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**ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE
DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN
MANAGEMENT**

**THE EFFECT OF INVENTORY MANAGEMENT PRACTICE
ON SERVICE DELIVERY: THE CASE OF ETHIOPIAN
ELECTRIC UTILITY**

BY

BIMREW MELESE (GSD/o184/06)

ADVISOR: TEKLEGIORGIS ASSEFA (Asst. Prof.)

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in Partial Fulfillment of the Requirements for the Award of Masters
of Arts Degree in Logistics and Supply Chain Management**

**JUNE, 2017
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ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE
LOGISTICS AND SUPPLY CHAIN MANAGEMENT

DECLARATION

I, the undersigned, declare that the work done in the project entitled “*The effect of Inventory Management Practice on Service Delivery of EEU: The case of Central Warehouse*” is an outcome of my original and own effort prepared under the guidance of Teklegiorgis Assefa (Asst. Prof.), and that all sources of materials used for the study 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 institutions for the purpose of earning any degree.

Declared by:

Bimrew Melese
Student

Signature

Date

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ENDORSEMENT

This thesis has been submitted to Addis Ababa University School of Commerce Graduate studies for examination with my approval as a university advisor.

Teklegiorgis Assefa (Asst. Prof.)

Advisor

Signature

Date

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DEDICATION

This work is dedicated to the Almighty God for his mercy and protection, for seeing me this programme. Finally to my loving wife, Tigist Ewunetu and my dear children, Hana, Bezawit, Yeabsira, Elshaday, and Abenezer. I thank you for the support, understanding and your sacrifices while carrying out the study.

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ABSTRACT

The research objective was to assess the impact of EEU inventory management practices on service delivery. The study was a descriptive research design. The target populations for the study were employees working at head office and 3 regions in Addis Ababa. Simple random sampling techniques were applied to select a sample size of 110 employees from both managerial and non managerial positions. 97 employees (88.18%) response rate was obtained. Primary data was mainly collected using self-administered questionnaires consisting of both open and closed ended questions with 5 point Likert Scale. Data were also collected through documents overview, interview and observation guide. The collected data were quantitatively analyzed using SPSS to produce descriptive statistics and regression analysis. The key findings from the study revealed that: The utility was not effective in practicing modern inventory management techniques instead there is poor inventory management system that results under stocking, overstocking, high cost, high customer complaints and poor service delivery. The study discovered that poor procurement planning, purchase of unnecessary materials and bulk purchase practices result the availability of excess amount of obsolete and non moving items. The study also revealed that lack of adequate qualified and well trained staffs (i.e., skill gaps and awareness) impede in implementing effective inventory management techniques. Moreover, Lack of up to date inventory policy and procedure, poor recording and documentation practice, poor communication, poor decision making among user departments, and poor inventory revaluation system all aggravate poor service delivery of the utility. The researcher recommends that there is need for EEU management to emphasize applying Optimized Inventory Management Techniques, Implementing Integrated and Automated Inventory Management System, Recruiting adequate and qualified staffs, Developing Employees Capacity, Implementing Proper Disposal System, Developing Up-to-date Inventory Management Policies & Procedures. The study also suggests that further study should be conducted to assess the Role of Management in adoption of integrated and computerized inventory control system.

Key words: Effectiveness, Inventory, Inventory management practices, Service Delivery, Obsolete and Inactive inventories, Staff Skills, Inventory Record Accuracy, documentation.

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LIST OF ACRONYMS

DRP:	Distribution requirements planning
EEU :	Ethiopian Electric Utility
EAAR:	East Addis Ababa Region
EOQ:	Economic Order Quantity
ERP:	Enterprise Resource Planning
FIFO:	First-in-First-Out
GRN:	Goods Receiving Note
ICT:	Information Communication Technology
ISIV:	Inter Store Issue Voucher
JIT:	Just-In-Time
LIFO:	Last-in-First-Out
MetEC:	Metals and Engineering Corporation
NAAR:	North Addis Ababa Region
RMG:	Return Manufacturing Goods
SAAR:	South Addis Ababa Region
SR:	Store requisition
SRN:	Store Return Note
SIV:	Store Issue Voucher
SPSS:	Statistical Package for Social Scientist
UEAP:	Universal Electric Access Program
WAAR:	West Addis Ababa Region

CHAPTER ONE

INTRODUCTION

This chapter discusses the Background of the Study, Statement of the problem, Research Questions, Research Objectives and Significance of the Study, Scope of the Study, Limitation of the Study, Definition of Terms and Organization of the Study.

1.1 Background of the Study

The American Production and Inventory Control Society (APICS) define inventory management as the branch of business management concerned with planning and controlling inventories. Inventory management is a critical management issue for most companies – large companies, medium-sized companies, and small companies.

Lyson and Gillignham (2003) argue that inventory management involves controlling of stock or inventory levels with the physical distribution function to balance the need for minimizing stock holding and handling costs. Consistently, inventory management is aimed at ensuring that the company is supplied with the right inventories (quantities of inventory) at the right time, in the right places and ensuring optimization of the benefits of holding inventory in the organizations. Inventories are the stock of products a company holds to further its production and sales they appear in the form of raw materials, work in progress, finished products and supplies maintained by firms to smoothly conduct their business (Pandy(2005).

According to Ogbadu(2009), inventory plays an importance role in the growth and survival of an organization in the sense that ineffective and inefficient management of inventory will mean that the organization loses customers and sales will decline. Effective Inventory Management decisions are essential to support the utility's strategic plan and to meet the needs of customer demand. Effective inventory management is the result of outstanding inventory control and inventory management. An effective inventory management is able to generate more sales for the company which directly affects the performance of the company. Aminu (2012) also states that Efficient and effective management of inventories also ensures business survival and maximization of profit which is the cardinal aim of every firm. More so, an efficient management of working capital through proper and timely inventory management ensures a balance between profitability and liquidity trade-offs.

According to Reid & Sanders (2007) inventory management basically serves two main goals. First of all good inventory management is responsible for the availability of goods. It is important for running operations that the required materials are present in the right quantities, quality, at the right time, right item, at the right location and at the lowest cost in order to deliver a specific level of service. The second goal is to achieve this service level against optimal costs. Not all items can be held in stock against every cost for example and therefore choices have to be made. To meet these goals, inventory professionals work with two major (and sometimes conflicting) objectives in mind: Maximize customer service (that is, provide material when the customer needs it) and minimize inventory dollars (that is, control the number of dollars invested in parts and material). Inventory management departments must work with purchasing departments and customers to reconcile the two conflicting objectives.

Ogbo, A. I & Onekanma I.V. (2014) state that the scope of inventory management also involves managing the replenishment lead time, replenishment of goods, returns and defective goods and demand forecasting, carrying costs of inventory, asset management, physical inventory, available physical space, demand forecasting, inventory valuation, inventory visibility, future inventory price forecasting and quality management. With a balanced of these requirements, it is possible to reach an optimal inventory level, which is an on-going process as the business needs shift and react to the wider environment.

The general purposes for carrying inventory may include one or more—(a) forming the basis for doing business; (b) provide a favorable return on investment; (c) allow the buyer to take advantage of quantity discounts; and (d) protect against fluctuations in demand, delayed supply, and inflation.

Inventory availability is the most important aspect of smooth operations and good customer service in many situations. According to Frazelle (2002) the goal of inventory management is to increase financial returns on inventory while simultaneously increasing customer service levels. In this context, the primary goal of inventory is to provide the right material, at the right location and time, at the lowest cost. To achieve this goal, inventory professionals work with two major and sometimes conflicting objectives: These are Maximize customer service level (that is, provide material when the customer required it) and minimize inventory funds (that is, control the amount of finance invested in parts and material). Therefore, Inventory management

departments must work with purchasing & logistic departments and customers to reconcile the two conflicting objectives.

Buffa and Salin (1987) stated that there are several reasons for keeping inventory. Too much stock could result in high dollars being tied down, increase in holding cost, deterioration of materials, obsolescence, non moving items, pilferage and theft. On the other hand, shortage of materials can result interruption of service; poor customer relations and underutilized the available manpower.

Determining how much inventory is required to support a company's assets is one of the most difficult questions posed to Inventory Management and Supply chain leaders today. A utility's generation, transmission, distribution and sales of electricity can mean investing millions of dollars in inventories that could be used to meet its growing list of energy demands. Therefore, sufficient and timely availability of required quantity of materials is very important for timely delivery of projects and services to customers. It thus becomes absolutely essential to manage inventories effectively so as to avoid unnecessary cost and ensure high level of performance and customer service.

Therefore, Effective Inventory Management decisions are very essential to support the Ethiopian Electric Utility's strategic plan and to meet the needs of customer demand. It is the result of outstanding inventory control and inventory management system which able to generate more electric sales for the utility which directly affects the performance of the organization. Sensible management of inventory reduces depreciation, obsolescence, pilferage and wastages while ensuring availability of the materials when required. Therefore it requires a systematic inventory management practices which is managed by a group of employees who are experts in this area. Moreover, Dimitrios (2008) states that Inventory Management Practices have come to be recognized as a vital problem area needing top priority and deserve maximum attention. On the other hand, Rajeev (2010) also denotes that excessive inventories tie up working capital and boost up carrying costs.

1.2 Overview of the Company

In 2013 the Ethiopian Electric Power Corporation (EEPCO), one of the state owned giant public utilities split into two: Ethiopian Electric Utility (EEU) and Ethiopian Electric Power (EEP). By Regulation No. 303/2013" The Ethiopian Electric Utility (EEU) as public utility enterprise was established for indefinite duration with a vision of "Energizing Ethiopia's sustainable growth and

enabling it to be power hub of Africa". At the time of establishment, the authorized capital of the corporation was 64,715,822,693.20 billion birr of which 16,178,955,673.30 birr was paid up in cash and kind. The Enterprise shall be governed by the Public Enterprises Proclamation No. 25/1992. The Ministry of Water, Irrigation and Energy shall be the supervising authority of the Enterprise. The Enterprise shall have its head office in Addis Ababa and may have 15 regional offices and more than 430 district customer service centers throughout the country.

The purpose of the Utility is described on Federal Negarit Gazeta of FDRE, 20th Year No.5 Addis Ababa, 27th December, 2013 as follows:

1. To construct and maintain electric distribution networks; to contract out the distribution networks construction to contractors as required;
2. To administer electric distribution networks, to purchase bulk electric power and sell electric energy to customers;
3. To initiate electric tariff amendments and, upon approval, to implement same;
4. In line with directives and policy guidelines issued by the Ministry of Finance and Economic Development, to sell and pledge bonds and to negotiate and sign loan agreements with local and international financial sources.
5. To undertake any other related activities necessary for the attainment of its purposes.

As the information obtained from the strategic planning, Currently Government of Ethiopia (GoE) has initiated a transformation program to enhance operational efficiency & effectiveness of energy sector to attain power sector performance excellence by establishing Ethiopian Electric Utility (EEU) with a vision: "To be a customer-centric process based utility energizing sustainable growth of the nation" with an aim to double the customer base (from current 2.55 Million to 6.955 Million by year 2020. The number of full-time staff in this new environment is expected to rise to more than 13,000 (www.eepco.gov.et, Accessed on 12 Dec. 2016, 4:30 PM).

Inventory Management is very critical for generating, transmitting, distribution, and sales of electric energy. Inventory constitutes the most significant part of current assets in Ethiopian Electric Utility (EEU) and because of the relative largeness of inventories maintained by the utility; a considerable sum of an organization's fund is being committed to them. There is challenging inventory management practices that the utility experiences such as stock out cases, pilferages and theft, stock deterioration and damage, overstocking leading to tying up of capital in stock and over/under valuation of stock. Any increase in the dissatisfaction of customers or

operations due to shortages of inventory may lead to poor service, profit loss and its associated costs. In line with above issues, EEU has been subject of a lot of criticism from the public in the quality and on time services delivery. Dimitrios (2008) states that too much inventory consumes physical space, creates a financial burden and increases the possibility of damage, spoilage and loss. On the other hand, too little inventory often disrupts business operations and increases the likelihood of poor customers services.

Thus, Effort must also be made by EEU management to strike an optimum investment in inventory since it costs much money to tie down capital in excess inventory. Solutions must be found to optimize inventory levels, reduce inventory management costs, and minimize obsolescence costs while maintaining service and availability levels. Therefore, it is important to assess the effect of inventory management practice in order to understand the seriousness and impacts on EEU's service delivery and operational success and accordingly give remedial solutions.

1.3 Statement of the Problem

The reason for carrying out inventory management practices is to ensure regular supply of materials when required. Inventory management practices therefore deserve utmost attention from top management to lower level employees. According to Sanghvi (1988), the reliability or quality of electricity supply had emerged as a key issue, because of the greater dependence of modern economies on power. However, the critical issue faced by our country is that the demand for electric power is high and there is a critical power supply problems.

It is also true that EEU as a public monopoly enterprise is constantly confronted with government ownership that faced with a lot of customer service troubles. Studies show that the utility's customer satisfaction is not meeting the required objectives. Esrael Birhanu (2015) on his study of measuring customer satisfaction at EEU revealed that the supply and procurement of materials and vehicles must be in the right quantity, quality and at the right time. Moreover, from the researcher's observation, reviewing of the utility's financial, internal audit and public relation reports and discussion with material management officials, the following problems were observed in inventory management system of EEU.

- (i) Customers who request for new electric power are expected to wait at least a year. As per the information obtained at Retail Business Office of EEU, from 2003 to February 2009 E.C, there are a number of applicants & waiting Customers for new connection. Some applicants

have been waiting for more than 7 years due to shortage of distribution materials. As a result of this, customers' complaint is high on the supply of materials and service delivery of EEU.

- (ii) As per the primary physical survey and observation undertaken at EEU central store, there are materials which are found in excess amount and also high stock outs in other materials. It was also observed that there is unplanned and urgent purchasing. On the other hand too much amount of obsolete, damaged, scrap and slow moving items were observed in the warehouse.
- (iii) EEU's finance department annual physical inventory count report on September 2016 at Central (Gofa main) warehouse also revealed that some items are over stocked, leading to high inventory carrying cost and some critical items were out of stock, leading to urgent buying because of low stock levels. The annual stock taking report also asserted that the problem might have been attributed to poor procurement planning and long bureaucratic procedure. The report also revealed the cases of inaccurate recording or poor entering of some data information, which was a good indication of poor inventory control. Materials are laid down traditionally and not properly placed to make simple count, issue and control easily. In addition to this the unidentified items, aged storage\shades and disorganize stock items were the main short coming observed.
- (iv) EEU enterprise level risk management plan of December 2015 page 37& 53 also states that Non-availability and/or delay in procurement have significant impact on the provision of better customer service and overall project delivery timelines. Shortage of spares results in costly maintenance and increased network down time. Frequent equipment failures lead to disruption of service and outages. Since EEU seems to be lacking an efficient inventory and store management, restoration times are usually large resulting in customer dissatisfaction.
- (v) The work force of the central warehouse is one of the significant problems in the process of inventory management. To loosely quote Peter Drucker, if efficiency is doing things right, then effectiveness is doing the right things. Therefore, if your staff is following the right processes to achieve a desired result, you have to make sure you're directing them to do the things that have the greatest impact on your inventory management. The placement and organization structure by itself has its own problems in specifying the required work force, competency and qualification of the employees.

Therefore, based on the researchers observation and discussion with material management & stock accounting, Procurement, logistic & warehouse officers reveals that EEU has constraints in

areas of inventory management controlling system, integrated and automated information system, inventory disposal system, and other aspects which include on skills and competency of employees, employment training, documentation and recording, overstock and under stock. The simple fact that ineffective inventory practice affects virtually the utility's objectives necessitates this type of research work. More specifically, the following basic research questions were needed to be addressed and intended to provide possible solutions.

1.4 Research Questions

This Study focused on seeking answer to the following research questions to address the stated problems.

- (i) What are the inventory management techniques that are practiced in Ethiopian Electric Utility?
- (ii) What are the effects of obsolete and slow moving inventories to the service delivery of EEU?
- (iii) How does inventory record and documentation practice affect service delivery of EEU?
- (iv) How do Staff skills and competencies affect the service delivery of EEU?
- (v) What are the challenges with inventory management practice that affect the service delivery of EEU?

1.5 Objectives of the Study

The study has both general and specific objectives. The main objective of the study is to assess the effect inventory management practice on service delivery the case of EEU. In order to achieve this general objective, the following specific objectives need to be met:

- (i) To assess inventory management techniques commonly affecting the service delivery of EEU.
- (ii) To find out the effect of obsolete and slow moving materials on the service delivery of EEU.
- (iii) To determine the effect of poor inventory records and documentation practice on the service delivery of EEU.
- (iv) To find out the effect of staff skills and competency on the service delivery of EEU.
- (v) To determine the challenges of inventory management practice that affects the service delivery of EEU.

1.6 Significance of the Study

The purpose of this research is to assess the effect of inventory management practice on service delivery of EEU. The result of this study has great significant to different stakeholders that include: EEU management, employees, customers and other researchers. Therefore, the study would have both practical and theoretical significance in the following ways:

- (i) The researcher try to propose feasible managerial suggestions to improve the company's inventory management system through our own analysis, after examining the relevant theories and understanding the business operational practice of EEU.
- (ii) The researcher hopes that the finding of the study is important to provide information to EEU management and employees to develop an organized thinking on the importance of inventory management practices.
- (iii) It enables to design and issue effective inventory policies that enable government institutions to adopt best inventory management practices that increase organizational performance and service delivery by reducing wastage of inventory investment.
- (iv) The study is significant to academic areas enabling to have practical training by integrating theoretical training with real working situation.
- (v) Additionally, the result of this study would help as a source document and as a reference for those researchers who want to make further study on the same area afterwards.

1.7 Scope of the Study

There are Fifteen (15) regions in EEU. However, due to remoteness of the area, employees and stores of those 11 regions which are located outside Addis Ababa are not the target population. To cope with the available time and resource constraints, the research project was intended to look into the effect of inventory management practice on the service delivery of EEU. The target population for the study was limited to departments of head office, ERP Project office, UEAP, Central warehouse and three regions of Addis Ababa (SAAR, NAAR & WAAR). To ensure a fair representation of the population, both full time employees working in managerial and non-managerial position are utilized. Due to the wide nature of the subject, the researcher was unable to investigate no more than 4 years inventory data and therefore bounded from June 2006 to February, 2009 E.C.

1.8 Limitation of the Study

- (i) The study didn't cover other factors that contribute to power interruption and customer dissatisfaction. The study is limited to the impact of inventory management practice to service delivery of the utility.
- (ii) The limitation of the study would dealt with the finding of reliable data and depth of coverage of the research work and also limited sample size as compared with the large number of employees in EEU. Data was collected from user departments of head office, Central store and 3 regions of Addis Ababa, which is smallest area as contrast with the exiting 15 regions of the EEU's stores. Therefore, accordingly generalizations would be made for the whole regional stores of EEU. Therefore, the finding of this study should be considered as showing the general circumstance of inventory management practice and service delivery EEU. Another study with a large sample size may be required in the further to arrive at reliable conclusion about factors affecting EEU's customer service delivery.
- (iii) The study was faced with a problem of not finding all respondents on time, were busy and tight with the organization work to answer the questionnaires properly, to make interview and formal discussion as much as required. Moreover, some of the respondents were not volunteered to respond the needed information. In addition some respondents were hesitated, unwilling to give information freely, failed to return the questionnaires and/or not interviewed at all.
- (iv) Some respondents specially middle and junior level managers were frustrated and felt that some information may lead to them accountable by providing more information on the EEU and were therefore not willing to disclose and provide detail information specially the open ended questions on white paper. Rather they want to provide information orally and be interviewed in steady of written data.

