



**ST.MARY'S UNIVERSITY  
SCHOOL OF GRADUATE STUDIES**

**EFFECTIVNESS OF INVENTORY MANAGEMENT  
SYSTEM  
(A CASE STUDY OF ETHIOPIAN ROADS  
AUTHORITY)**

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**ST. MARY'S UNIVERSITY  
SCHOOL OF GRADUATE STUDIES  
MBA PROGRAM**

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SYSTEM  
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AUTHORITY)**

**A THESIS SUBMITTED TO ST.MARY'S UNIVERSITY, SCHOOL  
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## **ENDORSEMENT**

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

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Advisor

**St. Mary University, Addis Ababa**

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Signature

**December, 2016**

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## **List of Acronyms**

<b>IHA</b>	Imperial High way
<b>IBRD</b>	International Bank of Reconstruction and development
<b>ERA</b>	Ethiopian Roads Authority
<b>MOFED</b>	Ministry of Finance and Economic Development
<b>IC</b>	Inventory Control
<b>IFMS</b>	Integrated Financial Management System
<b>JIT</b>	Jist in Time principle
<b>SI</b>	Specific Identification

## **Abstract**

*The effectiveness of inventory management has been considered to be an important issue on the performance of an organization. This study examines the effectiveness of inventory management (A case study of Ethiopian Roads Authority) and interprets the result by relating with different experiences taken from previous studies, books manuals and different websites. Descriptive study design and purposive sampling technique. The researcher used a sample size of 80 employees from the target population to act as sample size. The research used questionnaire, interview with key informants, and observation of the researcher. The collected data were analyzed quantitatively and qualitatively. The key findings from the study revealed that several surpluses scrape inventories are exist in the ware house and around store yard for many years, less modern inventory management system exist in the network districts. Lack of purchasing procedures throughout the organization, lack of use scientific method in determining their inventory level, the obsolete stocks has identified and counted by the Auditors and locked in one store. The researcher recommends for better improvement of the inventory management and control of ERA, by providing the constructive comments.*

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background of the Study**

The success of one organization depends on the efficient and effective utilization of the given resources. These resources need proper management (Bose, C. 2006). The inventory type of an organization depends upon the work to be performed by the organization. Inventory begins from purchasing of materials for use of an organization, then storing, using and the remaining stock will be stored in the warehouse until requested for use.

Inventory management is defined as “the continuing process of planning, organizing and controlling inventory that aims at minimizing the investment in inventory while balancing supply and demand”. Specifically, the process is a supervision of supply, storage and accessibility of items in order to ensure an adequate supply without excessive oversupply (Liu Zongjian, 2013).

Inventory control is the function of materials management which attempts to maintain stocks at their predetermined levels (Sharma C., 2004). It is exercised by planning required stock levels at regular intervals. Management’s role in any organization involves the acquisition, storage disposition and control of resources that are necessary for the attainment of organizational objectives. Those (factors of production) typically include labor, capital equipment and material of inventories (Vohra, 2008:427). According to Temeng et al. (2010:195), historically, however organizations have ignored the potential savings from proper inventory management, treating inventory as a necessary evil and not as an asset requiring management.

The goals of inventory management are to ensure that the inventories needed to sustain operations are available, but to hold the costs of ordering and carrying inventories to the lowest possible level. There is always pressure to reduce inventory as part of firms' overall cost containment strategies, and many firms are taking drastic steps to control inventory costs (Brigham Daves, 2004).

## **1.2. Background of the Organization**

Ethiopia's difficult terrain, cleft in numerous places by canyons of great depth and high mountain ranges has often rendered communication impossible. Because of this the Imperial Highway Authority (IHA) Established by Proclamation No. 115/1951 as Semi-Autonomous Agency. The Ethiopian Roads Authority when established in 1951 as IHA had about 650 permanent employees of which all supervisory personnel, engineers and majority of construction equipment operators and machines were experts. Having founded a national road policy by the establishment of the IHA, the Imperial Ethiopian Government needed financial help to carry out the job through. The sum of US \$ 5000,000 was borrowed from the International Bank of Reconstruction and development (IBRD).

The vision of ERA is to *“To assure the best economic and social benefits of the customers by joining Ethiopian road network to middle income countries in 2023.”* To meet this goal ERA should modernize the financial system to administer the budget that has been allocated by government and other different grants, for the desired road construction. According to ERA Human resource directorate information, ERA has six core directorates, two training centers, 10 network districts in different regions who are working integrated with the head office, have a total number of 2706 employees. The Head office has one central warehouse, the two training centers and 10 networks have their own warehouses. The inventory has counted twice a year and the data recorded by

IC (Inventory Control) Software, the consolidation has done by IC integrated with ACCPAC Software by the result of inventory counted in each warehouses.

E.R.A has different stores and different kinds of inventory those are listed below:

- ✓ Electrical Supplies
- ✓ Spare parts
- ✓ Clothing (for uniform of employees)
- ✓ Different machineries spare parts
- ✓ Tire with inner- tube
- ✓ Oil and grease
- ✓ Other materials
- ✓ Small hand tools
- ✓ Stationary
- ✓ Janitorial supplies
- ✓ Construction materials

On the bases of this there are many inventory items stocked in different warehouses, some of them are obsolete items that needs management decision and difficult to count at year end, the other and main problem is the suspense account has pending for further investigation due to a balance accumulated from prior years with no solution rolled year to year these causes for audit comment. So here the student researcher wants to see the problems in detail and give emphasis for the management to provide feasible recommendations based on the findings.

### **1.3 Statement of the Problem**

Inventories are basically stocks of resources held for the purpose of future production and/or sales. Inventories may be viewed as an idle resource which has an economic value. Better management of inventories would release capital for use elsewhere productively (Ghosh & Kumar, 2003). Hence Inventory control implies the coordination of materials accessibility, controlling, utilization and procuring of material. The direction of activity with the purpose of getting the right inventory in the right place at the right time and in the right quantity is inventory control and it is directly linked to Inventories are a major component of any logistics system and as such require to be planned, managed and controlled in order to achieve the basic aims of Production function of any organization. This implies that profitability of any organization directly and indirectly is affected by the inventory management system operated (Miller, 2010).

Organizations maintain inventory of goods mainly for the following reasons:

- Minimizing costs at acceptable levels of investment.
- Providing the desired levels of customer service.

Many organizations have got many problems due to not giving attention for inventory management throughout its stages from planning to consumption that causes cost for the organization. The researcher tried to get studies made on effectiveness of inventory management of Ethiopian Roads Authority but there is no research has been done on it and backup the findings and solutions to the respective body.

Empirical studies show that different countries use different techniques of inventory management system. Inventory accuracy is particularly important when tracking serial and lot numbers. Manually recording serial and lot information can lead to numerous inaccuracies. The other is implementing an inventory control solution can help to



simplify work processes within an organization, leading to improved efficiency and productivity. Without an inventory management system, the staff may not be operating efficiently, the way information passes from one employee to another wastes valuable time, and leaves room for mistakes to occur, Staff may forget to record a serial number, ship the wrong goods to a customer, or move items around the warehouse, making it difficult for other employees to find the goods they need. By incorporating an inventory control solution, it is possible to create a standard set of practices to handle every inventory transaction (Thomas E.Vollmann, 2010).

Due to the reason no previous study on effectiveness of inventory management of ERA, the student researcher highly motivated to study and used the necessary data investigated related to the following research questions.

#### **1.4 Research Questions**

The study attempted to answer the following basic research questions:

- Does ERA make use of appropriate inventory management techniques?
- What does the inventory management practices of ERA looks like?
- How inventory management system contributes to the effectiveness of ERA's financial statement?
- What are the major factors affecting the inventory management practice or system of ERA?
- What is the weakness of ERA inventory management system?
- What type of stock taking and store management system that ERA uses?

## **1.5 Objectives of the Study**

The study has general and specific objectives.

### **1.5.1 General Objective**

General objective of the study is to assess the inventory management practice of ERA and to provide possible solutions for the problems identified.

### **1.5.2 Specific Objectives**

The following are specific objectives of study

- To determine the types of inventory control systems applied by ERA
- To examine how inventory management function is critical for the organization
- To what extent the existing inventory management system affects the effectiveness of the current inventory management system and the financial accounting practice of the organization.
- To investigate the causes of obsolete stocks of ERA.
- To examine the root causes of suspense accounts that rolls up year to year in the financial statement of ERA.
- To assess the practice of stock and store management system of ERA.

