ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES

ASSESSMENT ON SUPPLY CHAIN MANAGEMENT PERFORMANCE: THE CASE OF POPULATION SERVICE INTERNATIONAL/ETHIOPIA

BY

SAMUEL FIKRU

SEPTEMBER 2013
ADDIS ABABA, ETHIOPIA

ASSESSMENT ON SUPPLY CHAIN MANAGEMENT PERFORMANCE: THE CASE OF POPULATION SERVICE INTERNATIONAL/ETHIOPIA

BY

SAMUEL FIKRU

A THESIS SUBMITTED TO ST. MARY'S UNIVERSITY, SCHOOL OF GRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION

SEPTEMBER 2013
ADDIS ABABA, ETHIOPIA

ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES
FACULTY OF BUSINESS

ASSESMENT ON SUPPLY CHAIN MANAGEMENT PERFORMANCE: THE CASE OF POPULATION SERVICE INTERNATIONAL/ETHIOPIA

BY

SAMUEL FIKRU

APPROVED BY BOARD OF EXAMINERS

_____   _____
Dean, Graduate Studies   **Signature& Date**

_____   _____
Advisor   **Signature & Date**

_____   _____
External Examiner   **Signature & Date**

_____   _____
Internal Examiner   **Signature & Date**

TABLE OF CONTENTS

ACKNOWLEDGEMENT

ACRONYMS

AHP	Analytic hierarchy process
COGS	Cost of Goods Sold
DCP/STI	Demand Creation and Promotion /Sexually Transmitted Infection
ERP	Enterprise Resource Planning
FDRE	Federal Democratic Republic of Ethiopia
FMOH	Federal Minstry of Health
GIN	Good issuance Voucher
GRN	Good Receiving Voucher
HCs	Health Centers
HPs	Hospitals
HSDP	Health Sector Development Program
IIPs	International Implementing Partners
LIPs	Local Implementing Partners
MAP	Measurement Availability Performance
MOH	Ministry of Health
NGO	Non Governmental Organizations
NHP	National Health Policy
PCP	Preventive Care Package
PFSA	Parmaceutical Fund Supply Agency
PO	Purchase order
PSIE	Population Service International Ethiopia
SAP	System Application Product
SC	Supply Chain
SCC	Supply Chain Council
SCM	Supply Chain Management
SCMS	Supply Chain Management System
SCOR	Supply chain operations reference model
SCPMS	Supply Chain Performance Measurement System
SPSS	Statistical Package for Social Science
STD	Sexually Transmitted Diseases
USAID	United States Aid for International Development
VMI	Vendor-managed inventory
WHO	World Health Organization

List of Tables

List of Figures

ABSTRACT

Supply chain management (SCM) is a key strategic factor for increasing organizational effectiveness and for better realization of organizational goals. In view of that, Supply chain performance measurement (SCPM) provides insight to reveal the effectiveness of strategies and to identify potential opportunities and improve overall performance.

The purpose of this research is to measure the performance level of the supply chain management of Population Service International Ethiopia (PSIE). The emphasis is on performance measures dealing with suppliers' relationship management, delivery performance, Warehouse and Inventory management, distribution and customer service. In developing the measures, an effort has been made to align and relate them to customer satisfaction. The research used an explanatory research design in which both qualitative and quantitative methods of analysis were applied.

It has been found that the structure of the SC and achievements towards social marketing are functions where the organization performed better. Performance gaps were seen with regard to supplier relationship, delivery, warehouse and inventory management and customer service. This resulted in customer dissatisfaction and consequently a lower product demand. The findings drive to a conclusion that the supply chain management of the organization is weak. Where by Implementtetion of Supplier selection criteria, Adequate supplier relationship management, Operational restructuring and Mobilization of resources, building interdepartmental integration were among the recommendations given to improve the performance level.

Key words: *Performance measurement, PSIE, Supply chain management*

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The development and functioning of Supply Chain (SC) have become important subjects for organizational decision makers. According to Chow D. and Heaver T. (1999), Supply Chain is the group of manufacturers, suppliers, distributors, retailers and transportation, information and other logistics management service providers that are engaged in providing goods to consumers. A Supply Chain comprises both the external and internal associates for the corporate. Supply chain refers to the organization's networks that are involved in the diverse processes and activities that generate value in the form of goods and services in the hands of the end customer (Christopher, 1998). It requires close integration of internal operational within corporate and efficient relationships with the external functions of members in the Supply Chain (Hau and Billington, 2000).

Supply Chain management (SCM) is the strategic and efficient coordination of the conventional business functions and the strategies across these business functions within a specific corporate and across businesses within a supply chain, for the aims of developing the long-term performance of the corporate and the supply chain as an entire. (Christopher, 1998)

SCM is aimed at examining and managing Supply Chain networks. The rationale for this concept is the opportunity (alternative) for cost savings and better customer service. An important objective is to improve an organizational competence in spite of challenging external forces and promptly changing customer needs.

The concept of SCM requires measuring overall supply chain performance rather than just the performance of the individual chain members. It is the combined performance of the supply chain, the final outcome of the efforts of all integrated members that is of greatest importance from a measurement perspective. Although measures of supply chain performance differ in terms of individual indicators employed, virtually all have one overriding focus continuous improvement of end customer service (Kulkarni and Khot, 2012).

Neely, Gregory and Platts (1995) define performance measurement as the process of quantifying the effectiveness and efficiency of action. Effectiveness is the extent to which a customer's requirements are met and efficiency measures how economically a firm's resources are utilized when providing a pre-specified level of customer satisfaction. Performance measurement systems are described as the overall set of metrics used to quantify both the efficiency and effectiveness of action.

Timely and accurate assessment of overall system and individual system component performance is paramount. An effective performance measurement system (1) provides the basis to understand the system, (2) influences behavior throughout the system, and (3) provides information regarding the results of system efforts to supply chain members and outside stakeholders. In effect, performance measurement is the glue that holds the complex value-creating system together, directing strategic formulation as well as playing a major role in monitoring the implementation of that strategy. (Kulkarni & Khot, 2012)

The Ethiopian health care delivery system is guided by a National Health Policy (NHP) which was issued in September 1993 and a Health Sector Development Program (HSDP) as of 1990 E. C. (1997/ 98 G. C.). According 2001/ 2002 G.C estimate, $60 - 80\%$ of the health problems of the country are due to infectious and communicable diseases and nutritional problem. The Ministry of Heath is the major provider of health care followed by the private sector, Non−Governmental Organizations (NGOs) and other governmental organizations. (FDRE MOH &WHO, 2003) Focusing on preventing the major public health issues, PSI Ethiopia is among the NGOs supporting the improvement of the nation's health care delivery.

PSI is the largest social marketing organization in the world. Founded in 2003, PSI Ethiopia (PSIE) gas been implementing national results based programs on HIV/AIDS, child survival and malaria. These programs are creating realistic opportunities for both private and public sector. PSIE provides life treating products, clinical services and behavior change communications that help Ethiopia's most vulnerable lead healthier lives. By having international and local suppliers which are managed by donors PSIE has its own supply chain management for its program/ project based products.

This paper will investigate the performance of supply chain management in PSI/E based on measurement variables from Gunasekaran, Patel and McGaughey (2004) performance measures and metrics in supply chain.

1.2 Statement of the Problem

The measurement of the supply chain is become essential today. The analysis based on this measurement is also a critical task. The measurement along with criteria has to be done & then it has to be observing that whether every parameter is meeting with target or not (Kulkarni & Khot, 2012).

According to PSI/E mission, being one of the partners for MOH in the area of health care delivery, has been implementing national programs focusing on the same area particularly on prevention. That is an important part of the National Health Policy (NHP). The organization has its own partners for furthering and enhancing its mission and also to maximize the collective efforts.

The organizational document indicates that the programs currently under implementation are, HIV/AIDS, Mitigate, Understand, Leverage and Unite/ Most at risk populations (MULU/MARPs), Community Outreach and Social Mobilization (COSM), Demand Creation and Promotion for effective Sexually Transmitted Infection services (DCP/STI), TransAction, Child survival. These are responsible for targeting promote HIV prevention, increasing correct and consistent use of male condoms, increase adoption of HIV risk reducing behaviors, increase demand creation for quality STI prevention products, producing and distribution of Pre-Packed STI kits, delivering safe water system, salt iodization and de-worming respectively.

Structurally the supply chain department is responsible for the overall programs' product needs and accurate supply management. For that matter, each project will be functioning as per the expectation for the entire organizational goal.

In line with PSI/E's operational guideline, the organization has its own global and local suppliers which are financially and technically managed by its donors. Since the programs are donor specific there no supplier selection criteria implemented by PSIE function for global ones, rather following a pre-designed plan by the donors itself. This affects the

organization to look for better suppliers by applying criteria and specific selection procedures than being dependent on some specific suppliers. This intern has come with an effect on a product delivery or lead time irregularities, product qualities and packaging and Inventory management.

With regard to the local suppliers/Manufacturers since they paid an initial investment for some organizational arrangements, they are tied up with sunk costs which they claim they don't want to lose that paid up. That keeps them not to look for other possible alternatives.

Suppliers play an important role in achieving the objectives of the supply management. Thus, it is clear that supply selection is a problem that cannot be easily overlooked as the purchasing department's ability to contract the best suppliers for the organization could lead to significant cost reductions (David, Jonathan and Samuel, 2012).

According to the interview held with the supply chain manager during the study, most of the order management is done through these donors. These contribute for the order management and administrative procedures to be long enough to affect the supply management specifically the lead time. Consequently, the total cycle time will be affected. The shipment of products is done by transport companies guided by an agreement done with the organization. But there are managerial challenges to handle the activities based on the agreement.

Inline with above interview, the warehouse management specifically inventory management is influenced by the interests of the program units. Since most of the programs are project oriented they resulted in an increase of inventory caring cost. There are products and promotional materials with a very slow flow and none moving at all. Moreover, the kit production is done by external contractors but in organizations warehouse that result in additional managerial work for the warehouse management.

PSI/E SCM Manual shows that the organization is using direct and indirect distribution system. Directly by its own sales team and transport and indirectly by partner organizations, Key trade distributers and pharmaceutical wholesalers. In both arrangements they are using a centralized structure to manage the distribution. The organization has been implementing a reverse logistic for near expiry and expired items. There is no adequate technical support

delivery for the final organizational customers and management of feedback on after service delivery and after sales activity.

There are challenges in creating demand and promotional activities, distribution management, product delivery, customer order management and a customer satisfaction as well. In a Measurement Availability Performance (MAP) Study done on 2011 Evaluating the Availability of preventive care package (PCP) in Market outlets, on average it accounts more than 62% for the reason concluded as Insufficient Demand for such products.

1.3 Basic Research Questions

With reference to the purpose of the study, this paper tries to analyze the performance of the supply chain management in PSI/E. Thus, to be able to evaluate the practice in the supply chain there is a structured approach, and in doing so the entire theme of the paper try to answer the following basic questions:

- What are the performance metrics/ standards applied against the SCM performance in the organization?
- How are the supplier selection procedures implemented and the characteristics of integration?
- What is the delivery performance level of the suppliers?
- What are the difficulties in Inventory management?
- How the customer order management handled and what are the factors responsible for operational challenges?
- How is the level of variation of order lead time and other related factors affecting demand and customer satisfaction level?

1.4 Objective of the Study

1.4.1 General Objective

The general objective of this study is to examine the performance of the supply chain management practices of PSI/E.

1.4.2 Specific objectives

The study will try to look specifically into the following objectives:

- ⊕ Evaluate performance metrics/ standards applied against the SCM performance in the organization?
- ⊕ To examine the nature of supplier selection procedure and the characteristics of integration
- ⊕ To assess the level of delivery performance of the suppliers
- ⊕ To measure factors associated with difficulties in Inventory management
- ⊕ To explore the handling of customer order management and the factors responsible for operational challenges
- ⊕ To look in to the level of variation of order lead time and other related factors affecting demand and customer satisfaction level

1.5 Definition of key terms

Conceptual:

Supply chain: Supply Chain is the group of manufacturers, suppliers, distributors, retailers and transportation, information and other logistics management service providers that are engaged in providing goods to consumers (Chow, Heaver and Henriksson, 1999)

Supply chain Management: Supply Chain Management (SCM) is the strategic and efficient coordination of the conventional business functions and the strategies across these business functions within a specific corporate and across businesses within a supply chain. (Christopher, 1998)

Operational:

Performance Measurement: Evaluation of the practice's of supply chain management of PSI/E with regard to general and organizational standards

Product: Items marketed and distributed by PSI/E through the implemented programs.

Customer satisfaction: A level of performance measurement towards the PSI/E's social marketing activity based on flexibility, order fulfillment lead time and post delivery service.

TransAction: A USAID project to produce and distribute pre-packed sexually transmitted infections treatment kits and condoms.

Supplier Selection Criteria: Supplier selection criteria refer to a set of standard that a selection panel considers when assessing and evaluating suppliers. Selection criteria reflect the competencies to ensure that the suppliers have the capabilities to fulfill the organization needs.

1.6 Significance of the Study

In any organization there is always a need of improvement in every department & system. The extent of improvement is decided by the performance of that department or system. Thus it is important to measure the performance of supply chain as a system for its improvement.

The performance measurement enables the organization to plan, measure & control its performance according to its predefined strategy. The performance measurement should consider the efficiency & effectiveness of supply chain. The purpose of performance measurement is not only to know the system is performing but also to enable it to perform better. The ultimate aim of implementing the performance measurement system is to find out loop holes in the system & root causes of that & finally to improve the performance.

In recent years, a number of firms realized the potentials of SCM. However, they often lack the insight for the development of effective performance measures and metrics needed to achieve a fully integrated supply chain. Moreover, such measures and metrics are needed to

test and reveal the viability of strategies without which a clear direction for improvement and realization of goals would be highly difficult. (Hau and Billington, 1992)

Evaluating the performance of SCM of PSIE will benefit the organization by

- ⊕ Providing the basis to understand the system
- ⊕ Influences behavior throughout the system
- ⊕ Provides information regarding the results of SC system efforts, which are used currently by supply chain members and outside stakeholders.
- ⊕ In effect, performance measurement will give valuable information to organizational decision makers, and it will be used to improve the supply chain management practices.

1.7 Delimitation/Scope of the Study

The study is conducted following an official acceptance for the request made to do the research. It was a comfortable environment to get records, conduct the interview and held a discussion. But at the middle of the study it was not possible to get data from finance concerning inventory holding cost. In addition, permission was not given to visit the local supplier. Those limit the study not to measure the volume of the inventory holding cost and its implications on the performance of the SCM.

The study will be focusing on the supply chain management performance of PSI/E. Due to limited capability of the researcher; the performance measurement from the external environment of the SCM will be specifically focusing in Addis Ababa area. The final consumers also will not be included in the study because of the applied methodology and capacity. Moreover, with a justification of time constraint the variables under consideration were limited to supplier relationship management, order management, delivery performance, warehouse and Inventory management, distribution and customer satisfaction.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Overview of Supply Chain and Supply Chain Management Performance

The advancement and operational of Supply Chain (SC) have become important subjects for organizational decision makers. Supply Chain management (SCM) is the strategic and efficient coordination of the conventional business functions and SCM is aimed at examining and managing Supply Chain networks (Christopher, 1998).

The concept of SCM requires measuring overall supply chain performance rather than just the performance of the individual chain members. It is the combined performance of the supply chain, the final outcome of the efforts of all integrated members that is of greatest importance from a measurement perspective. Although measures of supply chain performance differ in terms of individual indicators employed, virtually all have one overriding focus continuous improvement of end customer service (Kulkarni and Khot, 2012).

Neely, Gregory and Platts (1995) define performance measurement as the process of quantifying the effectiveness and efficiency of action. Effectiveness is the extent to which a customer's requirements are met and efficiency measures how economically a firm's resources are utilized when providing a pre-specified level of customer satisfaction. Performance measurement systems are described as the overall set of metrics used to quantify both the efficiency and effectiveness of action.

2.1.1 Supply Chain

There are quite a number of definitions given by different scholars and practitioners. The development and functioning of Supply Chains have become important subjects for organizational decision makers. Some of the definitions that have been investigated for the intention of academic research are as follows:

According to Chow, Heaver and Henriksson (1999) Supply Chain is the group of manufacturers, suppliers, distributors, retailers and transportation, information and other

logistics management service providers that are engaged in providing goods to consumers. A Supply Chain comprises both the external and internal associates for the corporate.

Ayers (2001) defines Supply Chain as life cycle processes involving physical goods, information, and financial flows whose objective is to satisfy end consumer requisites with goods and services from diverse, connected suppliers

Bridgefield Group (2006) defines Supply Chain as "a connected set of resources and processes that starts with the raw materials sourcing and expands through the delivery of finished goods to the end consumer".

According to the definition of Little (1999) Supply Chain is "the combined and coordinated flows of goods from origin to final destination, also the information flows that are linked with it".

Pienaar (2009) defines Supply Chain as "a general description of the process integration involving organizations to transform raw materials into finished goods and to transport them to the end-user".

The above definitions centralize on the core determinants of an effective Supply Chain. They connote the need for a

Provenance and a destination within which goods flow and accept the approach that overall Supply Chains start with resources (raw materials), combine a number of value adding activities and finish with the transfer of a finished goods to consumers.

2.1.2 Supply Chain Management

Supply Chain management is aimed at examining and managing Supply Chain networks. The rationale for this concept is the opportunity (alternative) for cost savings and better customer service. An important objective is to improve a corporate competitiveness in the global marketplace in spite of hard competitive forces and promptly changing customer needs.

