outlets are using distributors for their sources of products most of the distributors arranged flexible payment system for retail outlets unlike EPHARM. Therefore, there is better flexibility with distributors better than EPHARM. So EPHARM shall use such distributors' strength to fill its gap and strengthen SCM challenges. However, there are still some distributors that don't have flexible payment system. The company didn't identify those distributors that dissatisfy its ultimate customers. Also the results of hypothesis 3 supports that the supply chain flexibility of EPHARM with retail outlets is not strong.

To measure customers query time, the results of the retail outlets shows that, it is better than that of the company. But there are mixed results. Higher number of distributors delivers on-time directly to its customers. But there are some distributors that don't have direct delivery service like that of the company. Regarding communication between distributors and retail outlets, the results is of neutral. There are some distributors that have very good communication and relationship with their retail outlets. But there are some segments of distributors that there are not good communications with retail outlets. In addition, the results of hypothesis 4 show that it rejects the null hypothesis "EPHARM responses on the customer query time with retail outlets are very quick". This implies EPHARM's performance in selecting distributors and managing the overall SCM of its products are weak.

Post transaction measures of customers' service are measured by collecting products having quality problems, refunding mechanism for those products collected and collecting feedback from retail outlets. The result shows that there are retail outlets that don't know the regulation that enforce distributors and manufacturing company to collect their defected pharmaceutical company. The result also shows that EPHARM's performance in collecting feedback from retail outlets are weeks similar to the distributors.

Considering flexibility, the customer query time and post transaction measures of customers' service to measure customers' service and satisfaction the SCM practice of EPHARM with retail outlets through their distributors are weak. This result are also supported by the rating of the overall supply chain performance of EPHARM products.

Based on the Spearman correlation, the overall supply chain performance and fill rates have significant positive correlation. Hence, increasing filtrates by increasing availability of raw materials and capacity of the firm, the overall supply chain performance of EPHARM will be increased.

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

4.3   Summary of Findings

Based on presentation of the results, the finding of the study is summarized as follows.

To assess the SCM practices with suppliers, the findings show that there are selection criteria for suppliers. The selection criteria are stated in the purchasing manual of the company. The major criteria for selecting suppliers are price of the raw materials, quality of raw materials, GMP requirements especially for APIs, ISO certification for packaging materials, payment term and delivery time. These criteria are used for each tender announced.

Although there are selection criteria to select best suppliers, there are no long term relationships or backward integration with any international suppliers. All are evaluated in each tender. But for empty capsules that are manufactured in Ethiopia by Sino Ethiop Plc., there is long term relationship and the sole supplier for empty capsules.

The major factors that affect the order fulfillment lead time for raw materials are cost of raw materials, qualities of raw materials and shortage of foreign currency since most of the raw materials are procured from abroad. Transportation of raw materials from the suppliers' to the company, customs authority clearance and limited supplier for some products also affects order fulfillment lead time. In addition, capacity of the suppliers and GMP certification requirement for APIs has its own influence on availability of raw materials.

The assessment of the overall SCM practices in the company show that there is information sharing among different departments. The needs of raw materials are prepared based on the assessment of the market and shared through each responsible department.

The capacity utilization of the machines in each production line is recorded. Based on the annual record of the company (2004 EC), the average percent of attainable capacity with respect to design capacity for all machines is 56.42%. Whereas the average attainable capacity

with respect to planned capacity is 65.82%. Among the different production lines; the highest attainable capacity with planned capacity are for oral powders (89.03%) and the lowest are for ampule production lines (22.34%).

The major factors that affect the capacity utilization of the machines are most of the machines are very old (up to 50 years), shortages of raw materials, machine breakdown and their maintenance and the capacity of the firm.

The inventory control unit monitors the stock status of raw materials by focusing on short shelf life products. Also the unit determines the reorder level of each raw material. The result shows that the company have large amount of raw materials that use for at least six months in inventory. Due to huge amount of raw materials, inventory carrying cost is very high. Regarding the delivery of products for the customers, for most of its customers the company didn't deliver the product directly to the customers on time.