## **1.6 Significance of the Study**

The result of the research can be applied and benefit for Ethiopian Roads authority by providing the following advantages.

- It enables to know the overall inventory management system of Ethiopian Roads Authority for other investigators who need to upgrade their knowledge.
- It enables the management to control the inventory management system of Ethiopian Roads Authority ahead of time.

- It enables Ethiopian Roads Authority employees who are assigned on different stores, to catch some knowledge from this study.
- It enables to know the strengths and weakness of the organization's inventory management practice.

## **1.7 Scope of the Study**

- The study covers the effectiveness of inventory management practice of ERA, the planning (budgeting) and controlling of inventories, purchasing of materials, the Warehouse management, the obsolete stocks, and effects of the suspense accounts in the financial statement of the organization.
- The study is conducted at ERA Head office Central Warehouse, Alemgena Machine Base and Chancho Labor Base Training Centre. Because of the vastness of the organization the student researcher is forced to delimit the study to the above warehouses. The time duration of this research will be from August to December, 30/2016.

## **1.8 Limitation of the Study**

The study is expected to encounter the following constraints

- The nature of the organization is decentralized in different areas of the country, for the research purpose the researcher forced to study only on ERA central warehouse, Alemgena Machine Base Training Centre and Chancho Labor Base Training Center.
- The suspense account is accumulated for several years, may be it needs more time to investigate the whole stock accounts, because of this the researcher depend on some of high value items to finish the study on time.

## **1.9 Operational Definition of Terms**

**Effectiveness:** is the capability of producing a desired result. When something is deemed effective.

**ACCPACC Software:** Accounting software that is used to consolidation and enter all the organizations financial data.

**ERA:** Ethiopian Roads Authority, the head office (the home office account) the consolidation work summarized on financial Directorate.

**IC (Inventory Control) Software:** Software that is used to control the inventory data that integrated with ACCPACC.

**IFMS (Integrated Financial Management System):** A software that is used to control the financial system of governmental organization administer and control by Ministry of Finance and Economic Development (MOFED).

## **1.10 Organization of the Study**

The research report is structured into five chapters. Chapter one provides the general introduction, statement of the problem, research objective, significant and scope of the study. Chapter two describes the review of related theoretical and empirical literatures. Chapter three provide detail description of the methodology employed in the research. Chapter four contains data presentation, analysis and interpretation. Finally, the last chapter concludes the total work of the research and gives relevant recommendations based on the findings.

## **CHAPTER TWO**

### **REVIEW OF RELATED LITERATURE**

#### **2.1 Introduction**

This chapter gives an extensive review of the available theoretical and empirical literature to the problem will be investigate, critique of the existing literature relevant to the study, summary of the literature review and finally the research gaps.

#### **2.2 Review of Theoretical Literature**

##### **2.2.1 Definition of Inventory**

In a merchandising company consists of all goods owned and held for sale to customers. Inventory is expected to be converted in to cash within the company's operating cycle. In the balance sheet inventory is listed immediately after accounts receivable. Because it is just one step farther removed from conversion in to each than customer receivables (Williams, 2006).

##### **2.2.2 Inventory Management**

Effective inventory management is essential in the operation of any business (Hakansson and Persson, 2004) identifies three different trends in the development of logistics solutions within industry, one trend is concerned with the increased integration of logistics activities beyond organization boundaries with an aim to reduce cost items such as capital costs for inventory and handling costs of flows.

Inventory as an asset on the balance sheet of companies has taken on increased importance because many companies are applying the strategy of reducing their

investment in fixed assets, like plants, warehouses, equipment and machinery, and so on, which even highlights the significance of reducing inventory. Changes in inventory levels affect return on assets (ROA), which is an important financial parameter from an internal and external perspective. Reducing inventory usually improves ROA, and vice versa if inventory goes up without offsetting increases in revenue (Coyle et al., 2003).

### **2.2.3 Inventory Control**

Eni (2001) defines inventory control as the problems of verifying the quantity, the value and the balance of the entire range of materials held in the stock, so that it would be easy and possible to give the exact quantities of materials in the store at any given time. It helps the store-keeper (or the inventory controller, as the case may be) to tell how much was ordered (requested for), how many have been used, what is remaining and when to place the next order so that the enterprises would not lack materials to work with at any point in time. Similarly, Sharma (2004), views inventory control as the means by which materials of the correct quantity and quality is made available as at when required with due regard to economy in terms of storage and costs (both ordering and working capital). He also said that inventory control is the systematic ways of locating; storing and recording of goods in such a way that desired degree of service can be made to the operation shops at minimum ultimate cost.

Kumar and Suresh (2008), argue that effective control in inventory is a must for smooth and efficient running of the production cycle with least interruption. They proceed with their argument that this is warranted by varying intervals between receiving the purchased parts and transforming them into final products. They further argue that inventory control would ensure adequate supply of products to consumers and avoid shortages and ensure timely action for replenishment. Inventory control systems may ensures smooth production and hence no stock-out.

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 caused 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.

Organizations that have poor performance in inventory management faced different problems, and Menon (2006), indicates that, this poor inventory control has the following symptoms: high rate of order cancelation, excessive machine downtime due to material shortage, 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 (Aschalew Tsegaye, 2015).

#### **2.2.4 Obsolete and Excessive Inventory**

According to Mark Williams, (2009) Obsolete inventory has become a prominent phenomenon in most of the organizations. Many organizations are striving to avoid obsolete inventory and are also trying to avoid excessive inventory. There have been many articles in the literature that identify the best practices to control obsolete and excessive inventory. The items when become obsolete are unusable and it does not yield any value to the services and in turn they consume valuable storage space in the warehouses, added are the taxes. These excessive costs may yield to increase in the overall facility costs. The organizations must implement steps and methods that can help

inventory managers identify the excessive inventory and make use of the excessive inventory before it turns out to be obsolete. There have been many research articles that help in designing steps to avoid obsolete inventory. Having excessive inventory can be attributed as the primary causes of obsolete inventory. A literature review on inventory control and reduction of inventory shows that it is common to all the organizations that excess inventory translates to more dollars spent. Tony Wild (2002) suggests “more inventory means worse delivery time”.

### **2.2.5 Documentation /Stores Record**

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. Bailey and Farmer (2003) state that stock recording are expected to maintain particulars of receipt, issues and balances remaining in stock for each individual item held in the storehouse daily. Stock records provide the management with the information which is used to ensure accountability through stock taking and stock audit exercise.

### **2.2.6 Warehousing**

The warehouse is a point in the logistics system where a firm stores or holds raw materials, semi-finished goods, or finished goods for varying periods of time.’ (Coyle et al., 2003, p.285). Three Basic Functions of Warehouse Movement is necessary to store a product properly. It can be divided into three activities:

- i. Receiving inbound goods from transportation carriers and performing quality and quantity checks.



ii. Transferring goods from the receiving docks and moving them to specific storage locations throughout the warehouse.

iii. Shipping the goods outbound to customers by some forms of transportation.

Storage is the second function of warehousing. It can be performed in two different ways

i. Temporary storage means that storing a product, which is necessary for inventory replenishment.

ii. Semi-permanent storage is used for inventory in excess of immediate needs. It is the safety or buffer stock

### **2.2.7 Inventory Valuation**

Inventories are tangible property of a firm held for resale or to be consumed in the production of goods and services for sale. Regular income of a firm is generated by selling those inventories. Thus their valuation and proper recording are an important task in an enterprise. Generally inventories are classified in the balance sheet as follows (Birendia Krishna, Baherjee, 2010)

- Raw materials
- Stores and spares
- Work in progress
- Finished goods

### **2.2.8 Functions of Inventories**

Having (an amount of) stock is costly and can cause various additional risks. Waters (2003) states the following: “stocks are expensive, because of the costs of tied-up capital, warehousing, protection, deterioration, loss, insurance, packaging, administration and so on”. He therefore also wonders why inventories are being maintained by organizations at all. According to the Just-in-Time principle (JIT) when all materials arrive just in time,

no stock will be needed and thus inventory management will not have to deal with the temporary storage of all these goods (Coyle et al., 2003). This is how managers often explain the JIT-principle. Unfortunately the JIT-principle cannot always be applied and JIT is just a way of control in a situation where production takes place based on an order (no mass production). JIT does not mean there are no inventories at all, but aims at elimination of unnecessary stocks during production (Dijk et al., 2007).