"Alberta future centre" asserts that Supply Chain Management (SCM) is the act of optimizing activities across the Supply Chain. Ayers (2001) reported that Supply Chain

management is the maintenance, planning, and Supply Chain processes activity for the satisfaction of consumers needs.

According to Christopher (1998) supply chain refers to the organizations network that are involved in the diverse processes and activities that generate value in the form of goods and services in the hands of the end customer. Supply Chain Management (SCM) is the "strategic and efficient coordination of the conventional business functions and the strategies across these business functions within a specific corporate and across businesses within a supply chain, for the aims of developing the long-term performance of the corporate and the supply chain as an entire.

2.1.3   Measuring Supply Chain performance and Evaluation

It has been argued that measuring SC performance can facilitate a greater understanding of the SC, and improve its overall performance (Chen and Paulraj 2004). To attain this SC wide performance measurement initiative would seem most appropriate (Gunasekaran *et al*., 2004). Therefore, there is an emerging requirement to focus on the performance of the SC or network in which company is a partner. Supply chain performance measurement system (SCPMS) can facilitate inter-understanding and integration among the SC members. It also provides insight to reveal the effectiveness of strategies and to identify potential opportunities. It makes an indispensable contribution to decision making in SCM, particularly in re-designing business goals and strategies, and re-engineering processes. Moreover, the ways and means of accurately measuring SC performance is perceived as important field of research for both organizations and academics alike.

For effective performance measurement and improvement, measurement goals must represent organizational goals and metrics selected should reflect a balance between financial and non-financial measures that can be related to strategic, tactical and operational levels of decision making and control (Gunasekaran *et al*., 2004) suggested that effective SC administration requires a proactive management style focused on long-term continuous improvement of the SC. Performance measures that accurately reflect SC operations are required to support continuous improvement within a SC. Doing so requires the adoption of performance metrics that accurately measure the SC as a whole. The role of these measures and metrics in the success of an organization cannot be overstated because they affect

strategic, tactical and operational planning and control. Performance measurement and metrics have an important role to play in setting objectives, evaluating performance, and determining future courses of actions (Gunasekaran *et al*., 2004).

Bowersox & Closs (2006) states three objectives for developing and implementing performance measurement systems: to monitor historical system performance for reporting, to control ongoing performance so that abnormal processes may be prevented, and to direct the personnel's activities. A conceptual framework for measuring the strategic, tactical and operational level performance in a supply chain is proposed in (Gunasekaran *et al*., 2004), in which performance measures on warehousing and inventory in a SCM was emphasized.

Chan & Qi (2007) identified an activity-based approach for mapping and analyzing the practically complex supply chain network. Which can be regarded as a primary step on measuring the performance of processes? Lohman, Fortuin and Wouters (2008) points out that by means of local key performance indicators (KPIs), the measurement scheme should be developing at an organization-wide scale. Niemi, Huiskonen and Karkkainen (2009) indicates the warehousing processes and assesses the related management practices, in order to achieve the objective of improving the warehousing practices and adopting more sophisticated warehousing techniques supported by knowledge sharing. In addition, trade-off phenomenon on variable settings is a crucial aspect in the process oriented supply chain.

2.1.4   Why Measure Performance?

There are a number of reasons for measuring and evaluating supply chain activity and performance. And below are from among the benefits of the performance measurement. (Monczka, Handfield, Giunipero and Patterson, 2009).

Support Better Decision Making:

Measurement can lead to better decisions by making performance and results visible. It is difficult to develop performance improvement plans without understanding the areas in which performance falls short. Measurement provides a track record of purchasing performance over time and directly supports decision-making activity by management.

Support Better Communication:

Performance measurement can result in better communication across the supply chain, including within purchasing, between departments, with suppliers, and with executive management. For example, a purchaser must clearly communicate performance expectations to suppliers. The measures that quantify supplier performance reflect a purchaser's expectations.

Provide Performance Feedback:

Measurement provides the opportunity for performance feedback, which supports the prevention or correction of problems identified during the performance measurement process. Feedback also provides insight into how well a buyer, department, team, or supplier is meeting its performance objectives over time.

Motivate and Direct Behavior:

Measurement motivates and directs behavior toward desired end results. A measurement system can accomplish this in several ways. First, the selection of performance categories and objectives indicates to purchasing personnel those activities that an organization considers critical. Second, management can motivate and influence behavior by linking the attainment of performance objectives to organizational rewards, such as pay increases. (Monczka *et al*., 2009)

2.2 Supply chain performance from the perspective of social marketing in public health

The term social marketing was first coined by Kotler and Zaltman (1971) to refer to the application of marketing to the solution of social and health problems. The expansion of the marketing concept combined with a shift in public health policy towards disease prevention began to pave the way for the development of social marketing.

During the 1960s, commercial marketing technologies began to be applied to health education campaigns in developing countries. In 1971, Kotler and Zaltman published their seminal article in the Journal of Marketing *'Social marketing: an approach to planned social change'*. This was the first time the term "social marketing" had been used and is often heralded as its birth. (Ling, Franklin, Lindsteadt and Gearion, 1992)

They defined social marketing as *"the design, implementation and control of programs calculated to influence the acceptability of social ideas and involving considerations of product planning, pricing, communication, distribution and marketing research."*

2.2.1 Organizational objective of social marketing

Social change is a messy process and not the purposeful action of an architect. It is the synergy of efforts of multiple change agents. Many practitioners believe that permanent, large-scale behavior change is best achieved through changing community norms, a process that can require time and patience.

For organizations like PSI which practice social marketing merely for the development of the society's public health concerns, it is vital to adequately address the management and implications effective supply chain. Handling the supply chain management operation will help to answer the ten strategic questions of social marketing.

There are ten strategic questions that you can use to help work toward an initial marketing plan. These are:

1. What is the social [or health] problem I want to address?

2. What actions do I believe will best address that problem?

3. Who is being asked to take that action? (Society)

4. What does the audience want in exchange for adopting this new behavior?

5. Why will the Society believe that anything we offer is real and true?

6. What is the competition offering? Are we offering something the Society wants more?

7. What is the best time and place to reach members of our Society so that they are the most disposed to receiving the intervention?

8. How often, and from whom, does the intervention need to be received if it is to work?

9. How can I integrate a variety of interventions to act, over time, in a coordinated manner, to influence the behavior?

10. Do I have the resources to carry out this strategy alone; and if not, where can I find useful partners? (Turning Point National Program, 2007)

> *Social marketing is critical because it looks at the provision of health services from the viewpoint of the consumer. "Sure, we're all smart. We're program planners. We know what we're doing. But we have to listen. That's what is critical in a social marketing effort."*

(Jewel C. Love, Vice President) MEE Productions, Inc. (produces materials for public health campaigns) pp.86

2.2.2   Four criteria of a good supply chain strategy

The configuration components—operations strategy, channel strategy, outsourcing strategy, customer service strategy, and asset network—are the fundamental building blocks of your supply chain strategy. However, to drive forward your strategic business objectives and really gain a competitive edge, these components and the choices you make about each one must be

- Aligned with your business strategy
- Aligned with your customers' needs
- Aligned with your power position (your influence)
- Adaptive, because competitive advantage is temporary and market conditions change

These four criteria may sound elementary, but few companies actually follow them. In fact, the practice of developing and managing a supply chain strategy is not widespread. Many of our clients over the years have had only the most rudimentary supply chain strategy process in place, indicating that these concepts are either not well understood or difficult to implement. Let's examine them one by one (Chohen and Rouseel, 2009).

2.3   Supplier Relationship Management

2.3.1   The Supplier Evaluation and Selection Process

Supplier selection is widely recognized as the most important responsibility of the supply chain management and specifically the purchasing function. Because the organization's suppliers can affect the price, quality, delivery reliability and availability of its products. Organizations' aim that proper supplier selection would help to reduce product and material costs while maintaining a high level of quality and after-sales services (Monczka *et al*., 2009). Therefore, an efficient supplier selection process needs to be in place for the successful supply chain management.

Most purchasing experts will agree that there is no one best way to evaluate and select suppliers, and organizations use a variety of different approaches. (Monczka *et al*., 2009)

Regardless of the approach employed, the overall objective of the evaluation process should be to reduce purchase risk and maximize overall value to the purchaser. An organization must select suppliers it can do business with over an extended period. The degree of effort associated with the selection relates to the importance of the required good or service. Depending on the supplier evaluation approach used, the process can be an intensive effort requiring a major commitment of resources (such as time and travel). This section addresses the many issues and decisions involved in effectively and efficiently evaluating and selecting suppliers to be part of the purchaser's supply base.

Table 2.1 critical steps involved in the supplier evaluation and selection process
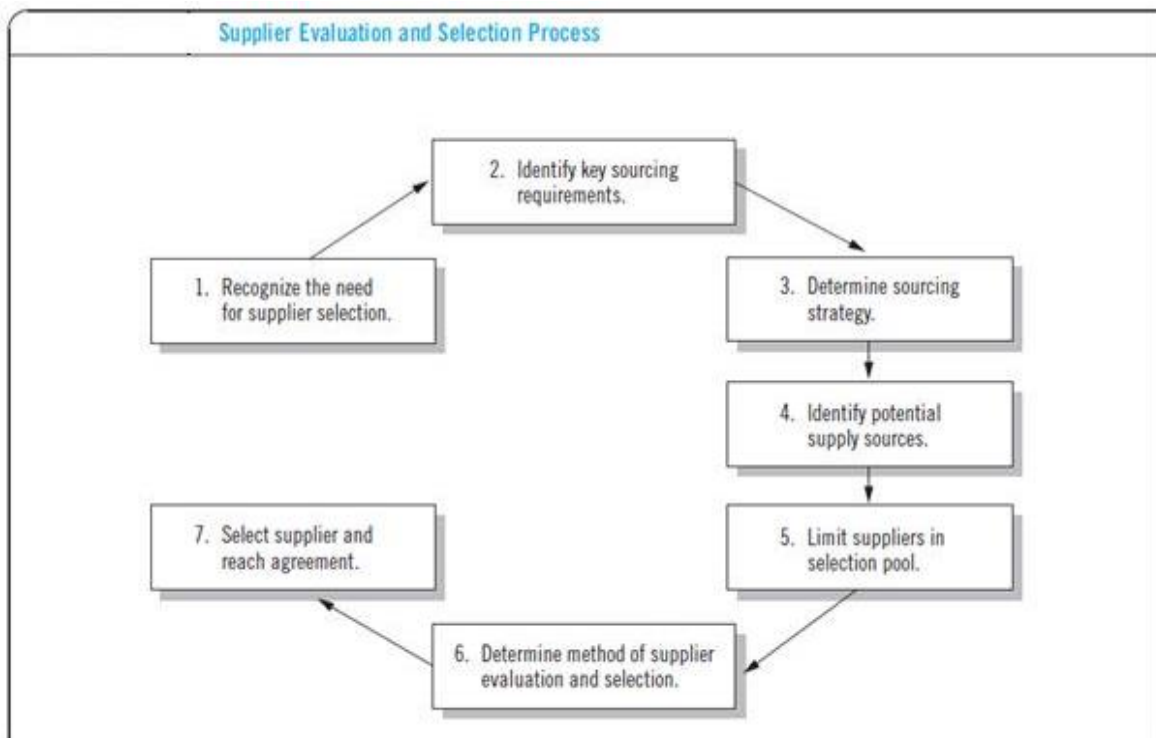
Source: (Monczka *et. al 2009*) *Purchasing and Supply Chain Management, 2009, 4th edition*

In order to achieve a desired mutual goal both the buyer and the supplier have to design and implement a constructive relationship management standards. The buying firm should continuously monitor the performance of suppliers based on predetermined and agreed-upon criteria such as quality, delivery performance, and continuous cost improvement. And there should be a plan in place to manage any conflicts that occur with suppliers. (Monczka *et al.,* 2009).

2.3.2 Supplier selection

In today's highly competitive environment, an effective supplier selection process is very important to the success of any manufacturing organization (Liu & Hai, 2005). Selecting the right supplier is always a difficult task for the purchasing manager. Suppliers have varied strengths and weaknesses, which require careful assessment by the purchasers before ranking, can be given to them. Therefore, every decision needs to be integrated by trading-off performances of different suppliers at each supply chain stage (Liu & Hai, 2005).

> According to Weber, *Current and Benton (1991)*, the review of the articles about supplier selection between 1966 and 1991 were investigated. In a related study, Zhang*, Lei, Cao and Ng (2003)* collected 49 articles between 1991 and 2003, which was a comprehensive classification of supplier selections published. The study of *Zhang, Lei, Cao and Ng (2003)* was done based on the Weber, *Current and Benton (1991)* study, and the 23 criteria of *Dickson's (1966)* study. The study concluded that net price, quality, and delivery were the most important supplier selection criteria. As concluded from three different studies, price is the number one selection factor, replacing *Dickson's (1966)* number one ranked quality criterion (Farzad, Osman, Ali, Yusuff and Esfandiary, 2008) pp. 54-76.

2.3.3 AHP approach

The AHP (Analytical Hierarchic Process) is a decision-making method for prioritizing alternatives when multiples criteria and sub-criteria must be used. It has been applied to a wide variety of decisions areas, including research and development project selection, evaluating alternative product formulations. This method allows the decision maker to structure complex problems in the form of a hierarchy, or a set of integrated levels. Generally, the hierarchy has at least three levels: the goal, the criteria, and the alternatives. For the supplier selection problem, the goal is to select the best overall supplier. Examples of criterion that might be used are quality, price, service and delivery. The alternatives are the different proposals supplied by the suppliers.

The AHP offers a methodology to rank alternative courses of action based on the decision's judgments concerning the importance of the criteria and the extent to which they are met by each alternative. For this raison, AHP is ideally suited for the supplier selection problem.

Analytic hierarchy process (AHP), since its invention, has been a tool at the hands of decision makers and researchers, and it is one of the most widely used multiple criteria decision-making tools. Many outstanding works have been published based on AHP. They include applications of AHP in different fields such as planning, selecting best alternative, resource allocations, resolving conflict, and optimization. (Omkarprasad & Kumar, 2006)

2.3.4 Delivery Service

Chase, Jacobs and Aquilano (2006) reported that the supplier's ability to deliver more quickly than its competitors can be an added advantage and satisfy their customers in respect to the overall business performance. Prior to this, suppliers need a strong sales team to better manage their pre-sales services such as response to the sales inquiries, explanation of product special features, spare parts availability and assist in the arrangement for financial advices (Tracey and Tan 2001). Generally, the end-user or purchasing managers will request for the equipment specifications and product demonstration from the salesperson before they decide on which to purchase. (Cebi and Bayrakta, 2008) also stated that the delivery lead-time, flexibility in changing the order, and delivery in good condition is an important criterion for decision support on supplier selection.

Besides, delivery service also refers to the response of the suppliers towards their post-sales services such as equipment installation.

2.3.5 Inventory Management

The standard literature on inventory models has rarely differentiated between the inventory record and the physical inventory. The two have always been considered to be the same, and the main concern was on how, having observed demand and the resulting inventory levels, an inventory manager should determine when and how much to replenish. In fact, based on a study done with a leading retailer, (Raman 2009) reports that out of close to 370,000 Stock-Keeping Unit (SKU) investigated, more than 65% of the inventory records did not match the physical inventory at the store-SKU level. Moreover, 20% of the inventory records differed from the physical stock by six or more items. A general definition of accuracy includes obtaining the correct value for a measurement at the correct time.

According to (Raman, 2008), inventory inaccuracy occurs when the system inventory, that is, what, according to the information system (IS), is available, does not match the physical inventory, that is, what is actually available. Another definition considers the percentage (and not the difference) error in the inventory records. As a conclusion of the last provided definitions, an inventory stock is inaccurate when the record stock is not in agreement with the physical stock. Inventory inaccuracy can be a major obstacle to improvements in firms' performance. Inventory inaccuracy might result from several factors. (Raman, 2008)

Transaction Errors

Transaction errors are unintentional errors occurring during inventory transactions. Some of these transactions happen when counting the inventory, receiving an order, or checking out at the cash register.

Misplacement Errors

Misplacement errors occur when a fraction of the inventory is misplaced; it is not available to meet a customer demand until it is found.

Vendor-managed inventory (VMI)

If a company wants to reduce the total effort it puts into inventory control, one option is to leave the whole problem to someone else, a third party. VMI is a business model where the supplier manages the inventory on behalf of the retailer and is responsible for controlling the inventory by deciding how much and how often to order, which is determined based on demand information received from the retailer.

The goal of VMI cooperation is to optimize the information regarding customers demand to improve inventory control and reduce excess units by, first and foremost, reduction of the supply chain´s safety stock, which leads to inventory cost reductions (Fry, Kapuscinski and Olsen 2007).

2.3.6   Customer service and satisfaction

The customer's perception is not always the same as the product manufacturer's perception. Customers may give more value to low cost, on time delivery, delivery date certainty, or

receiving a customized product (Simchi-Levi, Kaminsky and Simchi-Levi E., 2003). According to (Kurata and Num 2010), manufacturers and retailers are always looking for practical after-sales policies that will permit them to enhance customer satisfaction levels. Furthermore, an analysis conducted by Ou, Liu, Hung and Yen (2010) showed that customer-firm-supplier relationship management improves operational performance and customer satisfaction. Based on this, a sub-factor customer service is identified.

The goal of the companies is to give customers the best service in an efficient and effective manner (Handfield and Nichols, 1999). Without forgetting about information such as product description, product availability, order status, shipping dates, and assisting them in all what they need (Lambert and Cooper, 2000). Quayle (2006) states that customer service is defined by demand forecasting, service levels, order processing, parts/service support, and aftermarket operations.