To distribute its products, EPHARM uses two channels to address public and private sectors. To address the public sector, PFSA is responsible and procure higher percent of the firm's product (up to 65%). For private sectors MEDTECH Ethiopia has got sole distributors for 19 products. For the remaining product other distributors are also used. There was no long term relationship or forward integration with these distributors, but recently there is trial to initiate relationship.

The findings of questionnaire for distributors that measure flexibility to satisfy its customers shows that 46.9% respondents agree 37.5% respondents strongly agree that the products manufactured by EPHARM fulfill their need in terms of quality. However, 46.9% respondents disagree, 31.3% respondents neutral and 9.4% respondents strongly disagree that the products of EPHARM fulfills their need in terms of quantity. Also 34.4% respondents are neutral 31.3% respondents agree and 28.1% respondents disagree that EPHARM notifying the available stock to its customers regularly. In addition, 68.8% respondents disagree, 18.8% are neutral and 12.5% respondents strongly disagree that the products of EPHARM are available all the time. Also 34.4% respondents disagree and 21.9% respondents each agree or neutral that EPHARM have flexible payment system while purchasing its products.

Regarding customers query time the results shows that 50% of the respondents disagree and 40.63% of respondents strongly disagree that EPHARM delivers on-time directly to its customer's entity. Also 40.63% of the respondents disagree, 21.88% of the respondents' strongly disagree and 18.75% of the respondents agree that EPHARM respond for its customers when the products are stock out. In addition, 40.63% of the respondents disagree and 21.88% each of respondents agree or strongly disagree that EPHARM notify stock out products timely to its customers. At last, 56.25% of the respondents agree and 25% of the customers are neutral that there is clear communication mechanism between EPHARM and its customers.

The result of after sales customer service of the company display that 43.75% are neutral, 40.63% agree and 15.63% are strongly agree that EPHARM collects those products that have quality problems. Also 46.88% of respondents agree, 37.5% are neutral and 15.63% respondents strongly disagree that EPHARM has clear methods for refunding or substituting those products that have quality problems. In addition, 34.38% of respondents disagree, 15.63% strongly disagree and 25% each are neutral or agree on the company's performance on the post marketing measurement of customers satisfaction on its products.

The overall supply chain performance of EPHARM shows that 40.65% respondents agree, 31.3% respondents neutral and 21.9% disagree that the overall supply chain performance of EPHARM are excellent.

The results for measuring customers' satisfaction of EPHARM for retail outlets are summarized as follows. 38.5% agree and 30.8% strongly agree that the products manufactured by EPHARM fulfill the needs of retail outlets in terms of quality. Also 30.8% of the respondents agree, 26.9% are neutral and 19.2% responds strongly agree that EPHARM manufacture products that fulfill their need in terms of quantity. The supply chain of EPHARM products that fulfills retail outlets need shows that most of the respondents (42.3%) are neutral on the supply chain, 26.9% are both agree and disagree on fulfilling their need. Also 42.3% disagree, 38.5% are neutral and 7.7% are disagree that the availability of all drugs manufactured by EPHARM all the time. In addition, 34.6% of

respondents agree, 26.9% of respondents disagree and19.2% of respondents are strongly agree that there are flexible payment systems by distributors.

The result of customers' satisfaction by query time shows that; 34.62% of respondents agree, 26.92% of the respondents are both neutral and disagree and 7.69% of respondents strongly disagree that those distributors deliver on-time for EPHARM products. Also it shows that 53.85% are neutral and 19.23% disagree that distributors respond quickly for customers' response when there are stock out of products. 42.31% respondents are neutral and 19.23% each respondent agree, disagree and strongly disagree regarding the distributors to notify stock out products to its products. In addition, 34.62% are neutral 26.92% respondents each agree and disagree that there are clear communication mechanism between distributors and retail outlets.

The results of after sales customer satisfaction shows that; 43.75% are neutral, 40.63% agree and 15.63% are strongly agree that EPHARM collects those products that have quality problems. Also 46.88% of respondents agree, 37.5% respondents are neutral and 15.63% respondents strongly disagree that EPHARM has clear methods for refunding or substituting those products that have quality problems. In addition, 34.38% of respondents disagree, 15.63% strongly disagree and 25% each are neutral and agree on the company's performance on the post marketing measurement of customers satisfaction on its products.