1.9 Operational definitions of key terms

Effectiveness- is the capability of providing the desired service. When something is deemed effective, it means it has an intended or expected outcome, or produces a deep, vivid impression.

Inventory: This is a record of EEU's current assets. Inventory is the stock of any item or resource used in EEU.

Inventory management: the art and science of managing to have the right material, at the right time and place, in exactly the right amount, at the best possible price.

Inventory management practices: an activity that organizes the availability of materials to the customers from new connection items to maintenance and spare parts.

Service delivery: the interaction between customers and EEU where service is offered by the utility, and the customers either loses value or finds value as a result. Good service delivery provides customers with an increase in value or satisfaction.

Inactive inventories- are items you do not want to be visible in the inventory list.

Service- The intangible but identifiable activities of EEU designed to provide required satisfaction to customers of EEU.

Obsolete and scrap materials- materials, equipments or parts which are no longer usable or demanded in the service for which they are purchased.

Inventory Records Accuracy- is a measure of how closely official inventory records match the physical inventory.

Documentation - Material that provides official information or evidence or that serves as a record.

Staff Competencies- skills or attributes that employees need to perform their jobs most effectively at EEU..

1.10 Organization of the study

Generally, the study is organized into five chapters. The first chapter starts with an introduction of the background of this study. Furthermore it gives an explanation of EEU's problems. Then this part illustrates the general and specific objectives, significance, scope, limitation, and organization of the study. Introduction part of the study is followed by chapter two which reviews related studies and literatures of different theories that are related to the subject of this thesis. This can be used for the analysis where the research project fit in. In chapter three, methodology part, the researcher examines different research methods and present what methods are applied to this thesis. In the methodology part of the research approach, research design, population and sample size, data source & types, data collection procedures, ethical considerations and data analysis are described in detail. Chapter four presents the analysis of findings and interpretation of the data generated. That means the findings of the study is discussed based on the objectives of the research. Finally, chapter five provides the summary of findings, recommendations and conclusions of the study.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1. Introduction

This chapter introduces different theories that are related to the subject of inventory management practices that can be used for the analysis. The researcher highlighted the operational definitions of the key words which were used in the conceptual framework of the study. In detail, it captures the definition of inventory, the reasons for holding inventory, inventory management, objectives of inventory management, inventory management techniques, inventory cost, inventory valuation methods, documentation and stock record practices, staff skill and competency, effect of slow moving inventories, scrap & surplus disposal, and customer service. Finally, citations of past research concerning the inventory management and service delivery are listed down.

2.2. Definition of Inventory

The institute of Chartered Accountants of India defines inventory as “Tangible property held for sale in the ordinary course of business or in the process of production for sale or consumption in the production of goods or services for sale, including maintenance supplies and consumables and other machinery spares”. S. Anil kumar and N. Suresh (2009) in their book of operations management on page 176 defined inventories as: materials in stock. It is an idle resources of an enterprise. Inventories represent those items which are either stocked for sale or they are in the process of manufacturing or they are in the form of materials, which are yet to be utilized. The interval between receiving the purchased parts and transforming them into final products varies from industries to industries depending upon the cycle time of manufacture. It is, therefore, necessary to hold inventories of various kinds to act as a buffer between supply and demand for efficient operation of the system. Thus, an effective control on inventory is a must for smooth and efficient running of the production cycle with least interruptions.

2.3. Reasons for Holding Inventory

There are many reasons that motivate companies to have stock. Stock and Lambert (2001) outlined six reasons for holding inventory as follows.

- a) **Improve customer service:** having inventories will ensure that customers who desire or must have immediate stock availability or short delivery times are satisfied in their dealing with the firm. This measure assists the marketing department and specifically the level of customer service to the customers.
- b) **Encourage production economies:** items purchased or manufactured in quantities greater than what is needed immediately will create lot-size inventories. This is to take advantage of quantity discounts, to reduce shipping, clerical, setup costs and in some cases, where it is impossible to make or purchases items at the same rate it will be used or sold.
- c) **Permit purchase and transportation economies:** inventory acts as buffer between demand and supply so that production can be geared to a more constant output than fluctuating demand. Therefore, lowest per-unit cost is possible due to the fact that production runs at a constant quantity. Inventory will also allow the seizure of lower per-unit rates of full-vehicle-load quantities. Likewise, lower prices can also be realized from price-quantity discount offer as more can be purchased and inventoried.
- d) **Act as hedge against price changes:** goods that are purchased on the open market are subject to the price level s dictated by changing supply-demand pattern. Purchases may be made in advance of need because of anticipated price increases.
- e) **Protect against uncertainties in demand and lead time:** in most cases, the level of demand on a logistics system and time required for re-supply cannot be known for sure. To assure product availability, additional amounts of stock are maintained. These stocks are in addition to the regular stock to meet to meet production and marketplace needs.
- f) **Act as hedge against contingencies:** labor strikes, fire and floods are just a few of the contingencies that can happen. Therefore, maintaining backup inventories is one way in which normal supplies can be maintained for a period of time.

2.4. Inventory Management

As stated by Jessop (1999), Inventory management is the art and science of maintaining stock levels of a given group of items incurring the least cost consistent with other relevant targets and objectives set by management. It is important that managers organizations that deals with inventory, to have in mind, the objectives of satisfying customer needs and keeping inventory costs at a minimum level. Inventory management is sometimes taken as inventory control that refers to”the process whereby the investment in materials and parts carried in stock is regulated

within predetermined limits set in accordance with inventory policy established by the management". The activities of inventory control/inventory management are determination of limit of inventories to be held; determination of inventory policies; setting out of investment pattern and its regulation as per individual and collective requirements; follow-up to examine the working of the inventory policy and effecting changes as and when needed. The primary objectives of inventory managements is to minimize idle time caused by storage of inventory and no availability of inventories as per requirement, and to keep down investment in inventories, inventory carrying cost and obsolescence losses, Saleem (1997).

2.5. Objectives of Inventory Management

Inventory management basically serves two main goals, Reid & Sanders (2007). First of all good inventory management is responsible for the availability of goods. It is important for running operations that the required material are present in the right quantities, quality and at the right time in order to deliver a specific level of service. The second goal is to achieve this service level against optimal costs. However, all firms keep a supply of inventory for the following reasons:

- i. **To minimize inventory investment:** One benefit of good inventory control is improved managerial efficiency in all functional areas of management.
- ii. **To supply the required materials continuously:** there should be a continuous available of materials in the factory or finished goods for trade. The main objective of inventory management is to maintain required inventory so that production and sales process run smoothly.
- iii. **To minimize the risk of under and over stocking of material:** if a company keeps inventory without proper analysis, there will be a chance of overstocking, which will increase the cost of carrying the inventory or under stocking of inventory that create problem in smooth operation of a business. So one of the main objectives of the inventory management is to minimize the risk caused due to under and over stocking of inventory.
- iv. **To maintain systematic record of inventory:** management needs different information regarding inventory for planning and decision-making. A systematic records of inventory helps provides such information to the management. It also assists to evaluate the current inventory management policy.

- v. **To reduce losses, damages and misappropriation of materials:** inventory management aims to reduce or remove the losses and misappropriate of materials. This is done by maintaining the proper stocks of materials with utmost care.
- vi. **To minimize the cost associated with inventory:** the proper maintenance of the information regarding inventory helps to make decisions like whether to take discounts or not, the size of order to be placed, when to order etc. the total cost associated with inventory may be minimized by analyzing the lot size to be acquired, the offer of discount on variable lot size and the timing of order. Such analysis helps to reduce the unnecessary inventory in inventories.
- vii. **To be stability in price:** an effective inventory management system minimizes the effects of regular price fluctuation. This in turn helps to gain the stability in selling price.

2.6. Store Management

According to Anil Kumar and N. Suresh (2009: 174), Stores play a vital role in the operations of company. It is in direct touch with the user departments in its day-to-day activities. The most important purpose served by the stores is to provide uninterrupted service to the manufacturing divisions. Further, stores are often equated directly with money, as money is locked up in the stores.

2.7. Inventory Management Techniques

Inventory management practices can be defined as an activity that organizes the availability of goods to the customers from sales items to consumables and spare parts. According to Lyons(2000), the concept of inventory management practices basically focuses on the techniques used to ensure that stock of raw materials or other supplies, work-in-progress and finished goods are kept at levels which provide maximum service levels at minimum costs. Inventory management practices helps businesses to optimize their stock levels, a critical aspect for any organization trying to adapt ever-changing consumer's demands. This practice enabled companies that adopted to succeed boost their operational efficiency, offering their customers exactly what they need, when they need it. Inventory management practices involve the use of many techniques of managing inventories in an organization. Some of these techniques are ABC analysis, EOQ method, JIT, establishing annual stocking policies, preparation of inventory budgets, optimized purchasing procedures and ERP. All these

methods can be used by any organization in managing inventories they briefly explained as below.

2.7.1. ABC Analysis

Bloomberg, Lemay and Hanna (2002) noted that ABC analysis categorizes products based on importance. Importance may come from cash flows, lead time, stock outs, and stock out costs, sales volume, or profitability. Once the ranking factor is chosen, break points are chosen for classes A, B, C and so on. The 80-20 concept is particularly useful in distribution planning when the products are grouped or classified by their sales activity. The top 20 percent might be called A items, the next 30 percent B items, and the remainder C items. Each category of items could be distributed differently. For example, an items might receive wide geographic distribution through many warehouses with high levels of stock availability, whereas C items might be distributed from a single, central stocking point (e.g.) with lower total stocking levels than for the A items. B items would have an intermediate distribution strategy where few regional warehouses are used, Ballou (2004).

2.7.2. Economic Order Quantity (EOQ)

Plasecki (2001) defines economic order quantity as an accounting formula that determines the point at which the combination of order costs and inventory costs are the least. Lysons and Gillingham (2003) also states economic order quantity as the optimal ordering quantity for an item of stock that minimizes cost. Economic order quantity approaches have proven to be effective inventory management technique when the demand and lead time are relatively stable, as well as when significant variability and uncertainty exist. This theory is relevant to this study in that it suggests that the appropriate or optimum level of stock or inventory that an organization should keep or store must help to reduce the cost of doing business.

2.7.3. Just -In -Time System (JIT)

According to Lysons and Gillingham (2003) definition JIT system as an inventory control philosophy whose goal is to maintain first enough material in just the right place at just the right time to make just the right amount of product. It is a lean production system used mainly in repetitive manufacturing. The JIT system suggests the inventories should be available when an organization needs them, not any earlier, nor any later. Stock and Lambert (2001) also defined JIT system as a program which seeks to eliminate non-value-added activities from any operation with objectives of producing high-quality products, high productivity levels, lower levels of

inventory, and developing long-term relationships with channel members. He further explained that in JIT System, anything over the minimum amount necessary for a task is considered wasteful. Thus, JIT attempts to minimize inventories through the elimination of safety stock. This theory is relevant to this study because it focuses on the identification and elimination of manufacturing system. This therefore helps to eliminate unnecessary inventory and reduce cost throughout the entire supply chain system.

2.7.4. Establishing Annual Stocking Policies

Management just decides the maximum and minimum level of stocks and supplies that need to be kept in the warehouse or across the network of warehouse locations. Management must also set optimized re-order levels, safety stock levels (below which supply must not be allowed to fall) and an average inventory level to ensure costs are contained.

2.7.5. Establishment of Optimized Purchasing Procedures

In order to ensure that inventory is under adequate control, management must adopt purchasing procedures that align with actual sales history and demand pattern data. All inventory items that have not had an inventory turnover or have not been sold within an accounting period, typically 12 months, should be classified as obsolete stock and should be liquidated from inventory to eliminate unnecessary carrying costs. Any item with a declining customer demand should be flagged in the system and its safety stock level thresholds and re-order point counts should be downwardly adjusted to mitigate risk of obsolescence and cost.

2.7.6. Preparation of Inventory Budgets

Many organizations have an annual inventory budgets and they are usually prepared well in advance before inventory is procured. Budgets should include the total cost of ownership to keep inventory on hand during that years account period. This includes materials cost, fixed operational costs, carrying costs, logistic costs, redistribution costs and additional miscellaneous costs that contribute to the total costs of ownership.

2.7.7. Inventory Control Practice

Anil Kumar and N. Suresh(2009) page 176 defined inventory control as a planned approach of determining what to order, when to order and how much to order and how much to stock so that costs associated with buying and storing are optimal without interrupting production and sales.

The scientific inventory control system strikes the balance between the loss due to non-availability of an item and cost of carrying the stock of an item. Scientific inventory control aims

at maintaining optimum level of stock of goods required by the company at minimum cost to the company.

According to Arora (2000), the factors to be considered in inventory control include; procurement costs, inventory carrying costs, cost of spoilage and obsolescence, cost of running-out of stock and set-up cost. A good inventory control system minimize the possibility of delays in production that are used by lack of materials, permits a company to exercise economics in purchasing, essential for an efficient accounting system is deterrent to people who might steal materials from factory, expedite the production of financial statement, allows for possible increase in output, creates buffer between input and output, insures against scarcity of materials in the market and avoid inventory build-up , Carter (2002).

The purpose of the inventory control function is supporting the business activities are to optimize the three targets which is customer service, inventory costs and operating costs, Tony Wild (2002). Kumar & Suresh (2008) also argue that effective control on inventory is a must for smooth and efficient running of the production cycle with last interruption. They proceed with their argument that this is warranted by varying intervals between receiving the purchased parts and transforming them in to final products. They further argue that inventory control would ensure adequate supply of products to customers and avoid shortages and ensure timely action for replenishment. Inventory control systems may ensures smooth production and hence no stock-out.

Poor inventory control has the following symptoms: high rate of order cancellation, excessive machine downtime due to material storage, large scale inventories written down because of price decline, distress sales, widely varying rate of inventory losses, large writing down at the time of physical inventory taking, continuous growing inventory qualities, liabilities to meet delivery schedules and even production rate, Menon (2006)

2.7.8. Stock Levels

The stock level deals with quantitative models for materials planning and control. There are four pre-determined critical levels for each item of material in the store. These are maximum level, minimum level; and re-order level and re-order quantity.

(a) Maximum level: The maximum stock level is that level above which stock should not normally be allowed to rise. It is set by:

- i. The rate of consumption of material.

- ii. Lead-time or time necessary to obtain new deliveries.
- iii. Re-order level of the material.
- iv. Re-order quantity of the material.
- v. The capital available and the opportunity to acquire items at low price.
- vi. The cost of storage and the availability of storage space.
- vii. Insurance costs.

(b) **Minimum Level:** This refers to the ordering point or flag point at which a new order should be placed to replenish used stock. The minimum stock level of an item is set so that stock will not be depleted during the lead-time required for the new order to be processed in manufacturing on with a vendor, as the case may be. When the minimum is reached, sufficient materials are generally ordered to bring the stock up to a maximum stock level. The minimum and maximum are usually stated in terms of number of units, as a minimum of 30 pieces and a maximum of 100 pieces.

(c) **Re-order Level:** This is the stock-level at which new order for materials should be placed. It lies between the minimum level and the maximum level. It is set after considering:

- i. Carrying costs of the material, which include interest on capital, used cost of deterioration and risk, insurance cost and cost of storage.
- ii. Ordering costs of preparing purchase order, cost of preparing purchase order, cost of receiving and inspecting materials and postage cost.

(d) **Re-order Quantity:** Re-order quantity is the quantity of material that is purchase each time. This is also termed as order size. The re-order quantity is also termed as economic order quantity if it can be acquired at the minimum cost. The re-order quantity can be calculated as under. $\text{Re-order quantity} = \frac{\text{maximum stock level} - \text{re-order level} + \text{minimum consumption}}{\text{minimum re-order period}}$

2.7.9. Enterprise Resource Planning (ERP)

According stock and Lambert (2001) enterprise resource planning (ERP) is a system that includes the core accounting functions of accounts payable, accounts receivable, and general ledger, coupled with logistics functions, to manage the organization. Lysons and Gillingham (2003) also defines enterprise resource planning (ERP) as a business management system that, supported by multi-module application software integrates all the departments of functions of an enterprise.

ERP systems are usually broken down into modules such as Financials, Sales, Purchasing, Inventory Management, Manufacturing, MRP, and DRP. The modules are designed to work seamlessly with the rest of the system and should provide a consistent user interface between them. These systems usually have extensive set-up options that allow you to customize their functionality to your specific business needs. Unfortunately he further explained that enterprise resource planning (ERP) is the latest and possibly the most significant development of material requirement planning (MRP I) and manufacturing resource planning (MRP II). While MRP I and MRP II allowed manufactures to track supplies, work in progress and the output of finished goods to meet sales orders, ERP is applicable to all organizations and allows managers from all functions or departments to have a consolidated view of what is, or is not taking throughout the enterprise.

2.7.9.1. Advantages of ERP for Inventory Management

According to Tom Miller (2014), ERP provides several benefits such as:

- a) **ERP integrates all business activities.** For example, if a purchase is entered in ERP by the sales department the order can be automatically passed to the manufacturing application. This application, in turn, is able to automatically calculate the required materials and create a production planning. The list with required materials is again passed to the purchase department where materials can either be ordered automatically (via EDI) or via a purchaser.
- b) **Inventory turnover Tracking and interconnection:** Because the order was entered before, the logistics can easily be coordinated as well and it is immediately clear where the materials are required and have to be delivered. Additionally all (financial) transactions are tracked in ERP. This provides the management the possibility to monitor in real-time, the planning status and predicted delivery times. Interconnections in ERP make sure that information in one part of the business can be obtained by another. ERP is thus able to react faster to orders, purchases etc. due to the automated interconnections between different business activities.
- c) **Reduce inventories and increase customer service:** Due to the speed at which the information is available, ERP has the potential to radically reduce inventories and increase customer service. The many interconnections also prevent people from reentering information into different systems which was often the case with legacy systems. Reentering information is a waste of time and may cause unwanted errors. With ERP (in theory) less people are required which is of course a costs saving.

- d) **Planning Replenishment Orders:** With ERP, planning can automatically be adjusted and has become more flexible. Also due to automate processes, delivery times and order-to-cash cycle times can be shortened drastically moreover the information is often available to supply chain partners. Your ERP inventory management system allows you to categorize parts which help easily order the right quantity. One item is ordered only when there is a specific demand in exactly the quantity to meet the demand. Another item is ordered when at a lower cost and easily procured. Your goal here is fewer transactions so you order enough to satisfy all the demands seen in the next three months. Optimizing replenishments means fewer transactions and that leads to better inventory accuracy.
- e) **Surplus Inventory Management:** You can quickly see and react to surplus inventory. Whether the surplus is caused by a decrease in some demand or you learn that the economy of a good buy wasn't so economical, your ERP inventory management system will spotlight the surplus immediately. Should you return the item? Can you contact the customer and ask for another order to use up the surplus? There are options you have when the surplus is quickly found and reaction is immediate. Delay might mean you move the surplus to the trash pile and disposition costs money instead of earning money.
- f) **Business Savings:** You save time and money through better inventory organization using your ERP inventory management software. Better organization can lead to improved customer satisfaction. Organization might mean moving your items with the most transactions to locations at the front of the stock room and near each other. It could mean combining the parts used for a particular order in nearby bins. ERP is easily used to improve inventory organization and the results can be much improved efficiency and better productivity in your stock room. Your employee satisfaction goes up and your profits right along with it.