Effective supply chain management is all about delivering the right product in the right quantity and in the right condition with the right documentation to the right place at the right time at the right price. If only it were as simple as it sounds. (SCC, SCOR model, 2010)

2.4   Related studies on supply chain Management

2.4.1   Supply chain Management from Global Strategy perspective

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).

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.

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.

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 (Cilliers and Nagel, 1994).

2.4.2 Supply Chain Management in Ethiopian perspective

SCM practices and challenges in different industry of Ethiopia were studied in different dissertations. The results of different researches in the SCM performance in different commercial and non commercial sectors of Ethiopia are concluded as 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.

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 to the hospitals and health centers.

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

3.1   Research Design

Based on the purpose of the research and the nature of the focus area the study used explanatory research design as a general frame work. In line with the research design descriptive and qualitative statistical analysis methods were employed. Both questionnaire and interview check list was developed and applied as data collection tools in addition to the organizational records for secondary data. It was found to be particularly useful to clarify the understanding of problems that lies under the SCM of PSI/E and potential recommendations were given to solve performance gaps.

3.2   Sample and Sampling Technique

The nature of the study area cover different stake holders, for that matter both probability and non-probability sampling techniques were applied where stratified and purposive sampling were used respectively.

> Purposive or judgmental sampling enables you to use your judgment to select cases that will best enable you to answer your research question(s) and to meet your objectives. This form of sample is often used when working with very small samples such as in case study research and when you wish to select cases that are particularly informative (Neuman 2005). (Saunders, Lewis and Thornhill, 2009) pp. 237.

Suppliers:

PSI/E has both international and local suppliers for different program's product needs. Due to the scope of the study and limitation to contact the international suppliers only two local suppliers were contacted for an interview and discussion by using purposive sampling. It is because PSI/E has only two local suppliers (one international having office locally) from among its five total suppliers and the reset are international which are located abroad (Pakistan, china and Korea). The above situations forced to use purposive sampling to contact these organizations as a source of data regarding suppliers. The focus of contact will be supply chain/Logistic managers.

PSI/E:

Much of the information was composed from the unit of analysis (PSIE). Hence, the supply chain manager, procurement manager, finance, warehouse manager and program units were included in the study as main sources of primary data. From the operational structure of the organization these sections are responsible for the function of the entire supply chain in different degree of involvement.

Intermediaries and outlets

PSI/E has partner/sub-grant organizations, Key trade distributers and a Pharmaceutical wholesaler as intermediaries and institutional and private commercial pharmacies as outlets under its distribution structure. Since the nature of these groups of population is different and the strata are already made a stratified probability sampling which includes simple random sampling was applied. By taking the scope of the study and ease of contact in to consideration 12 organizations among the intermediary organizations were selected (8 Partner/sub-grants and 2 key trade distributers and 2 Pharmaceutical wholesalers). The number of intermediaries is relatively small and that is why purposive sampling was applied to include these organizations. Moreover, though the below statistical formula was applied for this specific strata, the result sample became more or less as same as the size of the strata.

For the purpose of this study and according to its scope both institutional (both public and private) pharmacies and private commercial pharmacies were selected under simple random sampling. The pharmacy outlet was considered as one stratum. There are 240 different pharmacies (from the above stratum) which are currently getting service from PSI/E available in Addis Ababa. At a confidence level of 95% Saunders *et.al*. (2009) and Israel (2009) a statistical sample of 150 were selected by applying this statistical formula

$$n = \frac{N}{(1 + N * e2)} \quad , \quad n = 240/(1 + 240 * (0.05)2) = 240/1.6 = 150$$

3.3   Source and Tools/Instruments of Data Collection

Both primary and secondary data were used in the study. Focus group discussion, structured interview and questionnaire were used to collect primary data. PSI/E's supply chain manager was a responsible person where primary data was collected trough interview and discussion. The same technique was used for suppliers.

Procurement manager, finance officer and warehouse manager of PSI/E were passed through a structured interview. With regard to intermediaries and outlets/pharmacies questionnaire were distributed and filled by responsible official from Logistic or supply chain unit and the pharmacy head respectively.

The focus group discussion with the supplier was focusing on the order fill rate performance, nature of the integration, feedback and reporting and factors affecting those activities. Factors affecting the performance of the SCM, performance metrics/ standards applied in the organization, supplier selection procedure were some of the issues covered in a discussion with the supply chain manager and warehouse manager of PSI/E.

With regard to delivery performance of the suppliers, identification of factors associated with difficulties in Inventory management, reasons behind a variable order lead time and challenges associated with distribution, they were the procurement manager, supply manager and warehouse manager being interviewed using a structured interview.

For the following focus areas questionnaire was used, customer order management, the degree of flexibility of the organization's order and delivery system and variables responsible product demand and customer satisfaction level in order to get a primary data.

With the help of the availability of different organizational documents (reports, research findings, and activity records) secondary data was collected from the supply chain department, human resource unit and warehouse. Supply chain response time, delivery performance of the suppliers, the delivery lead time, and inventory records were the areas under consideration in this part of data collection.

3.4   Procedures of Data Collection

Focus group discussion: After granting confidentiality opening statement access was requested by issuing consent. Then the participants were acknowledged for this dedication and scarifying their time. The discussion was guided by the researcher by using a list of areas for discussion so as to stay in the same agenda. And the data collected were recorded after a common agreement up on the conclusion on each issue. Finally the discussion gets closed within the planned time frame by paying gratitude to the participants.

Structured Interview: It followed the above procedure with regard to getting access, acknowledgment and closing as well. But here the data will be collected using a structured interview and only the respondent's feedback will be registered.

Questionnaire: Primarily data collectors were chosen and they were highlighted about the nature and purpose of the study. Then an attachment for the questionnaire was prepared which explain the purpose of the study and information about significance of the study. Some assistant were given to clarify questions from the respondents. Then questionnaires were collected up on the agreed time between the data collector and the respondent.

3.5   Method of Data Analysis

There was an application of different statistical techniques to analyze both the qualitative and quantitative data mainly descriptive statistics. The qualitative data were coded and treated with Statistical Package for Social Science (SPSS). Based on SPSS, both descriptive and inferential statistics were used. Descriptive statistics involved analysis Such as, frequency distribution, measures of central tendency, correlation and data variability to present quantitative descriptions and describe the basic features of the survey data. Quantitative data were addressed by using percentage computation, mean and standard deviation. Then findings are reported by using tables and charts.

The study variables are supplier integration, Average order lead time, delivery performance and order fill rate (on time, flexibility), Inventory accuracy, and warehouse management performance and customer satisfaction.

The status of supplier relationship management was evaluated qualitatively and measured with reference to the theoretical recommendation point of view. The accuracy of order entry was assessed with relative to the organizational quality data needs and theoretical standards. The order lead time was also calculated using mean and standard deviation.

Delivery performance of suppliers was analyzed using percentage of on time and in full delivery for customer request for each supplier. The same method of analysis was employed for measuring the delivery performance of the organization to its customers. The general practices of the warehouse management and inventory control were evaluated as per the value adding theoretical recommendations and with respect to the organizational guideline.

The customer satisfaction for perceived value of the product will be analyzed graphically by comparing percentage of responses. And also Spearman's correlation analysis was employed to measure the association and degree of reliance of variables with the outcome. This correlation coefficient was used for the data which are in terms of ranks. The advantage of this method over the others in that it can be used even when the actual values of items are unknown. Findings or actual performance of the supply chain management of the analysis was also being measured with relative to plan of action of the organization. In which case, percentage computation was applied.

3.6   Ethical Consideration

The variables used under the study to measure the SCM performance of the organization are supplier relationship management, order management, delivery performance, warehouse and Inventory management, distribution and customer satisfaction.

As it is all about to fulfill what is needed by the final customers and consumers by making avaialable products and service the independet variable is customer satisfaction. All the other factors contribute to the independent variable in different degree of enflunce. Thus, they are considerd as dependent variables.

Supplier relationship management has an effect by selecting and managing a reliable suppler so that the system will have an adequate supply of the needed products. The supplied products has to be kept and treated well so as to insure the quality and sustainable supply of

the products trough inventory management. Then it is the responsibility of the management of customer order, delivering thte order using efficient distribution system to finaly prove that the customers get the right product, with the right quantity, from the right source, at the right time, with the right price, at the right place.

CHAPTER FOUR
RESULTS AND DISCUSSION

The presentation of the result of the study is by separating the entire supply chain in to two main categories as the Upstream and Downstream part of the supply cain. Where the upstream covered the chcain from suppliers through intermidiaris to PSIE, and the downstream covered from PSIE through intremidiaries to the final customers.

4.1   The upstream of the Supply chain: Suppliers to PSIE

4.1.1   The supply chain structure of PSIE

The supply chain department stands to be one of the main operational sections of the organization. The head of the department is directly reporting to the country representative. It is known that the organization in general is implementing the interests of the donors. This brought in a significant structural effect on the design of the supply chain. That means both the upstream and downstream part of the SC reveal the mission of the donors, where most of the suppliers and distribution channels to reach the beneficiaries are selected by them.

As shown in the supply chain diagram below PSIE has four international and one local supplier for the type products which are under this study. The order to the international suppliers has to follow the root through the largest donor of the organization, USAID. The supply chain department collects and discusses the demands of the program units and quantifies the total requirement for a specified budget year. Then the order requisition will be submitted to the respective office of USAID where they merge it with the order requisition of other implementing partners for approval. The final approved order will be delivered to the manufacturers based in Asia.

The given amount of order will be delivered not at ones rather it will be divided and shipped at different times in the given year. There transport companies who took a contract to distribute the shipment from the manufacturers to port as well as from port to the central warehouse. There is also a custom agent (Panafric Global) to facilitate the clearance and coordinate the transporters. All these are arranged by the donor. The above supply line is mostly intended to PUR and Condom.

One of the international suppliers, SCMS has an office of operation locally. Thus, keeping the order requisition line PSIE communicate the local office for the delivery of loose drugs to make
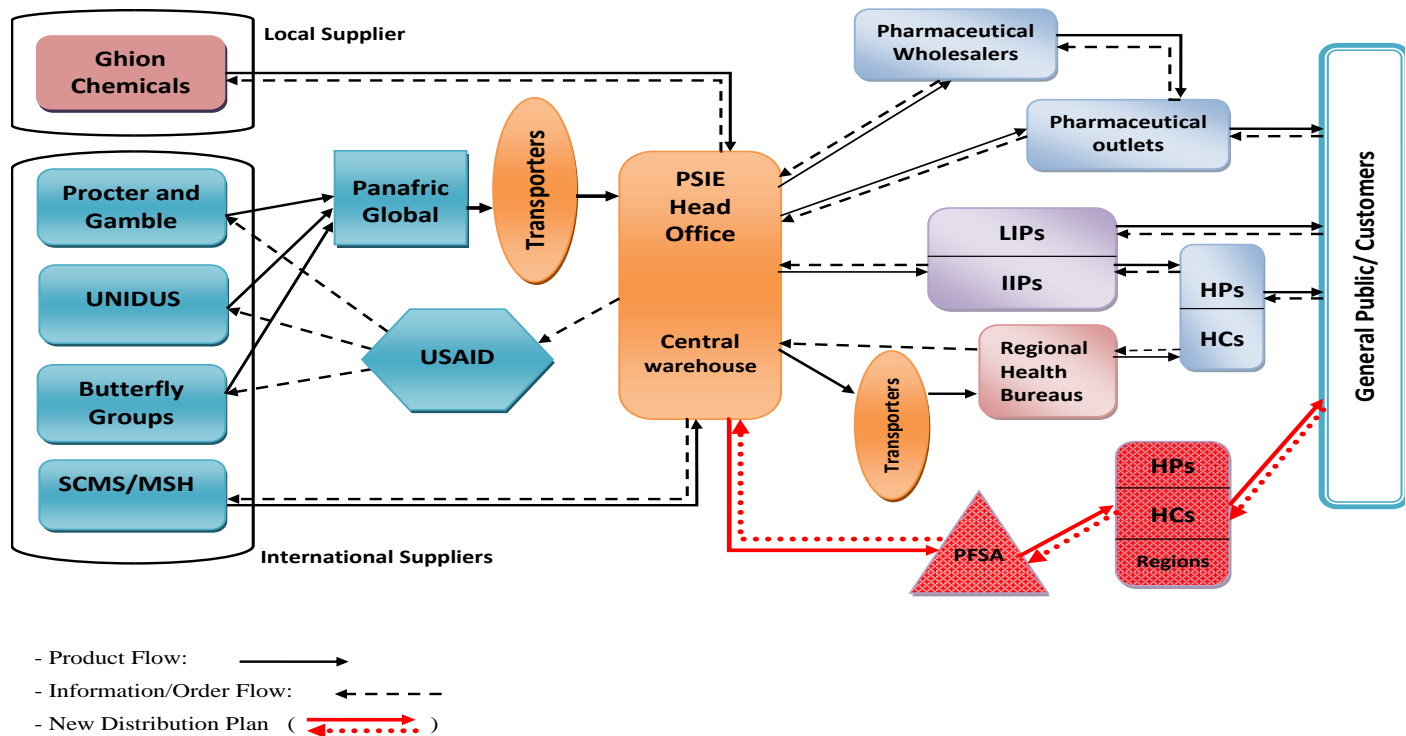
(Source: Author Sketch, Info. PSI SCM Dept.)

Figure 4.1 PSIE Supply chain structure

the KITs (Addis Cure, Addis Cure PLUS and Ulcure) for the treatment of sexually transmitted diseases. As the warehouse and the office of this supplier are in Addis Ababa, it is relatively easy to handle the logistics and communication. But since this supplier get the products from abroad from their own suppliers the supply chain of PSIE is indirectly affected by the performance of this effect. Therefore, PSIE is dependent on the reliability of service given by the suppliers of their suppliers.

The only local supplier, Ghion Industrial plc, is responsible for the supply of Water Guard. Here the order requisition should be given directly to the supplier by PSIE through their procurement office. But they notify the donor office about the plan of activity and the performance followed. PSIE give an annual product demand and they also have to generate

a specific purchase order (PO) for a specific amount production and that is following an order form a customer. Each amount of specific order for production will be prorated from the annual order. Here PSIE is using a vendor based warehouse system, which means they are not transporting the manufactured products in to their warehouse. Alternatively what they do is the warehouse coordinator or an officer will go the premises of Ghion and do the required recording for stock adjustment then the shipment will be transferred to the ordering customer directly. This will benefit the organization to cut cost of transport and inventory handling.

As shown in the diagram products get to the PSIE warehouse in a root mentioned above. It is where all the necessary inventory handling procedures and record administration is executed. All the orders from diffident customer groups are forwarded to the warehouse after the required approval from the supply chain program units. Then the delivery will be processed through PSIE sales staffs for pharmaceutical whole sellers and pharmaceutical outlets using their own vehicles. For the other customers they could use or contract transporters according to the size of the shipment. The distribution is not regular but it is according to the frequency of customer order initiation.

4.1.2   Supplier relationship and selection

As it has been explained above most of the SC structure of the organization is modified by the interest of the donors. Therefore, as what can be referred from the interview held with the supply chain manager PSIE has not a significant role in selection of the international suppliers. They also do not have set any selection criteria or give comment for possible change or modify the existing arrangement. There is only a performance report about the function of the SC given to the donor and discussion about the performed tasks and future plan of actions.

The relationship between the international suppliers and the organization will stay as long as the donor would like to hold the contract given. It is not subject to any amendment by PSIE's operational interest and feedback. As from the interview from the warehouse manger there isn't any adjustment made so far for the claims raised by them about the product quality, packing material and standard packing size, adequate communication about

shipment coming and others. This has resulted in a great dissatisfaction by the staffs and adding a work load to them from time to time.

With regard to the drugs supplier (SCMS) they also have a complaint about the volume of supply, frequent change of the brand of the drugs and shortage of supplies. But the last comment has not been confirmed as it was not the same from the information found from SCMS. They said they have always a good stock for what is required by PSIE and it is due to their low performance. They added that they are not ordering and taking the volume of the demand for what they forecasted together in their general meeting. This implies that there is a communication gap and the donor has not play its role efficiently and the SC integration is not well built.

There is no any selection criteria found about how the only local supplier (Ghion Industrial plc.) has been selected though there are other similar companies rendering the same product and service. The supply chain manager said that they have invested a huge initial cost. For example, they are the only brand holder for "Water Guard" and incur a higher cost for a mold of the container. Referring these and other costs he said that they are tied up in the cost they invested and that will not be economically feasible to look for other companies and make the same expense again. He added that they have a good relationship and the costs of the product are always reasonable for that matter there is a frequent economic up date for any product cost adjustment from the supplier. And it is in a fair range concluded the supply chain manger.

It is not theoretically recommended that taking an initial investment cost economically termed as "Sunk Cost" for a current decision making (Harold 2009). "Sunk cost fallacy" making decisions based on the size of previous investments rather than on the size of the expected return. It misleads not to entertain the use of the most recent information so as to make right and timely decision. Therefore, PSIE hasn't done any market research to look for other potential suppliers with a better service, technology advancement and product cost. Moreover, it is not clear that how the product cost adjustment could be concluded as fair without having any market research and analysis.

It was not possible to contact Ghion Industrial plc due to a decline for permission from PSIE. Which limit the research not to find out balanced facts from the other side concerning Integration, production performance and performance metrics/standards applied in the organization, supplier selection procedure and about the general performance of the SCM as well.