The results of overall supply chain performance of EPHARM shows: 42.3% of respondents are neutral, 26.9% agree and 23.1% are disagreeing on the overall supply chain performance of EPHARM products is excellent.

To measure the fill rate; 50.0% of respondents said the fill rates of EPHARM products are between 51-75%, 26.9% said between 26-50%, 15.4% said it is more than 75% and 7.7% said that it is below 25%. With the mean value of 2.73 with standard deviation of 0.82 the overall fill rate of EPHARM products is around 50% which is not good enough.

4.4 Conclusions

The purpose of this research is to investigate the SCM practices of Ethiopian pharmaceuticals manufacturing companies. Based on the findings the following conclusions are drawn.

The overall SCM practices of EPHARM are weak as expected due to different challenges. EPHARM has clear selection criteria to select suppliers and using the criteria to select them when there is tender. But the current practices of SCM are not in single bid forms. As stated in the literature part long term relationship with suppliers and focusing on the value chain of products are highly favored. Though there are trials with local suppliers, there is no long term relationship with major suppliers.

The company has recognized suppliers for APIs and packing materials; and their performance is known. But there was no a recorded data that compares each suppliers based on objective data like suppliers delivery performance. But recently the company starts to collect data to measure the performance of its suppliers since it is important for certification of GMP.

The order fulfillment lead time of the company is too long from 6 to 7 months in average. There are external and internal factors that contribute for long period of lead time. The internal factors are; there are no long term relationship with trusted suppliers, processing tender consume considerable amount of time and there is no well-developed information sharing system in the company. The external factors that contribute for long period of lead time are shortage of foreign currency and the transportation system to transport raw materials from suppliers to the company. Also most of the raw materials are procured from aboard. In addition, the country's infrastructure including transportation, information communication technology, and financial sector to facilitate loan and international trade and customs clearance system contributes its own share for delay of delivery of raw materials.

Based on the annual record of the company, the capacity utilization of the machines are below the standard. Especially for ampules production line, the efficiency is very low. There are different factors that contribute for low level of capacity utilization. Shortage of raw materials, capacity of the firm to convert raw materials to finished products as per the markets demand, old machines, and maintenance of machines failure due to capacity of the maintenance team contributes a lot for low level of capacity utilization.

The company has good internal information sharing between departments. It helps to decide on the annual need of raw materials, since the actual need of the raw materials are extracted. But there are gaps in collecting actual customers need from the market. Although there is marketing and sales department responsible for it, due to limited human resources the needs of the customers are not collected. Also there are gaps on-time deliveries to customers' point of use. As observed, there are no sufficient vehicles and system to delivery customers' products except for PFSA.

The company has very good system in inventory management by inventory control unit. This unit manages all raw materials in the pipeline, in process and in store. Also it determines the reorder level for each raw material. However, due to long procurement lead time of raw materials huge amount of raw materials are accumulated that will finish up to six months. Due to the huge raw materials, the inventory carrying cost is very high and major portion of the cost is due to these bulk raw materials.

As mention earlier the delivery performance of raw materials are very long. Also delivery lead time of the company is long since there is no on-time delivery, low level of response when there are stocks out of products and all the products manufacture in the company are not available all the time. In addition, the capacity utilization of the machines and maintenance of the machine contributes for long delivery lead time. Hence, due to this the overall supply chain response time of the company is too long.

Based on the analysis of the questionnaires of distributors and retail outlets; EPHARM products are very good in terms of quality. But there are interruptions of the products all the time and enough amounts of products are not produced as per the demand of the

market. Also the company lacks flexible payment system for most of its distributors. But some of the distributors of the firm arranged flexible payment system for retail outlets. Hence, the customers' service and satisfaction based on flexibility is low.

Regarding the firm's response to a customer inquiry, the company is weak to respond quickly when its products are stock out and notifying those stocks out products. Similarly the distributors are also weak in notifying retail outlets and respond to stock outs.