Arnold and Chapman (2001) there are two main inventory system employed by businesses to assure the quantities of inventory on hand,

- 1) The periodic inventory system, and
- 2) The perpetual inventory system

(1) The periodic inventory system is called periodic because the quantities of inventories are only known after physical inventories are taken at period ends, usually at the end of a year. It is more appropriate for businesses that hold large quantities of small unit cost items.

(2) The perpetual inventory system indicates something that is continuous. Hence, the perpetual inventory procedure continually indicates (reveals) the balance of inventory. It is more appropriate for businesses that deal with small quantities of high unit cost inventories. With the help of computer technology, however, the perpetual inventory system can also be applied for larger quantities of small unit cost items. To confirm the inventory figure available from accounting records, physical inventory of items should be taken at least once during the fiscal year.

### **2.2.9 Inventory Carrying Costs**

There are costs associated with holding all inventories, and the costs go beyond the expenditure of the inventory investment, inventory carrying costs form an interesting concept, representing both accounting costs and economic costs (Goldsby et al., 2005).

Accounting costs are explicit and call for a cash payment. Economic costs are implicit, not necessarily involving an outlay but rather an opportunity cost.

#### **(1) Ordering Costs**

Are the costs of placing and processing orders with suppliers ordering costs also include the cost of investigation possible suppliers and negotiating contracts with suppliers

#### **(2) Stock out Costs**

Include the cost of failing to meet customer demands the costs of lost sales and lost profits. As well as lost customer good will for a manufacturer stock out costs include the cost of production delays and do will time as well as the related costs of restarting production. Inventory management involves the difficult task of balancing the benefits of carrying inventory against the related costs. In a merchandise business inventory management is normally the responsibility of a merchandising manager or buyer (Tony Wild, 2007).

### **2.2.10 Inventory Valuation**

Inventories are generally valued at cost. If the purchase price of merchandise is constant on the periodic and perpetual inventory system, the issue of inventory costing would become such a simple task. Unfortunately, during any given period it is very likely that prices of merchandise vary due to one or more reasons. In such cases, there arises a problem of determining which price of a good to assign as an inventory cost (Barzandeh, 2011). The problem inventory costing can be solved by making assumptions as to the

flow of costs. Cost Flow assumptions are traditional cost allocation methods. They help to allocate prices between cost of goods sold and ending inventories.

According to (Barzandeh, 2011) there are several methods of cost allocation:-

1. Specific Identification (SI)
2. First-in, First-out (FIFO)
3. Weighted Average Cost

### **2.2.11 Funding**

According to Dobler and Burt (2006), Funds can be a constraining factor to effective inventory control when funds allocated cannot cater wholly for the organizations material requirements within the budget period. The stature of financial management in the organization can affect adversely its effectiveness and in the finance resource application in various activities. The 2005/2006 government financial settlement meant that many government institutions were forced to make substantial cuts in their services. Staffing levels have also been affected and many government institutions have had to make staffing cuts. Although this has meant that redundancies have been made, many authorities have chosen to leave positions vacant rather than choose this option. The loss of staff has resulted in the loss of specialist staffs with most institution employing clerks, and this has affected the individual services.

### **2.2.12 Knowledge and Skills Possessed by the Staff**

According to Susan and Michael (2000), people in warehouse 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 materials 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 materials, issuing stock material in response to a material request from customers, conducting cycle counts, annual physical, 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.

Lyson and Gillingham (2003), define training as a planned process to modify attitudes, knowledge, and skill through learning experience to achieve effective performance in an activity or range of activities. Its purpose in the work situation is to develop the abilities of the individual and to satisfy the current and future human resource needs of the organization. The author further says that employees may be trained internally on the job or externally in a college offering supply chain management courses.

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.

### **2.2.13 Obsolete and Excessive Inventory**

Obsolete inventory has become a prominent phenomenon in most of the organizations. Many organizations are striving to avoid obsolete inventory and are also trying to avoid excessive inventory. There have been many articles in the literature that identify the best practices to control obsolete and excessive inventory. The items when become obsolete are unusable and it does not yield any value to the services and in turn they consume valuable storage space in the warehouses, added are the taxes. These excessive costs may yield to increase in the overall facility costs. The organizations must implement steps and methods that can help inventory managers identify the excessive inventory and make use of the excessive inventory before it turns out to be obsolete. There have been many research articles that help in designing steps to avoid obsolete inventory. Having excessive inventory can be attributed as the primary causes of obsolete inventory. A literature review on inventory control and reduction of inventory shows that it is common to all the organizations that excess inventory translates to more dollars spent. Tony Wild, (2002) suggests “more inventory means worse delivery time.

### **2.2.14 Tools of Inventory Management**

According to Laysons and Farrington (2006) there are tools which are necessary to manage inventory effectively. ABC analysis, barcoding, radio frequency identification (RFID), and inventory software are among important tools that help to manage inventories. Using these tools has a significant impact on the productivity of the store. The other authors Tom Jose, et.al. (2013) suggests additional tools which helps to manage inventories like FSN items. Hereunder, there are discussions only about tools which are relevant to success of this study.

### **2.2.14 ABC analysis**

The ABC system is a widely used classification technique to identify various items of inventory for purposes of inventory control. On the basis of unit cost involved, the various items are classified into 3 categories:

A, consisting of items with the large investment,

C, with relatively small investments but fairly large number of items and

B, which stands mid-way between category A & C.

Category A needs the most rigorous control, C requires minimum attention and B deserves less attention than A but more than C Tom Jose, et.al. (2013).

### **2.2.15 The Major Purchasing Decision Processes**

There are six major purchasing decision processes: (1) 'make or buy', (2) supplier selection, (3) contract negotiation, (4) design collaboration, (5) procurement, and (6) sourcing analysis. In the 'make or buy' decision process, based on the part/service is a finished/semi-finished goods or not, a company will decide the part/service should be produced internally or outsourced. In the supplier selection process, a number of supplier are chosen for purchasing according to a predefined set of criteria; the purchasing contract could be either short-term or long-term; as to design collaboration, the buyer and the supplier cooperate closely to design part/service that meet the customer's specific requirements; the procurement decision process is related to ensuring delivery of the part/service in time from the supplier and with minimum costs; finally, in the sourcing analysis phase, a company should examine the effectiveness and efficiency of its procurement process (Aissaoui et al., 2007).

### **2.2.16 Purchasing Management**

Purchasing has two main objectives, one is to purchase for resale, and the other one is to

purchase for consumption or for transformation (Quayle, 2000).

Purchasing function starts as subordinate to the more important functions of marketing, finance and operations (Bloomberg et al., 2002). Firms give more attention to purchasing when the costs of purchased items increase. Reengineering the supply chain strategy concerns not only coordination of the various activities in the supply chain but also deciding what to produce in-house and what to outsource (Simchi-Levi et al., 2004). With the strong trend towards more outsourcing over the last decade, presently purchasing has evolved as an important strategic area of management.

### **2.2.17 General Procurement Procedures**

Menon, S. (2006) mentioned that, a purchasing department buys many different types of materials and services and the procedures used in completing a total transaction normally vary among the different types of purchase however the general cycle of activities in purchasing most operating materials and supplies fairly standardized the following steps.

- ✓ Recognize, define and describe the need
- ✓ Transmit the need
- ✓ Investigate, qualify and select the supplies
- ✓ Prepare and issue the purchase order
- ✓ Follow up the order (including expediting and de expediting)
- ✓ Receive and inspect the material

### **2.3 Review of Empirical Studies**

Empirical evidence in the inventory management-performance relationship Produced also mixed results. Specifically, Milgrom & Roberts (1988) and Dudley & Lasserre (1989)



indicated that timely and informative customer demand data can result in improved firm performance through reduced inventories.

A study carried out by Bhausheb & Routroy, (2010) shows that companies are keen in managing their inventory so as to reduce costs, improve the quality of service, enhance product availability and ultimately ensure customer satisfaction. Results of a study carried out by Rosenfield & Simchilevi (2010) shows that inventory management has a huge /financial implication on both the customer satisfaction and financial performance of an enterprise.