4.1.3 Results from Supply chain review

4.1.3.1 Delivery time variation for selected products

One of the performance measurements under consideration in this study is lead time management. There was no any record or documentation concerning the agreement on average lead time or any plan of action to follow the lead time operation performance. The only information available from the supply chain department was that they usually give an annual demand or volume of forecast to the donor. Then, the donor communicates the manufacturer/supplier and PSIE will gate the product in divided volumes of shipment in different times. But the exact time of these shipments is not known.
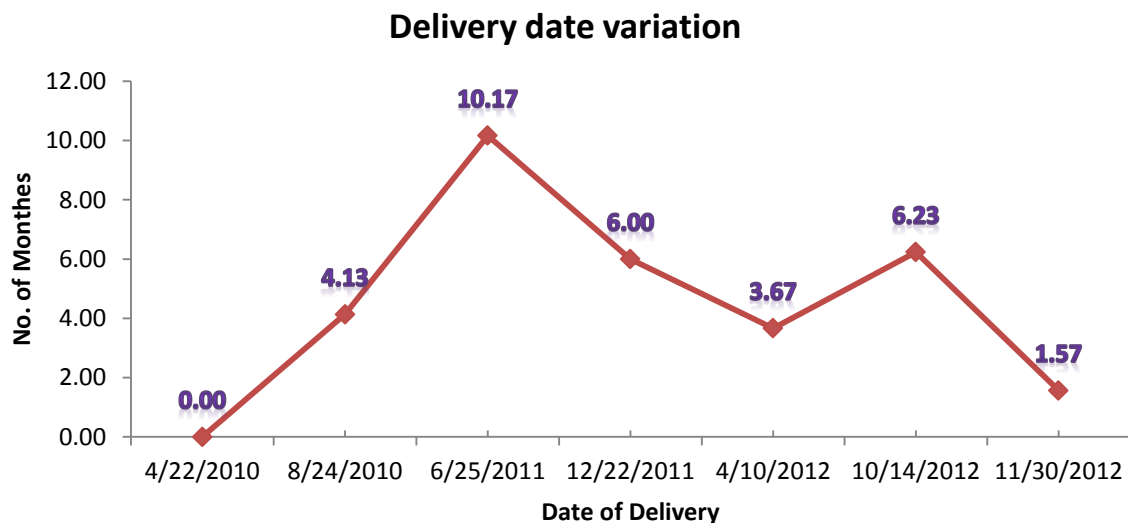
(Source: PSI, organizational document, Warehouse and Inventory Management)

Figure 4.2 Delivery date variation for Condom.

The above arrangement leads the organization to have less performing inventory management. It is difficult to calculate or analyze different stock levels that help to handle a

given product logistic flow, reduce inventory handling cost, avoid product expiration, and also to avoid a possible stock out. Stock levels like, re-order level, maximum stock, level, minimum stock level and safety stock levels.

Since there was a data limitation concerning lead time, and as it is the main element in lead time calculation the study took in to consideration the delivery date. The delivery date variation will help to estimate the respective lead time.

Figure 4.1 shows the delivery dates for condom. It is apparent that it has a significant variation with relative to having an average standard date. It is difficult to attain a stock level that can satisfy the demands of the organizations program units at any given time. As there is the highest delivery gap which ranges from a maximum of 10.2 months to the shortest this is 1.6 months. It can also tell that there is 84.3% difference between the two figures. Moreover, the delivered quantities during these dates are irrespective of the time they are taking. Challenges faced are over stock and out of stock at different times.

Average delivery time
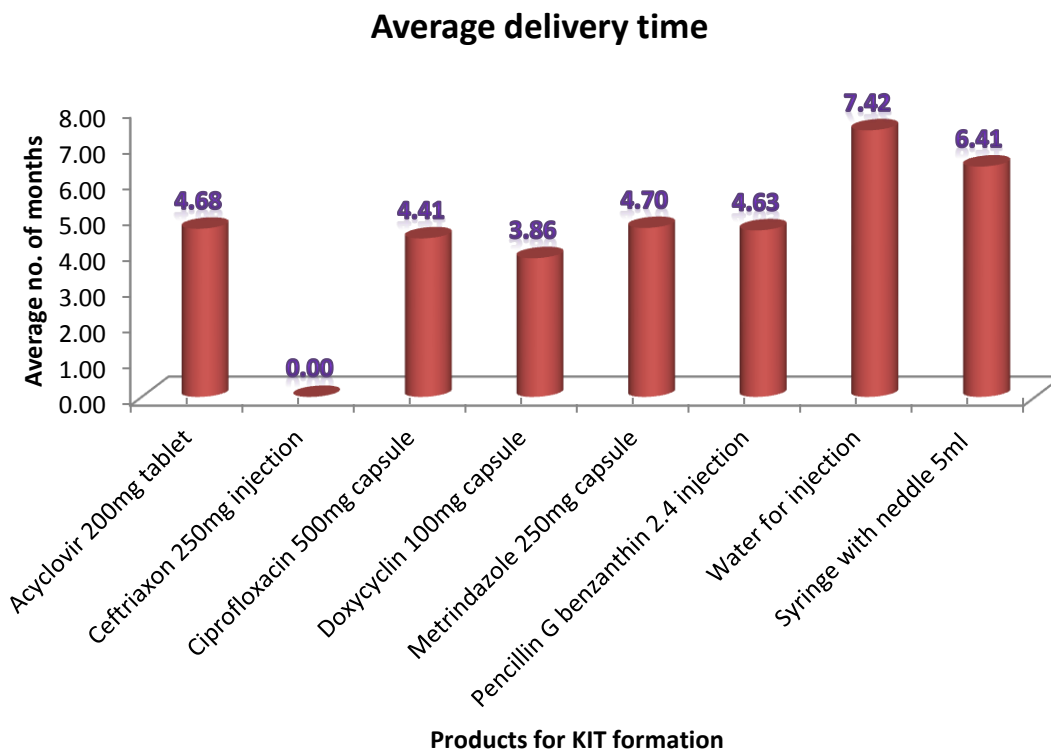
(Source: PSI, organizational document, Warehouse and Inventory Management)

Figure 4.3 Delivery date variation for drugs for making STD Kits.

35

There is a relatively better performance for the delivery dates of drugs for making the STD treatment Kits referring Fig 4.2 They were delivered on an average of every 4.5 months. It looks different for the delivery of Ceftriaxon injection as it has been delivered only one time. But for these commodities they have a good reputation. This could be the result of the advantage for having the international supplier's office locally here in Addis Ababa, for that matter it eases the communication and the logistic flow.

Delivery date Variation
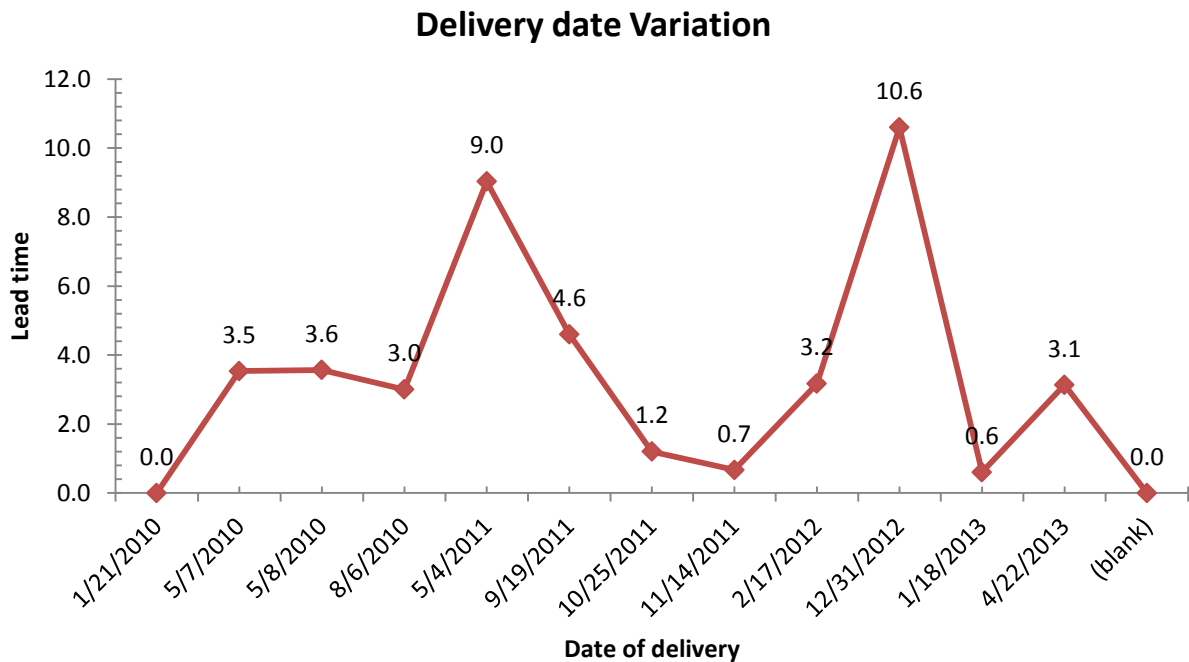
(Source: PSI, organizational document, Warehouse and Inventory Management)

Figure 4.4 Delivery date variation of PUR

It is the same performance for the other product supplied from the other supplier. It shows another irregular rate for delivery which implies that the lead time will also fluctuate in the same manner. That will have a negative implication as poor control over the operations of Inventory management, delivery performance, and cost minimization and for the entire supply chain integration at large. Fig. 4.3 strengthens the finding for the implication of poor lead time performance over the entire performance of the supply chain.

The above measurement for these particular products shows that there is a lesser performance of the supply chain with regard to the given measurement. As shown in the

36

figure it took 1.2 and 0.7 months for the shortest and 9.0 and 10.6 months for the longest time where it is possible to see a great variation. The shortest month counts only 6% of the longest month, it is also possible to notice that there is a 94% time variation. The information presented can tell about the lead time management is also not performing in a well manner. And also as what is outlined above from the interview held with the ware house manager and the supply chain manager, there is no any record or manual concerning the standard lead time. This is a weakness for the organization supply chain management.

4.1.3.2   Time and Volume of Delivery variation for water Guard

For water guard, which is the only product from the local supplier, there is a different inventory management. As it can be referred from above in the supply chain structure section of this report PSIE is not having a stock for this product rather they notify the supplier their annual demand and they prepare a specific purchase order at different times in the given year. The given Purchase order (PO) could be for a single order or a combination of two or three customer orders. Therefore, the PO would take some time to be closed after it is delivered in divided shipments for a single or group of customers who made the order. A PO closure may depend on the urgency of the order and the manufacturing capacity of the supplier.

Time for PO closure
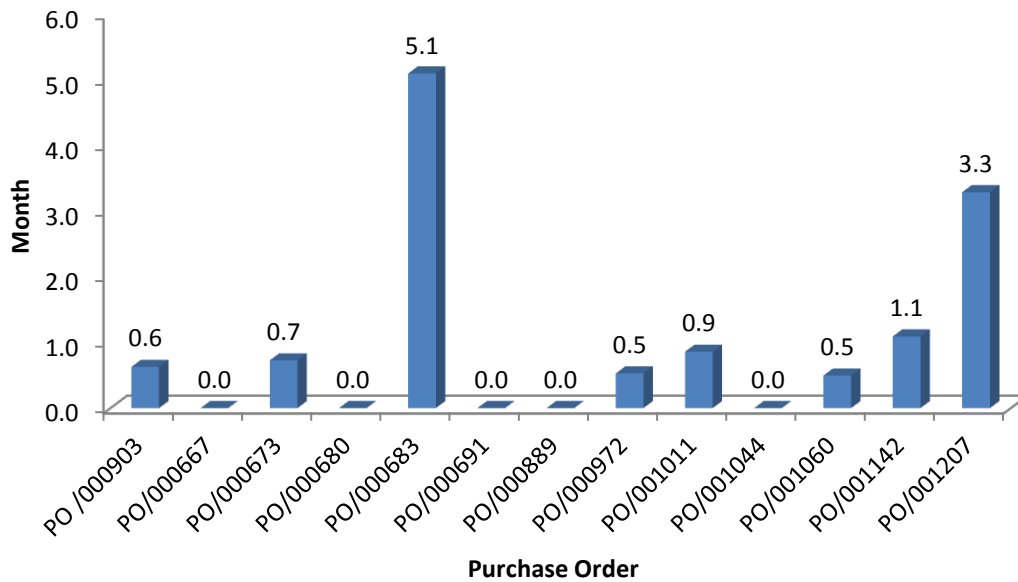
(Source: PSI, organizational document, Warehouse and Inventory Management)

Figure 4.5 Time variation for PO closure

Fig. 4.4 shows the variation for the time taken to close different POs. This measure can show the manufacturing capacity of the supplier. But Fig. 4.5 gives details the size of the PO and the actual quantity produced against a given PO. The variations are two ways, which means there are times where the actual delivery exceeds the PO quantity by more than 30 % and there are also times where the PO quantity exceeds the actual delivery by 38 % and 50%. The variations in these two figures indicate that there is a communication gap or low production cost management Vs order handling. It is also possible to see how long it took for a PO for closure with relative to the size of the PO.

Order Vs Actual delivery
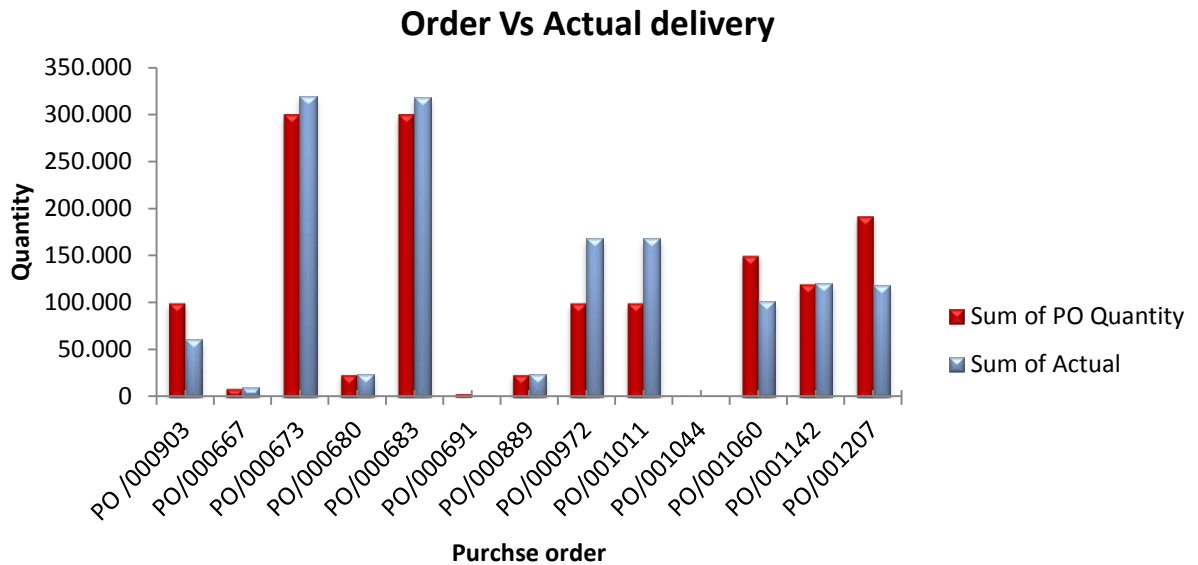
(Source: PSI, organizational document, Warehouse and Inventory Management)
Figure 4.6 Quantity of order in PO Vs actual production quantity

4.1.4 Warehouse Management

The warehouse structure is designed as: there is a warehouse coordinator who is directly reporting to the Supply chain manager and under the supervision of the coordinator there is a warehouse officer. There is also one personnel responsible for the supervision of Kitting operation under the direct reporting line to the supply chain manager. All the clerical activities are handled by both the coordinator and the officer. It is the responsibility of the coordinator to inform the status of the stock to respective program offices in order to help them to execute their plan accordingly and on time and also for any probable contingency reaction as well.

The main activities performed in the this section includes preparation of a storage area before a shipment delivery, receiving the order, physical quality and quantity checkups, ware house arrangement and stock keeping, Inventory and regular stock checkups, record keeping, receiving order and dispatch processing, managing the daily laborers and transport arrangement, report preparation and communication, and other administrative functions.

The warehouse is located approximately 8 km from the head office. The building is easily accessible for the loading and unloading and the compound is enough to accommodate big

tucks. The storage area is arranged with pallet and shelf racking with partition as main stock keeping area, expired and damaged room, kitting room and dispatch area that help the workers to manage every activity easily. There is no a risk for water flooding and a fire extinguisher is placed. It is a well ventilated room there is also a MaxMin thermometer and a regular temperature recording that will have its own positive effect to keep medical items. Security is good but daily laborers are free to walk in and out that resulted in shelf pickups and theft. The main lock is not also changed after every inventory.

There is a general warehouse manual for every function. The record documents used are Bin card, stock card, Inventory report sheet, GRN, GIN, stock return note and stock transfer note which is to transfer stocks from one program to another and to manage the dead stock. Stock card are kept in finance department and the warehouse staffs have no access for it. For Bin card the warehouse staffs are also using an excel sheet to facilitate the record and quick reference. Their operation is not supported with SAP application or with any database to facilitate the stock management. They are only using an excel application which is not as helpful as the warehouse or stock management databases.

The warehouse is not connected to the main office neither via internet connection nor telephone line. This has created a significant problem to perform adequate communication in facilitating the administrative and operational functions. They are using a personal mobile telephone but it is with a poor network quality with relative to the location of the warehouse. The total storage area accounted for approximately to $275m^3$ and it is not adequately used as per the outline and the partition planned. This is due to the volume of product kept at a time; some products are stoked in a place where it is not allocated.