Government of Ethiopia (GoE) has initiated a transformation program to enhance operational efficiency & effectiveness of energy sector to attain power sector performance excellence by establishing Ethiopian Electric Utility (EEU) as a “new world class electric power utility company” with an aim to double the customer base (from current 2.455 Million to 6.955 Million by year 2020). The number of full-time staff in this new environment is expected to rise to more than 13,000 in EEU.

To achieve its vision of providing the World Class services, EEU has to undertake an exercise to redefine the way business is done by creating a framework of new organizational structure & business processes. A “To-Be” IT Application Architecture should be defined to support the operations and management of the company in order to achieve the Objective of Customer Centricity and Operational Excellence. This prestigious ICT transformation project for new software applications along with deployment of state of the art infrastructure has been initiated with the purpose to establish a platform for EEU’s long term ICT strategy for Capacity Building and sustainable growth.

Under this project the existing application environment and infrastructure should be replaced with state of the art ICT systems that are fully integrated, robust & scalable. The site location and offices of EEU should be connected to central server.

2.8. Inventory Costs

According to Coyle, J.J., Bardi, E.J. & Langley Jr., C.J. (2003) inventory cost are important for three major reasons. First, inventory cost represents a significant component of total logistics cost in many companies. Second, the inventory levels that a firm maintains at points in its logistic system will affect the level of service the firm can provide to its customers. Third, cost trade-off decisions in logistics frequently depend upon and ultimately affect inventory carrying cost. As with any other investment, the cost of holding stock must be related to the benefits to be gained. To do this effectively, the costs must be identified. According to Gourdin (2001), there are three types of costs that must be considered in setting inventory levels.

2.8.1. Holding or Carrying costs

Capital cost, storage space cost. Inventory service cost and inventory risk costs are components of inventory carrying costs. These charges increase as inventory levels rise. In order to minimize carrying costs, management makes frequent orders of small quantities. Holding costs are commonly assessed as a percentage of unit value, i.e. 15 percent, 20 percent, rather than attempting to derive a monetary value for each of these costs. This practice is a reflection of the difficulty inherent in deriving a specific per-unit cost for, for example, obsolescence or theft.

- a) **Capital costs:** These include interest on money invested in inventory; interest on money invested in inventory handling and control equipment; and interest on money invested in land and building to store inventory (if land and buildings are owned).

- b) **Inventory service costs:** These include taxes on inventory; labor costs of handling and maintaining stock clerical costs for inventory records; contribution to social security by employer based on prorated time devoted to inventories by employees; unemployment compensation insurance based on prorated time of “inventory involved” personnel; employer contribution to pension plans, and group life, health, and an appropriate proportionate share for administrative overhead, including all taxes, social security, pension, and employer contributions to insurance programs for administrative personnel who are involved.
- c) **Storage space costs** include public, plant, rented, and company owned warehouses. These include taxes on land and buildings; insurance on buildings; depreciation on buildings and warehouses owned; rent (if paid); materials for repairs and maintenance on buildings; utilities; and janitor, watchman, and maintenance costs.
- d) **Inventory risk costs** include insurance on inventory; obsolescence of inventory; physical deterioration of inventory; pilferage; and losses resulting from inventory price declines.

2.8.2. Ordering Costs

These costs refer to the managerial and clerical costs to prepare the purchase or production order. Ordering costs include all the details, such as counting items and calculating order quantities. Those costs associated with placing an order, including expenses related to personnel in a purchasing department, communications and the handling of the related paperwork. Lowering these costs would be accomplished by placing a small number of orders, each of large quantity. Unlike carrying costs, ordering costs are generally expressed as a monetary value per order.

2.8.3. Stock-out costs

Include sales that are lost, both short and long term. These charges are probably the most difficult to compute, but arguably the most important because they represent the costs incurred by customers (internal or external) when inventory policies falter. Failure to understand these costs can lead management to maintain higher (or lower) inventory levels than customer requirements may justify. This cost refers to the cost of not having product available when a customer demands or needs it.

2.9. Inventory Valuation Methods

Inventory valuation is important because businesses are required to reduce the amount they deduct for inventory purchases over the course of a year by the amount remaining in inventory at

the end of the year. Valuing the remaining inventory differently could increase the amount deducted from income and thus reduce the amount of tax owed by the business.

As mentioned from the book of accounting for Managers chapter 6 (page 137-145), there are three basis approaches to valuing inventory that are allowed by GAAP:

- D. **First-in, First-out (FIFO):** Under FIFO, the cost of goods sold is based upon the cost of material bought earliest in the period, while the cost of inventory is based upon the cost of material bought later in the year. This results in inventory being valued close to current replacement cost. During periods of inflation, the use of FIFO will result in the lowest estimate of cost of goods sold among the three approaches, and the highest net income.
- E. **Last-in, First-out (LIFO):** Under LIFO, the cost of goods sold is based upon the cost of material bought towards the end of the period, resulting in costs that closely approximate current costs. The inventory, however, is valued on the basis of the cost of materials bought earlier in the year. Three points should be noted regarding this method:
 - (a) Materials issues are priced at actual cost.
 - (b) Charge to production for material cost is at the latest prices paid.
 - (c) Closing stock valuation is at the oldest prices paid and is completely out of line with the current prices.
- F. **Weighted Average (Average Cost):** Under the weighted average approach, both inventory and the cost of goods sold are based upon the average cost of all units bought during the period. When inventory turns over rapidly this approach will more closely resemble FIFO than LIFO. In stores, material is always mixed up. The principal on which the average cost method is based is that all of the materials in store is so mixed up that an issue cannot be made from any particular lot of purchases. Therefore, it is proper, if the materials are issued at the average cost of materials in store.

2.10. Effects of Slow Moving Inventory

The two primary inventory challenges for utilities are inactive inventory and lack of visibility into critical spares. Inactive inventory includes materials that have not moved in a specified length of time (typically one to five years) and that the utility no longer needs. Critical spares are inactive assets that must be kept on hand because in the event of an emergency an outage might occur if these spares were not distributed to the field quickly. To be useful, however, utilities

need good visibility into the location and condition of critical spares even though these assets are rarely needed.

The main problem of the slow moving products is the lack of historical data .For Industry producing different types of products, large quantity of the items are typically slow moving items. These items should have intermittent demand character and uncertainty about the lead time. It is difficult to predict the reorder point of the slow moving items which results in the increased carrying costs. To avoid this problem, firm must know the manufacturing quantity and retention period of the inventory, R. R. Jesse and J. M. Kraushaar (1985). Due to over stock situation, managing the slow moving or obsolescent items is the main problem for manufacturing, distribution and retail industries. Every item should liquidate before the salvage value otherwise it will become obsolete. Effective inventory control method for slow moving items could be developed and implemented in order to improve the customer service and to reduce production, inventory and holding costs. A regular review reorder based inventory control system was inappropriate for slow moving items.

Economic order quantity formula is the best well known one in inventory theory in which the demand should be uniform and lead time is constant. In this case shortages are not considered. In the case of slow moving items the demand seems to be fluctuating Haneveld and Teunter (1998).

2.11. Scrap and surplus disposal

Disposal of scrap and surplus are very important aspect of material management function, and if effectively done can contribute to the profitability of the firm. Scrap, according to Carter (2006) is the residue of process materials left behind during production while surplus is the materials from purchases which were not wholly consumed in the production. To achieve profitability in disposal of scrap and surplus, it involves managerial decisions in the areas of return to suppliers, selling to suppliers, selling to other firms, selling to dealers, etc

2.12. Documentation and Stock Record Practices

2.12.1 Stock Record Practice

According to Susan & Michael (2000) accuracy of inventory records is necessary to provide satisfactory customer service, determine replenishment of individual items; ensure that material availability meets repair or project demand, analyze inventory levels and dispose of excess inventory. He also states that stock records provide the management with the information which is used to ensure accountability through stocktaking and stock audit exercise. Bailey and farmer

(1982) state that stock recording are expected to maintain particulars of receipt, issue and balances remaining in stock for each individual item held in the storehouse daily.

PSI/Et warehouse manual (2010) also argues that appropriate standard records and documents should be used for receipts and inspection of goods. They argue that items in stock represent money and therefore should not be misappropriated, wasted or improperly used.

Storekeepers should have full details of the name, designation and specimen signatures of all persons empowered to approve issue notes. Further, issue documents should contain the description and stores code number entered by the user who prepares the document in the first place. They also state that records can be posted manually but, where the volume and complexity of the documents handled is of major proportion mechanical methods are often to be more effective. Manual posting is comparatively slow, there is high risk of filling the wrong detail, and it can be easily misplaced or lost due to multiple handling as compared to Computer posting system.

Carter and Price (1993) states that receipt of goods must be strictly controlled to ensure efficient stores management contributing to the function of receipt and inspection of goods. They also argue that specialized control documents have been developed to enable the issue of stock to be successfully monitored and controlled. It is important to ensure that all stock records are updated and that an accurate picture of the total stock situation can be maintained to ensure sufficient supplies of all materials.

Jessop and Morrison (1994) states that records can be posted manually but, where the volume and complexity of the documents handled is of major proportion mechanical methods are often to be more effective. Manual posting is comparatively slow, there is high risk of filling the wrong detail, and it can be easily misplaced or lost due to multiple handling as compared to Computer posting system. They also described stock control as is the operation of continuously arranging flows of materials so that stock balances are adequate to support the current rate of consumption, with due regard to economy. Stock control documentation therefore is the capture of data relating to stock balances, dues in, dues out, consumption record, forecast requirement, lead-time and economic order quantities (EOQ). They also argue that stock records are important when estimating future consumption because past performance acts as a guide. PSI/Et Warehouse Manual (2010) also recommends that the basic method of controlling stock by

quantity is by means of fixing, for each commodity, stock levels which are recorded in the stock record system and subsequently used as a means of indicating when some action is necessary.

2.12.2 Inventory Record Accuracy

An inventory stock record is accurate when the information on the stock record is in agreement with the actual physical situation, Schrady (2006). Inventory records can be achieved through the following strategies proposed by Lee (2006); selection and installation of inventory tracking software, revision of layout to allow for optimal storage, creation of rack location codes and assigning unique identifying number, locking warehouse and storage areas to limit unauthorized removal or movement of inventory. In addition, an organization may consolidate parts, so that the same items are kept in one place, assign unique part numbers to the parts, establish units of measure for the parts and embark on continuous and consistent inventory counting Supply Chain Metric (2016). In this study, inventory accuracy will be measured through the six indicators suggested by Strategos, Inc (2014). The indicators are; accurate forecasts for inventory items, accurate inventory counts, accurate coding system, accurate and efficient tracking system, minimum redundancy and minimum errors in inventory records.

2.12.3 Documentation-Receipt and Issue of Materials

For inventory control, documentation is important from the stage of, receipt, storage and issue to customer service.

- a) **Purchase Requisition (Materials Requisition Slip):** Bill of Materials is the first step for initiating the purchase of materials. In case, material is already in use and requires replenishment (refill), stores department sends the request to the purchase department, preparing 'Purchase Requisition'. Based on purchase requisition, purchase department initiates purchase of materials.
- b) **Goods Received Note:** Based on the purchase order, concerned supplier would supply the materials. Once material is received, necessary inspection is made at the stores to ensure that the quality received is as per the specification of the order placed. After inspection and satisfying that the supply is in total conformity of the purchase order, stores department issues 'Goods Received Note' which is sent to the purchase department, accounts department, production department and costing department. Goods received note is, popularly, called GRN.

Once Goods Received Note is issued, it is an indication that the goods have been, physically, received at the go down, in total conformity of the terms of Purchase Order, in respect of quantity and quality. Goods Received Note is an important document to the Accounts Department to verify and process the bill for release of payment.

- c) **Bin Card:** Bin card is a record of the receipt and issue of materials, kept for each item in the stores. The bin card shows the balance of stock of the item concerned, at any time. This record is of immense help to the storekeeper in controlling the stock position. A bin card is attached to the bin, drawer or any other container in which the material is stored. All the entries made therein are to be supported by proper documents. Goods received note supports the receipts and materials requisition note supports the issues. Balance in Bin card has to tally with the balance in the account of the concerned item in the stores ledger. When physical verification is made, physical quantity would be reconciled with the quantity shown in the bin card as well as the concerned account for the materials in the stores ledger.

2.13. **Effect of Computerized Inventory System**

Opeyemi, A. (2013) indicates that manual inventory system is characterized by a number of challenges. First it is time consumption as the system is updated manually after daily business operations. The second challenge is associated with communication. In manual system, the inventory records are taken manually hence hindering information flow between stores and related departments. Other challenges include difficult stock counting, difficulty in keeping track of daily inventory movements and inconsistency in ordering of materials. Because of the above challenges, many organizations are adopting computerized inventory system.

2.14. **Knowledge and Skills Possessed by the Staff**

Stock Control is no longer considered a clerical function performed independently by untrained individuals within a governmental agency (National Institute of Governmental Purchasing, 2001). Qualified staff that is competent and skilled will help the organization to achieve its goals and objectives by being efficient and effective when carrying out their various functions. For an organization to succeed, qualification is therefore a pre-requisite and must be matched with job requirement, hence the need to hire and develop ambitious personnel.

If staff involved in stock control is not qualified and competent, then there will be ineffectiveness in inventory control. Bailey and Farmer (1982) says that for inventory management function to achieve a superior performance, it's necessary to recruit, train and develop personnel with the

capacity and motivation to do better job. Incompetent employees can render stock control virtually ineffective.

According to Susan & Michael (2000), people in warehouse (that is, stores) are responsible for the distribution of inventory materials to all storage or using locations. They are also responsible for the physical security and safekeeping of material at all stores locations and for all storekeeping activities, including material receiving, put-away, and material picking and shipping. Other responsibilities include: maintaining accurate inventory records, managing the physical layout of storehouses, including bin location assignments, determining the physical movement and distribution of material throughout the organization, receiving and storing material; issuing stock material in response to a material request from customers, conducting cycle counts, annual physicals, or both, reconciling discrepancies between cycle count and annual physical inventory, developing and operating truck and route schedules for distribution of material, and working with purchasing departments to resolve vendor-related problems with timing, quality, quantity, and delivery.

2.15. Customer Service

2.15.1. Definition of Service

According to Murdick (1990), “service can be defined as economic activities that produce time, place, form, or psychological utilities”. Many service firms have become successful by identifying a previously unrecognized or unsatisfied customer wants. Stanton (1994) stated that “services are identifiable, intangible activities that are the main object of a transaction designed to provide want satisfaction to customers”. He also stated that the travel, hospitals, finance, entertainment, health care communications, utilities and professional services fields are prime examples. The world service industry leaders such as General Electric and the like have shared common denominators that are always pursue to serve their customers. They are never satisfied with what they have. Sing (2002) stated that services are difficult to define while services can be defined as intangible tasks that satisfy consumer needs when efficiently developed and distributed to chosen consumer segments. Therefore, In order to attain its organizational objectives, a business is to meet customers’ needs. Customers’ desire has always been a vital issue in a company not only to maintain sales but also to increase it. Harrison (2001) notes that ‘to understand the customer there must, first, be some direct link with the customer and second, it is essential that these information channels speak the language of the customer.

2.15.2. Importance of Customer Service

Customer service is the most important component of the logistics system. Not only do customer service decisions have a direct impact on the firm's customers and employees, but they also determine how the rest of the logistics mix will be structured (Gourdin 2001). Bloomberg, Lemay and Hanna (2002) are of the opinion that customer service defines the effectiveness of integrated logistics in the channel of distribution.

Tseng, Qin Hai and Su (1999) sum up the importance of service by underlining the fact that the growing importance of the service sector in almost every economy in the world has created a significant amount of interest in service operations. In practice, many services sectors have sought and made use of various enhancement programs to improve their operations and performance in an attempt to hold competitive success. As most researchers recognize, service operations link with customers. The customers as participants act in the service operations system driven by the goal of sufficing his / her added values. This is one of the distinctive features of service production and consumption.

2.15.3. Attributes for Customer Service

Customer service and delivering quality service is the major issue determining the competitive edge of organizations. Lack of or failure to meet quality will lead an organization to lose all or some of its customers. A great emphasis is needed for a service to retain all its qualities that customers need. Quality in a service business has become a measure of the extent to which the service provided meets the customer's expectations. In the modern highly competitive business world, the key to sustainable competitive advantage lies in delivering high quality service that will in turn, lead to satisfied customers. Customer satisfaction is considered a pre requisite of customer retention and loyalty, and can help to boost profitability, market share and return on investment.

Monczka, Trent and Handfield (2002) add that customer service includes a wide set of activities that attempt to keep a customer satisfied with a product or service after the initial sale. Often, this means that a business has dedicated customer account managers who help in managing customer promotions, inventory control and delivery schedules. This may require providing customer training or having technical support personnel available to answer phone questions 24 hours a day. Customer service may also include a network of spare parts distribution centers that provide rapid replacement of parts and components.

Bowersox, Closs and Cooper (2002) have underlined five fundamental attributes for customer service. These attributes will be briefly analyzed in order to enlighten the theoretical part of this study.

(i) Availability

Availability is the capacity to have inventory when desired by a customer. As simple as this may seem it is not at all uncommon for an organization to expend considerable time, money and effort to generate customer demand and then fail to have products available to meet customer requirements. The traditional practice in organizations is to stock inventory in anticipation of customer orders. Typically, an inventory stocking plan is based on forecasted demand for products and may include differential stocking policies for specific items as a result of sales popularity, profitability and importance of an item to the overall product line and the value of the merchandise.

It should be clear that achieving high levels of inventory availability requires a great deal of planning. In fact, the key is to achieve these high levels of availability for selected or core customers while minimizing overall investment in inventory and facilities. Exacting programs of inventory availability are not conceived or managed on average; availability is based on three performance measures: stock out frequency, fill rate and orders shipped completed.

(ii) Operational Performance

Operational performance deals with the time required to deliver a customer's order. Whether the performance cycle in question is market distribution, manufacturing support, or procurement, operational performance is specified in terms of speed of performance, consistency, flexibility and malfunction recovery.

(iii) Service Reliability

Service reliability involves the combined attributes of logistics and concerns a firm's ability to perform all order-related activities, as well as provide customers with critical information regarding logistical operations and status. Beyond availability and operational performance, attributes of reliability may mean that shipments arrive damage free, invoices are correct and error-free; shipments are made to the correct locations; and the exact amount of product ordered is included in the shipment. While these and numerous other aspects of overall reliability are difficult to enumerate, the point is that customers demand that a wide variety of business details

be handled routinely by suppliers. Additionally, service reliability involves a capability and a willingness to provide accurate information to customers regarding operations and order status

(iv) On-time Delivery

According to Wallin (2006), customers are more satisfied if the time taken to deliver their products is less than the time they are willing to wait once they have placed an order. Flexibility is paramount in meeting the delivery deadlines and therefore information sharing is required to enable the members of the supply chain to meet specified delivery dates by the customers. Yinmei (2013) also shows that effective customer delivery influences customer satisfaction and service quality. Customers are said to be more satisfied if their suppliers are able to meet and fulfill their orders within the required time, Wilding (2003).