High levels of inventory increases the probability that the customers are likely to get what they want, increases sales and service levels (Cachon & Terwiesch, 2006). High inventory levels however lead to both stock holding costs and in-store logistics errors. This is because it becomes difficult for the employees to perform shelving and replenishment which makes goods physically available in the store but the employees cannot trace those (phantom products) (Ton & Raman, 2005).

Maintaining optimum levels of inventory is important in an organization because excess inventory results in stock holding costs (rental charges, opportunity costs, obsolescence costs, breakages, pilferage) and inadequate inventory (stock outs) is also costly as customers may leave to competitors (Berling, 2011). For each sale that an organization does loose as a result of stock outs, the company not only loses profits but also customers who may be dissatisfied and source for an alternative reliable supplier (Knights, 2008).

When inventory management (maintaining adequate inventory levels) is carried out efficiently, it ensures that the materials needed in an organization are available in the right quality, quantity thus avoiding issues of overstocking and under stocking and ultimately guaranteeing customer satisfaction and increased profits (Ewuolo, et al., 2005).

Mohamad, et al. (2016), in a case study of a textile chain store in Malaysia, examined the relation between inventory management and company performance and found that there inventory days was significantly related to return on assets (used proxy for company performance). The study identified that the textile chain store company had unorganized inventory arrangement, large amount of inventory days and lacked accurate stores balances due to unskilled workers. Also, Victoire (2015) investigated the impact of inventory management on profitability in Rwanda using a manufacturing company as case study. The findings indicate that inventory management had significant impact on the company's financial performance.

According to Deveshwar & Modi (2012), having unqualified employees in charge of inventory control who either don't have enough experience, neglectful in their job, or don't have adequate training, lack of encompassing all the aspects and factors in the company inventory planning, weakness on supervision how inventories are managed in the organization, having excessive inventory in stock or running out of stock, lack of computerized inventory system and complication of using it, and misplacing of items in wrong location within a store and others are some of problems facing inventory control.

### **2.3.1 Critique of Past Studies/Empirical Review**

Studies have been conducted by various researchers concerning the effectiveness of inventory control in both public and private body with the aim of identifying the causes of the ineffectiveness. Several have embarked on the problem of inadequate funds, long procurement procedure, inadequate qualified personnel, and inadequate stock control procedure.

### **2.3.2 Summary of the Literature and Knowledge Gap**

Schroeder (2000) established that there are three motives for holding inventories, which are transaction, precautionary and speculative motives. According to review poor documentation/records keeping, bureaucratic procedure, poor funding are some of the factors that limit effective inventory control.

Dobler & Burt (2006) emphasized that stock represents money and similar control measures should be taken on stock as it the case of cash. It's important to have a good stock record system as it help in preventing stock out, overstocking, deterioration, obsolescence and high carrying cost. A sound stores record system is therefore vital for procurement decision making. Effective stock records are important to an organization which expects to operate profitably or offer quality services. Late posting have undesirable effects.

It is important to have a good inventory system as it helps in preventing stock outs, overstocking, deterioration, obsolescence and high carrying cost. A sound inventory management system is therefore vital for decision making in the effectiveness of organization and effective use of information technology are important to an organization, which expects its inventory management to operate efficiently.

### **2.3.3 Research Gap**

One might expect the seemingly infinite stream of inventory theory related research to be a key resource for managers seeking to gain a competitive advantage through inventory control. However, some have suggested that managers who turn to inventory theory research may find it to be of little significance (Krautter, 2009) or that it has little to offer in terms of enhancing inventory practices (Wagner, 2002).

Therefore, an empirically derived agenda founded on practitioner-identified issues, is needed (Vigoroso, 2005). There is no study that has comprehensively been done on the effectiveness of inventory control system in Ethiopian Roads authority (ERA) and hence the study intends to fill gap the inventory management system and practices of ERA

## **CHAPTER THREE**

### **RESEARCH DESIGN AND METHEDODOLOGY**

#### **3.1 Research Design and Approach**

The research employed descriptive type of research method. This method enables the researcher to describe briefly the problem stated in Chapter I. The research approach or strategy used in this study is the mixed methods approach (i.e., both qualitative and quantitative). The student researcher used the quantitative approach for data collected through questionnaire and the qualitative approach was used to analyze the data obtained from interview of different responsible bodies and for open ended response obtained through the questionnaire.

#### **3.2. Source of Data**

The study has been conducted by using primary and secondary source of data. Primary data was collected through questionnaire and interview of employees and officials from ERA Head Office Central warehouse, Financial Management Directorate and Internal Audit Directorate staffs and Team leaders, Alemgena Machine base and Chancho Labor Base Training Centers warehouse staffs Including some observation has been employed by the student researcher and secondary data was collected from annual reports of external audit and different documents, books, internet, and websites.

#### **3.3 Data Collection Procedures**

These were the steps/process used by the researcher while collecting data using the collection instrument. Structured questionnaires were administered to the main

respondents. These questionnaires were delivered by hand to the respondents at their duty stations during working hours personally. They were issued and collected after a four days to give respondents enough time to answer the questions.

### **3.4 Target Population**

The information that the researcher got from ERA Human Resource department indicated that currently there are 2607 employees working in the organization. From this total population the target population which directly related to the study were 132 employees, working in ERA Head Office Financial Management, Internal audit directorates, Alemgena Machine Base and Chancho Labor Base training center employees and Team Leaders. However due to different reasons 52 employees have been excluded from the study because of they were unskilled and worked in labor; helpers and sanitarians. The study involves 80 employees (60%) of the target population. Because they were the right persons who can sufficiently provide the required data about the inventory management practices and the challenges than the rest of the employees in the organization.

### **3.5 The Sampling Techniques and Sample Size**

The study used stratified random sampling techniques. Stratified was used to group the samples in strata having similar characteristics. Stratified sampling was used to achieve representation of the main respondents as the population to be studied in to two equal parts that was 40 and 40. The main respondents were stratified on the basis of their departments.

The targeted population which directly related to the subject under this study were 132 employees. However 52 employees excluded due to unskilled employees that might have lack of knowledge for the study. Thus, the total population of 80 (60%) of employees selected from the targeted population.

The technique which used in drawing the sample size is stratified random sampling method, in which the population divides into two equal groups based on the nature of the work 40 employees selected from ERA head office and the two training centers, (Alemgena & Chanco training centers) and procurement staffs and the second the second group depended on Head office Financial Management Directorate and Internal Audit Directorate staffs and team leaders.

### **3.6 Method of Data Analysis**

The method of data analysis depended on descriptive type and the analysis after generalizing the planned data has been summarized and rearranged according to the response of the target population, then the data analyzed tables and percentages. The researcher used quantitative descriptions for questionnaires and qualitative explanations for interview to briefly explain the response, and also the researcher observed the store to obtain data from bin card and stock cards in three warehouses and has been analyzed the data based on the findings.

In this chapter, the student researcher briefly explained Ethiopian Roads authority inventory management system from the primary data collected from the employees and team leaders who are closely related with the inventory management and the secondary data taken from external audit report, books, manuals, rules and policies, published and unpublished research works and relevant materials.

In addition to Questionnaire, attention was also given for interview and observation because of reducing biases and the possibility of getting unreliable answer. Finally to come up with sound, concrete and credible research findings. Interviews are used for concerned person in the area of the three directorates. Observation and visiting was done

in Warehouse and Store in order to get more practical knowledge about Structures, Design and outlay of stores and helpful for the findings of research. The data gathered from respondents has been presented and analyzed by categorizing questions based on their nature to answer the research questions and presented and analyzed in table form.



## **CHAPTER FOUR**

### **RESULTS AND DISCUSSIONS**

#### **4.1 General Information about Respondents**

Currently ERA uses two financial software to record and closes the financial accounts. The first is IFMS for administering of fund that assigned from the Ministry of Finance and Economic Development (MOFED). The second is ACCPAC that used to administer and close the fund raising from different donors. The organization use Inventory control (IC) software for coding recording and finally at year end closing the stock account by ACCPAC that working integrated with IC. The Organization has branch accounts of 10 Network districts, ERA has also implemented a decentralized accounting system since 1997. Consolidated financial statements are prepared at ERA level using ACCPAC accounting software. All inter – authority balances and transactions are eliminated on consolidation (ERA External Audit report, 2011).