Due to the enforcement by the regulatory authority, for products that have quality problems, the company and distributors are responsible to collect those products. In this regard the company is very good reputation in collecting failed products and clear methods for refunding the costs of the failed products. However, due to human resource shortage of marketing and sales unit, there is weak in communication the satisfaction of their customers.

The company fills only half of the products that are demanded by the customers. Based on the above analysis and the results of the questionnaire, the overall supply chain performance of EPHARM is good considering the capacity and external factors that contributes a lot on its performance.

Generally, SCM practices are affected by internal factors such as capacity of the firm, utilization of machines capacity and very responsive to the customers need. In addition, external factors like infrastructure including transportation, information communication technology, financial sectors, and skills of pharmaceutical sectors in SCM are also its own contribution. Based on the findings, EPHARM performance is affected by both internal and external factors. So, other pharmaceutical manufacturing companies of Ethiopia are not an exception. Hence, the SCM practices of Ethiopian pharmaceuticals manufacturing companies are not strong due to both internal and external factors that affect implementation of SC strategies in the company.

4.5   Recommendations

Based on the conclusions of the study the following are recommended.

Today the pharmaceutical manufacturing focus is not only on the single company, rather the overall value chain starting from the raw materials suppliers to the ultimate customers. To be competitive, long term relationship throughout the supply chain is fundamental. EPHARM don't have long term relationship with internal suppliers. So the company selects its suppliers from those performing best currently and build long term relationship be competitive in the market

Due to different factors, the order fulfillment lead time of raw materials is too long. To reduce the order fulfillment lead time of raw materials, the company shall discuss with relevant stakeholders like banks to get foreign currency, Ethiopian shipping lines the current multimodal transport agency to facilitate transportation, and the customs authority by clearly identifying list of raw materials that are tax exempted to reduce unnecessary delay.

The company's products are accepted by the market in terms of quality, but it is not available all the time. Availing its products all the time by tackling stock out should be considered. So increasing the capacity of the firm by utilizing the machines efficiently, capacitating the maintenance team and implement preventive maintenance. Also additional production lines or substituting those production lines that failed persistently to increase production capacity.

One of the gaps identified are, the firm don't collect feedback and assess the market since it has weak marketing units. Strengthening the marketing and sales unit by recruiting additional human resources and logistics to reach its target markets to assess the customers, monitor the customers' satisfaction and market research.

The result also shows that there is no direct on-time delivery for most it's wholesalers. Since on-time deliveries to customers' point of use are preferred by most of the customers, direct on-time delivery to its customers by buying delivery vans is recommended. Also

outsourcing the delivery service for best performing transportation agents can be used others core competencies.

There are no information sharing experiences with its suppliers and distributors. Since information is vital throughout the supply chain for making decisions timely, introducing system to collect, analyze and disseminate information with its customers are vital. The information system shall be accessible and use friendly by its customers.

There are variations in performances and customers handling among distributors of EPHARM products. By collecting feedbacks from retail out lets and evaluating the performance of the distributors, best performing distributors can be selected. Hence, the firm can use the core competencies of its distributors to satisfy the need of the retail outlets.

Since there is no flexible payment system for most of its distributors, arranging flexible payment system by monitoring the liquidity of the distributors can increase its access to different segments of the pharmaceutical market.

REFERENCES

Admaw Anley, (2010). Impact of Supply Chain Management Practices on Competitive Positioning of Ethiopian Textile Firms. Unpublished Master's Thesis, University of South Africa.

Asamoah D., Abor P. and Opare M. (2011). An examination of pharmaceutical supply chain for artemisinin-based combination therapies in Ghana. Management Research Review, 34(7), 790-809.

Asamoah D., Annan J. and Nyarko S. (2012). AHP Approach for Supplier Evaluation and Selection in a Pharmaceutical Manufacturing Firm in Ghana. International Journal of Business and Management, 7(10), 50-62.

Awad H. A. and Nassar M.O. (2010). Supply Chain Integration: Definition and Challenges. Proceedings of the international multi conference of Engineers and Computer Scientist, Volume I, Hong Kong.