(v) Customer Satisfaction

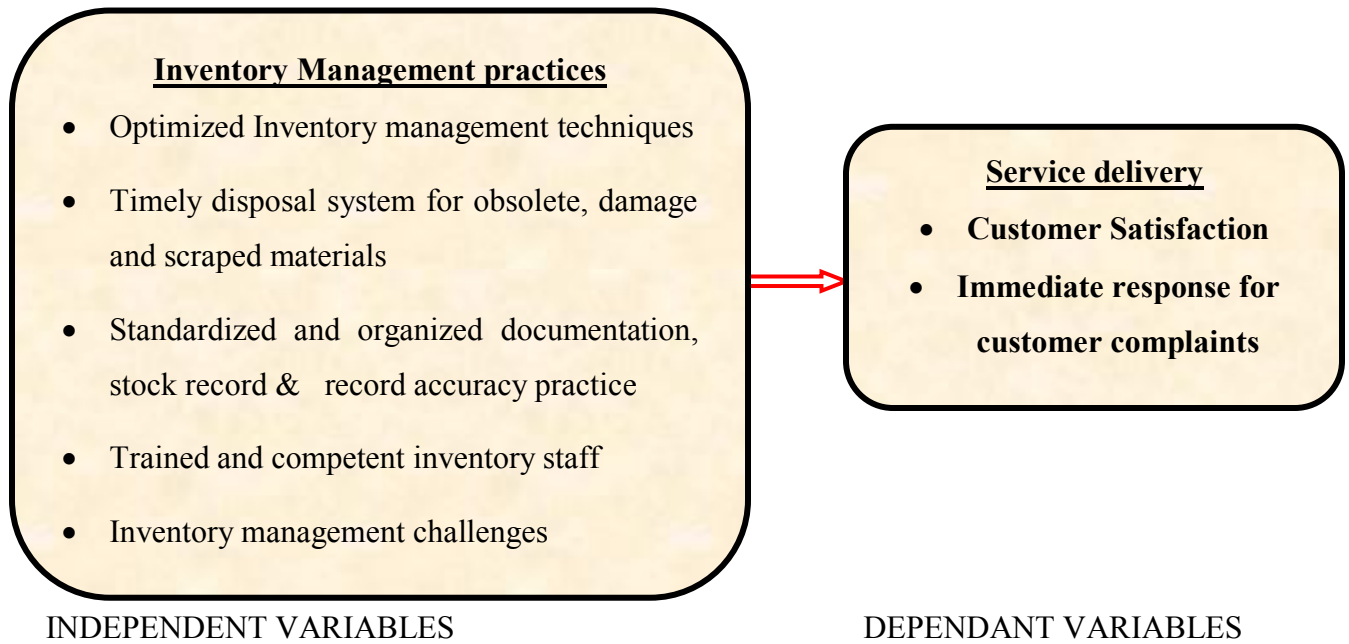
Satisfaction is simply meeting the customer requirements. The ability to meet the customer requirements is vital for a firm success. According to Oaklan (2006) by constantly meeting customers' requirements, we can move to a different plane of customer satisfaction. Douglas and John (2010) also define customer satisfaction/dissatisfaction as a comparison of customers expectations regarding the actual service come upon. Customer's satisfaction depends on the products perceived performance relative to buyer's expectations. If the service quality falls short of expectations, the customer is dissatisfied or there is a quality gap. If performance matches expectations, the customer is satisfied. If performance exceeds expectations, the customer is highly satisfied or delighted. According to Michael (2003), consumers satisfaction/dissatisfaction is determined by the overall feeling of attitude, a person has about a product after it has been purchased. It is more than a reaction to the actual performance quality of a product/service. It is influenced by prior expectations regarding the level of quality.

2.16. Research Frame Work

Mugenda (2003) defined a conceptual framework as a hypothesized model identifying the relationship between the independent and dependent variables. It shows relationships and variables of inventory management practice that affect service delivery of EEU. The model explains that inventory management practices such as inventory control techniques, timely disposal system for obsolete, damage and scraped materials, documentation and record accuracy, staff skills and competency have an influence or impact on the electric service delivery of the EEU. Therefore, electric service delivery is dependent variable which has been predicted by the

effective inventory management practices. Therefore, this study sought to use the Conceptual Framework in Figure 1 to determine that inventory management has impact on service delivery on EEU. It is from this conceptual framework that the research design of the study in the next chapter was made as well as the design of the data collection instrument and data collection and analysis.

Figure 1. Conceptual Frameworks



Source: Researcher's Own Construct based on the literature review, January (2017)

CHAPTER THREE

RESEARCH METHODOLOGY

Kothari (2004) defined research methodology as a science of studying how research is done scientifically. It contains details about the research approach, research design, survey population, sample size and sampling techniques, data source, data collection instruments, data analysis, reliability and validity of the instruments and finally ethical considerations.

3.1. Research Approach

The general objective of this research was to assess the effect of EEU's Inventory Management Practice on service delivery of the utility. Therefore, so as to meet this objective properly, both qualitative and quantitative approaches were used. The research started with informal observation of inventory process of EEU central warehouse before questionnaire was adopted to measure the impact of inventory management practice on the service delivery. Qualitative approach included the use of interview to strength the quantitative data while quantitative approaches were involved the use of descriptive statistics generated with frequency tables, pie charts, graphs, mean and standard deviation.

3.2. Research Design

The study adopted a descriptive research design. According to Mugenda & Mugenda (2003), descriptive research is used to obtain information concerning the current status of the phenomena to describe what exists, with respect to variables or conditions in a situation. Descriptive research design is used in this study since the researcher intended to look at the problem at hand thoroughly to define it, clarify it, and obtain pertinent information that could be of use in assessment of the impact of EEU's inventory management practices on service delivery of the utility. It is also able to describe the data and find out the relationships among the variables under study.

3.3. Population, Sample size and Sampling Techniques

3.3.1. Population of the Study

The target population from which the information was solicited by the researcher was 150 employees involved in controlling inventory or any other related activities in EEU. The target population for the study were staff members who are working at 13 different departments of

head office and three regions of Addis Ababa that include: Finance, Internal Audit, Procurement, Central Warehouse, Material Management, Retail Business, Corporate Planning, vigilance office, NAAR, WAAR, SAAR, UEAP and ERP project offices. Moreover, the researcher has purposefully selected 20 top and middle level managers to fill the open ended questionnaires and for interview purpose. This is because of the researcher believed that these managers and officers are aware of the EEU’s inventory activities and therefore they could provide detail and depth information. According to Fetter and Mcmillan (1980), purposive samples normally involve a more deliberate effort to secure a sample that conforms to some predetermined criteria. 20 single-phase, commercial and power customers were also selected as a target population for the purpose of interview from all 4 regions of Addis Ababa. Hence, the customers were selected as per their customer type. Stratified sampling was selected because of the nature of the populations were in different consumption and tariff level, so that it was assumed that they perceive EEU’s customer service in different way.

3.3.2. Sample size and Sampling Techniques

As to the sample size determination, from among different methods, the one which was developed by Yamane (1967) provides a simplified formula to calculate a precise sample sizes with 95% confidence level and P = .5 is assumed for Equation: $n = \frac{N}{1+N(e)^2}$

Where: n – designates the sample size the research uses.

N - Designates total number of target population at head office and 3 regions of Addis Ababa.

e – Designates maximum variability or margin of error 5% (0.05).

1 – Designates the probability of the event occurring.

When this formula is applied to the target population the sample size obtained as:

$$n = \frac{N}{1+N(e)^2} \quad n = \frac{150}{1+150(0.05)^2}, n = 110 \text{ employees}$$

Using this formula, out of 150 target population 110 employees were selected using simple random samplings and expected to fill the questionnaires. Dillman (2000) stated that a sample size of 100 and above is sufficient to present good concise research findings when the population contains a large number of units.

3.4. Sources of Data

To obtain information relevant to the study, both primary and secondary data were used for qualitative and quantitative methods. The primary data for this research were collected using both open ended and closed ended questionnaires administered to 110 respondents' of EEU executives and non executives working at head office and three regions of Addis Ababa. It was also gathered through oral interview and the researcher's physical observations. For Secondary source, the researcher referred relevant documents review such as inventory policy and procedure of EEU, reference books, financial and audit reports and research papers related to the topics in order to get information on theoretical frame work of the study.

3.5. Data Collection Procedures /Instruments

For this study the primary instruments used to collect data were survey questionnaires, interviews and physical observations. Mc Burney and White (2007) give confidence to use both the open ended and the closed ended questions since using the two methods can permit the respondents reacting in their own words and also in other case to limit the respondent's alternatives so as to guide them according to the questioner's designers. Therefore, for this study, self- administered questionnaires which were both open ended and close ended in nature were employed.

The questionnaires were distributed by hand to the selected management and non management employees of head office and three regions in Addis Ababa at their working departments during working hours personally. The researcher gave the respondents the option of filling the questionnaires at their convenient time and collected after three days for analysis. An interview questions were also conducted with employees and customers of EEU. Moreover, 20 single-phase, commercial and power customers were also interviewed from 4 regions of Addis Ababa. Physical observation of the working environment and all activities of central warehouse were also used as collecting instrument. Finally, the data collected through survey, interview and physical observation were analyzed to check the reliability and validity of the results. Regression and Descriptive statistics involved working out the mean, percentages and frequencies which were used to assess the correlation of the variables.

3.5.1. Questionnaires Design

The responses were prepared based on five point Likert Scale of 1=Strongly Disagree, 2= Disagree, 3=Neutral, 4= Agree and 5=Strongly Agree. Each objective questions consisting of 5

to 12 items to be answered by selected respondents. Likert Scale layout of the questionnaire was made; so that the respondents could easily understand, and answer them without taking much of their time. This method was used because it is reliable, simple; need minimum cost and the required data to collect with a minimum number of errors. It also allows the researcher to collect facts from a larger number of people maintaining uniform responses. The research questionnaires were separated into two parts. Part-I consists of seven demographic information such as gender, age, marital status, educational back ground, working position, experience of the respondents and working departments while Part-II consists of independent and dependent variables with 46 questions of Likert Scale layout. Additionally, 10 open ended questions with some explanation were administered to top and middle level management staffs for collecting data.

3.5.2. Interview Questionnaires

The researcher used formal face to face interview with employees and customers of EEU as a method of data collection in depth. This was used to collect the important information that would not be collected using survey questionnaires from top level and lower level employees. 9 short and precise interview questions were conducted with 3 district line mangers, 7 officers of Finance, Internal Audit, Procurement, Logistic & Warehouse, and Material & Stock Accounting. This is because of the researcher believed that these officers are aware of the EEU's inventory activities and routine operations of EEU. 7 Interview questions were also conducted with 20 different customers of EEU in order to collect information whether the existing inventory management system of EEU has impact on the service delivery. The researcher recording the results of interview on paper and then directly wrote onto a Personal Computer (PC).

3.5.3. Documentary Sources

This method is used to collect secondary data by studying the available documents within the organization, i.e. reviewing inventory records, audit reports and annual physical inventories for more information.

3.5.4. Physical Observation

The researcher collected primary data mainly through observations in the fieldwork, visiting the warehouses and observing the operational process of warehouse activities, looking into the internal control system& the information system, arrangement of materials, handling of

materials, documentation process, observing the status of shades and other operational process of central warehouse.

3.6. Data Analysis

Data analysis is an application of reasoning to understand, clear and interpret the data or information that have been collected through the questionnaires, Zikmund (2003). The data gathered through questionnaires was summarized, edited, coded, tabulated and analyzed using descriptive statistics such as frequency, percentage, charts. Editing was done to improve the quality of data for coding. The data collected through the questionnaire was analyzed using a statistical package for social sciences (SPSS version 20).

Regression Analysis: The researcher conducted a multiple regression analysis so as to determine the effect of inventory management practices on service delivery at EEU. The researcher applied the statistical package for social sciences (SPSS) to code, enter and compute the measurements of the multiple regressions for the study. The data collected from interview and documents was also analyzed qualitatively.

3.7. Test of Research Instruments

Dawson (2007) in every quantitative data analysis, validity and reliability are paramount. Once the questionnaire was developed by the researcher it was tested in staffs of EEU. This was carried out to confirm suitability for the intended purpose. This helped the researcher in redesigning it better and estimates the amount of time and money that was required to collect and process the data effectively.

3.7.1. Instrument Validity

The structured questionnaires' validity was provided through adequate coverage of the topic under investigation as per the expert advice. According to Mugenda & Mugenda (2003) expert opinion is used to check the content and format of an instrument to judge validity of the content. In this study the methods used to validate the research include content validity. Content validity was further ensured by consistency in administering the questionnaires. Pre testing was done to see the applicability and acceptability of the tools by the respondents. Validity of the instruments was conducted through 10 management and non management position of EEU working in different departments but who were not part of the study sample. The questions were formulated in both Amharic and English languages for clarity and ease of understanding. Moreover, in this study, the researcher secured validity by precisely defining major concepts, Clear instructions, matching the items to the research questions, clarity of wording, visual layout and format,

readability, accuracy of the elicited information were seriously considered. All questionnaires were completed and distributed to respondents by the researcher personally. This was done to prevent respondents from giving questionnaires to other people to complete on their behalf.

3.7.2. Instrument Reliability

A questionnaire is said to be reliable if we get same/similar answers repeatedly. This will be done by Test-retest reliability - whether repeating the test/questionnaire under the same conditions produces the same results will be done. Polit and Hungler (1993) refer reliability as the degree of consistency with which an instrument measures the attribute it is designed to measure. Reliability is done to ensure that same results are obtained when used consecutively. This was established following pre-test procedure before they are used for actual respondents. This was done by minimizing sources of measurement error like data collector bias by the researcher's being the only one to administer the questionnaires, exhibiting similar personal attributes to all respondents, e.g., friendliness and support. Respondents were requested not to write their names on the questionnaires to ensure confidentiality. In addition to this, the researcher was tried to put clear instructions at the beginning and be sure that all questions were answered based on proper understanding of respondents. Thus, by asking different questions or statements using different rating scales (e.g. agreement/disagreement) respondents can measure the same characteristic or satisfaction.

3.8. Ethical Consideration

In order to secure the consent of the research, the researcher had communicated the details and aims of the study. The researcher has stated to the participants that they have to participate in the research willingly. Moreover, the researcher ensured to the respondents not to disclose their names, position and personal information. Besides, informed verbal consent was obtained from the key respondents during data collection. The respondents were given the right to refuse or take part in the study. All the primary and secondary data collection in the organization was under the permission of the managers and without any offence in ethical rules during the whole research process. Moreover, developing trust on research participants, lookout against misconduct, applying professional writing codes of ethics, selecting research problems that will benefit individuals being studied, avoiding words or languages that are biased against persons in opposition to gender, racial or ethnical group, disability, keep away from falsifying or inventing findings etc, were the ethical concerns of the study.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRERATIONS

4.1. The Response Rate of Questionnaires

A total of one hundred ten (110) copies of questionnaires were administered and distributed across 13 departments. Out of the total respondents, 97 of them returned the questionnaire as they correctly filled and used in data analysis. This makes the response rate 88.18%. Mugenda & Mugenda (1999) states that a response rate of 50% is adequate, 60% is good and above 70% is perfect to represent the opinion of the entire population. As it can be seen in table 2 below, from the total of 110 questioners distributed, 13(11.82%) staffs had not returned the questionnaires. This leads the researcher to conclude that these employees's refusal and unwillingness to filling questionnaire instead they only look into their regular work schedule.

Table 1: Respondents Response Rate

No	Departments	Questionnaires Administered	Questionnaires Returned	Rate of Respondents (%)
1	Finance	25	25	100
2	Internal Audit	9	5	55.55
3	Material management and stock Accounting	3	2	66.67
4	Procurement , Logistic & Warehouse	11	8	72.72
5	ERP project Office	15	15	100
6	Central warehouse	7	4	57.14
7	Retail Business	9	9	100
8	Corporate Planning and Risk management	4	4	100
9	North Addis Ababa Region(NAAR)	10	8	80
10	South Addis Ababa Region(SAAR)	5	5	100
11	West Addis Ababa Region(WAAR)	5	5	100
12	Universal Electric access Program(UEAP)	4	4	100
13	Vigilance office	3	3	100
Total		110	97	88.18

Source: Field survey and SPSS output, May (2017)

As it can be seen in table-1 above, 100% of the respondents were from Finance, ERP Project Office, Retail Business, Corporate Planning & risk Management, SAAR, WAAR, UEAP and Vigilance Offices which indicates that the response rate was high. On the other hand NAAR registered 80% response rate followed by 72.72% response rate of Procurement, Logistic & Warehouse Office. While Material Management and Stock Accounting responded 66.67 %; Central Warehouse responded 57.14% and Internal Audit registered 55.55% response rate respectively. This indicates that 8 departments returned 100% and the rest departments returned on average more than 70% of the total questioners given to them. In addition to the questionnaire given to employees of EEU, 10 closed ended questionnaires were distributed for 10 higher and middle management officers' of Internal audit, Finance, Material management & Stock Accounting, Procurement, logistic & warehouse departments, NAAR, Property and General service. From the 10 questioners given to these officers, the entire questioner (100%) has been returned.

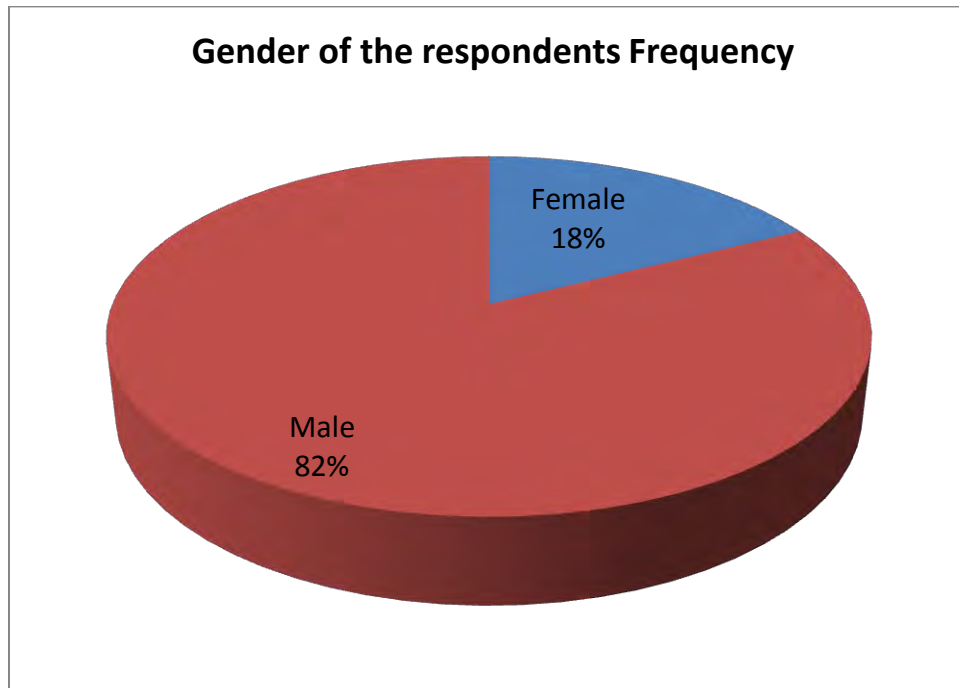
4.2. Findings of Demographic Characteristics of Respondents

The demographic data in the study includes: gender, marital status, age, service year, work position, department and educational background of the respondents. These variables given as insight about the sample characteristics that took part in this study. This part of analysis also deals with personal data of the respondents of questionnaires given to them. The subsequent details of the background information are shown in tabular, pie and bar chart form.