The information here under is collected through questioners from three warehouses of the organization, Alemgena training center Garage staffs, Procurement staffs and the two training Center Camp administration staffs, Financial Management directorate and Internal Audit Directorate. From distributed 80 questioners, 78 were properly filled and returned to the researcher.

The data analysis has been done according to the educational level of each employee and the employee working department separately. Some respondents are identified below grade 12, because of this the questionnaire prepared in Amharic and English used to enable the respondents to answer the research questions easily and precisely.

**Table 4.1.1: Respondents and Departments/Units they represented**

<b>Respondents by working department</b>	<b>Number of distributed Questionnaires</b>	<b>Number of returned Questionnaires</b>	<b>Percent (%)</b>
Central Warehouse	15	15	100
Alemgena Machine base Training Centre Warehouse.	5	5	100
Chanco Labor base Training Centre Warehouse.	10	10	100
Procurement	10	10	100
Financial Management diractorate	35	3	94.3
Internal audit directorate	5	5	100
Total	80	78	97.5

**Source: Field Survey, November, 2016**

The researcher made every effort to reach all the relevant respondents in all the five departments. As stated under methodology, a total of thirty two (80) copies of questionnaires were distributed, and 78 (97.5%) copies retrieved as correctly filled which were subsequently used in the analysis. The table above shows the number of respondents who were available from the targeted population.

**Table 4.1.2 Educational Level of warehouse and procurement Respondents**

<b>Item</b>	<b>Frequency</b>	<b>Percent</b>
Below grade 12	8	10.25%
12 complete	22	28.2%
Certificate	10	12.8%
Diploma	12	15.4%
Degree	26	33.35%
Total	78	100

**Source: Field Survey, November, 2016**

As it can be seen in the above table 4.1.2 out of 78 respondent employees 8(10%) of the respondents were below grade 12, 22(28.2%) were completed grade twelve, 10(12.8%) have Certificate, 12(15.4%) were diploma holders, and 26(33.35%) of them were degree holders respectively. Bailey & Farmer (1982) says that for Stock control function to achieve a superior performance, it's necessary to recruit, train and develop personnel with the capacity and motivation to do better job.

According to the above table, the respondents who answered the questionnaire indicated that most of them were below Diploma level and this shows that the warehouses are partially staffed with employees who have not full knowledge about inventory management. This lack of knowledgeable employees in warehouses may have impact on inventory management system.

Every time as the technology grows, balancing with the technology comes with learning. The rules and regulation of the organization stated that the opportunity to learn in the organization is widely open; the organization covers the school fee 75% for every interested employee working in the organization. On the other hand, in GTP 1, ERA gives full sponsorship for more than 3000 civil engineers to learn for MSC in Engineering at Addis Abeba and Hawasa University. Due to the need and the nature of work of the organization, that give attention for Civil engineers, the other staffs are expected as support giving service for the organization, the salary scale is less than the engineers, this has influence to retain social science professionals and to attract new applicants to the organization and also ERA Human Resource structure shows that there is high turnover of Accountants, Auditors, HR experts, and office managers and other related social science professionals.

The Human Resource chart shows that, there is open vacant position of Stock Management Officers and Lead warehouse supervisor. This has influence on Stock

control and on warehouse management. Stock Control is no longer considered as clerical function performed independently by untrained individuals within a Government Agency (National Institute of Government Purchasing, 2001).

Based on the researcher observation the employees on warehouses were fed up of on the routine and effort need work, might be the causes of not going to school after working hours, and upgrading their educational level.

**Table.4.1.3. Duration in the organization and related work**

Duration In the organization			Duration in the related work	
Item	Number of respondents	Percent	Number of respondents	Percent
<b>Below 5 years</b>	<b>32</b>	<b>42.5</b>	<b>32</b>	<b>42.5</b>
<b>6-10 years</b>	<b>18</b>	<b>22.5</b>	<b>18</b>	<b>22.5</b>
<b>11-15 years</b>	<b>16</b>	<b>20</b>	<b>16</b>	<b>20</b>
<b>Above 15 years</b>	<b>12</b>	<b>15</b>	<b>12</b>	<b>15</b>
<b>Total</b>	<b>78</b>	<b>100</b>	<b>78</b>	<b>100</b>

**Source: Field Survey, November, 2016**

To identify transparent information from employees knowing about the overall aspects of inventory management, the time of waiting (working) in the organization assigned on inventory management related work is necessary. Working large number of years within the organization and specific team (department) gives employees a chance to know every movement of transaction happened within their department. Not only getting experience, there must be upgrading self by taking different short term and long term training to achieve the organizational goal.

According to table 4.1.3, from the total of 78 respondents 12(15%) of them working in the organization above 15 years, 32(41%) of them below five years, 16(21%) 11-15 years and 18(23%) are staying in the organization 6-10. This result indicates that most of employees worked in the organization and in warehouse below 5 years and they are not well experienced. According to Human resource information some employees has been working starting from bottom (Laborer) to current title by upgrading their knowledge through learning, because of this some of the employees working in the organization for many years.

For clear and brief analysis the student researcher dividing the analysis in to two equal group (strata) 40 employees each based on the nature of work that employees working departments. In part one the warehouse, procurement and training center staffs and part two the Financial, Internal Audit directorate employees and team leaders. On the following part the researcher briefly analyze the Inventory management practice and techniques of the organization based on the data collected from the respondents raised on the research questions in Chapter I.

**Table 4.1.4 The nature of Inventory Record System of the Organization:**

Description	Alternative Choice	Group I: W/ouse, Procurement & training center employees and Supervisors		Group II: Finance Internal audit employees & team leaders	
		Frequency	Percentage	Frequency	Percentage
What is the nature of your organization inventory record system?	Manual	6	15%	-	-
	Computerized	8	20%	8	21%
	Both manual & computerized	26	65%	30	79%
	<b>Total</b>	<b>40</b>	<b>100</b>	<b>38</b>	<b>100</b>

**Source: Field Survey, November, 2016**

For the question that what is the nature of inventory system of the organization raised on table 4.1.4, Group I respondents 6(15%) said Manual, 8(20%) computerized and the rest 26(65%) both manual and computerized. On the other hand the Group II respondents 8(21%) agreed on computerized and 30(79%) said both manual and computerized. Based on the reply more respondents saying the organization used both manual and computerized system to record the inventory system.

Sabena, (2003) stated that today Computer Based Information System (CBIS) plays a very important role in handling, processing and retrieval of large data, and converting the same with ease into useful information decision making. Most of the Computer Based Information System are integrated information system for material procurement, warehouse management and inventory control.

**Table 4.1.5: Techniques of Inventory Management**

Techniques of Inventory Management	No. of resp.	Percentage of Respondents						Total
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree		
Duties and responsibilities of Inventory Department are properly segregated.	78	3.75%	6.25%	12.5%	40%	37.5%	100	
There is clearly predetermined provision about the disposition of obsolete and inactive items from inventory.	78	1.25%	2.5%	18.75%	42.5%	35%	100	
Do you agree that all the purchased items are aligned with the annual plan of the Organization?	78	40%	18.75%	15%	12.5%	13.75%	100	
To what extent do you agree that high carrying/holding cost affects inventory control and financial statement of the organization?	78	3.75%	5%	18.75%	27.5%	45%	100	
The bulk purchase that provide by Government Purchase Agency have delayed and not satisfactory for the organization demand.	78	2.5%	5%	11.25%	32.5%	48.75%	100	
Organizational structure of warehouses is safe and the items are arranged properly and easy to get any items when needed.	78	6.25%	8.75%	17.5%	35%	32.5%	100	
There is effective handling system to protect inventories from spoilage, damage, theft and other problems.	78	42.5%	28.75%	15%	7.5%	6.25%	100	
Do you agree that the annual physical count covers and assure the existence of each and every item?	78	1.25%	2.5%	23.75%	20%	52.5%	100	

**Source: field survey November, 2016**

Table-4.1.5 for the statement duties and responsibilities of inventory department are properly segregated, the result shows that most of the respondents which is 40% agreed and 37.5% strongly agree. This implies that ERA has job description for the duties and responsibilities for inventory department.

The principle of Segregation of duty is based on shared responsibilities of a key process that disperses the critical functions of that process to more than one person or department. Without this separation in key processes, fraud and error risks are far less manageable (Anthony Ghosn, 2006).