The order and dispatch function is handled in a well manner. But the shipment delivery performance from suppliers is weak and it is due to lack of sufficient communication and capacity problem of the third party logistic agents and transport companies. For example there are times where shipment is coming from port but the warehouse is not communicated about the effect. As the warehouse manual is outlined, there must be a four hour pre notification for every order process and stock movement. That enables the warehouse staffs to get enough time to check both the record and physical stock status, document and

dispatch preparation. Availability of trucks from the transport companies is not as per the urgency of the dispatch. This created a negative effect on the total supply chain performance.

In summary the overall management of the warehouse can tell that, the capacity of the warehouse resources are not adequate to handle the size of operation that they are managing now. Plus it shows the areas of intervention for improvement.

4.1.5 Inventory Accuracy

Among the good performance of the warehouse is that, they have a regular stock checkup and record up date and an annual inventory with an external auditor and a delegate from finance. The record after an approval from the designated officials it will be kept in finance for further analysis, managerial decision and reporting. Below is the inventory and stock checkup performance which is specific to the study period.

Inventory Accuracy rate Formula

Rate = <u>Number of items where stock record count equals physical count</u> * 100

Total number of items counted
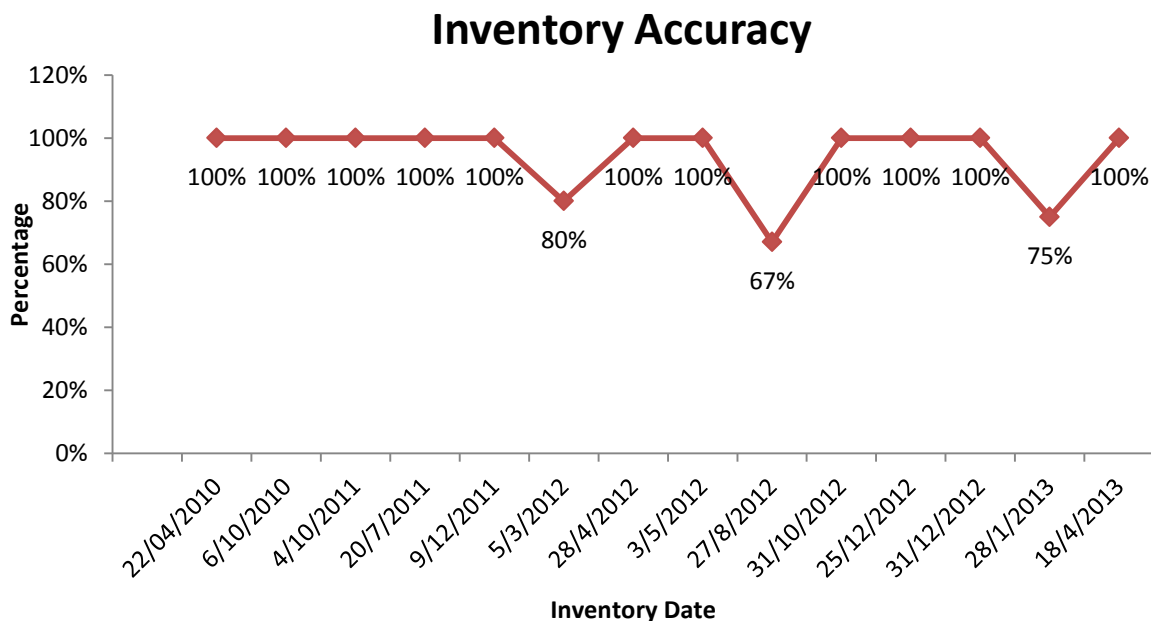
(Source: PSI, organizational document, Warehouse and Inventory Management)

Figure 0.7 Inventory Accuracy graph

41

The above table and graph shows the inventory performance rate for the study period. The inventory reading looks good but there are times where there are discrepancies between the record and physical count and there were no any claims or justification found for the effect. As shown in the figure it counts 20%, 25%, and 33% for the degree of the discrepancies. It is known that these figures would have been 100% each. This can happen from inadequate record handling, work load due to man power shortage, frequent daily laborer change.

If there are dead stocks (damaged and expired) they will be quarantined for disposal which is conducted every six month. They have their own technical Standard Operation Manual (SOP) for the effect. Then the amount of dead stocks will be written off from the main record in finance and adjustment will be made accordingly for the new plan.

The accuracy level of the inventory performance shows that there are unnoticed happenings that cause the discrepancies. Yet there were no any claim reports found for that. This tells that there is a need for a critical evaluation to be implemented.

4.1.6   Program offices and the supply chain

The main objective of the supply chain is to satisfy the logistical needs of each program according to their needs and on time with right quality and quantity. As this action needs an absolute integration to execute the organization's missions, they are working together. Practically all the program offices and the supply chain department have a working plan to communicate and integration. This helps them to realize a significant achievement of their organizational objectives. Though they are successful in many standards, there are also some challenges that affect their integration. These challenges are rising from conflict of interest between the offices and the supply chain department.

Program managers were included in the interview session during data collection. From the information collected it was possible to see some gaps in between. Periodically they usually have a Joint planning session to access the needs of the programs and the capacity of the supply chain with regard to the donors' interest and the organization objectives. In the joint planning session they agree on the specific needs of the programs, the size of the logistic and commodity demand, the type of intervention (decide on the four Ps of Marketing). What to deliver, the product type and size, where to deliver the prioritized locations and beneficiaries,

at what price, according to social marketing or free delivery, using what type of promotion, training or technical detailing.

The program offices give their demands to the SC department and part of the demand creation is also done by them. After all the action plans are done it will be the supply chain responsibility to act accordingly. Here the program offices said despite the successes they are not satisfied by the performance of the SC department as it is not functioning fully as per the agreed action plan and also the level of integration is low. Though they receive a weekly stock status report from the warehouse, they claim they are not able to know the status of the product after they are marketed and distributed and there is no such a system to control. They also said the performance of the sales people is not fully satisfactory. They have a burden of doing the sales activity at the same time they are performing a technical detailing and promotion for professionals and retail outlets as well. Moreover, the sales people are also responsible for a vast geographical coverage not only in the capital but also nationally. This is one of the reasons for the low performance.

In addition there is also some disagreement between the program and the SC in prioritizing the areas of intervention for product sales and distribution. The type of intervention is also a challenge. The program office reported that they wanted the SC to act accordingly to their identified public health problems prevalence rated locations. That means the programs need to focus on the highly prevalent area but the supply chain focusing on the general coverage. These challenges can tell the above agreed marketing strategies are not addressed well, particularly the two Ps, Place and promotion.

There are other challenges listed by the programs like the there is a frequent stock out problem, the packaging materials and labeling is not qualitatively adequate and lack of consumption data and size and type of sales promotion.

The program offices have also not taking in to their consideration the scope of the SC at some points. They need to get up to date data from SC about stock status in the outlets which is beyond their role. There is no regular product order from the program offices to the SC. They also think it is the only task for the SC department to do a technical detailing to

rise up the demand. But according to the nature of the organizations operations it is the task of their mutual and adequate integration.

There is a monthly cross departmental meeting to report on the activities and review on performance but it is not well established. The interdepartmental communication is also informal as there is no defined root of communication.

4.1.7 Product Distribution and Sales

The downstream operation of the supply chain is to distribute the products based on the demand and plan of program units. According to the mission of the organization and the donor interest the distribution should be done in two channels. One is social marketing in which the products will be sold to the market where the targeted population can access them through different market channels. In this line the price of the product is highly subsidized by the organization to achieve what is planned in social marketing. Table 4.1 elaborate more on the degree subsidy on product price. As this is a marketing function PSIE has followed the principles of marketing while selling the products. There is a special unit to implement the action plan based on the 4Ps of marketing (Product, Promotion, Price and Place).

As shown below in Table 4.1 the percentage of subsidization for the Cost of Goods Sold (COGS) is from selling price for the whole sellers whom are getting the highest discount. The highest subsidy margin is 72.8 % in where the product price is 13.91birr and it was supposed to be sold with 51.12 birr. This found to be the basics of social marketing to serve the public with much affordable products for an important public health challenges.

Table 4.1 Product pricing and social marketing

PPST Kit Brand	Selling Price			COGS	Percentage of COGS Subsidized (-ve Profit margin)	Retail Price of Loose Drugs
	Wholesaler Price (in Birr)	Retailer Price (margin = 15%) in birr	Consumer Price (Margin = + 25%) in birr			
Addis Cure	4.17	4.80	6.00	9.53	56.2%	7.6
Addis Cure Plus	6.96	8.00	10.00	11.16	37.7%	15.1
Ulcure	13.91	16.00	20.00	51.12	72.8%	55.44

(Source: PSI, organizational document KIT production and marketing)

There is also a big subsidy margin for Addis Cure, it has a 56.2% where the product price is 4.17 birr and it was supposed to be sold with 9.53 birr.

This channel employed a sales force to run the sales activity together with a technical promotion. In its structure there are Pharmaceutical whole sellers, pharmaceutical outlets and key distributers. The sales people are pharmacy professionals as they should engage with health professionals and health institutions. They are work loaded to cover huge geographic locations nationally including the capital. That force them no to follow the professional sales activity to repeatedly visit a professional and an outlet to strengthen the performance of the sales activity. Moreover, the organization employs sales representatives in contract phases for a very short period of time that has its own negative impact on professional sales activity. In the interview presentation with program officers above they said the product flow is very slow. Therefore, the work load and less efficiency of the sales people can contribute to this challenge. This will be elaborated in the next analysis section for customer satisfaction.

The second channel is free distribution or donation of products to the specified group of customers. That also follows the plan of action of the individual program units. In this channel structure there are local implementing partners (LIPs), international implementing

partners (IIPs), hospitals (HPs) and health centers (HCs) and regional heath bureaus. This mostly run by the program officers for program operation follow up. They officers coordinate the order from the customers, dispatch and distribution from the organization assuring that the logistic is according to the need of the specific customer.

Table 4.2 Amount of Kits delivered

Product/ KIT	Amount Delivered to PSIE from suppliers (Kit production) Kits; Birr	Expired. amount Kits; in Birr(price COGS)	% of expired. From total delivery	Free sample amount Kits; in Birr(price COGS)	% of sample from total delivery
Addis Cure	242,408	8,151	3%	9,856	4%
	2,310,147 Birr	77,679.03 Birr		93,927.68 Birr	
Addis Cure PLUS	204,777	4,761	2%	8,467	4%
	2,285,311 Birr	53,132.76 Birr		94,491.72 Birr	
Ulcure	35,021	887	3%	911	3%
	1,790,272 Birr	45,343.44 Birr		46,570.32 Birr	

(Source: PSI, organizational document, KIT Distribution during the study period interval)

As a promotional strategy free samples are distributed for health care professionals. This aims to promote the use of products for the intended public health challenges and increase the sales volume accordingly. As shown in Table 4.2, the size of free sample for STD Kits are almost equivalent with the size of expired kits. 3% Vs 4% for Addis Cure, 2% Vs 4% for Addis Cure PLUS and 3% Vs 3% for Ulcure. This implies that the product management is not sufficient. It would have been possible to use the amount of expired quantity for promotion as free samples or for free distribution as a donation, if there were an adequate inventory management.

4.2 The downstream of the SC: PSIE, Intermediaries and customers

4.2.1 Results of questionnaire distributed to Intermediaries and customers

4.2.1.1 Descriptive statistics

Based on the sampling technique employed in the study a stratified probability sampling were applied under which simple random sampling was also included, and this is due to the nature of these groups of population is different and the strata are already made. By taking the scope of the study and ease of contact in to consideration 12 organizations was selected purposefully (8 Partner/sub-grants and 2 key trade distributers and 2 Pharmaceutical wholesalers) among the partners and sub grant organizations and from intermediaries. The reason to do a purposive sampling to include all was due to their relative small number of population.

Questionnaires were distributed to all intermediaries and only six were returned from eight partner/sub grants and rest were fully collected back. That makes the fill rate for the intermediaries to be 10 out of 12 (83.3%).

Table 4.3 Types of facility covered in the study

(Source: Survey data SPSS analysis)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Private Commercial Pharmacy	113	79.6	79.6	79.6
	Private hospital pharmacy	11	7.7	7.7	87.3
	Public Hospital Pharmacy	8	5.6	5.6	93.0
	Partner/Sub grant	6	4.2	4.2	97.2
	Wholesaler	2	1.4	1.4	98.6
	Key Distributer	2	1.4	1.4	100.0
	Total	142	100.0	100.0	

For the purpose of this study and according to its scope both institutional (both public and private) pharmacies and private commercial pharmacies were fall under simple random sampling. Among the 240 different pharmacies from the above classes which are currently

getting service from PSI/E available in Addis Ababa. At a confidence level of 95% (Mark Saunders, et.al, 2009) a statistical sample of 150 were selected.

The fill rate for all the distributed questionnaires was found to be 88 % which can be interpreted as, the returned questionnaires are 132 from the total of 150 distributed.

The filled and collected questionnaires were summarized and coded for ease of data entry and analysis by Statistical Package for Social Science (SPSS) version 20 software. The following will be a summary of the analysis of descriptive statistics with regard to the focus areas in different groups of the questions to measure the SCM performance accordingly.

Table 4.4 Frequency Percentage of variables for challenges from customer order Management

	Very Dissatisfied (%)	Dissatisfied (%)	Neutral (%)	Satisfied (%)	Very Satisfied (%)	Mean	SD
Deliver the correct Order	5.6	9.9	14.8	45.8	21.1	3.69	1.09
Meeting promised Delivery dates	14.1	40.1	13.4	21.1	11.3	2.75	1.26
Helpfulness of customer Service and Supervision	-	32.4	17.6	36.6	13.4	3.31	1.07

(Source: Survey data, SPSS analysis)

Table 4.5 Standard format for order collection

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	37	26.1	26.1	26.1
	No	105	73.9	73.9	100.0
	Total	142	100.0	100.0	

(Source: Survey data, SPSS analysis)

As shown in the above Table 4.4, 45.8% of respondents are satisfied and 21.1% are very satisfied for being delivered with the correct amount of the order they gave to PSIE. In this category 14.8 % fall under neutral where as 15.5 % of the respondents says they are very dissatisfied and dissatisfied together. This details that the organization is relatively in a good position in satisfying their customers towards the correct delivery but having in mind that there also gaps need to be improved.

Though the above finding discover that the organization has a good record in satisfying the correct order, it is a different result for meeting the promised delivery dates. They are 54.2 % of the respondents saying that they are very dissatisfied and dissatisfied together and also 13.4 % are neutral. This can tell there is a less performance with regard to this measurement. But there are group of respondents who said they are satisfied and very satisfied in the organization in meeting delivery dates being rated 21.1 % and 11.3 % respectively.

With respect to the helpfulness of the customer service and supervision by PSIE towards their customers the finding shows that the respondents seems to be symmetrical as 32.4 % are dissatisfied and 36.6 % are satisfied but since 13.4 % of the respondents replied as they are very satisfied the final outcome weighted to a satisfactory level of performance. This implies that the organization performs well but there is still a way to go further to improve the customer satisfaction level.

Table 4.5 explains that the organization do not have a standardized format for customer order collection which accounts for 73.9 % of the respondents. On the other side 26.1 % of the respondents confirmed that they are able to use a standardized format for order. Here it is possible to conclude that the organization has an organized order collection format but the problem is with regard to the use of it appropriately because a significant number of respondents were not able to get it.

In general it is possible to summarize that, challenges regarding the customer order management came up from lack of an organized and customer oriented service, not only those but also incapability of employing resources efficiently.

Product Availability
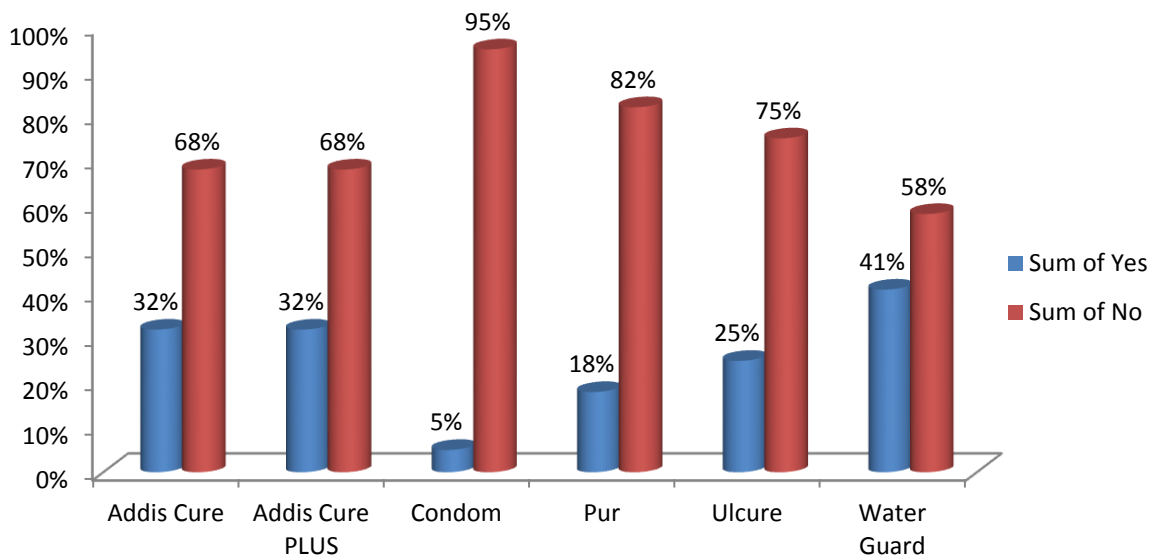
Figure 4.8 Product Availability in customer stores

Product availability through a dedicated and representative customer to the end user is one of the most important objectives of a well managed supply chain system. It is when there a difficulty to place the products for consumer accessibility the performance of a supply chain would be in question. Here under this study the findings for the availability of the products show that there is a challenge in distributing and making the products available to the use of the end users.