4.2.1. Gender Characteristics of Respondents

Even if the majority of the respondents in EEU were run by male than females, having both gender make the study complete.

Figure 2: Gender of respondents



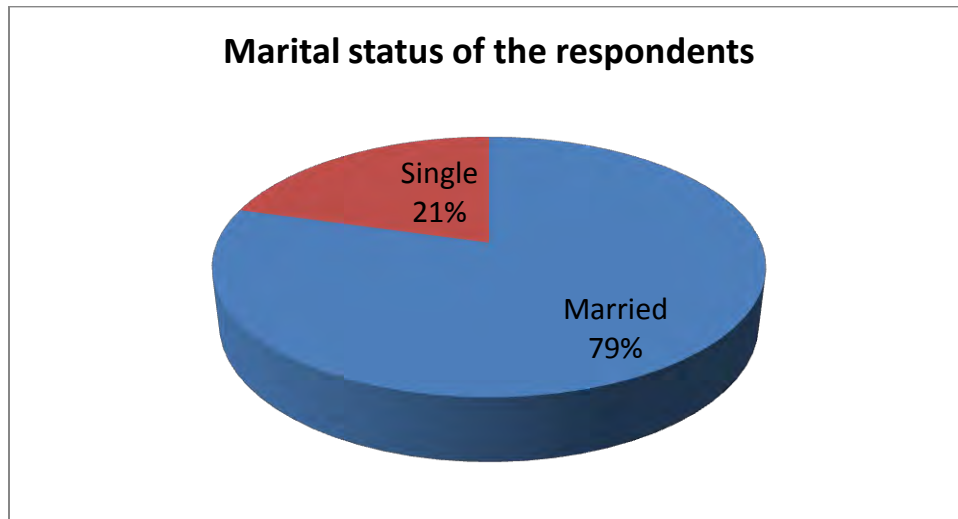
Source: Field survey and SPSS output, May (2017)

Frequency distribution of findings in figure 2 above shows that out of the 97 responses obtained, the majority of respondents 80(82.5%) were male and the remaining 17(17.5%) were females. This shows that many males participated in the study and in most cases it is believed that they dominate in EEU's warehouse management and related activities.

4.2.2. Marital Status of Respondents

Since family is the most important organization in the society and the family group constitute the most influential group, the respondents marital status is the good source of information for the study Assessment of the Effect of Inventory Management Practices on Service Delivery of EEU. As Figure 3 above exemplifies, 77 (79.4%) were married and 20(20.6%) were single. Moreover, it is believed that married staffs are more responsible, committed and show responsive effort on their assignment than single one.

Figure 3: Marital status of respondents

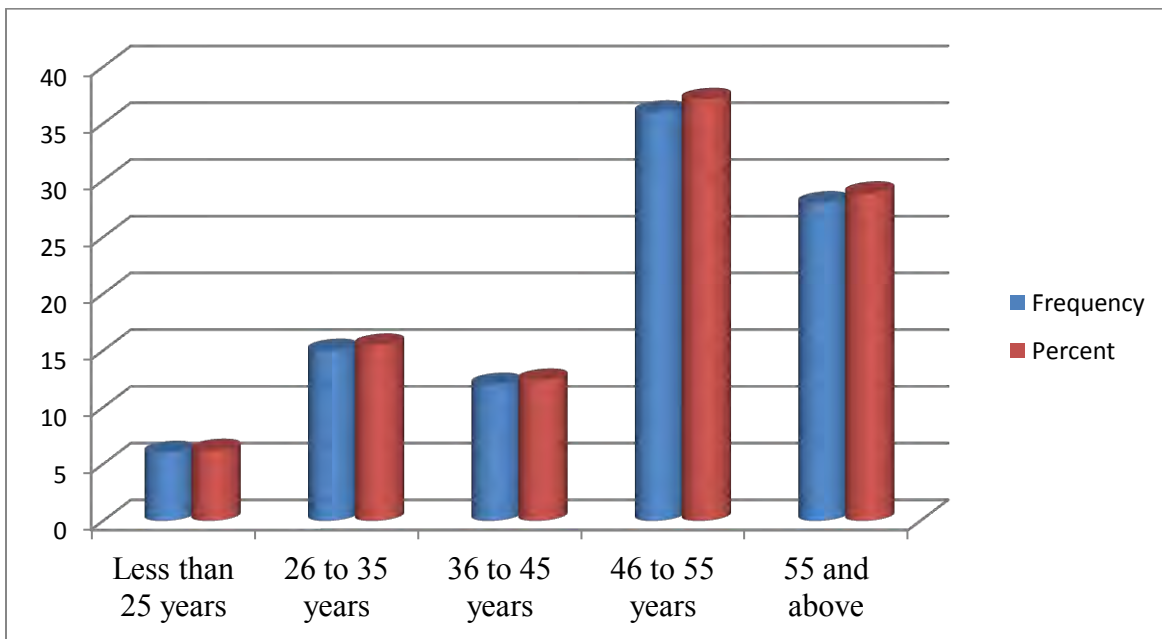


Source: Field survey and SPSS output, May (2017)

4.2.3. Age Distribution of Respondents

As it can be seen in Figure 4 below, out of the 97 responses, the minimum age of the respondents is 24 and the maximum reaches above 55 years old. Therefore, we can say that the study have the feature of the new as well as the old generation.

Figure 4: Age groups of respondents

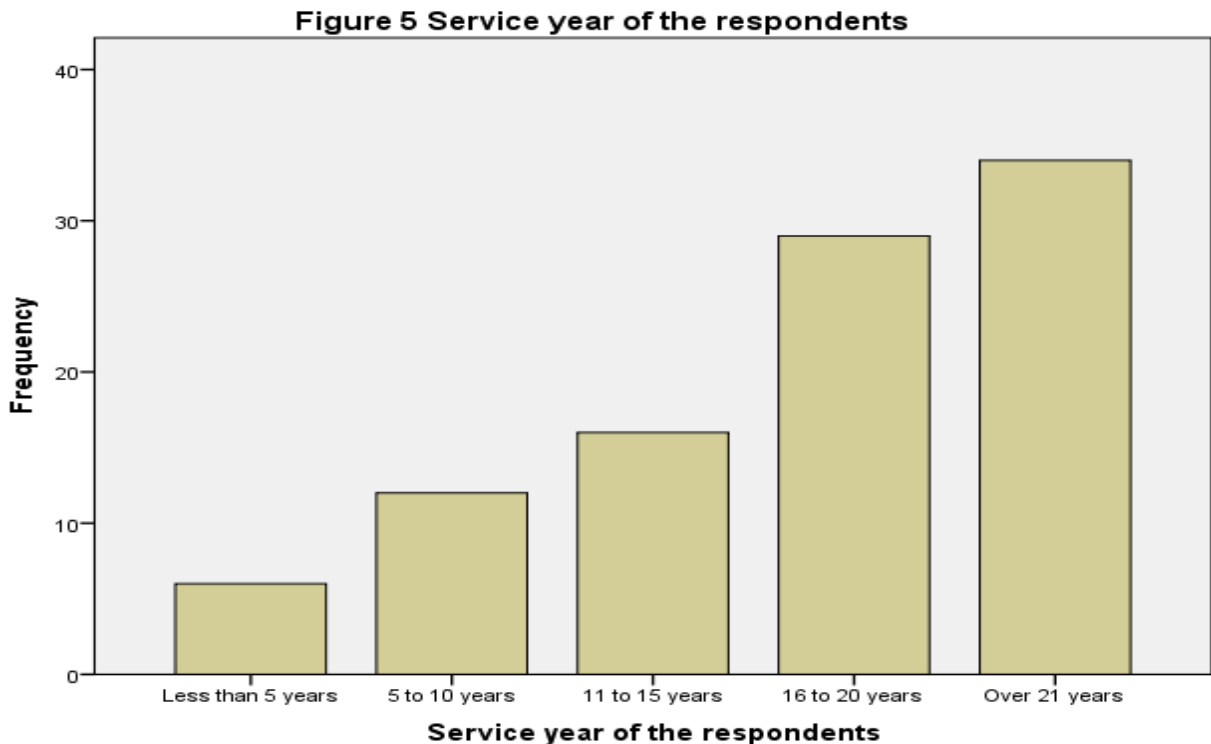


Source: Field survey and SPSS output, May (2017)

Figure 4 above illustrates that out of 97 responses obtained, most of the respondents were found to be senior staff representing 36(37.1%) between 46 to 55 years old and followed by age groups 55 and above years old by 28 (28.9 %) response rate. This indicates that the majority of the respondents were aged with long year's experience. While 15(15.5%) of respondents were in the age group of 26 to 35, 12(12.4%) were between 36 to 45 and few respondents of 6(6.2%) were less than 25 years of old. The data shows that most of the respondents are 46 and above years of old which imply that old aged employees are assigned in the areas which require extra efforts.

4.2.4. Work Experience of Respondents

As it can be seen in figure 5 below 6(6.2%) of the respondents have work experiences of less than 5 years. Respondents representing 12(12.4%) were between 5 to 10 years experience. 16(16.5%) of the respondents have experience between 11 to 15 service years; 29(29.9%) of the respondents had served from 16 to 20 years; and finally the largest grouping 34(35.1%) of the respondents have experience of more than 21 years. It is believed that respondents with high service years assumed that they know the organization process of inventory management practices, policies and procedures, internal control system and the status of the service delivery of EEU.



Source: Field survey and SPSS output, May (2017)

4.2.5. Work Position of Respondents

Table 2: Work position of the respondents

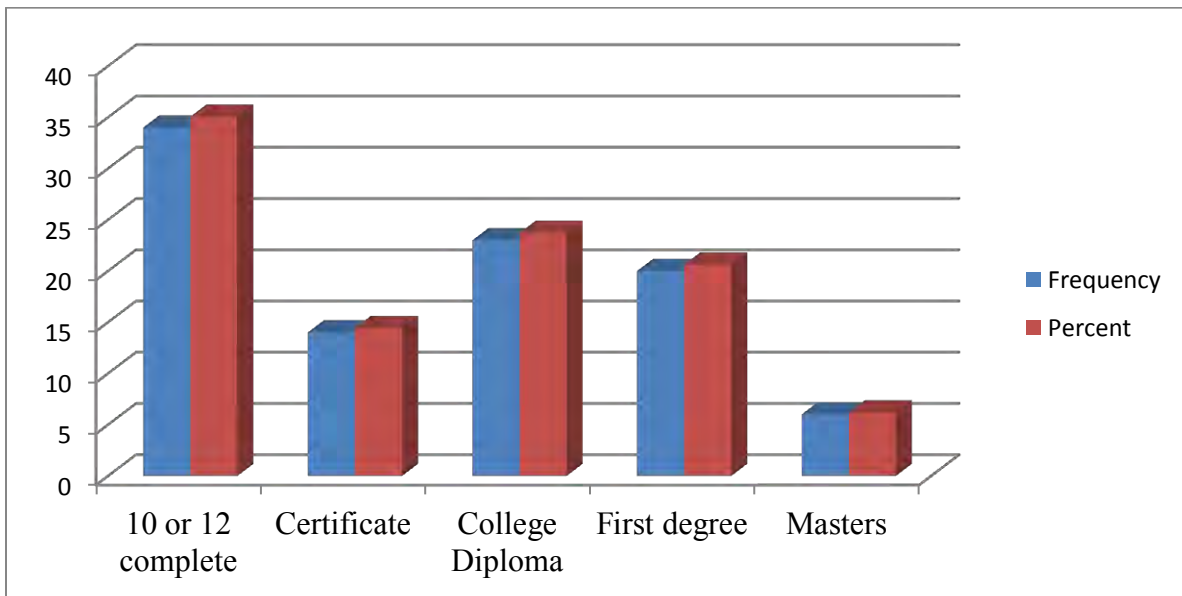
Work position		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Worker	45	46.4	46.4	46.4
	Supervisor	9	9.3	9.3	55.7
	Junior Management	20	20.6	20.6	76.3
	Middle Management	23	23.7	23.7	100.0
	Total	97	100.0	100.0	

Source: Field survey and SPSS output, May (2017)

As it can be seen in table 2 above, from the total 97 respondents only 45 respondents (46.4 %) were workers while 9(9.3%) were supervisors, 20(20.6%) were from junior management position and 23(23.7%) were from middle management position respectively. This implies that the majorities of the respondents who are working in the warehouse and inventory management activities are workers & this is good source of information that EEU’s inventory management system is managed by less educated and lower level employees.

4.2.6. Educational Background of Respondents

Figure 6 below indicates that education status held by the respondents.



Source: Field survey and SPSS output, May (2017)

As data gathered from respondents 34 (35.1%) of the respondents were 10/12 grade complete, 14(14.4%) were certificate, 23(23.7%) were college diploma holders, 20(20.6%) were first degree holders and 6(6.2%) were masters holders respectively. The respondent's educational background holding from lower to higher level implies that the data collected is good in this respect and can help the study to incorporate ideas from different view angles. The majority of the respondents 71(73.2%) were either 10/12 complete, certificate or college Diploma holders. Those respondents who have lower educational background are assumed to have little knowledge on the organization procedure of inventory management systems and are rarely have the capacity to inventory management techniques, poor documentation practice, and low responds to better customer service. It also implied that in EEU warehouse, qualification is not pre-requisite and matched with job requirements. Moreover, it is believed that qualifications of most employees are not sufficient enough to handle their work effectively.

4.3. Discussion and Findings of Open Ended Questionnaire Responded by Higher and Middle Level Managers of EEU

In this paper, through open ended questionnaire, respondents were given a chance to provide a view on the effect of inventory management practices on the service delivery of EEU. Ten open ended questions had been distributed to 9 male and one female higher and middle managers that are working at head office departments. These managers are selected in view of the fact that they have enough information, observation and expected to be the good source of detail and reliable information for the study. Their responses for each question are summarized as follows.

1. Practicing Inventory Management Techniques

All respondents responded that EEU is not effective in practicing the inventory management techniques such ABC analysis, Economic Order Quantity, Just in Time, Optimized Purchasing, etc in order to reduce inventory carrying and associated problems. Instead, there is traditional way of inventory management system. Each work units or departments prepare their requirements as per their work plan and availability of budget and then send to procurement department for further processing. The main problem here is that departments do not provide their needs on time and do not know their actual requirement's, their minimum and maximum level. The respondents replied that very important materials were purchased in very small amount but unnecessary items were procured in bulk. There was no cross checks and communication whether the materials were available in the warehouse or not. There is poor

communication among user departments. They also mentioned that this practice lead to excessive accumulation of obsolete and slow moving items in each warehouses. The respondents response is supported by EEU finance department annual physical inventory count report on September 2016 at central warehouse which revealed that some items are over stocked, leading to high inventory carrying cost and some critical items were out of stock, leading to hasty buying because of low stock levels.

2. On the Issue of Problems that are Encountered in the Existing Inventory and Warehouse Management System of EEU

The respondent's responses on main problems that are encountered in the existing inventory and warehouse management system of EEU are summarized as following:-

- The current Ethiopian market system doesn't invite to use Just in Time techniques (JIT).
- A qualified and professional staff to manage the warehouse is a major problem. All respondents revealed that HR placed staffs are not educated and skilled in inventory management systems. There is lack of professional staffs in inventory management systems. Moreover, employees who are involved in inventory management are not responsive to the customer demand and request. They don't have enough knowledge regarding to their duties and responsibilities.
- There is shortage of forklift, crane and vehicle to perform effective warehouse activities.
- There is no efficient system to handle and organize material arrangement. Materials are scattered in the field. There is accumulation of unusable materials which finally leads to excessive amount of obsolete and slow moving items. Every year these materials were counted which means that EEU is exposed to unnecessary inventory cost. Obsolete materials and active stocks were mixed together and not properly handled.
- There is bulk purchasing system. Materials are purchased without demand analysis. In addition to this, user departments do not use the purchased materials immediately and through time they become obsolescence, damage, theft, poor management, occupy large space and increase inventory carrying or operational cost.
- The respondents mentioned that there is no organized data in most warehouses; Lack of up to date inventory valuation practicing; Inventory items are not properly and fairly distributed to the concerned body; Returned materials especially from projects are not properly recorded

with full and required information; Poor distribution channels and Poor inspection and check on the quality of purchased materials.

- The respondents also mentioned that most of inventory management processes are manual and non value adding activities. There is lack of integrated and networked inventory management system. The inventory system is not supported by automated system. In general, there is lack of modern information technology application in the area. There is lack of innovation in the inventory and warehouse management. The presence of all the above problems implied that there is poor inventory management system which has a major impact on the service delivery of EEU.

3. Inventory Policies and Procedures: The respondents discussed that there is policy and procedure but not up to date. EEU is currently using EEPCO's policy and procedure which was established during 1997 E.C. When this policy was formulated at that time, it was established for a limited number of district stores and therefore useless when compared with the existing number of districts and regional warehouses. Even if inventory procedures are available, employees are not well trained and not aware of these procedures. Most staffs of the warehouse work traditionally and not properly referred it. Internal auditors do not properly address the strength of internal control systems of these procedures.

4. Obsolete, Damaged and Inactive Inventory Items: The respondents discussed that EEU has many obsolete, damaged and inactive inventory items. There is poor controlling system for obsolete, damaged and inactive inventory items. The respondents explained that the management was not properly and effectively act to dispose these materials. EEU's effort concerning the issue is very minimal. No one is worried about the money that EEU is losing on possessing these materials. The value of these items is deteriorating from time to time. These items also occupy large space which can be used by EEU for other purposes. The respondents stated that there is no well developed inventory disposal policy. There is a disposal committee but not functional. Moreover, the disposal system is highly centralized and unable to implement at each regional level. The disposal system was linked to other stakeholders such as government organizations for its implementation but neither the agency nor EEU are in the position to dispose those items. These items continue as difficult to manage, costly for handling and bottleneck for performing other activities.

5. Revaluation of Fixed Assets: The respondents described that the revaluation of fixed asset was carried out before 15 years. This indicates that EEU is not practicing fixed asset revaluation for the last 15 years and hence the balance sheet, capital balance and financial statement of EEU don't show the correct value or figure of fixed assets. In addition it implies that EEU balance sheet will be stated at historical value which is unfair value.

6. Skilled and Competent Manpower: Most respondents believed that it is a major bottleneck for the effectiveness of warehouse management system. They stated that there is a great challenge to get professionals in this area. It was also observed that there is no pre or post-employment training on the area. They observed that staffs with inefficient background, inexperienced, staffs who are not challenging, undisciplined, demoted employees are assigned to inventory management. The respondents believed that if skilled and competent employee deployment is refused, it will be one of the critical factors for the ineffectiveness of inventory management practice and service delivery of EEU. They also recommend that if EEU places skilled and competent employees and further provide the required pre and post employee training on inventory management systems, EEU can achieve its objectives and provide effective customer service.

7. Customer Complaints due to Poor inventory Management Practices

The respondents argued that customers are waiting for a longer time due to shortage of new connection and distribution materials. Poor store management practices and weak logistic system has aggravated the situation. They also described that stock out of the required materials, lack of organized and proper feedback system from internal or external stakeholders, poor practice of inventory management techniques, Lack of establishing optimized stock level techniques i.e., poor practice of minimum and maximum stock level are the major bottlenecks in EEU. This indicate that due to poor inventory management system, EEU was unable to provide the expected service to its customers. This data shows red light to EEU so as to improve its inventory management system.