Bagchi P.K., Ha B.C., Skjoett-Larsen T. and Soerensen L.B. (2005). Supply chain integration: a European survey. The International Journal of Logistics Management, 16(2), 275- 294.

Ballou R.H. (2007). The evolution and future of logistics and supply chain management. European Business Review, 19(4), 332 – 348.

Belay Mengistu, (2011). Challenges of Supply Chain Management and Their Relationship with the Competitive Position of Cement Industries in Ethiopia. Unpublished Master's Thesis, University of South Africa.

Booth R. (1996). The role of supply chain re-engineering in the pharmaceutical industry. Logistics Information Management, 9(3), 4-10.

Chen I.J. and Paulraj A. (2004). Understanding supply chain management: critical research and a theoretical framework. <u>International Journal production and research</u>. 42(1), 131-163.

Chin K., Tumala V.R., Leung J.P. and Tang X. (2004). A study on supply chain management practices. The Hong Kong Manufacturing Perspective. <u>International Journal of Physical Distribution and Logistics Management</u>, 34(6), 505-524.

Cilliers W.W. and Nagel P.J. (1994). Logistics Trends in South Africa. <u>International Journal of Physical Distribution & Logistics Management</u>, 24(7), 4 – 14.

CSCMP (Council of Supply Chain Management Professionals). (2012). <u>CSCMP Supply Chain Management Definitions.</u> To access the definitions, go to http://cscmp.org/aboutcscmp/definitions.asp (accessed 10-08-2012).

Dereje Asfaw, (2012). Impact of Supply Chain Management Practices on the organizational Performance of basic metal and engineering industries in Ethiopia. Unpublished Master's Thesis, University of South Africa.

EPA (Ethiopian Pharmaceutical Association), (2011). Ethiopian Pharmaceutical Association Annual Conference Proceeding Report, Addis Ababa, Ethiopia.

FMOH (Federal Ministry of Health) and World Health Organization, (2003). Assessment of the pharmaceutical sector in Ethiopia, Addis Ababa, Ethiopia.

Guansekeran, A., Patel, C. and Tirtiroglu, E., (2001), Performance measures and metrics in a supply chain environment. <u>International Journal of Operations and Production Management</u>, 21, 71–87.

Heizer J. and Render B. (2011). <u>Operation Management</u>, Global Edition, 10th ed. New Jersey, USA, Prentice Hall Inc.

Israel, GD. (2009). Sampling the Evidence of Extension Program Impact. Program Evaluation and Organizational Development, IFAS, University of Florida. PEOD-6.

Kannan V. and Tan KC. (2005). Just in time, total quality management, and supply chain management: understanding their linkages and impact on business performance. The international journal of management science, 33, 153-162.

Kim S.W. (2006). Effects of supply chain management practices, integration and competition capability on performance. Supply Chain Management: An International Journal, 11(3), 241 – 248.

Kotler P. (2000). Marketing Management, Millenium Edition. 10th ed., Boston, USA, Pearson Custom Publishing..

Lambert DM., and Cooper MC. (2000). Issues in Supply Chain Management. Industrial Marketing Management, 29, 65-83.

Lancaster S., Yen D.C. and Ku C. (2006). E-supply chain management: an evaluation of current web initiatives. Information Management and Computer Security, 14(2), 167 – 184.

Leavy B. (2006). Supply chain effectiveness: strategy and integration. Handbook of Business Strategy, 7(1), 331- 336.

Lummus R.R. and Vokurka R.J. (1999). Defining supply chain management: a historical perspective and practical guidelines. Industrial Management and Data Systems, 99(1), 11 – 17.

Lurquin, M.G. (1996). Streamlining the supply chain in the pharmaceuticals industry. Logistics Information Management, 9(6), 6-10.

McMullan A. (1996). Supply chain management practices in Asia Pacific today". International Journal of Physical Distribution & Logistics Management, 26(10), 79 – 95.

Mesfin Berhane, (2007). Model Development of Supply Chain Management System: A case study of Mesfin Industrial Engineering PLC. Unpublished Master's Thesis, Addis Ababa University.