The above figure reinforce the findings for the challenges from the customer order management. It is very clear that almost more than 60% of the products under this study were not available in customers' stores. It is a special scenario for condom as it should be distributed only for partner/sub-grant. For that matter it is available in all the six responded partner/sub-grants. The highest rate for the least distributed product goes to Pur as it is not available at 82 % of the respondents store and a relatively well distributed product were found to be water guard which attain for 41 % availability. Totally it implies that there is a big performance gap with regard to distribution of products.

Histogram

Mean = 2.92
Std.Dev = 0.89
N = 142

47.9 %

26.1 %

17.6%

8.5 %

1 - 2   3 - 4   5 - 6   7 - 8
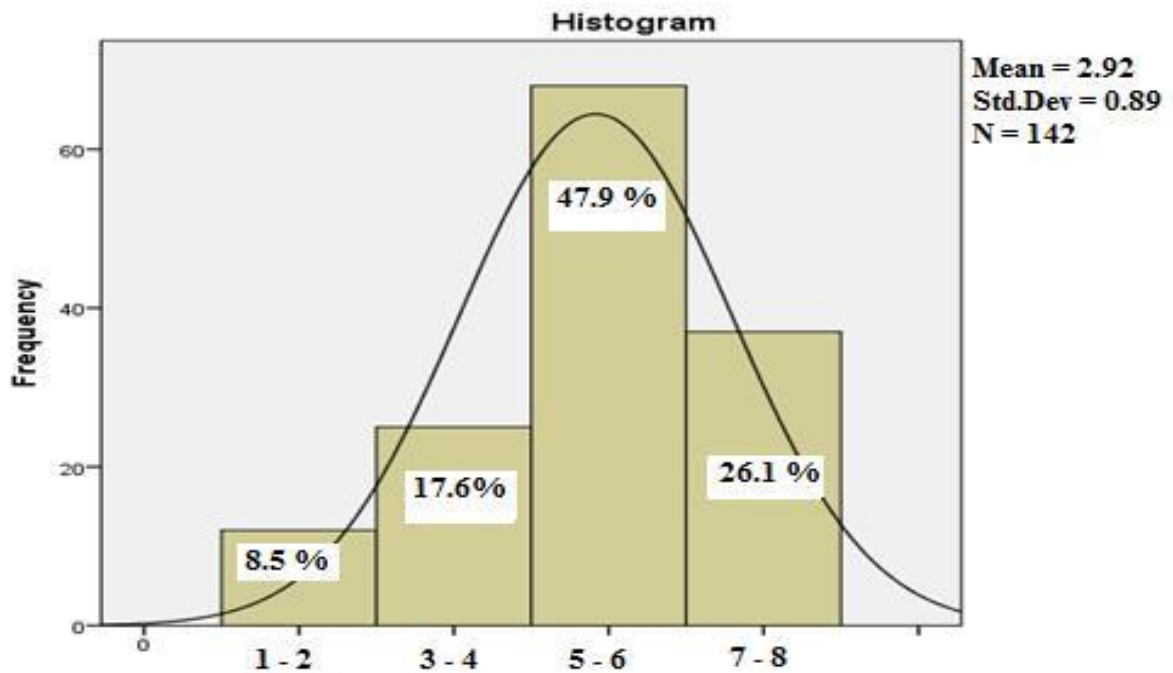
(Source: Survey data, SPSS analysis)

Figure 4.9 Frequency percentage for average customer lead time

As shown in Fig 4.9 above, it is the frequency analysis for the average length of period the customer has to wait until the order refill. Then 47.9 % of the respondents are said they have to consider a 5 – 6 days as the lead time and 26.1 % of the other respondents group said they even experienced a longer lead time which is 7 – 8 days. These figures can tell for a product distribution intended to protect the general public from health dangers are seems to be long. Whereas 17.6 % said they got the product within 3 – 4 days after they placed their order and even 8.5 % of them received in a lesser length of time which is 1 – 2 days. The lower two groups relatively have shorter lead times and they can be manageable.

Table 4.6 Frequency percentage for factors for low customer product demand

	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)	Mean	SD
Affordable product price	–	2.8	2.8	59.2	35.2	4.27	0.65
Good after purchase service	16.2	31	19	31	2.8	2.73	1.15
PSIE sales representatives are well trained and supervised	16.2	36	17.5	21.1	9.2	2.76	1.22
Ease and frequency of contacting sales reps. Are good	20.9	40.9	9.4	21.1	7.7	2.72	1.24
Over all satisfied with sales representatives	26.1	43	12.6	11.2	7	2.5	1.19

(Source: Survey data, SPSS analysis)

The respondents' feedback analysis towards the low level of product demand is presented in Table 4.6. It is found out that the products are affordable by the social status of the consumer, said that they are 59.2 % and 35.2 % agree and strongly agree respectively that makes them totally 94.4 % for the agreement about the product affordability. This analysis corresponds with the cost of goods sold analysis above in the product distribution and sales section of this report where it is stated as the products are subsidized up to the maximum of 72.8 % of their cost. From social marketing point of view this can entail PSIE has been performing very well in delivering affordable products.

There is again a performance gap shown with regard to the post sale service by the organization. This includes a technical promotion and detailing about the indication of the products which follows the marketing 4ps strategy implementation. 47.2 % of the respondents totally disagree and strongly disagree about the adequacy of the service they got. Whereas 31% of them do agree on that they got a good after purchase service.

Based on the data presentation from the above table, 52 % of the respondents fall under disagreement about the training and supervision the sales representatives received. And 21.1 % said they agree and the other 17.5% of them being neutral. It shows that the level of training the sales representative received would contribute significantly for the quality of service they can provide. Not only an adequate training that brought a good quality customer service, but also there should be a reliable supervision by the responsible personnel.

In relation to the above factor considered which contributes for low product demand, it is also the ease and frequency of contacting the sales representatives. Customers need a close contact with the sales representatives for order collection, technical enquiry, and promotion and for other supportive activities. It counts for 61.8 % of the respondents who disagree and strongly disagree for the frequent contact by sales representatives. And 21.1 % of them said they were able to do a frequent contact and at the same time they found the representatives easily so that they agree. They are 9.4 % who did not comment or being neutral.

The overall satisfaction rate about the helpfulness and receiving a quality service from sales representatives was rated at the same pattern like the above factors of measurement. From the analysis of the feedback of the respondents, 69.1 % were found to be strongly disagreeing and disagree or they are not satisfied at all. They are only 11.2 % of them are replied as agree and 12.6 % are neutral. The inference of the above data direct that customer visit and supportive service are determinants for the level of customer satisfaction and product demand.

In summary the factors revealed that the products are truly affordable but it is the deficient in supportive service which is accountable for the low level of the product demand. Poor after purchase service and lack of frequent contact and visit to follow the flow of products are the details of poor performance.

Table 4.7 The Likelihood record to buy a product again

	Probability of re-buying	Percent	Mean	SD
1	Definitely will buy	28.9	1.93	0.864
2	Probably will buy	43.1		
3	Might or Might not	23.0		
4	Probably will not	4.9		
	Total	100.0		

(Source: Survey data, SPSS analysis)

In addition to the low level of the product demand presented above, Table 4.7 shows that the probability of the respondents to order and buy the product again. Then 66.1 % of the respondents are not sure or they are in a dilemma about their action to purchase again. But 28.9 % of them confirmed that they will buy again irrespective of the challenges they faced from with regard to a lack of marketing support that resulted in less demand of the products. There are also respondents who decided not to buy again and counted to be 5 %.

As it can be referred from the profile of the organization, it is engaged in rendering a social marketing service to the public. Selling and donating affordable health care products and awareness creation to protect public health problems are among the main functions. But we have seen from the analysis done above there are some gaps in between the preparedness and capacity of the organization and the size of the demand. Below in Fig 4.10 It is the data analysis presentation for the attitude of the respondents if they believe whether the organization satisfy the objectives of the social marketing or not. As shown in the figure 33.8% of the respondents are disagreeing and 19.7 % of them also strongly disagree. That

makes the total disagreement level 53.5 %. This implies that the organization has still a long way to go in achieving its organizational objectives.
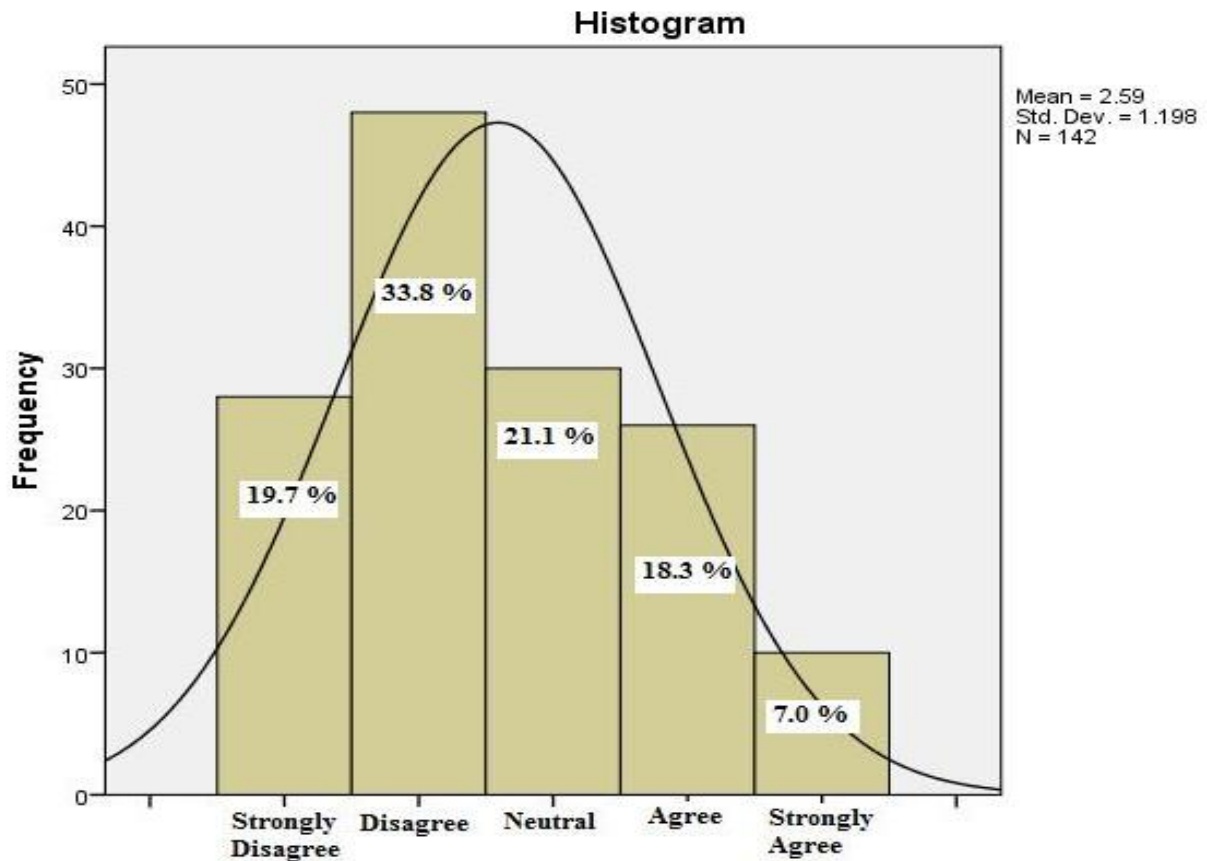
(Source: Survey data, SPSS analysis)

Figure 4.10 Frequency diagram for 'PSIE has a supply chain to satisfy social marketing'

There are also 25.3 % of the respondents who agree on that the organization is doing well in satisfying the social marketing objectives. Though the service has to be improved a lot this also implies that the organization has been doing an affirmative actions towards its goals. Among the total respondents 21.1 % of them are being neutral about the action taken by the organization so far.

4.2.1.2   Correlation analysis

Spearman's Correlations

As the study was intended to measure the performance of the supply chain performance, it is found to be constructive to include the respondents' general view towards the performance of the organization supply chain. In doing so it was tried to measure the performance using different indicators. Here in this section of analysis is the presentation of how significant was the variables to measure the overall satisfaction rate towards the performance of the supply chain from the respondents point of view.

The analysis focuses on the satisfaction level with PSIE supply chain system. And the variables forwarded to measure are flexibility of the organization's supply chain strategy, meeting the promised delivery dates, after purchase service and product affordability. And it is presented as how each variable is significantly correlated to the organization supply chain system. For that matter, it will be possible to draw a performance measure using these variables.

Table 4.8 Correlation of overall supply system with flexible strategy

			Over all satisfied with PSIE supply systems	Supply strategy flexibility of the organization
Spearman's rho	Over all satisfied with PSIE supply systems	Correlation Coefficient	1.000	.388**
		Sig. (2-tailed)	.	.010
		N	142	142
	Supply strategy flexibility of the organization	Correlation Coefficient	.388**	1.000
		Sig. (2-tailed)	.010	.
		N	142	142

**. Correlation is significant at the 0.01 level (2-tailed).   *(Source: Survey data, SPSS analysis)*

56

Table 4.9 Correlation of overall supply system with meeting promised delivery dates

			Over all satisfied with PSIE supply systems	Meeting Promised Delivery Dates
Spearman's rho	Over all satisfied with PSIE supply systems	Correlation Coefficient	1.000	.441**
		Sig. (2-tailed)	.	.010
		N	142	142
	Meeting Promised Delivery Dates	Correlation Coefficient	.441**	1.000
		Sig. (2-tailed)	.010	.
		N	142	142

**. Correlation is significant at the 0.01 level (2-tailed).   *(Source: Survey data, SPSS analysis)*

From the above analysis in Table 4.8 and Table 4.9 there was a significant positive correlation between overall supply chain system performance and the flexibility of the supply strategy and in meeting the promised delivery dates. And it is found to be statistically significant at $(P = 0.01)$ for each variable.

Table 4.10 Correlation of overall supply system with after purchase service

			Over all satisfied with PSIE supply systems	After purchase service is good
Spearman's rho	Over all satisfied with PSIE supply systems	Correlation Coefficient	1.000	.177*
		Sig. (2-tailed)	.	.018
		N	142	142
	After purchase service is good	Correlation Coefficient	.177*	1.000
		Sig. (2-tailed)	.018	.
		N	142	142

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.11 Correlation of overall supply system with affordability of price

			Over all satisfied with PSIE supply systems	Affordability of Product Price
Spearman's rho	Over all satisfied with PSIE supply systems	Correlation Coefficient	1.000	.270**
		Sig. (2-tailed)	.	.001
		N	142	142
	Affordability of Product Price	Correlation Coefficient	.270**	1.000
		Sig. (2-tailed)	.001	.
		N	142	142

**. Correlation is significant at the 0.01 level (2-tailed).

From the above analysis in Table 4.10 and Table 4.11 there was a significant positive correlation between overall supply chain system performance with after purchase service and affordability of products. And it is found to be statistically significant at (P = 0.018) and (P = 0.001) respectively.

According to the above information it possible to summarize that the variables are positively correlated at a high and significant level to the overall supply chain system. Therefore, the variables are capable of measuring the performance of the overall supply chain system from the perspective of customer satisfaction.
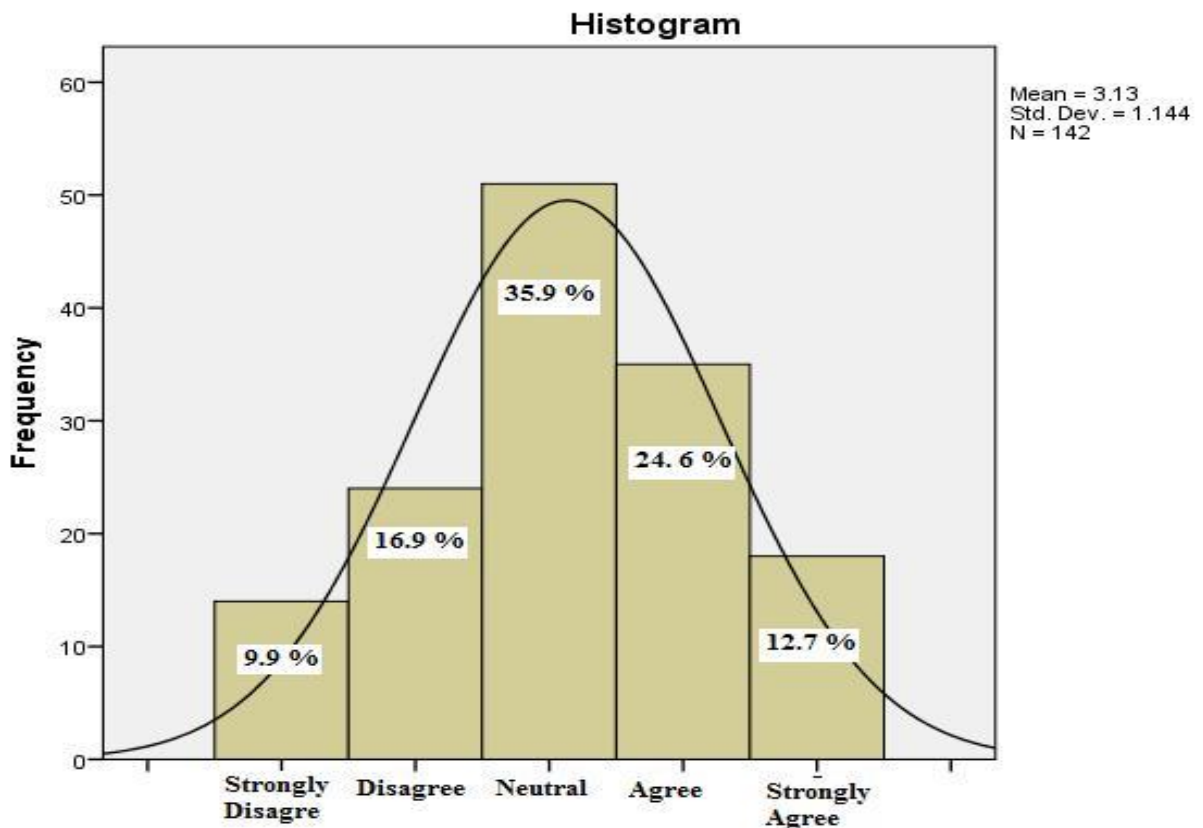
(Source: Survey data, SPSS analysis)
Figure 4.11 Overall satisfaction with PSIE supply chain performance

As shown in the figure 4.11 35.9 % of respondents are neutral on the overall supply chain performance of the organization. Totally they constitute 26.8 % of the respondents who do not agree and strongly disagree with the performance. The rest are said they strongly agree and agree and weighted to be 37.3 %. With a mean value of 3.13 and standard deviation of

1.14, the overall supply chain performance of the organization are not satisfactory as observed in previous measurements of inventory accuracy, delivery performance, product availability, customer order management and achieving social marketing objectives.