8. Recording, Handling and Controlling System for Returned Materials from Different Project Areas and Departments: The respondents replied that recording, handling and controlling system for returned materials from different project areas and user departments is a major bottleneck for EEU inventory managers which materials are returned

without full information. They stated that there is poor controlling system to safeguard EEU's returned materials from project areas. This implies that project offices do not properly handle the excess materials and are exposed to theft and lost. These materials are not counted annually which mean there is no current price available for these items. There is no system that forces to return all left materials after the project is completed or make the defaulter to be accountable.

9. Stock Movement and Up to date Information: The inventory management system in EEU is not well integrated with the financial system as the result of this the availability of up to date inventory information is not possible. For longer years, EEU's inventory management system was managed by IBM system which is not up to dated system. The information inputted to this system sometimes stays for more than a year without processing. The respondents believed that regional stores are not networked to each other, to branch offices and with central warehouse by this system. Accordingly documents related to store activity are not timely encoded to the system. There is no real time access that shows the status of the EEU's inventory movement. Generally they forwarded that store transactions are made manually. Encoding the store documents in the computer system takes a longer time. Respondents explained that this issue will be improved when ERP is implemented.

10. Procurement Process and Availability of Materials: Most respondents stated that sufficient and timely availability of required quantity of equipment/materials is critical for timely delivery of projects and services to customers. EEU currently faces problems regarding to procurement and has very low stock of spares and inventories. In some cases, sufficient transformers with its accessories and other required distribution materials are not available in the store which leads to interruption of distribution networks and long restoration time. Non-availability and/or delay in procurement have negative impact on the provision of better customer service and overall project delivery timelines. EEU's inventory managers do not established optimized stock level techniques that need to be kept in the warehouse (i.e. no Maximum, Minimum, and safety stock levels). EEU's purchasing system is not properly addressed the required materials because most work units do not know their needs. In addition the procurement department purchased any of the requested materials without checking the availability of the materials in the store. Even they purchased additional materials which are not required and already idle in the warehouse. Additionally, the

procurement process is long that will lead to extra cost, delay for material delivery and inefficient operational process.

4.4 Discussion and Findings of Interview Questionnaires Presented to EEU Employees

In addition to the open ended questionnaires, the researcher used formal interviewing and physical observation as a method of data collection. Personal Interviews, informal discussion and physical observation can provide useful insights, as can personal experience. Nine (9) interview questions have been designed and conducted with the selected employees on the effect of inventory management practices on service delivery of EEU. Interview was conducted with 10 employees of District managers, Procurement, Logistics and Warehouse, Internal Audit, Finance, Material Management & Stock Accounting Officers. These officers were selected in view of the fact that they know well the day to day activities and observe the situation of the inventory management system and can have genuine & important information regarding inventory management and service delivery process than any other employees of EEU. Their views were summarized as follows: -

- (a) The interviewee stated that currently there are many types of obsolete, damage and scraped materials stored in each regional warehouse for more than 10 years and unable to dispose them timely. There is also poor management and control system especially for those unused and returned materials from different project sites. According to them, there is no ownership for these materials to control and are exposed to theft and lost. They stated that there is no clear procedure for obsolete, damaged and slow moving items on how to manage, control and dispose them.
- (b) The respondents reply that no attention is given to inventory management specifically on capacity building of human resources. Employees in inventory management section are not engaged and participated in either of pre or post assignment training in relation to inventory management systems. The manpower in this area is the most neglected part by EEU. Many of store employees are not skilled, qualified and competent to handle proper inventory management system. Due to poor and incompetent skilled man power, poor documentation, recording, communication, and poor records are observed in the company. Inventory staffs are not professional and not properly selected. Most of them have low educational background. There is unfair professional title. No related experience. Most of them are aged,

discouraged, penalized, injured and unethical staffs. Employee from any department which doesn't have related experience and education back ground will be assigned to inventory positions. Moreover, there is shortage of employees for the warehouse management activities. Due to these the assigned employees are not motivated to carry out their duties properly. The respondents emphasized that the management especially human resource department should give due attention for the deployment and placement of employees in this section.

- (c) As per respondents, Inventory management activities are not properly integrated with procurement activities. It is common to see the practice of highly demanded items are purchased in smaller portion whereas unnecessarily irrelevant materials are purchased in bulk amount i.e. there is no optimized purchasing in EEU. The presence of poor procurement process and poor inventory planning are also stated by the respondents. This results excessive amount of obsolete and slow moving items found in EEU Store. Additionally, due to poor communication channel, materials that are found in stock will be purchased repeatedly. This indicates that there is no automated and integrated stock management systems rather EEU use of traditional inventory system. Respondents confirmed that EEU is dependent on Metals and Engineering Corporation (MetEC). MetEC supplies different Distributional materials to EEU with extra price of other suppliers but with poor quality as compares with other suppliers. In general, MetEC become too ambitious to meet EEU's distribution materials demand rather aggravated customers' dissatisfaction.
- (d) Employees also declare that there is poor attention and concern from top management regarding inventory management system. EEU is investing a huge amount of financial resource for material purchase but they decided to manage the warehouse by low level employees and low educational background staffs. They consider inventory management activity as an auxiliary activity as if does not have any value adding activities which is contrary to the objective of EEU (i.e. contrary to maximizing the performance and service delivery of EEU). EEU is not in the position to discharge its obligation given by the government and people due to poor management system. Poor commitment, poor attention, poor decision and poor supervision were the major weakness of the company. They observed that there is poor or inadequate asset management system. EEU is unable to know its asset where exactly located, found and by what amount.

(e) **Absence of integrated and online accounting system and poor reporting system.** There is outdated software used to record inventories which is not integrated and networked to other systems. As per employees responses, the major problems observed in the current ICT inventory working system are:-

- ❖ **Searching problems:** Since there are so many lines of items found in the store centers, searching for material information is time consuming for the storekeepers. This leads to elongation of the overall working processes.
- ❖ **Manual Bin card/Stock Card calculation:** Since updating the received and issued materials is performed manually; it takes too much time and is error prone.
- ❖ **Automatic Notification problem:** In the current working system, since it is manual, there is no an automatic notification in some basic business processes. For example, those materials which are out of stock/expired/dormant are not notified.
- ❖ **Reconciliation is time taking:** Moving all the Bin card to the Inventory Control section for reconciling it with Stock Card and all the Ledger Stock Cards to finance to reconcile it with their Ledger card is tiresome, time taking and labor intensive activity.
- ❖ **Information Inconsistency:** Since there is no centralized system and network environment between the different divisions of the Procurement and the other units of EEU, information is stored and processed in each divisions separately that leads to data inconsistency which in turn slows down the working movement in EEU. The existing system doesn't provide them information regarding each type of stock movement in each store, which will help us in identifying and making a timely decision to dispose those materials kept in stock for a long period of time without having any kind of movement.
- ❖ **Extended Stock Closing period:** The utility year end stock closing period will always be extended for more than 3 months after the year end period. This is because of time taking process involved in every regional finance office in taking stock count and recording. Due to this reason, that they were not able to record the two different physical period stock data simultaneously in the existing system. This situation was resulted the utility in not getting any stock data financial information for more than 3 months.

In this case they replied that there is a considerable amount of gap between inventory management practice and service delivery of EEU.

4.5 Discussion and Findings of Interview Questionnaires Presented to Customers

In addition to EEU employees, customers interview were conducted so as to view the inventory management practice to substantiate and triangulate with the quantitative result. To do so, seven (7) different questions have been designed for EEU customers that can help to assess the effect of Inventory Management Practice on Service Delivery at EEU.

The interview was conducted on 4 EEU's Addis Ababa Regional Offices namely SAAR, WAAR, EAAR and NAAR. Totally 20 customers were engaged for the interview and from these customers 9 are Domestic, 6 are Commercial and the rest 5 are industry customers. As per the interview, their responses are summarized as follows;-

- Regarding to the question rose to evaluate the service delivery for new connection customers with respect to material issue, the majority of customer's response was more of criticizing and blaming i.e. EEU is not good enough in delivering new connection service to customers.
- Most interviewee responds that the utility does not provide fair and equal service for all new connection customers and doesn't serve as per waiting lists. They respond that there is high shortage of materials and unfortunately these causes to a lack of transparency and accountability for some Regional/District Offices. As per their reaction, some customers who requested power lately or recently served immediately where as so many customers paid one year and above obliged to wait for a long period without power. It is also found that some Regional Offices give priority for Government Customers, Small Scale Industries, Investors and other industries which are export by nature.
- Regarding to the question rose to the availability of materials with the required level of quantity and quality at the required time, the response of majority of the interviewees was that the utility do not supply the required quantity of material at the specified time. For example, a customer may need Poles and Cables for the installation of power but either of the two may be out of stock. Or a transformer customer may get transformer but its accessories may not be available in store. They said that there is challenging in inventory management practices that the utility experiences stock out and the like cases. Regarding to the quality of the materials supplied by EEU, most respondents replies that EEU is much better in providing quality materials than materials found outside the market.

- Regarding to the question on providing on timely service to customers, they replied that it differs from region to region and from district to district. In addition, they explained that it depends on the type of service requested and availability of materials. There are some regions that provide the service immediately and there are also regions who do not serve at the required time. The reasons are availability of vehicle, availability of manpower, readiness and commitment of employees, availability of power (whether saturated substation or not), availability of the required materials, and others. The time it takes to repair faulty network lines, the customers handling quality, the sustainability of repair and maintenance of defects are not satisfactory. Unless these problems are improved they can hamper sound customer relation. It can be concluded that without the provision of proper customer service and implementation of fair power distribution schemes, it would be difficult for EEU to satisfy the needs of its potential customers.
- The customers had been asked to rate their supply of electricity however the majority of the interviewees had complaint. They told that most EEU Managers and Field Technicians externalize the issue and try to relate the cases with shortage of materials like transformer & its accessories, pole, cables and so on.
- Regarding to the question raised on the satisfaction of customers as entire EEU service delivery relating with Inventory Management, most of them replied that they are not satisfied. They respond that as a public utility enterprise, it is not in a position to commit its duties and obligation levied by the government. There is high electric demand from the public side but EEU's service delivery is not effective and efficient. The public is expecting more from EEU but not found as perceived by them. Respondents point out that the performance of the Emergency Offices established for repair and maintenance of electric lines is poor. Moreover, there is no favorable situation to serve customers based on the standards. These interviewees irritated on the limitation of human and material resources. Contrary to this, as per respondents, the customer handling system is somehow good but still needs to be improved. Generally, due to the incompatibility between resource availability and the needs of customers, they accept as true that there is a gap between what customers expect from the utility and what they actually found.

4.6 Discussion and Findings of Physical Observations by the Researcher

As per the researcher observation one of the major items found in the main store is the availability of obsolete, damaged, unidentified, and slow moving items warehoused for more than 8 years. The warehouse has so many obsolete items, scrap items and inactive items. These items currently have no use for the company but took a large part of warehouse spaces. At the time of annual inventory, these items are usually taken their card balance rather than conducting physical count for the subsequent years. Despite the fact that EEU established Disposal Committee, the committee has made no significant disposal. There is weak internal controlling system for these items especially those items returned from project offices are exposed to weak controlling mechanism. Moreover, the user departments don't have any idea about the existence of these items in the EEU warehouse. Even if procurement procedure required having maximum and minimum level of inventory, the researcher couldn't see anything regarding to the maximum and minimum level of inventory items. The warehouse data are updated by the Head Office Finance Department by encoding SIV, ISIV, GRN, SRN, RMG and Adjustment note but there is highly delay sending ISIV and SIV to head office for encoding. The researcher also observed that there is critical problem as regarding to the arrangement of the inventories; i.e. these items are laid down traditionally as they are not properly placed to make simple count, issue and control.

4.7 Finding and Discussion of Documentary Review

The researcher has reviewed Internal Audit Report of 2007 E.C and Annual Physical Inventory Count Report of Central Warehouse for the budget year 2006 and 2007 E.C. Comments and feedbacks given by customers from the suggestion boxes were also reviewed. According to the data obtained from Business Excellence Office, from 2004 E.C to Megabit/2009 E.C, the number of customers waiting for new connection and additional power request were:- Domestic customers 63,841, Commercial customers 4,572, Industrial and power customers 1,085, total 69, 498 customers. One of the major barriers in providing early connections is the non- availability of material and manpower to provision large number of connections, thus extending the queue with time. Moreover, the main reason for waiting longer time was due to poor allocation of materials, poor communication among user departments and poor concern from top to lower level of management.

- **Workforce:** It was also found written on the internal audit and physical count report that old aged employees are assigned in the areas which require extra efforts. Qualifications of

some employees are not sufficient enough to handle their work effectively. Moreover, the numbers of employees are not adequate as compared with the warehouse activities. It is also observed that the placement in the organization structure states 50 employees are required for different positions however only 21 employees (42%) are placed. It was also stated that the motivation of employees is not well managed.

- **Obsolete and Unidentified items:** It's noticed and identified so many obsolete, scrap and inactive items which already taken much of the warehouse space. Many of these items don't have any use to the company rather increasing carrying cost, insurance premium cost and cost of deterioration's.
- **Disposing Materials:** Despite the fact that there are so many items to be disposed in the Central Warehouse, the disposal committee has made no significant disposal during the year.
- **Minimum and maximum inventory levels:** Currently the EEU don't have approved inventory management manual which set minimum and maximum inventory level for inventory management, so far it's not applied in the warehouse. Because of these the warehouse is currently incurring addition carrying and other cost with regard having excess material (insulators and cables) and also facing stock out with other items(like HRC fuse and pole mount fuse).
- Inventory data is expected to be encoded to the S400 system database and pushed to Agresso financial database system on monthly basis through batch processing. However currently the insertion of store data is not updated timely to the data base, the database didn't show the status of the store at a time.
- **Costing of Inventories:** Method of costing the company using is weighed average system of costing. In this method the timing of data insertion is very important because it affect the current price. In the current situation the insertion of data is too late and weak control.
- There was critical problem as to the arrangement of the inventories, these items are laid down traditionally that are not simple to count, issue and control. It's difficult to conduct physical inventory on certain inventory items because these items are not sorted scientifically in a way that can be easily counted.

4.8 Findings and Discussion of SPSS results

According to Lockesh (1984), descriptive research studies are designed to obtain pertinent and precise information concerning the current status of phenomena and whenever possible to draw valid general conclusions from the facts observed. In this study, the descriptive statistics specifically sought to test the level of the independent variable (Inventory Management Practices) and dependent variable (Service Delivery).

4.8.1. Cronbach's Alpha

Cronbach's Alpha is designed as a measure of internal consistency of items in the questionnaires. Total number of questions in the questionnaire were 46 testing variables and 7 items related to demographic variables, hence "N" of items in the below Cronbach's Alpha test is 46. Instruments are generally considered reliable and acceptable when they have an alpha level > .50 threshold on a scale of 0 to 1, Rubin & Bobbie (2009). The Reliability Statistics result in table-3 below shows that the value of Cronbach's Alpha is greater than 0.70. Hence, scales developed suggest good internal consistency.

Table-3: Cronbach's Alpha Values

Reliability Statistics		
Dimensions	Cronbach's Alpha	N of Items
Inventory Management Practice	.706	46

Source: Field survey and SPSS output, April (2017)

A high coefficient indicates that the items are consistently measuring the same underlying construct. Therefore, those correlation values make data entered into SPSS safe for assuming reliability.

4.8.2. Correlation Analysis

Pearson correlation was used to establish the relationship between Inventory Management techniques, Computerized Inventory Control System, Inventory disposal system, Inventory Records Accuracy and competency of inventory staffs. Pearson correlation coefficients present the relationship between the variables while the significance values show the statistical significance of the relationships. The research findings were as presented in table 4 below.

Table 4- Correlation Analysis between Independent and dependent Variables

Variables		Service Delivery
Inventory Management techniques	Pearson Correlation	.908 ^{**}
Automated Inventory Control System		.939 ^{**}
Proper Inventory disposal system		.794 ^{**}
Inventory Records Accuracy		.521 ^{**}
Competency of Inventory Staffs		.664 ^{**}
Sig. (1-tailed)	.000	.000
N	97	97

Source: Field Survey, 2017

Correlation analysis results in table 4 above; $R=0.908$; $p=0.000$ (<0.01) imply statistically significant strong positive relationship between Inventory Management techniques and effective Electric Service Delivery. This implies that inventory management technique is a significant determinant of service delivery. $R=0.939$ and $p=0.000$ (<0.01) imply statistically significant positive relationship between Automated Inventory Control System and Service Delivery. $R=0.794$ and $p=0.000$ (<0.01) imply statistically significant positive relationship between Proper Inventory disposal system and service delivery. $R=0.521$ and $p=0.000$ (<0.01) imply statistically significant positive relationship between Inventory Record accuracy and Electric Service Delivery. The results therefore indicate significant positive influence of Inventory record accuracy and documentation practice on Electric service delivery. $R=0.664$ and $p=0.000$ (<0.01) imply statistically significant positive relationship between Staff Competency and Electric Service Delivery. The results therefore indicate that significant positive influence of Staff skills and Competency on service delivery. These findings reveal that all independent variables have significant positive influence on Electric service delivery of EEU.

4.8.3. Pearson's correlation matrix of explanatory variables

Table 5- Correlation between Explanatory Variables

Variables		Availability of the required materials	Operational performance	On time Service availability	Responds to customers complaints	Provision of quality materials	Customer satisfaction
Availability of the required material	Pearson Correlation	1	.617**	.674**	.440**	.548**	.563**
Operational performance		.617**	1	.675**	.585**	.572**	.616**
On time Service availability		.674**	.675**	1	.523**	.487**	.712**
Responds to customers complaints		.440**	.585**	.523**	1	.491**	.493**
Provision of quality materials		.548**	.572**	.487**	.491**	1	.497**
Customer satisfaction		.563**	.616**	.712**	.493**	.497**	1
Sig. (2-tailed)		.000	.000	.000	.000	.000	.000
N	97	97	97	97	97	97	97

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

Source: Field survey and SPSS output, April (2017)

Table-5 above shows the degree of correlation or the relationship among variables. Positive values indicate a directly proportional relationship between the variables. The correlation coefficient between availability of the required material and operational performance is 0.617 which approves a positive relationship between them. This implies that we are sure that there is significance relationship between availability of the required materials and operational performance. The correlation coefficient between on time service availability and Customer satisfaction is also 0.712. This also exemplifies that we are sure that there is significance relationship between on time service availability and customer satisfaction. According to the

correlation result, responds to availability of the required material and Customer satisfaction is .563 which is positive related. This means that employees of EEU are sure that there is a significance relationship between availability of required materials and customer satisfaction. Employees feel that availability of necessary resources has greater impact on Customer satisfaction. From the above table-5, we can imply that the correlation coefficient between variables is greater than 0.400 which mean that we are 99% sure that there is significance relationship between variables.

4.8.4. Hypotheses Testing

The study had five hypotheses. Consequently the five hypotheses were formulated and tested using t-statistic.

Hypothesis 1: H₀: Effective deployment of best practice inventory management technique does not have significant effect on service delivery of EEU.

Hypothesis 2: H₀: Effective implementation of Automated Inventory Control System does not have significant effect on service delivery of EEU.