On the other hand, 42.5% of the respondents agree and 35% of respondents strongly agree on the views that the organization has clearly predetermined provision about the disposition of obsolete and inactive items from inventory. As per the result it implies that the organization decides on obsolete stocks on time.

From the response given all the purchased items are aligned with the annual plan of the Organization proved that most of the respondents who reply as 18.75% disagree and 40% strongly disagree. UN practitioners hand book, 2012 states that the ultimate goal of procurement planning is coordinated and integrated action to fulfill a need for goods, services or works in a timely manner and at a reasonable cost. Early and accurate planning is essential to avoid last minute, emergency or ill-planned procurement, which is contrary to open, efficient and effective – and consequently transparent – procurement.

Blackburn (2010), is among authors who agree that EOQ is one of the models widely used to manage inventory in many industries. EOQ model was developed by F.W.Haris in 1913 and is also known as Wilson EOQ model, who critically analyzed the model in detailed, that is according to Arsham (2006), the use of the model has shown increase in some costs as other costs decline, an example of ordering costs decline with the inventory



holdings, while holding costs rise and the total inventory associated costs curve have a minimum point. It is also known as the point where total inventory costs are minimized. EOQ is the level of inventory that minimizes the total of inventory holding costs and ordering costs.

Martin Murray, 2008 stated the carrying cost of inventory is often described as a percentage of the inventory value. This percentage can include taxes, employee costs, depreciation, insurance, and the cost of insuring and replacing items.

Similarly, respondents were asked on the issue of whether or not the bulk purchase provided by the Government Purchase Agency have delayed and not satisfactory. Accordingly, 48.75% and 32.5% of them strongly agree and disagree respectively. From this One can infer that the Government Purchasing Agency delayed the procurement of materials and not satisfactory on timely supply of materials for the organization.

For the question Organizational structure of warehouses is safe and the items are arranged properly and easy to get any items when needed, the response shows that more than 35 % of the respondents agreed and 32.5% of the respondents strongly agree. This shows that the organization structure of the warehouses are well organized and structured, that helps to get any items easily with no taking time.

The other response for statement, there is effective handling system to protect inventories from spoilage, damage, theft and other problems, 42.5% are strongly disagree, 28.75% disagree. Based on this response the protection of inventories in the organization is not safe and not well protected from any of damages, such as spoilage, damage, theft and other conditional problems. On my observation some big value items like bridge steel placed with open shed, this might be not safe until it is not in locked store.

Finally, on the issue of whether or not the annual physical count covers and assure the existence of each and every item, 52.5% and 20% of the respondents strongly agree and agree respectively. The result indicate that each item of the organization counted properly and existed in physical count.

## **4.2 Response from Interview**

### **4.2.1 An interview Made to Warehouse Supervisor of Alemgena**

An interview made to warehouse supervisor of Alemgena Machine Base Training Centre about does ERA makes appropriate inventory management techniques and the inventory management practice. He indicated that materials and goods in the warehouse are categorized based on their type, inventories are valued based on their entry price and the organization used weighted average method to evaluate its inventories consumption and to calculate its total stock. The warehouse uses manual and computerized system to record its inventories, when one inventory item requested by the users, primarily checking if it is supported by budget and if there is stock balance, then every item has its own shelf and bin card that have identification number to get the item easily and after getting the item deducted from stock card that should be balanced manually. Then after one item out of stock it should be recorded in Inventory control software (IC) computerized. The physically counted items also recorded on IC software to get balance and close the inventory account, the balance of all the organization inventory account consolidated with IC balance integrated with ACPAC. The Organization uses ACPAC software to close the accounts, including different software integrated with it such as for fixed asset uses Norming software, for inventory uses Inventory control (IC) and also the payroll and procurement software's. On the other hand he explained that Inventory control (IC) software has no gap for error, one of the organization problem is always

urgency on closing of the accounts, and because of this employees create new account negligently for the same materials different account instead of one account for one material, this causes the database to have huge and stacked. The other problem is the organization not give on job training for the employees, it has its own share for not to have shortage/overage of stock balances. The weighted average method not taken as day end, it batched once monthly, this is not showed the daily price fluctuation and not to have perfect weighted average.

On the other hand the researcher raised how can manage the purchase order size of inventories, the warehouse supervisor answered that the purchase work is the procurement work, each directorate of the organization prepare annual budget of its own, the procurement organize and send the request to Government Purchasing Agency. The government Purchase Agency Purchase the items by transparent auction from different supplier who have less cost, then the organization takes the materials from the winner supplier and give to the warehouse to distribute for the directorates according to the requests. After receiving the materials the warehouse open a stock card and bin card for new items, on the other hand for the existing the new balance recorded manually. The warehouses issue the materials by ISR (Issuing, Shipping and Returned) form when the Material requisition sent to warehouses. On his explanation he point out that the bulk purchase by the Government Agency not timely supply the materials requested by the organization, this has impact in nil in stock (some items finished before the new order arrived).

The other question raised to the warehouse supervisor is how inventory management system contributes to the effectiveness of ERA's financial statement? He answered that, the stock remains more than 10 years without movement has an influence on the financial statement because they have big value rolling up year to year, and that have spoiled by dust wearing out with no giving service to the organization, takes place in warehouse and

has effect in financial statement of the organization, the Bridge Iron that used for temporary bridge has issuing many times also has an effect on recording the cost, this means once issue by original price, then for the controlling purpose it records with 1 Birr value for many times, when requested for use and returned back to the warehouse. On the other hand he raised the over and under balances in the closing of financial statement taking as suspense and after year end that is not cleared out and identify the causes, and remains in the general ledger, this also has impact and reason for external audit comment yearly.

What is the level of management's awareness about suspense account and obsolete stocks? He answered that the supervisors knows every problem of stock and store management, they identify the stock remains for more than 10 years without movement and stocking them in different place to protect from any problems and taking as an obsolete stock, reporting to the management for disposition, transferring or other further action, to close and clear the accounts from the general ledger, finally the management decided that to transfer the obsolete stock for MEC (*'Mekelakeya'* Engineering corporation) in 2015, some of them left and the other mobilized. In addition to this the management has awareness but they delayed to take an action on it. Because of this the obsolete stocks has taken place in store and big value in the financial statement of the organization that is not cleared for consecutive years. For the suspense accounts the management knows very well, in related to this in 2002 E.C the management decides the shortage of stock balances should be identified and until they are corrected, recorded as the debt of the warehouse supervisors.

The last question raised is what type of stock and store management system that ERA uses? When he answered this question, the stock and store management of ERA might be the model for other governmental organization; this system is organized by the American citizens after IHA (Imperial High Way Authority) the existing name of Ethiopian Roads

Authority (ERA) officially formed. Every stock has tagged on bin card used to keep track of the numbers of items held in the warehouse or stock room, a description of those items and any relevant notes regarding the items, it uses to easily identify the items in the warehouse. In related to this the stock card used to record the quantity and cost of receipts, issues and balances of items material received. ERA has different stores by the type of material such as for tire and tube, spare parts, other materials and etc. On My observation there are some huge materials with no shelter and might be damaged by different environmental and human problem.

#### **4.2.2. An Interview Made to Team Leader of Record & Control**

The researcher get response for structured questions related to the topic from interview of Team Leader of Record and Control of Financial Management Directorate, has summarized as follows:-

##### **What are the Factors that Affecting Inventory Management of ERA?**

There are some problems related to inventory management of the organization. Among these problems the skill of the employees, lack of warehouse and store management, not using scientific Method for ordering materials, receiving of defective materials, carelessly giving different account for the same materials and others are the factors that affect inventory management.

##### **What are Tools and Techniques of Inventory System?**

He answered that the most important technique of the organization by preparing of inventory budgets from different directorates, then the procurement summarize, preparing purchase order and send to Government Purchasing Agency to get the materials bought by bulk purchase. This helps to protect and control from fraud and unnecessary problems. After having received the materials in the warehouse, it is distribute as the request of each

directorate. In some time interval there is inventorying of stocks (perpetual inventory system). This might help to close the inventory item timely.

### **What inventory cost valuation method is used by ERA?**

When he answered this question the organization used weighted average method for inventory valuation but it has some problem to apply perfectly, because of the organization not batching the day end balance recording on Inventory Control (IC) software, instead summarize and batching the monthly balance. This might not show the price fluctuation and not support to get the correct weighted average.

