ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
Department of Logistics and Supply Chain Management (MA) Program

Assessment of Pharmaceutical Warehouse Operation Management in The Case of Ethiopian Pharmaceutical Supply Agency

By: Henok Yezid (GSE/4949/09)

In Partial Fulfillment of the Requirements for the Award of Master of Arts in Logistics, and Supply Chain Management

Advisor: Teklegiorgis Assefa (Ass. Professor)

June, 2019
Addis Ababa, Ethiopia

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Declaration

I, the under signed, Henok Yezid Abdurahman declare that this thesis entitled "*Assessment of Pharmaceutical warehouse operation management: in the Case of Ethiopian Pharmaceutical Agency*", is my original work and to the best of my knowledge has not been presented for a degree by any other person, and that all the sources of materials used for the thesis has been acknowledged.

Declared by:

Henok Yezid Abdurahman

_____

Date & Signature

Statement of Certification

This is to certify that the thesis carried out by **Henok Yezid Abdurahman** on the topic entitled: "*Assessment of Pharmaceutical Warehouse Operation Management: in the Case of Ethiopian Pharmaceutical Supply Agency*" is his original work and is suitable for submission for the award of Masters of Art Degree in Logistics and Supply Chain Management.

Advisor: Teklegiorgis Assefa (Ass. Professor)

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Date & Signature

ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

SCHOOL OF COMMERSE

DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

This is to certify that the thesis carried out by **Henok Yezid Abdurahman**, entitled: "*Assessment of Pharmaceutical Warehouse Operation Management: in The Case of Ethiopian Pharmaceutical Supply Agency"* and submitted in partial fulfillment of the requirements of the Degree of Master of Art in Logistics and Supply Chain Management complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Advisor Name_____ Advisor Signature_____

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Chairman Name _____Chairman Signature_____

Acknowledgment

Above all I would like to thank my Lord God who is the reason for my existence and my family, then my deepest gratitude goes to my advisor Teklegiorgis Assefa (Ass.Pro) for his valuable comments and unreserved guidance during this research work. I would also like to extend my deepest thank to all of study participants and other assisted me on the survey for their valuable time and cooperation.

Abstract

In a supply chain, warehousing function is very critical as it acts as a node in linking the material flows between the supplier and customer in today's competitive market environment companies are continuously forced to improve their warehousing operations, and many companies have also customized their value proposition to increase their customer service levels, which has led to changes in the role of warehouses. For many years, the private sector has taken a professional, systematic approach to warehousing; recognizing its importance to overall cost, customer satisfaction, and performance of the business. In turn, organizations involved in public health in the developing world have started to focus more attention on commodity warehousing, realizing its role as a critical resource for improving public health, and the professional and systematic approach used by the private sector is directly applicable to the challenges public health warehousing face in countries around the world. Challenges, such as the increase in variety of products in the public health system, or stock keeping units (SKUs), and the demand for reduced processing time, can be addressed by improving inventory management; and, in some cases, using technologies, such as automated data collection tools. Warehouse operation performance measurements are becoming more and more important issue when warehouse operation management becomes focus. measuring warehouse operation performance helps the agency to identify, success, helps the agency to clearly monitor and control its activity which will help the agency in meeting its strategic objectives, to easily identify factors which hinder success and to design a strategic plan to alleviate bottlenecks for improvements of the agency performance in the pharmaceutical supply chain, to make decisions based on visible facts. The objective of this research is to critically assess warehouse operation management at CEPSA The researcher have gathered data through primary sources using questionnaire SPSS software was applied to present and analyze the data gathered from 69 study participants, and the analysis result presented in different statistical presentation for ease of understanding the result.

Keywords: ***Warehouse operation management, Warehouse operation management performance metrics.***

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List of Acronyms

AVG	Automated Guided Vehicle
CBHI	Community Based Health Insurance
CEPSA	Central Ethiopian Pharmaceutical Supply Agency
FLSES	Front Line Service Employees
HRM	Human Resource Management
KPIs	Key Performance Indicators
MHE	Material Handling Equipment
SCM	Supply Chain Management
SCOR	Supply Chain Operation Reference
SKU	Stock Keeping Units
USAID	United States Agency for International Development
WIMS	Warehouse Management System

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Ethiopia continues to experience a growing demand for pharmaceuticals and medical supplies in the public sector. Since 2009/10, the annual value of products distributed by PSA has grown from USD126 million to USD500 million in 2017/18. In 2018/19 the volume is projected to grow to USD750 million, and the 2016 – 2020 Health Sector Transformation Plan projects spending on pharmaceuticals and medical supplies in the public sector to reach almost USD1 billion by 2020, excluding the impact of introducing national health insurance. Experience with Community Based Health Insurance (CBHI) suggests nationwide health insurance could double demand for medications covered by the scheme. The planned expansion in the number of hospitals and health facilities over the coming decade also points to demand growth continuing into the foreseeable future. Supply chain activities and supporting systems at PSA characterized by complex and lengthy business processes, low levels of asset utilization due to, in many cases, investing in more distribution network assets than was required for an efficient operation, lack of management information to control the supply chain activities, operational systems that did not allow for the introduction of best practice techniques, and a dissatisfied workforce primarily resulting from the current terms and conditions of employment,(Revised Pharmaceutical Supply Transformation Plan.2018)