Msimangira K.A. (2003). Purchasing and supply chain management practices in Botswana. Supply Chain Management: An International Journal, 8(1), 7 – 11.

PFSA (Pharmaceutical Fund and Supply Agency), (2012). Standard Operating Procedures Manual for the Pharmaceuticals Logistics Systems in Health Facilities of Ethiopia, PFSA, Ethiopia.

Power D. (2005). SCM integration and implementation: a literature review. Supply Chain Management, An International Journal, 10 (4), 252 – 263.

Rushton A., Oxley J. and Croucher P. (2000). The Handbook of Logistics and Distribution Management, second ed. Glaskow, Bell and Bain Ltd.

Simichi-Levi. D., Kaminiski P. and Simichi-Levi E. (2008). Designing and Managing the Supply Chain, Concepts, strategies and case studies, 3rd ed. Boston, USA, McGraw-Hill Irwin publisher.

Sutton J. and Kellow N. (2010). An Enterprise Map of Ethiopia. London UK, International growth center.

Tan, KC. (2001). A framework of Supply Chain Management Literature. European Journal of Purchasing and Supply Management, 7(1), 39-48.

UNCTAD (United Nations Conference on Trade and Development). (2011a). Investment in Pharmaceutical Production in the Least Developed Countries, A Guide for Policymakers and Investment Promotion Agencies. UN, Geneva.

UNCTAD (United Nations Conference on Trade and Development). (2011b). Local Production of Pharmaceuticals and Related Technology Transfer in Developing Countries: A Series of Case Studies by the UNCTAD Secretariat. UN, Geneva and New York.

Voordijk H. (1999). Obstacles and preconditions for logistics and manufacturing improvements in Africa - a case study. International Journal of Operations & Production Management, 19(3), 293 – 307.

World Bank, (2009). Ethiopia Improving Health Systems, Public sector Health care supply chain Strategic network analysis and Design, Driving Service improvements through supply chain excellence, The World Bank, Ethiopia.

Zailani S. and Rajagopal P. (2005). Supply chain integration and performance: US versus East Asian companies. Supply Chain Management: An International Journal, 10(5), 373-393.

APPENDIX

Appendix A: Interview questions for Technical manager and marketing and sales division head of EPHARM

Welcome!

First of all I would like to thank all of you for your willingness to participate in the focused group discussion by scarifying your precious time.

I am Wondimieneh Sewuye a final year master of business administration (MBA) student at St. Mary's University College, School of Graduate Studies. I am conducting a research on my final thesis entitled "Supply Chain Management Practices in Ethiopian Pharmaceuticals Manufacturing Share Company".

The purpose of this study is to investigate the practices of the supply chain management of your company. Since you are experts of the company, your ideas and information are crucial for the research. The information you are giving will be used for the partial fulfillment for the master's thesis.

This research addresses the supply chain management practices of Ethiopian pharmaceutical manufacturing share company. Supply chain management is get higher attention by different firms since it is used by different firms as one of the core competencies. So this discussion mainly focuses on the supply chain management practices of your company.

1. How can you explain the overall supply chain management practices of the company?
2. How do you select the supplier of raw materials for manufacturing pharmaceuticals?
3. What are the major factors that affect raw materials availability?
4. How do you measure the utilization of the production capacity of the available machines?

5. What are the major factors the decreases the utilization of the capacity of production in the company?

6. What are the inventory management across pharmaceutical supply chain?

7. Do you have backward integration to suppliers and forward integration to distributors or wholesalers as a long term strategically?

8. What are the parameters affecting the total supply chain response time from getting raw materials to use of the products by the customers?

9. Do you have an experience sharing best experiences in the area of supply chain management from benchmark pharmaceutical companies?

10. What are the supply chain management problem faced so far with suppliers and distributors?

11. What are the recommendations or possible solution to solve such challenges raised so far?

12. Is there anything you need to say regarding the supply chain management practices of the company?

With this I think, we will wind up the discussion and thanks once again for your active participation, sharing your experiences and the recommendations for the challenges.