### **What type of stock taking system that ERA uses?**

He respond for the above question that ERA used quarterly counting of inventory items in all branches, the two Training centers, the Central Warehouse and the ten network districts. And the data encoded and recorded in Inventory Control (IC) software. Then reconciling the stock balance and the IC balance used to maintain and keeping the financial statement correct and clean from under/overage of balances.

### **How can minimize and clear the suspense account from ERA financial statement?**

According to his response the primary cause of suspense account is the urgency of closing the accounts, not giving sufficient time for employees who are working on recording of financial data's. For receiving the account created and for issuing not created the account this causes the item will cause under/over accounts, the employee will record in the suspense account until he/she gets the correct account the might be recorded on closing time then no one remember to back and excavate the root to adjust the account. The secondary cause is the negligence of employees creating many accounts for the same materials and directs the accounts to be bulky and not support to record easily to its own item. This reason has its own influence the suspense accounts to have and to continue

having bulky amount. To minimize the suspense account, identifying the root causes of the over/under amount accounts clear from suspense account. The other method to avoid the suspense accounts might not creating different account for one material; one item should have one account number.

### **How can ERA maintain a mechanism on the clearance of obsolete stocks once for all?**

To avoid and clear the obsolete stocks from ERA financial statement, purchasing materials according to the specification and needs of the departments to protect defective materials not to store in warehouses. The other reason is budgeting by forecasting might have influence to have obsolete stocks in warehouses, by using scientific system for budgeting ordering materials might be avoid the problem not to have obsolete stocks.

### **How ERA has plan the budget to materials that assumed to be used?**

He responded for the above question, I am giving my own idea for this question that ERA might have planning the budget according to the need of departments, not to be forecasting based on previous year actual accomplishment.

### **4. 2.3 Interview of Internal Audit Team Leader**

On the proposal the researcher planned to interview ERA Internal Audit director due to different reason, instead of him the researcher forced to interview the internal audit team leader. The first question is how stock managed by internal audit. He explained his experience there is a procedure and sometime surprise auditing of stocks in different times throughout the year, by reconciling the IC record, physically appearance of materials in the warehouse and stock card balances. When there is difference between IC and stock balances his office give comment to the store team leader to correct timely, to assist the clearness of financial statement and helps to fasten the closing time.

The 2<sup>nd</sup> question is how much time you take inventory count in the organization? When he answered the question the plan by the organization to count the inventory is once a year, but from auditor's comment that the organization need year end closing timely, by accepting the comment and to improve the clearness and timely closing the financial statements, we used counting the inventory quarterly. This helps to correct a transaction and fasten the closing time.

The 3<sup>rd</sup> question raised is after taking inventory count from commenting on the findings, have you seen improvement year to year? The answer is it has improvement but in some inventory items there is repetition of account for one item, instead of finding the existing one, creating new account seen in Inventory Control (IC) by the negligence of employees, this causes the account be junk. On the other hand, the management didn't take timely action for scrap items, even the defective materials that bought by Government Purchasing Agency not pushing to return to the supplier, and has limitation on some inventory items that needs the management decision, not taking action timely, it has influence on cleanness of the financial statement.

### **4.3 Analysis of External Audit Report**

The researcher used external audit report of six years from (2010-2015) to investigate deeply what were the findings from auditing of the warehouses of Ethiopian Roads Authority (ERA). Based on the annual reports of the external audit report, the researcher tried to take the basic comments that used to be able improve the organizations financial statement clean from any problems stated yearly on external audit comments.



**Table 4.3.1 Audit report findings**

<b>Year</b>	<b>Year-end revealed net shortage/Overage</b>	<b>Goods in transit outstanding</b>	<b>Loss in fire or different reason, abnormal bal.</b>	<b>Obsolete stock</b>	<b>Suspense Account</b>
2010	15,488,024.00 Shortage	23,914,360.00	5,260,851.00	104,240,185.00	75,512,414.00
2011	10,140,448.00 Overage	27,510,597.00	23,065.00 Shortage	100,213,732.00	60,697,052.00
2011	2,756,477.00 Overage	27,022,619.00	00	64,783,565.00	38,179,752.00
2013	600,452.00 Overage	27,022,619.00	00	65,211,138.00	37,579,300.00
2014	28,341.00 Overage	27,022,619.00	00	65,211,138.00	38,693,008.00
2015	00	27,022,619.00	00	Transferred to MEC	37,830,952.00

**Source: External audit report from 2010-2015**

According to these prior years findings show that the Ethiopian Roads Authority has facing a problem due to not giving attention for inventory management at its different stores. In the above table when we see goods in transit it must not pass a year, it has the nature of Receivable, when the goods enter to the warehouse it must be clear the goods in transit account from the general ledger, but this account has been outstanding and not clear from the general ledger of Ethiopian Roads Authority (ERA). The obsolete stock was difficult to count each year, because of this counted once and sealed in one store by the auditor's until it handed over an amount of 37,830,952.00 for *Mekelakeya*

Engineering Corporation end of 2015, the remaining amount 862,056.00 not cleared from the general ledger, this amount rolling and passes from year to year, until the management decided on it.

The audit comment on the findings of shortage and overage should be investigated by the authority. For obsolete stocks action is taken to sort out these without any delay. For damaged, stolen and loss in fire or different reason, this matter be addressed by the Condemnation Committee and action be taken as is deemed necessary.

## **CHAPTER FIVE**

### **CONCLUSIONS AND RECOMMENDATIONS**

This chapter is deal with the conclusion and recommendation part of the research. Conclusion and recommendation for the research finding explained as follows.

#### **5.1. Findings**

The success of one organization depends on the effective utilization of the given resources. The resources need proper managements and control for an organization to exist in a competitive business environment. Inventory management and control system must be designed well.

In Ethiopian Roads Authority the system of inventory management and control is done by the help of computers and manually. This system contributes a lot for the success of the Authority.

Based on the analysis the following are basic findings:

- Several surpluses scrape inventories are exist in the ware house and around store yard for many years. These materials tied up the capital and increases carrying cost.
- Stock and scrap that was available around the stock yard do not have any controlling mechanisms.
- Less modern inventory management system exist in the network districts, this has influence in the consolidation of financial statement, force to extend the closing time.
- Lack of purchasing procedures throughout the organization, bulk purchase by Government purchasing Agency procure some defective materials, these might

not be requested and distributed to departments, because of this the materials take place in store that will be cost for the organization.

- Lack of use scientific method in determining their inventory level.
- The obsolete stocks has identified and counted by the Auditors and locked in one store, the management has not decided for many years and the Auditors always complaints each year on their final reports, finally decided to give to Mekelakeya Engineering Corporation (MEC). Currently the defective materials not returned to the suppliers, this might be absolute stock for the next years.
- The employees working in store has lack of knowledge on inventory management and lack of training given to them by the organization. This has influence on properly managing the transactions.

## **5.2 Conclusion**

Based on the above findings we can conclude that ERA has some difficulty to handle the inventory effectively, practically needs close follow up on each warehous, stock management and clear and careful transaction record on its IC and stock balances. And needs immediate correction measures timely. The materials around the stock yard scattered in different place,that might be damaged due to different unconditional situations. The employees needs on the job training for upgrading their skill.

## **5.3 Recommendations**

The researcher recommends the following ideas for better improvement of the inventory management and control of ERA.

- In order to determine inventory level, the organization should develop safety stock level and record point.

- In order to effectively control resources and to reduce expense incurred in relation to landing of material the ERA should organize its unorganized store.
- Give training and development course for employees who work in store to upgrade their skills and knowledge
- Establish appreciates control methods for scrap material and necessary action to dispose them.
- There should be separate place for scrap stock yard equipment.
- The management should decide on the obsolete stocks which are taken a lot of space, this will give some additional place for the new stock items.
- For better management of stocks the counting of stocks should be quarterly, this helps the year end closing will be good and perfect, on the other hand the problems will be solved timely.
- By avoiding negligence, creating one account for one material in IC software, it helped to easily identify and reconcile the physical inventory balance and computerized balance.
- Batching the day end balance helps to see the price fluctuation and get correct weighted average.
- There should be budgeting materials based on the needs of Directorates, stop budgeting based on forecasting.