Hypothesis 3: H₀: Effective Inventory disposal system of obsolete items does not have significant effect on service delivery of EEU.

Hypothesis 4: H₀: Accurate Inventory record and documentation practices do not have significant effect on service delivery of EEU.

Hypothesis 5: H₀: Competency of inventory staff does not have significant effect on service delivery of EEU.

The results of hypotheses were as presented in table 6 below.

Table-6: Coefficients of Variables

Unstandardized Coefficients		Standardized Coefficients			
Model	B	Std. Error	Beta	T	Sig. (p Value)
(Constant)	1.235	.551		7.773	.000
Inventory Management techniques	.860	.098	.451	6.563	.000
Automated Inventory Control System	1.025	.059	.716	4.771	.000
Proper Inventory disposal system	.295	.087	.188	3.546	.000
Inventory Records Accuracy	.892	.015	.219	2.557	.000
Competency of Inventory Staffs	.176	.015	.036	2.374	.000

Source: Field Survey, 2017; Dependent Variable: Service Delivery

The first hypothesis of the study was; H₀: Effective deployment of best practice inventory management technique does not have significant effect on electric service delivery of EEU.

T=6.563 and p=0.000 (<0.01) imply that the relationship between Inventory management techniques and service delivery is statistically significant. The null hypothesis was therefore rejected and conclusion made those effective inventory management techniques such as ABC analysis, EOQ, JIT and optimized purchasing has significant effect on service delivery of EEU.

This finding is supported by Peacock's research (2013) which found that effective application of inventory optimization models and practice is relevant to achieving quality and efficient operations. The findings of this study are also consistent with those of Dimitrios (2008) which stated that effective inventory management system means holding an appropriate quantity of inventory with better quality. Too much inventory consumes unnecessarily your limited space, creates financial burden, and increases the possibility of materials to be obsolete. Too little quantity of inventory often disrupts business operations, and increases the likelihood of poor customer service. Moreover, a study carried out by Bhausahab & Routroy(2010) shows that companies are keen in managing their inventory so as to reduce costs, improve the quality of service, enhance service availability and ultimately ensure customer satisfaction. All these inventory management techniques discussed above reveals that carrying unnecessary stock of goods and materials adds to the operational cost of the utility and therefore reduces its performance and service delivery of EEU.

The second hypothesis was; H₀: Effective implementation of Automated Inventory Control System does not have significant effect on electric service delivery of EEU. T=4.771 and p=0.000 (<0.01) imply statistically significant influence of Automated Inventory Control System. The second null hypothesis was therefore rejected and the study concluded that Automated Inventory Control System has significant effect on service delivery of EEU. These findings are consistent with the findings of Nyariki & Wanyoike (2016) that established that computerized inventory control system has significant positive influence on records accuracy and procurement performance and ultimately improves customer service and satisfaction.

The Third hypothesis was; H₀: Effective disposal system of obsolete items does not have significant effect on Service delivery of EEU. T=3.546 and p=0.000 (<0.01) imply statistically significant influence of Effective disposal system of obsolete items. The third null hypothesis was therefore rejected and the study concluded that Effective disposal system of obsolete items

has significant effect on service delivery of EEU. The above finding supported by Goldsby and Martichenko (2005) that as obsolescence reflects real possibility that inventory value may decline in the course of being kept. Thus a decline in inventory value increases carrying cost and finally affects the performance and service delivery of the organization.

The fourth hypothesis was; H0: Accurate inventory record and documentation practices do not have significant effect on electric service delivery of EEU. $T=2.557$ and $p=0.000$ (<0.01) imply statistically significant influence of Accurate inventory record and documentation practices. The fourth null hypothesis was therefore rejected and the study concluded that an accurate inventory record and documentation practice has significant effect on service delivery of EEU. The study finding agrees with Susan & Michael(2000) finding that accuracy of inventory records is necessary to provide satisfactory customer service, determining replenishment of individual items; ensures that material availability meets repair or project demanded, analyze inventory levels and dispose of excess inventory. Susan & Michael (2000) also stated that stock records provide the management with the information which is used to ensure accountability through stocking taking and stock audit exercise. An inventory stock record is accurate when the information on the stock record is in agreement with the actual physical situation, Schrady(2006).

The fifth hypothesis was; H0: Competency of inventory staff does not have significant effect on electric service delivery of EEU. $T=2.374$ and $p=0.000$ (<0.01) imply statistically significant influence of Effective disposal system of obsolete items. The fifth null hypothesis was therefore rejected and the study concluded that Competency of inventory staff has significant effect on service delivery of EEU. The above findings were supported by this statement as: Stock control is no longer considered as clerical function performed independently by untrained individuals within governmental agency (National institute of Governmental Purchasing, 2001). Bailey, P., & Farmer, D (2012) also found that for inventory management function to achieve superior performance, it is necessary to recruit, train and develop personnel with the capacity and motivation to do better job. Training of staffs is important in full use is to be made of their abilities and talents. The study finding agrees with Jessop and Morrison (1994) findings that well trained personnel should be employed in the organization to help in proper stock recording system. Carter and price (1993) also indicate that training of staff is vital if full use is to be made of their abilities and talents.

4.8.5. Regression Analysis

Multiple regression analysis was conducted to establish the combined influence of Inventory Management techniques, Automated Inventory Control System, Proper Inventory disposal system, Inventory Records Accuracy, and Competency of Inventory Staffs on electric service delivery of EEU.

Table 7: Regression Analysis

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.941 ^a	.885	.780	.445

Source: Field Survey, 2017; a. Predictors: (Constant), Inventory Management techniques, Automated Inventory Control System, Proper Inventory disposal system, Inventory Records Accuracy, and Competency of Inventory Staffs

As per the results on table 7, model 1 has a R² value of 0.885 meaning that 88.5% of the variation in the dependent variable is explained by the independent variables while 11.5% is explained by other variables outside the model. This indicated that my model is a strong predictor. The R-value of 0.941 indicates that there is a strong positive correlation between the dependent variable (service delivery) and the set of independent variables.

4.8.6. Analysis of variance (ANOVA)

To test the significance of the relationship, ANOVA test was conducted. The findings were as presented in table 8 below.

Table 8: Analysis of Variance

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	74.878	45	1.644	8.396	.000 ^b
	Residual	9.711	49	.198		
	Total	84.589	94			

Dependent Variable: Service Delivery

Source: Field Survey, 2017

a. Predictor(Constant):), Inventory Management techniques, Automated Inventory Control System, Proper Inventory disposal system, Inventory Records Accuracy, Provision of Quality Materials and Competency of Inventory Staff

From table 8 above , $p=0.000 (<0.01)$ implies that the combined influence of Inventory Management techniques, Automated Inventory Control System, Proper Inventory disposal system, Inventory Records Accuracy, and Competency of Inventory Staffs on service delivery is statistically significant. From the research findings, the following multiple regression model was developed;

$$Y = 1.235 + 0.860 X_1 + 1.025 X_2 + 0.295X_3 + .892X_4 + .176X_5 + e$$

Where; Y – Service Delivery

X₁- Inventory Management techniques

X₂ – Automated Inventory Control System

X₃ – Proper Inventory disposal system

X₄ – Inventory Records Accuracy

X₅ – Competency of Inventory Staffs

E-error term

The above model presents the linear relationship of the research variables. The coefficients implies that change in Inventory Management techniques by one unit leads to change in service delivery by 0.860, change in Automated Inventory Control System increases service delivery by 1.025 and change in Proper Inventory disposal system leads to change in service delivery by 0.295 percent. Change in Inventory Records Accuracy leads to change service delivery by .892 percent. Competency of Inventory Staffs leads to Change in of service delivery by .176 percent.

4.8.7. Findings and Discussion on Challenges of Inventory Management Practice at EEU

The fifth objective is to determine the challenges of inventory management practice that affects the service delivery of EEU. It was measured using nine sub variables.

Table 9: Results of Challenges of inventory Management

Challenges of inventory Management practices	Mean	SD
Availability of the required materials with the right quantity, quality and at the right time.	3.58	1.257
There are use of outdated storage facilities, aged storage\shades,	3.62	1.168
There is long bureaucratic procurement process.	3.73	.872
There are inventories which are overstocked or under stocked.	3.68	1.104

There is lack of pre/post employment training.	3.73	1.104
There is poor warehouse management and weak inventory control.	3.59	1.106
There is lack of integrated and automated system.	3.70	1.192
There is poor coordination among departments.	3.65	1.128
There is a proper and up-to-date fixed asset revaluation method.	2.19	1.265
There are a large number of waiting customers for new connection.	3.93	1.175
Excessive amount of used, scrap, obsolete and slow moving materials	3.78	.986
Valid N (list wise)	97	

Source: Field survey and SPSS output, April (2017)

From the above table 9 shown that most of the respondents were somewhat signifying disagreement to those challenges that the researcher used to determine the challenges of inventory management practices. The standard deviation of all variables implies that there is high variation in the responses. The first challenge which the respondents gave higher mean score was Q39 which stated as: There are a large number of waiting customers for new connection with mean score of 3.93 and SD 0.986. Most respondents agreed that this is the major challenge in the utility that a number of customers are waiting for the service of new connection and additional power request due to shortage of distribution materials. Respondents disagreed with Q38 with mean scores of 2.19 and SD 1.265. Other challenges that staff respondents agreed were statement Q40 with mean scores of 3.78 and SD 0.986, Q34 with mean scores of 3.73 and SD 1.104, Q32 with mean scores of 3.73 and SD .872, Q36 with mean scores of 3.70 and SD 1.192, Q33 with mean scores of 3.68 and SD 1.104, Q37 with mean scores of 3.65 and SD 1.128, Q31 with mean scores of 3.62 and SD 1.168, Q35 with mean scores of 3.59 and SD 1.265 and Q30 with mean scores of 3.58 and SD 1.257 respectively. The standard deviation of all variables implies that there is high variation in the responses. As it could be seen from the table 9 above, most respondents agreed that EEU was highly challenged with availability of the required materials, use of outdated inventory facilities, long bureaucratic procurement process, lack of employment training, lack of integrated and automated system, poor coordination and availability of excessive amount of used, scrap, obsolete and slow moving materials.

For example, respondents agreed with Q33 mean scores of 3.68 and SD 1.104 which states that: ***There are inventories which are overstocked or under stocked.*** This statement was supported by the researcher Buffa and Salin (1987) which stated as there are several reasons for keeping

inventory. Too much stock could result in funds being tied down, increase in holding cost, deterioration of materials, obsolescence and theft. On the other hand, shortage of materials can lead to interruption of products for sales; poor customer relations and underutilized machines and equipments.

4.8.8. Findings and Discussion of the Effectiveness of Service Delivery at EEU

The mean and standard deviation of these responses were calculated to judge the mean level of the variables and its variability (Standard deviation, SD).

Table 10: Result summary of Effectiveness of Service Delivery

Service Delivery Items	Mean	SD
Availability of the required material	2.21	.978
Operational performance	2.41	.910
On time Service availability	2.21	.946
Responds to customers complaints	2.05	.821
Provision of quality materials	2.36	.831
Customer satisfaction	2.01	.848
Valid N (list wise)	97	

Source: Field survey and SPSS output, April (2017)

As it could be seen from table 10 above, that the mean score of all respondents was low which implies that the respondents are not satisfied with availability of the required materials, operational performance, on time service availability, respond to customer’s complaints and customer satisfaction of EEU. The standard deviation of all variables implies that there is high variation in the responses. However, the above findings disagreed with Reid & Sanders (2007) findings that inventory management basically serves two main goals. First of all good inventory management is responsible for the availability of materials. It is important for running operations that the required materials are present in the right quantities, quality , at the right time, right item, at the right location and at the lowest cost in order to deliver a specific level of service. The second goal is to achieve this service level against optimal costs.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The final part of this research paper provides summary, conclusions and recommendations drawn from the findings and discussions of the data collected by survey, interview, document overview, and physical observation.

5.1. Summary of Findings

The following summaries of major findings of the study are presented based on the analysis and interpretation of collected data.

Inventory Management Techniques From questionnaire, physical observation, document review as well as interview results that the utility is not effective in practicing the major inventory management techniques such as ABC analysis, JIT, EOQ, establishing optimized purchasing procedure, up to date inventory revaluation methods for fixed assets, establishing optimized stock level techniques such as Maximum, Minimum, and safety stock levels are not applied in EEU. Instead, there is traditional way of inventory management system that results high cost and poor service delivery. The utility's purchasing system is not properly addressed the required materials. The respondents stated that the main problem is that departments do not provide their needs on time and do not even know their actual requirement. Inventory management activities are not properly integrated with procurement activities. As per the respondents, it is common to see the practice that highly demanded items were purchased in smaller portion whereas unnecessary materials were purchased in bulk amount. Additionally, due to poor communication channel, materials that are found in stock were purchased repeatedly. There is lack of integrated and networked inventory management system and as the result of this it is difficult the movement of materials in each warehouse.

Obsolete and slow moving items: It could be seen that respondents agrees with the items used to measure the presence of excess quantity and amount of obsolete and slow moving items at EEU. From all sources of data revealed that currently there are many types of obsolete, damage and scraped materials stored in each regional warehouse for more than 10 years and unable to dispose them timely. There is poor controlling system for obsolete, damaged and inactive inventory items. The management was not properly and effectively acted to dispose these materials. No one is worried about the money that the utility is losing on possessing these

materials. The value of these items is deteriorating from time to time. These items also occupy large space which can be used by the utility for other purposes. These items continue as difficult to manage, costly for handling and bottleneck for performing other activities..

Inventory Record Accuracy and Documentation Practices: All collected data results revealed that there was lack of immediate update of inventory records. Failure to have a specific time or date for posting of inventory records greatly affected inventory control. The interviewees agreed that EEU's recording and documentation practices are manual and not timely encoded to the system. There is no real time access that shows the status of the utility's inventory movement. Manual recording systems and delays in posting of inventory records causing discrepancies between actual and physical stock balances and then could influence the inventory control system EEU. It is difficult to get up to date stock information. Due to this there are so many items in EEU described for a number of times in different stock control cards. The respondents attributed the discrepancy between the physical stock balance and balances reflected in stock control record to be attributing factor for theft and pilferage, frequent stock out of some crucial items and poor planning. In regard to issuing and receiving of goods, the study reveals that this activity was commonly done by different personnel, an activity that may have a negative effect on: poor stock control recording, misappropriation of stock, discrepancies during reconciliation of stock balances and lack of responsibility for actions related to stock control.

Staff Skills and Competency: From questionnaire, document review as well as interview results of employees revealed that there is skill gap in the inventory management operation. Staff skills and competency are a major bottleneck for the effectiveness of warehouse management system in EEU. Qualification is not a pre-requisite and does not match with job requirements in the utility's warehouse. Respondents revealed that staffs with low educational background, staffs who are not challenging, undisciplined, and demoted employees are assigned to inventory management activities. The researcher also observed that with respect to work force old aged employees are assigned in the areas which require extra efforts. The numbers of employees are inadequate to perform their daily activity activities and the motivation of employees is not well managed. As the result of this poor documentation, poor recording accuracy and poor communication and violation of inventory procedures are observed in the warehouse. Therefore, it can be deduce that inventory management practice was not effective in the utility due to skill gap and lack of motivation.

Challenges in this inventory operation: The study summarized that inventory challenges observed at EEU was shown by an overall mean of 3.56. The research finding shows that overall inventory management practice is not satisfactory and effective. The major challenges in this inventory operation are the availability of inventory as required, the time of delivery and acquiring in complete set of items. In addition, large numbers of obsolete and non moving items with huge high value of stock are available. The study revealed that all the variables listed to measure the inventory management practice of EEU are major problems which can hinder the utility's profit and customer service delivery. All respondents revealed that there is poor attention, poor commitment, poor decision making, poor supervision and poor concern from top management which lead to ineffective inventory management practice of EEU. Others such as poor reporting system, information inconsistency, long time taking in reconciliation of material records, lack of integrated and automated system, poor coordination among departments, and large number of waiting customers for new connection were mentioned. All these challenges results inefficient service delivery of EEU.

Effectiveness of the service delivery: The study summarized that effectiveness of the service delivery of EEU was shown by an overall mean of 2.21. From all questionnaire findings, respondent's and customer's interviews found that there is poor service delivery as the result of poor inventory management practices. From questionnaire, physical observation, document review as well as interview results of employees implies that poor inventory management practice contributes to insufficient material supply which leads to high customer complaints and poor customer service EEU. The respondents described that there is shortage of distribution materials at right quantity, right quality, right time, right price and required location. The majority of customer's response was more of criticizing and blaming EEU that as it is not good enough in delivering new connection service to customers. Many customers are obliged to wait for a long period without power. As the result of this, customers are not satisfied with the material supply and stock management system of EEU. Due to the incompatibility between material availability and the needs of customers, there is a gap between what customers expect from the utility and what they actually found.

5.2. Conclusions

This study sought to assess the influence of EEU Inventory Management practice on service delivery. From the findings of the study, it was established that Inventory Management Practice

has significant positive influence on service delivery. The study therefore concluded that effective Inventory management practice is a significant determinant for provision of effective service delivery.

Inventory Management Techniques: According to the data analysis, the utility has some progressive action in reduction of waiting customers of new connection, power improvement, preventive maintenance and emergency service delivery. From the findings of the study, it was established that Inventory management techniques has significant positive influence service delivery. The study therefore concluded that inventory management technique is a significant determinant of service delivery. However, the study has shown that in EEU there were least practiced inventory management techniques: ABC analysis, EOQ, Establishing optimized purchasing procedure, Up to date inventory revaluation methods, establishing optimized stock level, and Vendor managed inventory, Just- in –Time, Demand Forecast approach, and computerized inventory management. Hence there are inventory management techniques that result high cost and poor service delivery, high stock outs, rush ordering, unplanned and urgent purchasing items, presence of too much amount of obsolete and non moving items, unavailability of real time information, unawareness of how and where materials move, information inconsistency, long time taking in reconciliation of material records, lack of integrated and automated system, poor coordination among departments and tracking of inventory hardly possible.

Obsolete and Slow Moving items: The study investigated the influence of Proper Inventory disposal system on service delivery. From analysis, finding revealed that Proper Inventory disposal system has significant positive influence on service delivery. From these findings, the study concluded that Proper Inventory disposal system is significant determinant of service delivery. Based on the study findings, the main problem encounter in EEU are the availability of excessive amount of unused, scrap, obsolete and slow moving materials at the warehouse for a long period of time. There is also poor disposal system for these items in the utility. These materials took much of the warehouse spaces and increase carrying, insurance premium and deterioration cost. Since the availability of large number of obsolete, damaged, scraped and slow moving materials in the utility has a significant negative impact on the service delivery of the utility, the study conclude EEU is hardly meeting customers' satisfaction.

Inventory Record accuracy and Documentation Practice: The study investigated the influence of Inventory Records Accuracy on service delivery. From analysis, finding

revealed that Inventory Records Accuracy has significant positive influence on service delivery. From these findings, the study concluded that Inventory Records Accuracy is significant determinant of service delivery. According to Susan & Michael (2000) accuracy of inventory records is necessary to provide satisfactory customer service, determine replenishment of individual items; ensure that material availability meets repair or project demand, analyze inventory levels and dispose of excess inventory. Effective stock records and documentation practice provide the management with the information so as to ensure accountability through stocking taking and stock audit exercise. However, the study revealed that the majority of the respondents were not satisfied with the current recording and documentation process in that it slows down the daily operations, it is a threat to data integrity and security issues, and leads to inaccuracy of captured data in the system. Even if in some offices, little use of applications such as Ms Excel and access to store & process data is found, most Inventory Recording and Documentation are in EEU are manuals. Failure to have a specific time or date for posting of inventory records, lack of immediate update of inventory records, delay encoding to the system and no real time access greatly affect inventory control system.