Appendix B: Interview questions for procurement division head

1. Tell us how do you select the suppliers of the raw materials for active ingredients?
2. Do you have long term business relationship with suppliers or in tender basis?
3. How do you measure the performance of the suppliers?
4. What are the delivery performances of the raw materials for the major suppliers?
5. What are the factors that affect the delay of raw materials from suppliers' side?
6. What are other external factors affecting to raw materials availability?
7. What measures are taking by the company to solve such challenges?
8. How do you measure order fulfillment lead time for raw materials?
9. Is there anything you would like to say regarding the suppliers relationship with your company?

Thanks very much for giving such information and the expertise opinion. It will help a lot for getting the supply chain management practices of suppliers.

Appendix C: Questionnaire for distributors

Company Profile

Name of the company:	
Name and address of the contact person	
Name:	
Title in the company:	
Work experience:	
Telephone address: (optional)	
Email Address:	
Date:	

i. Instruction

The questionnaire is designed in Likert scale in five levels. Please select either one of the choices based on your evaluation. Please circle your answers on the box accordingly from number 1 -5. Each number designates the following meanings.

1. Strongly agree:
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree

ii. Questionnaire

Questions	Ratings				
1. The products manufactured by EPHARM fulfills your need in terms of quality	1	2	3	4	5
2. The products manufactured by EPHARM fulfills your need in terms of quantity	1	2	3	4	5
3. The company notify the list of products in the stock for your company regularly	1	2	3	4	5
4. All drugs produced by the company are available all the time	1	2	3	4	5
5. The manufacturer has arranged flexible payment system	1	2	3	4	5
6. The company delivers on-time directly to customer's point of use	1	2	3	4	5
7. It responds quickly on the customers response if the drugs are stock out	1	2	3	4	5
8. It notify stock out products timely for its customers	1	2	3	4	5
9. There is clear mechanism of communication used by the company to inform its customers	1	2	3	4	5
10. It collects those products that have quality problems timely	1	2	3	4	5
11. It has clear methods for refunding or substituting products having quality problems	1	2	3	4	5
12. The company contacts with customers to measure customers satisfaction on its products	1	2	3	4	5
13. Overall supply chain performance of EPHARM with your organization is excellent	1	2	3	4	5

14. Please list the gap identified in supply chain management practices of EPHARM

15. What do you recommend to solve such gaps

Appendix D: Questionnaire for Retail outlets

Questions	Ratings				
1. The products manufactured by EPHARM fulfills your need in terms of quality	1	2	3	4	5
2. The products manufactured by EPHARM fulfills your need in terms of quantity	1	2	3	4	5
3. The supply chain that you get EPHARM's products are fulfills your need	1	2	3	4	5
4. All drugs produced by the company are available all the time	1	2	3	4	5
5. The distributors has arranged flexible payment system for EPHARM products	1	2	3	4	5
6. The distributors delivers on-time directly to customer's point of use for EPHARM products	1	2	3	4	5
7. Distributors responds quickly on the customers response if the EPHARM products are stock out	1	2	3	4	5
8. Distributors notify stock out products of EPHARM timely for its customers	1	2	3	4	5
9. There is clear communication mechanism used by the distributors to inform its customers	1	2	3	4	5
10. It collects those products that have quality problems	1	2	3	4	5
11. The distributors have clear methods for refunding or substituting products having quality problems	1	2	3	4	5
12. EPHARM contacts the end users to get feedback	1	2	3	4	5
13. Overall supply chain performance of EPHARM with your organization is excellent	1	2	3	4	5

14. What are the overall fill rates of EPHARM products?

a. Below 25%	b. 26%-50%	c. 51%-75%	d. More than 75%

15. Please list the gap identified related to supply chain management of EPHARM products

16. What do you recommend to solve such challenges?

Thanks very much for giving your time to fill the questionnaire.

DECLARATION

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of Dr. Matiwos Ensermu. All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

_____   _____

Name   Signature

St. Mary's University College, Addis Ababa   April 2013

ENDORSEMENT

This thesis has been submitted to St. Mary's University College, School of Graduate Studies for examination with my approval as a university advisor.

_____   _____

           Advisor   Signature

St. Mary's University College, Addis Ababa   April 2013