4.3   Discussion

4.3.1   Supply chain structure

As mentioned in the supply structure of the organization it has both international and local suppliers to execute its organizational responsibilities. For any supply chain strategy and followed by structure, it is well recommended that it has to go in line with the general organizational strategy so as to gain the uppermost achievement. According to the findings of (Chohen and Roussel, 2009) for an organizational supply chain strategy to be in line with the organizational objectives and to be successful it has fulfill four basic strategies. These are aligned with business strategy, aligned with customer's needs, aligned with power position (your influence) and be adaptive for environmental changes.

According to the recommendations of Chohen and Roussel (2009) PSIE SC has performed well with regard to keep in line with the organization strategy and mostly importantly with their donors' interest. Because that is what the organization is mainly stands for. But when it comes to the criteria, which are alignment with customer needs and adaptively, according to the findings of this study there has been performance gaps, which are going to be discussed later in this section.

We have seen that procurement department is not part of the SC structure of the organization. As shown in the literature review this function should be included in the scope of the supply chain management. In 2008, Quayle said the business functions which falls within the scope of supply chain management are included in what is commonly known as the supply chain (or logistics) mix where purchasing is part of it. In PSIE this department has a role in the supply chain department but structurally it is not under the scope of the SC department.

4.3.2   Supplier selection and relationship

Supplier selection, effective management and performance evaluation are among the critical tasks of the supply chain management. Both the affirmative and negative actions taken with regard to the implementation of this function would harm the entire SC significantly.

In accordance with the conclusion made by (Monczka, 2009) Supplier selection is widely recognized as the most important responsibility of the supply chain management and

specifically the purchasing function. Because the organization's suppliers can affect the price, quality, delivery reliability and availability of its products. Organizations aim that proper supplier selection would help to reduce product and material costs while maintaining a high level of quality and after-sales services (Monczka, 2009). Therefore, an efficient supplier selection process needs to be in place for the successful supply chain management.

Furthermore, (Liu & Hai, 2005) has added that in today's highly competitive environment, an effective supplier selection process is very important to the success of any manufacturing organization

When we come to the supplier selection management of PSIE the findings shows that it isn't the mandate of the organization to select and manage its international suppliers. Selection of the local supplier is also not supported with practical selection criteria as to the findings of this study. In addition from the interview of the supply chain manager they are not looking to seek a competitive supplier to date due to the initial cost they made within the contract. But given the usefulness of the latest data to make a useful decision (Harold, 2009) said "Sunk cost fallacy"—making decisions based on the size of previous investments rather than on the size of the expected return. (Farzad *et al.*, 2008) added the use of price for a decision making as from three different studies, price is the number one selection factor, replacing *Dickson's (1966)* number one ranked quality criterion.

As stated above PSIE has a limited scope in managing the international suppliers, but that doesn't keep the organization to stay not being affected by the outcome of this effect. There isn't any action to design a measurement system and evaluation of the suppliers. But as we have seen in the analysis part there are some challenges originated from the supplier-PSIE relationship. In line with the study made by (Monczka et. al 2009), Earlier decisions may have to be revisited and re-evaluated if suppliers do not perform as expected. Regular reviews must be held to determine if the strategy is successful or whether it requires modification. And also they finally conclude that organizations face several key decisions when developing a supplier measurement system that are critical to the final design, implementation, and effectiveness of the system.

4.3.3   Delivery management performance

Delivery performance on the subject of keeping the time table to deliver the product with the right quantity is a key indicator for supply chain performance. Customers are affected significantly by their suppliers' actions towards delivery. The supplier's ability to deliver more quickly than its competitors can be an added advantage and satisfy their customers in respect to the overall business performance (Chase *et al*., 2006).

Here in the findings of this study there are variations on the delivery time intervals for the products taken under the analysis. For example for condom it is found to be 1.6 months for the smallest length of time between deliveries and ranges up to 10.7 months for the highest. And 0.6 month in minimum with 10.6 months at maximum for PUR, This doesn't seem to be healthy. Having such time variations will incur a cost of stock out and over stock at different times. Consequently these will have a negative impact on the performance of the supply chain.

Since delivery date is part of the lead time section to focus on, its random variation and proper or fixed time interval can speak about the relative performance of the lead time. Therefore here in PSIE, the lead time must be affected due to the performance of the delivery of products.

4.3.4   Warehouse and Inventory management

With regard to the supply chain structure warehouse staffs are responsible in managing the warehouse and inventory handling. But this is done with frequent contact with finance department and auditors in annual physical inventory. The warehouse has to be supported with the state - of - the art SAP applications in order to run a successful stock management. And also there must be enough number of staff with a clear division of labor. In PSIE in addition to the work load for the staffs are having there are a number of structural and administrational challenges affecting the performance. Communications, information system support, security to control the daily laborers are some of those.

As the documentation management and stock handling is not adequate in relation with the organizations' size of operations inventory inaccuracy have been recorded. As it is also explained in the analysis part the warehouse space utilization is not found to be efficient in

reference to the warehouse guide line. Products are misplaced and usually the warehouse is fully and sometimes over stocked. According to (Raman, 2009), inventory inaccuracy occurs when the system inventory, that is, what, according to the information system (IS), is available, does not match the physical inventory, that is, what is actually available.

Having the above operational challenges the inventory inaccuracy could result from several factors, transactional and misplacement errors (Fry *et al*., 2007). For Water guard, PSIE is using a vendor managed inventory system and which is recommendable from the perspective of cost reduction and efficient utilization of time. That can help to answer the customers demand on a timely manner. It has been said by (Fry *et al*., 2007) as, if a company wants to reduce the total effort it puts into inventory control, one option is to leave the whole problem to someone else, a third party. VMI is a business model where the supplier manages the inventory on behalf of the retailer and is responsible for controlling the inventory by deciding how much and how often to order, which is determined based on demand information received from the retailer.

4.3.5   Customer service management

As the objectives of the organization are the responsibilities of the program offices, they are also associated with the performance of the supply chain department. Each department has its own social goal backed with a product which is under social marketing management to address the demands of the general public. This is in reference with the definition of social marketing as the design, implementation and control of programs calculated to influence the acceptability of social ideas and involving considerations of product planning, pricing, communication, distribution and marketing research. (Ling *et al.,* 1992). But this study reveals that 33.8% of the respondents are disagreeing and 19.7 % of them also strongly disagree when they respond to if they think the organization satisfied the objective of social marketing.

In line with the above objective of the organization we have seen that from the supply chain perspective the products are highly subsidized and become affordable by the target consumers. But not only having a product which are affordable will satisfy the demands of the final or target consumer but also adequate supply of those products matters a lot. As it is shown in the product availability analysis one can learn that it is a significant operational

challenge happened. It is clearly explained as characteristics of an effective supply chain by (SCC, SCOR model, 2010) and stated as Effective supply chain management is all about delivering the right product in the right quantity and in the right condition with the right documentation to the right place at the right time at the right price. If only it were as simple as it sounds.

Furthermore, had it been an adequate supply of products to the customers' store qualifying the above R rules, again it would not be enough to see the entire organizational and also the supply chain objective to be successful. There must be a consistent after sales support in order to augment the performance of the supply chain. According to (Kurata and Num 2010), manufacturers and retailers are always looking for practical after-sales policies that will permit them to enhance customer satisfaction levels. Furthermore, an analysis conducted by (Ou *et al.*, 2010) showed that customer-firm-supplier relationship management improves operational performance and customer satisfaction.

The after sales support will contribute to fix operational gaps which contribute for the less performance of the supply chain. Those operational gaps were reported as challenges from customer order management, variation in product demand and product availability in the target consumer market as well. The analysis summary for this effect was shown as there was a performance gap shown with regard to the post sale service by the organization. This includes a technical promotion and detailing about the indication of the products which follows the marketing 4ps strategy implementation. 47.2 % of the respondents totally disagree and strongly disagree about the adequacy of the service they have got. In accordance with the above service level, the likelihood of customers to buy the product again became as 66.1 % of the respondents who are not sure or they are in a dilemma about their action to purchase again.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

The Performcane evaluation of the supply chain management of PSIE summarized the major findings that the the study variables resulted in. The variables under consideration through the study were supplier relationship management, order management, delivery performance, warehouse and Inventory management, distribution and customer satisfaction.

PSIE has not a significant role in selection of the international suppliers. They also do not have set any selection criteria or give comment for possible change or modify the existing arrangement. This implies that there is a communication gap and the donor has not play its role efficiently and the SC integration is not well built. Moreover, There is no any selection criteria found about how the only local supplier (Ghion Industrial plc.) has been selected though there are other similar companies rendering the same product and service.

PSIE has found tied up with initial investment cost which economically termed as "Sunk Cost" for a current decision making (Harold 2009) to look for a better supplier with a more reasonable pricing and better technonolgy.

There was no any record or documentation concerning the agreement on average lead time or any plan of action to follow the lead time operation performance. However, the donor communicates the manufacturer/supplier and PSIE will gate the product in divided volumes of shipment in different times. But the exact time of these shipments is not known. The above arrangement leads the organization to have less performing inventory whichement which inturn resulted in difficulty to attain a stock level that can satisfy the demands of the organizations program units at any given time. There is the highest delivery gap which ranges from a maximum of 10.2 months to the shortest this is 1.6 months. But there is a relatively better performance for the delivery dates of drugs for making the STD treatment Kits in whcih they were delivered on an average of every 4.5 months.

For water guard, which is the only product from the local supplier, there is a different inventory management, The given Purchase order (PO) could be for a single order or a combination of two or three customer orders. With regard to the operation there are times

where the actual delivery exceeds the PO quantity by more than 30 % and there are also times where the PO quantity exceeds the actual delivery by 38 % and 50%.

There is a general warehouse manual for every function. The record documents used are Bin card, stock card, Inventory report sheet, GRN, GIN, stock return note and stock transfer note. Their operation is not supported with SAP application or with any database to facilitate the stock management. They are only using an excel application which is not as helpful as the warehouse or stock management databases. The warehouse is not connected to the main office neither via internet connection nor telephone line. This has created a significant problem to perform adequate communication in facilitating the administrative and operational functions. In summary the overall management of the warehouse can tell that, the capacity of the warehouse resources are not adequate to handle the size of operation that they are managing now.

The inventory reading looks good but there are times where there are discrepancies between the record and physical count and there were no any claims or justification found for the effect. The figure found as 20%, 25%, and 33% for the degree of the discrepancies.

The program offices said despite the successes they are not satisfied by the performance of the SC department as it is not functioning fully as per the agreed action plan and also the level of integration is low. They also said the performance of the sales people is not fully satisfactory. In addition, there is also some disagreement between the program and the SC in prioritizing the areas of intervention for product sales and distribution. The interdepartmental communication is also informal as there is no defined root of communication.

With regard to delivery performance of PSIE 45.8% of respondents are satisfied and 21.1% are very satisfied for being delivered with the correct amount of the order they gave. Though the above finding discover that the organization has a good record in satisfying the correct order, it is a different result where 54.2 % of the respondents saying that they are very dissatisfied and dissatisfied for meeting the promised delivery dates.

The organization do not have a standardized format for customer order collection which accounts for 73.9 % of the respondents. In relation to that, almost more than 60% of the products under this study were not available in customers' stores.

Pertaining to the customer service 47.2 % of the respondents totally disagree and strongly disagree about the adequacy of the service they got. Moreover, for the question that wheather the organization satisfy the objectives of the social marketing or not, it was found to be 33.8% of the respondents are disagreeing and 19.7 % of them also strongly disagree.

In general, it is possible to summarize that the variables are positively correlated at a high and significant level to the overall supply chain system. Therefore, the variables are capable of measuring the performance of the overall supply chain system from the perspective of customer satisfaction. Finally there were 35.9 % of respondents being neutral on the overall supply chain performance of the organization and totally they constitute 26.8 % of the respondents who do not agree and strongly disagree with the performance.

5.2   Conclusion

It is with a value adding contribution that measuring supply chain performance facilitate a greater understanding of the SC, and improve its overall performance. It makes an indispensable input to decision making in SCM, particularly in re-designing business goals and strategies, and re-engineering processes. Therefore, as performance measurement is an element of a constant improvement process it is possible to conclude that not only it is important for comparison and for identifying performance gaps but also necessary for internal objectives and for satisfying requirements from diverse external stakeholders.

The findings of this study also support the importance of performance measurement for a supply chain. It shows that there are operational limitations that hold back the organization's effort to run a successful supply chain management. But there are also relatively better operational records the SCM was good at it.

➢ The general factors affecting the SCM performance of the organization found to be supplier selection and evaluation criteria, Integration, level delivery performance of suppliers, warehouse and inventory management, departmental coordination, delivery performance, level of product demand, customer service and satisfaction. For the above factors affecting the SCM there is no any performance metrics available to manage and taking appropriate decision.

➢ Structurally the supply chain of PSIE is well organized to handle such a function in line with the organizational objectives. Having both local and international suppliers benefits the entire supply chain as it gives a portfolio of experience in which the organization will improve its performance. But practically this doesn't happen. As the findings indicate the selection of the international suppliers is out of the organizations scope and also with regard to the local suppliers there is no a defined selection and evaluation criteria. It is with the interest of the donor organization to manage and to hold on or to change the degree of integration. The level of information flow to support the supply function is not also well organized. These found to result in negative implications to the performance level that the organization is trying to achieve.

➢ The result of the above mentioned poor supplier relationship management seen as irregular delivery and lead time that in turn alter the inventory management. There is no a clearly defined standards of stock handling in achieving a safety stock, reorder level, maximum and minimum stock levels. Inventory management without setting standards and defining the above stock levels will be very challenging.

In addition, though there are good performances so far with relative to utilization of the existing resources the general warehouse management is encountered by structural challenges. There is no information system support implemented. No internet connection, no telephone line and inefficient storing place utilization.

➢ The inventory accuracy rate is also found not satisfactory. It is possible to refer the performance of the inventory within the study period. The record shows that there were times where there was a discrepancy between the record inventory and the physical inventory but no any claim report found for the possible reasons of the inventory inaccuracy.

➢ It is mentioned in the introduction part that the main function of the supply chain department is to satisfy the logistical needs of the organization's program. To make that happen it is expected to engage in a significant mutual understanding and communication between these units and the supply chain department. What is seen as a result of this study is there is no such level of performance. Some of the program units are not satisfied with the SC they are having as it was not possible to address the target market with the level of acceptance towards the demand and the objective of the program. Though the final goal of the SC is believed to be making the product available for the use of the target consumer, here in PSIE the supply chain function is extended to demand creation which is the task of the program. Therefore, both sections are responsible for the less demand and unavailability of stocks in the stores of the target consumer market.

➢ The finding towards the delivery performance is relatively good concerning delivering the correct amount of the order volume. But this delivery is not in

accordance in meeting the promised delivery dates. A large percentage of respondents are not satisfied with that. Having the warehouse here in the study area (Addis Ababa), 74% of the respondents are having a lead time of $5 - 8$ days which is dissatisfactory and contributes for less reordering and the general product demand. It is due to the work load on the sales people and lack of proper order management, for example there is no efficient utilization of a standardized order collection format and follow up. This can be further evidenced by the likelihood of buying the product again and it becomes unlikely because 66.1 % of the respondents are not sure or they are in a dilemma to purchase again.

➢ The organization achieved a good performance level in delivering highly subsidized and affordable products. This is among the very objective of social marketing. But the service is not adequate enough to get this product to the use of the public. The after sales service given by the organization was found to be not fully satisfactory by the customers these is due to the management of sales team is not confirmatory with the objective of the programs in particular and with the organization in general.

5.3   Recommendations

Supply Chain management is aimed at examining and managing Supply Chain networks. The rationale for this concept is the opportunity (alternative) for cost savings and better customer service. It requires close integration of internal operation within corporate and efficient relationships with the external functions of members in the Supply Chain (Lee, 2000). To achieve this goal of the SCM a continuous performance monitoring is a check and very crucial to do it. Therefore, after the conducting this performance measurement study of PSIE the following recommendations are drawn for a possible implementation in order to improve its SCM.

➢ As PSIE is responsible for the overall output of the supply chain management that means for both the drawbacks and better achievement, the mandate or the scope has to be increased towards the selection, managing and evaluation of international suppliers. With regard to the local suppliers, selection and evaluation criteria should be designed and with a better application of those criteria to follow on doing market research. That is to make available a much rationalized data for decision making.