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**St Mary's University**  
**Faculty of Accounting and Finance**  
**MBA Program**  
**(Questionnaire for Employees of ERA)**

Dear respondents, the purpose of this questionnaire is to collect the relevant data needed to undertake a research on “assessment of the Effectiveness of inventory management system of Ethiopian Roads Authority (ERA)”. Therefore, your response in this regard has a paramount importance for the achievement of the research objectives. The data is meant purely for the academic purpose only; and you are required to provide your genuine response for each of the question appeared on the questionnaire. Finally, I hugely appreciate in advance for your willingness in responding to the questionnaire.

Thanks,

Therefore, I kindly request you to respond to each question item carefully.

- No need of writing your name.
- When you answer put “√” on your choice.

**Part I. Demographic Information**

1.1 Education below grade 12th  12th complete  Certificate  Diploma  Degree   
Masters

1.2 For how long do you work in the organization?

Less than 5 years  5-10 years  11-15 years  More than 15 years

1.3 How long do you work in the Warehouse Management or related work?

Less than 2 years  3-5 years  6-10 years  11-15 years  More than 15 years

Your current position \_\_\_\_\_

## **Part II. Questions related to the topic**

1. Is your educational background related with inventory management and helps to your current job?

Yes  No

2. Have you ever taken on the job training that improves your knowledge and skill related to inventory management? Yes  No

3. How do you rate the satisfaction level of your salary for your job?

Strongly satisfied  Satisfied  Averagely satisfied  Dissatisfied  Strongly dissatisfied

4. How do you categorize inventories in the stock?

Based on their values  Based on their movement  I don't categorize them

5. What type of inventory valuation does the organization used?

Specific identification  FIFO  Weighted average  LIFO  I have no idea

6. How do you determine inventory order size? By using

Past experience  financial capacity of the Organization  Forecasting  Mathematical model

7. What is the nature of your organization inventory record system?

Manual  Computerized  Both manual and computerized

8. Is there predetermined minimum and maximum quantity level for all types of inventories?

Yes  No

9. Is there clearly stated and systematically communicated policies and procedures related to inventory management in Ethiopian Roads Authority?

Yes  No

10. If your answer for question number 9 is 'Yes' how do you use the information for decision making?

Permanently  Frequently  Rarely  We don't use

11. In your opinion the most critical problem to purchase and supply the demand requested by the directorates of the organization timely is...

- a) Lack of financial capacity of the Organization
- b) Lack of administrative capacity in Purchase department
- c) Lack of providing the demand by the Government Purchase agency
- e) Other (if any).....

No.	Descriptions	Strongly disagree	Disagree	Average/y agree	Agree	Strongly Agree
1.	Duties and responsibilities of Inventory Department are properly segregated.					
2.	There is clearly predetermined provision about the disposition of obsolete and inactive items from inventory.					
3	Do you agree that all the purchased items are aligned with the annual plan of the Organization?					
4	There is day to day communication among warehouses about excess and shortage of materials to solve problems and use materials effectively?					
5	To what extent do you agree that high carrying/holding cost affects inventory control and financial statement of the organization?					
6	The organization maintains safety stock in any of planning calculation due to uncertainty in future demand or un guaranteed availability of supplies.					
7	There is a day to day follow up by the Warehouse supervisor to make sure enough materials are in the stock.					
8	The bulk purchase that provide by Government Purchase Agency have delayed and not satisfactory for the organization demand.					
9.	Organizational structure of warehouses is safe and the items are arranged properly and easy to get any items when needed.					
10.	There is effective handling system to protect inventories from spoilage, damage, theft and other problems.					
11	Do you agree that the annual physical count covers and assure the existence of each and every item?					
12	Internal auditors made surprise physical count of inventories.					

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**Interview Questions for Purchase Support Process Owner**

1. How do you describe the inventory management practice of the Organization?
2. How often is stock out frequency in the Organization?
3. Does the central store and other responsible divisions are supported by Information Technology to share information equally? If not, why?
4. What type of inventory management techniques does ERA use?
5. Does the Organization used the scientific way to control its inventory to stay at appropriate level?
6. Do you have any expired, obsolescence and damaged inventory items in warehouses?

**Interview question for Internal Audit Director**

Do you have stock audit systems in your organization?

Have you experienced discrepancies between recorded and physical stock balances? If yes, how do you adjust it?

How frequently does stock taking activity done?

Does your directorate take surprise audit in warehouses?

How much time you take inventory count in the organization?

After taking inventory count on year ends, have you seen improvement on the findings?

**ቅድስት ማሪያም ዩኒቨርሲቲ**  
**የአካውንቲንግ ኤንድ ፋይናንስ ፋኩልቲ**  
**የድህረ ምረቃ ፕሮግራም**  
**ለኢትዮጵያ መንገዶች ባለሥልጣን ሠራተኞች**

የተከበራችሁ የመ/ቤቱ ሠራተኞች፤

የዚህ መጠይቅ ዋና አላማ የንብረት አመራርና አመዘጋገብ ሁኔታ በኢትዮጵያ መንገዶች ባለሥልጣን በሚል ርዕስ መረጃ ለመሰብሰብ ነው። ጥናቱ የሚደረገው በትምህርቱ ሁለተኛ ዲግሪ ማሟያ ቅድመ ጥናት አላማ ነው። እርስዎም የሚሰጡት መረጃ እውነተኛና ትክክለኛ መሆን ለጥናቱ መሳካት እጅግ ጠቃሚ ነው። በመሆኑም እያንዳንዱን ጥያቄ በጥንቃቄና በትክክል እንዲመልሱ በአክብሮት እጠይቃለሁ።

ማስታወሻ፡-

➤ ስም መጥቀስ አያስፈልግም፤

➤ ተለዋጭ ምርጫ ለቀረበላቸው ጥያቄዎች መልሱን ይህን ' '√' ' ምልክት በማድረግ ይመልሱ ስለሚያደርጉልኝ መልካም ትብብር በቅድሚያ አመሰግናለሁ።

አስቴር ማሞ

የሥራ መደብዎ \_\_\_\_\_

1. መሥሪያ ቤቱ ለሚያስፈልጉት ቋሚና አላቂ ዕቃዎች በየዓመቱ በሚይዘው የበጀት ዝግጅት ላይ ተሳትፈው ያውቃሉ?

አውቃለሁ  አላውቅም

2. መሥሪያ ቤቱ በልዩ ልዩ ዕቃዎች ሞዴል፣ ብዛት፣ ዓይነትና ፍላጎት ላይ ከመጋዘን ሀሳብ ሲያስፈልግ ይሳተፋሉ በሚለው ይስማማሉ?

በጣም እስማማለሁ  እስማማለሁ  በመጠኑ እስማማለሁ  አልስማማም  በጣም አልስማማም

3. እያንዳንዱ ዳይሬክቶሬት የገቡለትን ዕቃዎች በአግባቡ ለመጠቀሙና ቀሪውን ባላንስ በዕቃ ግ/ቤቱ በኩል ታሳውቃላችሁ በሚለው ይስማማሉ?

በጣም እስማማለሁ  እስማማለሁ  በመጠኑ እስማማለሁ  አልስማማም  በጣም አልስማማም

4. በዕቃ ግምጃ ቤቱ የተቀመጡ ዕቃዎች ሳይንሳዊ በሆነ መንገድ ምዝገባ ይከናወናል በሚለው ይስማማሉ?

በጣም እስማማለሁ  እስማማለሁ  በመጠኑ እስማማለሁ  አልስማማም  በጣም አልስማማም

5. በግ/ቤታችሁ የሚገኙ አገልግሎት የማይሰጡና የተጠራቀሙ ንብረቶች ቆጠራ በየዓመቱ ይከናወናል ይከናወናል  አይከናወንም

6. በተራ ቁጥር 6 ላይ ለተጠቀሰው ጥያቄ መልስዎ ይከናወናል ከሆነ ከቆጠራው የሚገኘውን ውጤት መሰረት ያደረገ የሂሳብ መዝጋት አገልግሎት ላይ ይውላል በሚለው ይስማማሉ?

በጣም እስማማለሁ  እስማማለሁ  በመጠኑ እስማማለሁ  አልስማማም  በጣም አልስማማም

7. መሥሪያቤታችሁ በየስንት ጊዜ ሰቶር ውስጥ የሚገኙትን ንብረቶች ቆጠራ ያከናውናል?

በሦስት ወር  በየስድስት ወሩ  በዓመት  ግልጽ መመሪያ የለውም