Staff skills and Competency: The study investigated the influence of Competency of Inventory Staffs on service delivery. From analysis, finding revealed that Competency of Inventory Staffs has significant positive influence on service delivery. From these findings, the study concluded that Competency of Inventory Staffs is significant determinant of service delivery. The study result shows skilled and competence staff is the most ignored part of EEU. Almost all of the staffs working in EEU Inventory and Warehouse Management Department don't have the required skills, competencies, education and qualifications about stock management and inventory control system. It is concluded that most of the staffs assigned in the above mentioned department are aged, undisciplined, demoted and employees that doesn't have efficient background. On top of that, the numbers of employees are inadequate and motivation in this operation is not attractive. As the result of this poor documentation, poor record accuracy and poor communication and violation of inventory procedures are observed in the warehouse which these adversely affect the service delivery of the Utility. Therefore, to ensure effective inventory management practice for the service delivery of EEU, it is vital to place effective and efficient controlling systems. This would include recruiting well qualified personnel to manage the inventory system and set up functioning information systems which will be used to manage

the system. Inventory management should not be the preserve to the management and stores or logistics department only but every staff must be made to understand the importance of inventory management.

Challenges of Inventory Management: Further, the study concludes that the main challenges that hinder implementation of effective management practices and finally affects service delivery of EEU were: failure to invest in modern technologies, insufficient funding, and lack of top management commitment, poor attention, poor decision making, poor supervision and poor concern from top management, and lack of pre/post employment training system. Other challenges faced by the procurement, logistic and warehouse management department were lengthy bureaucratic process in the procurement process, poor implementation of inventory policies and procedures, poor reporting system, information inconsistency, long time taking in reconciliation of material records, lack of integrated and automated system, poor coordination among departments, poor inventory revaluation methods, excessive amount of used, scrap, obsolete and slow moving materials, outdated storage facilities and large number of waiting customers for new connection were mentioned. All these challenges results inefficient service delivery of EEU.

Provision of Materials: The study investigated the influence of Provision of Quality Materials on service delivery. From analysis, finding revealed that Provision of Quality Materials has significant positive influence on service delivery. From these findings, the study concluded that Provision of Quality Materials is significant determinant of service delivery. Due to the incompatibility between material availability and the needs of customers, there is a gap between what customer's expectation from the utility and what they actually found. Therefore, the researcher concluded that poor inventory management practice has great impact on the service delivery of EEU.

Findings of correlation, regression and ANOVA tests revealed that an Inventory Management practice has significant positive influence on service Delivery. The study therefore concluded that Inventory Management techniques, Automated Inventory Control System, Proper Inventory disposal system, Inventory Records Accuracy and documentation practice, Provision of Quality Materials and Competency of Inventory Staffs were significant determinants of service delivery both individually and collectively.

5.3. Recommendations

Primary and secondary data are analyzed and interpreted. From these analysis and interpretations, the researcher established that the inventory management practice had a positive impact on the effectiveness of service delivery of EEU. However, for the practices to be effective and to make positive influence on service delivery, the following recommendations are forwarded on issues which may have managerial implications.

1. Applying Optimized Inventory Management Techniques: The researcher has found that there is little practice of effective inventory management practice in EEU. It should be understood that effective inventory management practices starts with understanding of purchasing right materials in the right quantity at the right price from the right supplier. Applying these inventory management concepts along with the practices such as the right stock valuation, establishing maximum & minimum inventory level and ABC analysis ensures inventory efficiency and better customer service. Therefore, EEU's Inventory management techniques should cover determining the size of inventories to be held, determining EOQ, optimized purchasing, planning ahead of time to avoid shortages, deciding about the issues, receipts, inspection procedures, collaboration and coordinating among user departments and customers to maximize customer service and minimize unnecessary inventory investment. Therefore, Rather than depending on heuristics and guesstimate in managing inventory, there is need for the utility to adopt time-tested scientific models in determining inventory quantities and managing inventory cost.

2. Implementing Integrated and Automated Inventory Management System: The government of Ethiopia (GoE) has initiated a transformation program to enhance operational efficiency & effectiveness of energy sector to attain power sector performance excellence by establishing Ethiopian Electric Utility (EEU) as a “new world class electric power utility company” with an aim to double the customer base from current 2.455 Million to 6.955 Million by year 2020. In order to achieve this program, EEU warehouse and inventory management play a major and significant role. There should be implementation of integrated information system that links all business units and user departments. Integrated information system calls for a high degree of collaboration and visibility across all parties. In order to achieve this program, EEU management needs to modernize its inventory management system to increase service delivery and efficiency. Therefore, EEU should

invest in best practice inventory management software and modern information technology like barcode and ERP application system so as to react faster to orders, reduces inventory costs, integrates all regional stores and enables real time access and improve information sharing.

- 3. Computerized inventory control system:** Computerized inventory control system was also established to significantly influence inventory service delivery. The study recommends that procurement practitioners and procurement policy formulators should propose development of computerized procurement and control of inventory. Management must make available the critical resources needed for adoption of such systems and must create culture that supports use of the system.
- 4. Developing Employees Capacity:** Skilled and competence man power is a pre requisite so as to manage inventories efficiently and effectively. EEU should ensure that inventory management process is only handled by a competent and well trained procurement, logistic and warehouse staffs who should be entrusted with the responsibility of implementing inventory policy issues and bothering on the control and management of inventories. To apply this firstly, the utility should employ qualified and adequate staffs involved in inventory management activities that meet user needs. Secondly, EEU should invest in training of its staffs in order to equip with the required knowledge, skill and attitude, to reduce inventory and associated with holding inventory costs. Thirdly, best practice from the same and other industries locally and internationally can also improve the exposure of staffs and knowledge transfer. Additionally, EEU should create attractive work environment; establishing performance based rewarding, payment and motivation system and working on improving employees ethical problems in the utility.
- 5. Implementing Proper Disposal System:** The researcher has revealed and identified that a lot of wastage is experienced due to inventory becoming obsolete or expired in warehouse. Many of these items don't have any use to the utility rather increasing carrying cost, insurance premium cost and cost of deterioration's, exposed to theft and lost. To avoid the like limitations, EEU should have a good planning policy which should be demand oriented. EEU shall also design new projects so as to use these obsolete and inactive items and consider reselling of obsolete, scrap and inactive materials to third parties. If these are effectively done can contribute to the profitability and service delivery of the utility.

Therefore, the utility's material and stock management managers should have effective and timely disposal system and should also work with the responsible body on disposal of these items.

- 6. Up-to-date Inventory Management Policies and Procedure:** To safeguard a good inventory management practices, procedures and policies has to be designed and implemented in an organization. EEU should have formally structured inventory management policy and procedures which can create accountability and responsibility up on staffs assigned in the inventory position. These policies and procedures potentially can make inventory staffs effective to implement inventory technique and to solve inventory challenges existed in the utility. Furthermore, these policies and procedures should be effectively communicated across all EEU departments and staffs.
- 7. Practicing Optimized Procurement System:** The main objective of procurement department of any organization is to ensure timely and cost-effective delivery of high quality materials. The utility should practice optimized and modernize procurement system in order to avoid overstocking or under stocking of materials and to ensure quality materials. EEU should also avoid dependency on a single Vendor rather should consider list of market available Vendors. The most important procurement activity is to choose and keep close interactions with several reliable and high quality vendors in order to reduce material cost and maintain good customer service. These Vendors should participate in a competitive bidding before finalizing the price of any material. Moreover, Vendor assessment form should be created where each Vendor should be evaluated on the basis of quality, timeline, cost, after sales support and adherence to specifications. Creating a partner relationship with local manufacturers/suppliers is also important.
- 8. Ensuring Accurate Stock Record and Documentation Practices:** Ensuring accuracy of stock records and documentation provide EEU's managements with information which is used to insure accountability and timely decision making through annual stock taking and audit exercise. It is also necessary to provide satisfactory customer service, determine replenishment of individual items, analyze inventory levels and dispose of excess inventory. Therefore, EEU should ensure all inventory records kept are accurate and be compiled with receiving, issuing and delivering of materials.

9. Up to date inventory valuation practices: The researcher has revealed that EEU was not practicing fixed asset revaluation for the last 15 years and hence the balance sheet, capital balance and financial statement of EEU didn't show the correct value. Therefore, EEU should follow up to date inventory valuation practices.

5.4. Suggestions for Further Study

Further study should be undertaken to consider other factors which might influence the utility's performance like:

- (i) How Inventory management practice influence the performance and revenue of EEU.
- (ii) Optimizing the procurement process at EEU.

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APPENDIX I

ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

QUESTIONNAIRES ADMINISTERED TO EEU EMPLOYEES

Dear respondents,

As a partial fulfillment of the award of M.A. degree in Logistic and Supply Chain Management (LSCM) at AAU **school of Commerce**, I am conducting a research on “**The effect of inventory management practices on service delivery of EEU with the case of central (Gofa main) store**”. This questionnaire is therefore designed to request your independent views. Because you are the one who can give me a correct picture of the impact of inventory management practices of EEU, I kindly request your full cooperation to fill this questionnaire frankly and honestly. All information provided shall be treated with utmost confidentiality and used strictly for academic purpose. Please be free to answer questions without indicating your name.

Thank you in advance for your participation.

Email: belshaday@yahoo.com, phone: 0911- 13 56 41(Bimrew Melese)

Section I – Demographic Details

Instruction: Give your response by ticking (✓) once besides each choice.

1. Gender: Male Female
2. Marital Status: Single Married Divorced widowed
3. Age : less than 25 years 26 to 35 years 36 to 45 years
 46 to 55 years 55 and above
4. level of Education: 10/12 grade completes Certificate College Diploma
 1st degree Masters Others, please specify _____
5. Your Service years in the utility: less than 5 years 5 to 10 years
 11 to 15 years 16 to 20 years Over 21 years
6. Work position: worker. Supervisor Junior Management
 Middle management Senior management
7. In which department are you working _____

Section II- Questionnaires regarding inventory management practice

Instruction: Rate the following inventory management practices at EEU and kindly indicate the extent of your level of agreement with the statement below by **ticking [√] once** as per the scales provided.

Level of Agreements				
Strongly Disagree	Disagree	Undecided(Neutral)	Agree	Strongly Agree
1	2	3	4	5

Questions related with Inventory Management practices					
I. Inventory Management Techniques	Level of Agreement				
	1	2	3	4	5
1. The Ethiopian Electric utility is effective in practicing inventory management techniques such as ABC analysis, Economic Order Quantity, Just in Time, etc).					
2. The Ethiopian Electric Utility is effective in establishing optimized purchasing procedure.					
3. There is effective inventory control system that optimizes customer service, inventory costs and operating costs in EEU.					
4. There is holding of too much inventory but unable to provide better customer service in EEU.					
5. EEU’s inventory managers have established optimized stock level techniques that need to be kept in the warehouse (i.e. Maximum, Minimum, and safety stock levels).					
6. EEU has computerized all inventory management systems that provide information regarding each type of stock movement.					
7. Depending on the type of materials, EEU follows proper inventory valuation practices such as FIFO, LIFO or weighted average methods.					
8. EEU’s customer dissatisfaction is directly related with the poor inventory management techniques of EEU.					
9. EEU adheres strictly to its inventory management policies and procedures to protect materials against theft, damage and loss.					

10. There is insurance coverage to all items of the utility.					
11. There is an up to date inventory revaluation methods for fixed assets that show correct balance sheet and income statement report in EEU.					
12. There is a proper quality control check whether the materials received are according to the specification ordered, required quantity and quality standards.					
13. Do you have any additional point to mention regarding inventory management techniques of the utility's inventory management? _____ _____ _____					
II. obsolete, damage, scraped, and slow moving items	Level of Agreement				
	1	2	3	4	5
14. There are many breakage's/damaged, obsolete, scrap, unidentified and slow moving items mixed with other inventory items in EEU's central store.					
15. There is proper recording, handling and controlling system for returned materials from different projects of EEU.					
16. Disposal of obsolete and scrap items at EEU central store are effectively done on an annual basis with proper authorization and records.					
17. There is clear procedure for adequate provisions of obsolete and inactive inventories and accordingly EEU inventory management monitors and approves the write-offs for these inventories.					
18. All disposed items are updated in the inventory records/register/database for the purpose of proper management and control.					
19. Do you have any additional point to mention regarding the utility's obsolete, damage, scraped and slow moving materials inventory? _____ _____					

III. Inventory records & documentation practice	Level of agreement				
	1	2	3	4	5
20. In EEU's Central Store Proper documentation and up-to-date records of stock are effectively practiced from the stage of, receipt, storage and issue of materials.					
21. There are discrepancies between the stock record and the result of physical verification/count of inventories at central warehouse.					
22. The current inventory recording system of EEU is satisfactory. (i. e. There are proper records, accurate inventory counts, accurate coding system and minimum errors in inventory records).					
23. Bin card, stock controlling card and inventory audit report documents reflect correct inventory level and materials.					
24. Receiving, issuing, accounting and storing responsibilities are properly segregated in the utility's central warehouse.					
25. There are inventory items which do not counted annually at the central store.					
26. EEU Inventory management periodically checks inventory reports / records and make immediate decisions based on the reports.					
27. Do you have any additional point to mention regarding the warehouse inventory records accuracy & documentation practice EEU? _____ _____ _____					
IV. Staff Skills and competency	Level of Agreement				
	1	2	3	4	5
28. There are skilled and competent man powers in the utility's warehouse that use inventory management tools properly.					

29. The numbers of staff involved in EEU's stock control activities are adequate.					
30. There are old aged employees who are assigned in areas which require extra energy and efforts of the warehouse.					
31. In EEU warehouse, qualification is a pre-requisite and matched with job requirements.					
32. The utility's warehouse staffs are continuously trained on inventory management control systems.					
33. Do you have any additional point to mention regarding the warehouse staff knowledge and profession of EEU? _____ _____ _____					
34. Challenges faced in inventory management practices	Level of agreement				
	1	2	3	4	5
a) There is a problem in availability of the required materials with the right quantity, quality and at the right time.					
b) There are use of outdated storage facilities, aged storage\shades					
c) There is long bureaucratic procurement process at EEU.					
d) There are inventories which are overstocked or under stocked at Central store.					
e) There is lack of pre/post employment training.					
f) There is poor warehouse management and weak inventory control.					
g) There is lack of integrated and automated system.					
h) There is poor coordination among departments of EEU.					
i) There is a proper and up-to-date fixed asset revaluation method.					
j) There are a large number of waiting customers for new connection.					
k) Excessive amount of used, scrap, obsolete and slow moving materials at central store.					

35. **Effectiveness of service delivery** : tick[√] one as per the rating level)

Effectiveness		Rating Level				
		Very High	High	Medium	Low	Very Low
35.1	Availability of the required material					
35.2	Operational performance					
35.3	On time Service availability					
35.4	responds to customers complaints					
35.5	Provision of quality materials					
35.6	Customer satisfaction					

36. Please specify any additional suggestions for the overall inventory management practice and its impact on the service delivery of the utility? _____

Thank you for sharing your thoughts!

APPENDIX II
ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE
DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN
MANAGEMENT
OPEN ENDED QUESTIONNAIRE ADMINISTERED TO
EEU MANAGEMENT STAFFS

Dear respondents,

As a partial fulfillment of the award of M.A. degree in Logistic and Supply Chain Management (LSCM) at AAU **school of Commerce**, I am conducting a research on “**The effect of inventory management practices on service delivery of EEU with the case of central (Gofa main) store**”. This questionnaire is therefore designed to request your independent views. Because you are the one who can give me a correct picture of the impact of inventory management practices of EEU, I kindly request your full cooperation to fill this questionnaire frankly and honestly. All information provided shall be treated with utmost confidentiality and used strictly for academic purpose. Please be free to answer questions without indicating your name.

Thank you in advance for your participation.

Email: belshaday@yahoo.com, phone: 0911- 13 56 41(Bimrew Melese)

1. Do you think that the utility is effective in practicing the inventory management techniques such ABC analysis, Economic Order Quantity, Just in Time, optimized purchasing, etc to reduce inventory carrying and associated cost problems? If Yes, How and if No, why?

2. What are the main problems that encounter in the existing inventory and warehouse management system of EEU? _____

3. Do you think that the utility's inventory policies and procedures are systematically communicated and effectively implemented to improve inventory internal control system and service delivery? If Yes, How? If No, why?

4. Are there obsolete, damaged and inactive inventory items in the utility? If yes, do you believe that the utility implement proper management and timely disposal system for those materials? If not why? _____

5. Do you agree or disagree with the point that there is an up to date revaluation of fixed asset and accordingly the utility's balance sheet and income statement report shows correct asset and capital balance. If Yes, How? If No, why? _____

6. Do you agree or disagree with the point "the utility has high customer complaints due to poor inventory management practices which ultimately result poor service deliver"? If you agree, what are the possible reasons for the complaints and poor service delivery? If not why?

7. Does the Utility place skilled and competent employees and further provide the required pre and post employee training on inventory management systems in order to achieve effective customer service? _____

8. Is there proper recording, handling and controlling system for returned materials from different project areas and departments? If not why? _____

9. Do you believe that the existing inventory management system of EEU provides Up to date information regarding each type of stock movement in each regional store?

10. Please specify any additional comments on overall inventory management practice and its impact on the service delivery of the utility? _____

Thank you for sharing your thoughts!!

APPENDIX III

ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE

DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN

MANAGEMENT

INTERVIEW QUESTIONNAIRE ADMINISTERED TO EEU

EMPLOYEES

These interview questions are designed to be answered by line managers, Material Accounting, procurement, Logistics & central Warehouse employees of EEU using the interview guidelines.

1. Are there obsolete, damaged and inactive inventory items in the utility? If yes, do you believe that the utility implemented proper and timely disposal system for those materials? If not why?
2. Is there proper recording, handling and controlling system for returned materials from different project areas and departments? If not why?
3. Is there optimal procurement system in the utility? If not why?
4. Does the Utility provide the required training to the employees in warehouse management and IT? If not why?
5. Was the current customer complaint directly related to shortage of materials or any other reasons?
6. Are there large numbers of waiting customers for new connection? If yes, what are the main causes?
7. Is there insurance coverage to all inventory items?
8. As to your understanding what is the view of top management towards stock and warehouse management?
9. Could you provide any suggestions for effective inventory management practice at EEU central store (Gofa main store)?

APPENDIX IV
ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE
DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN
MANAGEMENT
INTERVIEW QUESTIONNAIRES ADMINISTERED TO EEU
CUSTOMERS

These interview questions are designed to be answered by Customers of Ethiopian electric utility using the interview guidelines.

1. How do you evaluate the service delivery response for new connection customers?
2. Is there fair and equal service delivery for new connection?
3. Is there availability of materials with the required quantity and quality at the required time?
4. Does the utility provide on time Service to its customers?
5. How do you evaluate the response rate to customer's complaints?
6. Are you satisfied with the service delivery of the utility?
7. Do you have any comment on the service delivery of the utility?