Application of the Analytic Hierarchy Process (AHP) approach is one with better advantage. The method uses multi criteria decision making techniques. It has found widespread application in decision making problems, involving multiple criteria in systems of many levels. This method is identified to assist in decision making to resolve the supplier selection problem in choosing the optimal supplier combination

➢ In line with the above recommendation to perform a better supplier relationship management it is better to design an efficient agreement to decide on the appropriate time of delivery. This means to decide on lead time interval by considering the nature size of the operation and the nature of the pipeline. And also the way of communication to have adequate information flow so that everything concerning the logistic will be under control.

➢ For a better warehouse management it is advisable to develop the capacity of the resources. Adding man power, increase the warehouse size, infrastructure development (telephone, internet). The next task is also related to the above

recommendation. Once the SCM be able to design the supplier relationship agreement it will also possible to decide on the stock control levels. So that inventory inaccuracy, over stock and stock outs will be minimized. The implementation of a warehouse management database is indispensible to improve the SC operation.

➢ Interdepartmental relations have to be improved as they are engaged in responsibilities to achieve the same final goal. A good level of communication and mutual understanding shall be developed before taking any actions. A clear division of task and a common information pool towards monitoring and evaluation shall also be implemented.

➢ Marketing subsidized and publicly affordable products is with a greater advantage to the success of the supply chain management in particular and to the success of the entire organization objective towards social marketing at large. Therefore it will be excellent if this operation should be continued and to add more effort to improve it further.

➢ The nature of health care related customer support and demand creation activities require dedicated service providers in their supply chain system. Therefore the organization shall assign additional employees in a permanent base. Not only that the geographical coverage or territorial management should also be improved in line with the number and capacity of service providers per a specified territory. That will decrease the product unavailability rate rather it will improve the product demand.

➢ Since the management of customer order handling found to be unsatisfactory, it is with greater advantage to use the standard order collection tools proficiently and increase the capacity of delivery service in order to decrease the lead time or do it in acceptable limit.

➢ An enterprise resource planning system (ERP) implementation will solve many operational challenges. ERP is a State-of-the-Art operational resource management tool. Expressed in simpler terms, ERP systems provide the means for tracking

organizational resources, including people, processes, and technology. The system serves as the backbone to the organization in terms of providing the information and support for making decisions. ERP systems also create process logic between the closely related areas of customer order management, purchasing processes, and financial management and accounting. (Monczka et. al 2009).

REFERENCES:

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

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

Ayers J. B. (2001). <u>Handbook of Supply Chain Management</u>. Boca Raton. Fla.: The St. Lucie Press/APICS Series on Resource Management.

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

Bowersox, D.J. & Closs, D.J. (2006). <u>Logistical Management</u>: the Integrated Supply Chain Process, Macmillan, New York, NY.

Bridgefield Group (2006). <u>Bridgefield group erp/Supply Chain (SC) glossary</u>. Available: http://bridgefieldgroup.com/bridgefieldgroup/glos7, accessed on June 2, 2013).

Cebi F., Bayraktar D. (2008), An integrated approach for supplier selection, <u>Logistics Information Management</u>, Vol. 16., No. 6 , pp 395-400

Chan, F.T.S. & Qi H.J. (2007). Feasibility of performance measurement system for supply chain: a process-based approach and measures, <u>Integrated Manufacturing Systems</u>, Vol.14, Issue 3, pp. 179-190.

Chase, R.B., Jacobs, F.R. and Aquilano, N.J. (2006) <u>Operations Management for Competitive Advantage</u>, 11th ed., New York: McGraw-Hill.

Chen, I.J. and Paulraj, A. (2004), Understanding supply chain management: critical research and a theoretical framework, <u>International Journal of Production Research</u>, Vol. 42 No. 1, pp. 131-63.

Chow, D., Heaver, T., & Henriksson, L. (1999). Logistics performance: Definition and measurement. International Journal of Physical Distribution & Logistics Management, 24(1), 17–28.

Christopher M. (1998). Logistics & Supply Chain Management: Strategies for Reducing Costs and Improving Services. London: Pitman Publishing.

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

David Asamoah, Jonathan Annan & Samuel Nyarko (2012). AHP Approach for Supplier Evaluation and Selection in a Pharmaceutical Manufacturing Firm in Ghana. International Journal of Business and Management Vol. 7, No. 10.

DeHoratius N, Raman A. (2008) Inventory record inaccuracy: an empirical analysis. Technical report. Graduate School of Business, University of Chicago. Working paper,

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.

Federal Ministry of Health of Ethiopia (FDRE) & World Health Organization (WHO) (2003) Assessment of the Pharmaceutical Sector in Ethiopia, A.A)

Fry, M. J., Kapuscinski R. and Olsen, T. L. (2007): Coordinating production and delivery under a (z,Z)-type vendor managed inventory contract, Manufacturer & Service Operation Management, Vol. 3, No 3, pp.151-173

Gunasekaran, A., Patel, C. and McGaughey, R.E. (2004), A framework for supply chain performance measurement, International Journal of Production Economics, Vol. 87 No. 3, pp. 333-47.

Handfield RB, Nichols ELJ. (1999) Introduction to Supply Chain Management. New Jersey: Prentice Hall, Inc.

Harold Kerzner, (2009) Project management: a systems approach to planning, scheduling, and controlling. 10th ed. John Wiley & Sons, Inc, pp. 1018 – 1019.

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

Kurata H, Nam S-H. (2010) After-sales service competition in a supply chain: Optimization of customer satisfaction level or profit or both? International Journal of Production Economics. 127:136-146

Lambert DM, Cooper MC. (2000) Issues in supply chain management. Industrial Marketing Management Vol. 29: pp. 65, 66.

Lee Hau & Corey Billington. (2000). The Evolution of Supply Chain Management Models and Practice, Hewlett-Packard. 25(5), 42-63. http://dx.doi.org/10.1287/inte.25.5.42

Ling JC, Franklin BAK, Lindsteadt JF and Gearion SAN (1992). Social marketing: its place in public health. Annual Review of Public Health, 13: 341-362.

Little, A. (1999). A European Supply Chain (SC) survey. Available: http://www.adlittle.be/insights/studies/pdf/european_supply_chain_survey.pdf. (July 15, 2013).

Liu, Fuh, and Hui Hai. (2005): The voting analytic hierarchy process method for selecting supplier. International Journal of Production Economics vol. 97, no.3 pp. 308-17.

Lohman, C.; Fortuin, L. & Wouters, M. (2008), Designing a performance measurement system: A case study, European Journal of Operational Research, vol.156, Issue 2, pp.267-286.

Mark Saunders, Philip Lewis and Adrian Thornhill (2009) Research Methods for Business Students 5th edition, Pearson Education Limited, **Pitman** publishing imprint.

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.

Michael Quayle (2008) Purchasing and Supply Chain Management: Strategies and Realities, University of Glamorgan, IRM Press UK, USA.

Michael Tracey, Chong Leng Tan, (2001), Empirical analysis of supplier selection and involvement, customer satisfaction, and firm performance, Supply Chain Management: An International Journal, Vol. 6 Iss: 4, pp.174 – 188

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

Neely, A., Gregory, M. and Platts, K. (1995), Performance measurement systems design: a literature review and research agenda. International Journal of Operations & Production Management, Vol. 15 No. 4, pp. 80-116.

Niemi, P.; Huiskonen, J. & Karkkainen, H. (2009), Understanding the knowledge accumulation process—Implications for the adoption of inventory management techniques, International Journal of Production Economics, vol.118, Issue 1, pp.160-167

Omkarprasad, S. V. & S. Kumar. (2006), Analytic hierarchy process: An overview of applications. European Journal of Operational Research 169: 1-29

Ou CS, Liu FC, Hung YC, Yen DC. (2010), A structural model of supply chain management on firm performance. International Journal of Operations & Production Management, 30:526.

P.P. Kulkarni, A.P. Khot (2012). Recent Trends in Mechanical Engineering, Supply Chain Performance Measurement, MPGI National Multi Conference, (MPGINMC_2012), proceeding published by Indian Research Transaction®

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

Philip Kotler, Gerald Zaltman (1971), Social Marketing: An approach to planned Social Change. Journal of Marketing. Vol. 35, No. 3.

Pienaar, W. (2009). <u>Introduction to Business Logistics</u>. Southern Africa: Oxford University.

Quayle M. (2006). <u>Purchasing and Supply Chain Management</u>. Hershey, PA: Idea Group Publishing.

Robert M. Monczka, Robert B. Handfield, Larry C. Giunipero, James L. Patterson, (2009). <u>Purchasing and Supply Chain Management</u>, 4th edn. South-Western Cengage Learning, USA

Shoshanah Cohen, Joseph Roussel (2009). <u>Strategic Supply Chain Management: The Five Disciplines for Top Performance</u>, McGraw-Hill,

Simchi-Levi D, Kaminsky P, Simchi-Levi E. (2003). <u>Managing the Supply Chain</u>. New York: McGraw Hill

Supply Chain Council, Inc. (2010). <u>Supply Chain Operations Reference (SCOR®) model Overview - Version 10.0</u>, 12320, Barker Cypress Rd. Suite 600, PMB 321, Cypress, TX 77429-8329 USA

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

Tahriri, Farzad, Rasid Osman, Aidy Ali, Rosnah Yusuff, and Alireza Esfandiary (2008), AHP approach for supplier evaluation and selection in a steel manufacturing company. <u>Journal of Industrial Engineering and Management</u> 1, no.2, pp. 54-76.

Turning Point National Program, (2007) <u>the Basics of Social Marketing</u>. University of Washington School of Public Health and Community Medicine 3rd edition. 6 Nickerson Street, Suite 300, Seattle, Washington 98109-1618.

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

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

APPENDIX

1. Inventory record table

Inventory/ Stock check date	Pur		Water Guard		Condom		Addis Cure		Addis Cure PLUS		Ulcure		Inventory Accuracy
	Record	Physical	Record	Physical	Record	Physical	Record	Physical	Record	Physical	Record	Physical	
22/04/2010					18,000,000	18,000,000							100%
6/10/2010					11,642,800	11,642,800							100%
4/10/2011					9,974,722	9,974,722							100%
20/7/2011	4,187,718	4,187,718					12,708	12,708					100%
9/12/2011					1,652,772	1,652,772							100%
5/3/2012	2,327,238	2,327,238			966,600	976,700	4,960	4,960	3,089	3,089	300	300	80%
28/4/2012							3,808	3,808	1,359	1,359	3,629	3,629	100%
3/5/2012	4,334,564	4,334,564					1,374	1,374					100%
27/8/2012	509,316	509,316					572	572	4,966	4,846			67%
31/10/2012							10,605	10,605	12,340	12,340	3,538	3,538	100%
25/12/2012							40,753	40,753	22,623	22,623			100%
31/12/2012			18,000	18,000			38,858	38,858	21,246	21,246			100%
28/1/2013	9,751,566	9,847,566					29,358	29,358	9,344	9,344	2,185	2,185	75%
18/4/2013	7,153,686	7,153,686					16,380	16,380	19,920	19,920			100%

Source: PSIE warehouse record.

2. Questionnaire

<div align="center">

St. Mary's University

School of Graduate Studies

MBA Program

paper to be filled by the Supply/Logistic Manager, Technical (Pharmacy) Manager or Marketing Manager.

</div>

I am Samuel Fikru, a final year student in Master of Business Administration at St. Mary's University College, School of Graduate studies.

Thank you for giving me the opportunity. Please help me by taking a few minutes to tell me about the service that you have received so far from PSI/E

Purpose of the study:

This study is conducted for academic purpose which is for the partial fulfillment of a study for a degree of Masters of Business Administration (MBA) in St. Mary's university college. Under the title *"A study on Supply Chain Management performance analysis: The case of population Service International /Ethiopia (PSI/E)"*

Questionnaire Guide

- Under this questionnaire you are not required to write your identification.

- Please attempt all questions

- Follow the specific instruction in each part

- If you have additional suggestions to say please use extra paper and attach it at the end.

- You are kindly requested to fill the questionnaire and get it back in a short time.

Thank you,

Samuel Fikru,

Student Researcher

I. Personal Data

1. Sex   Male ☐   Female ☐

2. Your Position in the company?

   Supply/Logistic Manager   ☐

   Technical Manager   ☐

   Marketing Manager   ☐

3. Number of years Served?

     < 2 ☐   3 – 4 ☐ 5 – 6 ☐   7 – 8 ☐   >8 ☐

4. Type of facility

   Private commercial pharmacy   ☐

   Private hospital Pharmacy   ☐

   Public hospital pharmacy   ☐

   Partner/sub grant   ☐

   Whole seller   ☐

   Key distributer   ☐

II. Demography of the company

1. For how long has the company been in operation? In years.

   1 – 5 ☐   6 – 10 ☐   11 – 15 ☐   >15 ☐

2. How many types of products does your organization have from PSI/E? _____

   Addis Cure ☐   Addis Cure PLUS ☐   Ulcure ☐

   Water Guard (Wuha Agar) ☐   PUR ☐   Condom ☐

III. General Supply chain

1. Way of order collection

   Telephone ☐   In person (you) ☐   Sales representative ☐

2. Is there a standardized format for order collection

   Yes ☐   No ☐

3. Average number of days to get the order filled (Lead time)

   1 – 2 ☐   3 – 4 ☐   5 – 6 ☐   7 – 8 ☐   >8 ☐

4.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Is there effective and delivery service					
PSI/E has a well established distribution system					
PSI/E supply strategy is flexible enough to support your organization operation					
Is the location of PSI/E's warehouse accessible					
compensation system including collection of expired and damaged products					
Possible to change or cancel an order if there happens a very long lead time					
PSI/E has supply chain Management that can satisfy social marketing objectives					

Compared to how you felt about PSI/E before this service, what is the likelihood of complete another organization with PSI/E?

Better performance ☐   About the same ☐   Worse performance ☐

I. Product

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall product quality is good					
Product price is affordable					
After purchase service is good					

Order

How satisfied are you…

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Speed of response to price and delivery enquiries					
Meeting promised delivery dates					
Informing about changes in delivery dates					
Delivering correct orders (according to order specifications)					
Quality of product packaging					
Accuracy of sales documents (invoices)					
Friendliness and helpfulness of customer service. E.g. supervision					
PSI/E has arranged flexible payment system for products					

II. Support Service

1. If you contacted PSI/E customer service, have all problems been resolved to your complete satisfaction?

   Yes, by the company [ ]   No, the problem was not resolved [ ]

2. Based on your experience with PSI/E products, how likely are you to buy them again?

   Definitely will [ ]   probably will [ ]   Might or might not [ ]

   Probably will not [ ]   definitely will not [ ]

3.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
PSI/E service representatives are well trained and supervised					
Ease and frequency of contacting PSI/E's sales representative					
Overall, I am satisfied with the PSI/E service representatives					
Overall, I am very satisfied with the PSI/E supply management.					

Feedback for Improvement

What can we do in the future to perform better?

_____

_____

What did we do really well?

_____

_____

Thank You!

3. Interview Check List

INTERVIEW CHECK LIST AND POINTS FOR FOCUS GROUP
DISCUSSION

♣ Supply chain Manager

1. General design/structure of the supply flow and management
2. Supply chain department structure and main responsibilities under each unit
3. Are there internally applied Supply chain performance measurement check list/indicators?
4. Supplier selection criteria
   - Major factors affecting the selection and the entire supply chain
5. PSI/E – suppler relationship
   - Delivery schedule (invoice quality, time of delivery Vs agreed plan)
   - Product order (plan Vs actual, how often, challenges)
   - How do you measure the performance of the suppliers
6. Warehouse arrangement
7. Product Range, Distribution, Reverse logistic?
8. Product type and size impact on SC performance with related to the program needs
9. Planned order procedure
   - Order entry methods?
   - Quality of orders: *Timely* (on time collection? regular? how often?), *Accurate* (use format? on the right channel? right quantity?), *Usable* (as per the data quality?)
   - Order lead time (Total cycle time)
   - Customer order path (no. steps (value adding?) the order has to pass through, IS application? Volume of paper work)
   - Orders (e.g., POs) that meet the set criteria (e.g., correct products received in the correct amounts, at the correct time, in the correct packaging; product arrived undamaged with adequate shelf life remaining;

10. Inventory management

11. Delivery structure

- Onetime delivery?

- Relationship with transport companies

- Cost effective distribution system

12. Customer service and satisfaction

- Flexibility to meet customer needs?

- Credit/cash sales (cash flow time)

- Post transaction/delivery and customer service?

13. Customer satisfaction level measurement practice?

⊕ *Warehouse*

1. Inventory Management

- Inventory documentations

- Accuracy of inventory

- Inventory carrying cost

- Cost reduction practices?

2. Order management

3. Delivery rate?

4. Capacity utilization, space utilization

5. Management of dead stocks (damaged and Expired)

6. Transportation, loading and unloading?

7. Warehouse condition Vs product quality

8. Documentation?

9. Application of any Information system (logistic software)

10. Standard operating procedures?

Procurement

1. Performance of procurement
    - Procurement plan
    - PO preparation in line with the supply chain plan
2. Market research for possible alternatives?
3. Supplier communication on pre product order and plan
4. Procurement agreement management

Suppliers

1. Type of Agreement
2. Degree of information sharing/reporting
3. Performance of order and delivery management
4. Shipment agreement
5. Operational planning (memorandum of understanding)
6. PSI/E supply chain management performance

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.

SAMUEL FIKRU   _____

Name   Signature & Date

ENDORSEMENT

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

DR. MATIWOS ENSERMU   _____

    Advisor   Signature & Date