Supply chain (sometimes called the value chain or demand chain) management consists of firms collaborating to leverage strategic positioning and to improve operating efficiency. For each firm involved, the supply chain relationship reflects strategic choice. A supply chain strategy is a channel arrangement based on acknowledged dependency and relationship management. Supply chain operations require managerial processes that span across functional areas within individual firms and link trading partners and customers across organizational boundaries. Logistics, in contrast to supply chain management, is the work required to move and position inventory throughout a supply chain. As such, logistics is a subset and occurs within the broader framework of a supply chain. Logistics is the process that creates value by timing and positioning inventory;

it is the combination of a firm's order management, inventory, transportation, warehousing, materials handling, and packaging integrated throughout a facility network. Integrated logistics serves to link and synchronize the overall supply chain as a continuous process and is essential for effective supply chain connectivity while the purpose of logistical work has remained essentially the same over the decades, the way the work is performed continues to radically change. The dominant theme of supply chain collaboration is the advancement of operational integration. The benefits attainable from collaboration are directly related to capturing efficiencies between functions within an enterprise as well as across enterprises that constitute a domestic or international supply chain, (Donald. J, David.j, and Cooper. M, 2002).

Operations is that part of a business organization that is responsible for producing goods and/ or services, goods are physical items that include raw materials, parts, subassemblies such as motherboards that go into computers, and final products such as cell phones and automobiles. Services are activities that provide some combination of time, location, form, or psychology value. Examples of goods and services are found all around you. Every book you read, every video you watch, every e-mail you send, every telephone conversation you have, and every medical treatment you receive involves the operations function of one or more organizations; So does everything you wear, eat, travel in, sit on, and access the internet. The operations function in business can also be viewed from a more far-reaching perspective; it determines the collective success or failure of companies' has an impact on the ability of a nation to compete with other nations, and on the nation's economy. The ideal situation for a business organization is to achieve a match of supply and demand, (Stevenson.W ,2012).

The pharmaceutical supply chain is somehow different from other supply chains of physical goods because of its urgency, importance, storage, transportation, and regulation. The pharmaceutical supply chain covers drug research, development, manufacture, storage, and distribution to a range of health care services and ancillary businesses that help effective functioning of these different stages. The pharmaceutical and healthcare industry is hugely complex because it involves so many markets, products, processes and intermediaries. It is also globally heavily regulated and used by everyone in life. (Moniruzzaman,M 2016)

In a supply chain, warehousing function is very critical as it acts as a node in linking the material flows between the supplier and customer in today's competitive market environment companies are continuously forced to improve their warehousing operations, and many companies have also customized their value proposition to increase their customer service levels, which has led to changes in the role of warehouses, (Rama.A,Subramanya.N, and Rangaswamy.M 2012).

A warehouse requires labor, capital (storage and handling equipment), and information systems all of which are expensive, and it is important, to better match supply with demand, and to consolidate Products, (Beatriz.T,2014).

Warehouse may be categorized primarily classified by the customer they Serve, as a retail distribution center, a service parts distribution center, a catalogue fulfilment or e-Commerce distribution center, third party logistics warehouse, and perishable warehouse. (Jhon. B and Steven. H,2011).

For many years, the private sector has taken a professional, systematic approach to warehousing; recognizing its importance to overall cost, customer satisfaction, and performance of the business. In turn, organizations involved in public health in the developing world have started to focus more attention on warehousing, realizing its role as a critical resource for improving public health. The professional and systematic approach used by the private sector is directly applicable to the challenges public health warehousing face in countries around the world. Challenges, such as the increase in variety of products in the public health system, or stock keeping units (SKUs), and the demand for reduced processing time, can be addressed by, using technologies, such as automated data collection tools, (USAID/DELIVER PROJECT TASK ORDER-4 March 2014).

This assessment describes the current warehouse operation management practices in Ethiopian Pharmaceuticals Supply Agency (EPSA) central pharmaceutical warehouses.

1.2 Background of the Organization

An organization called Pharmaceutical Importer and Distributor (PHARMID) operated in the country for over fifty years, until 2007 GC. PHARMID had been only responsible for non-program pharmaceutical, and co-existed with the private sector in supplying some of the pharmaceuticals

needed throughout the country. In mid-2007 G.C, the Pharmaceutical Fund and Supply Agency (PFSA) or the currently renamed Ethiopian Pharmaceutical supply Agency (EPSA) which is a legal entity established under the law of the government of Federal Democratic Republic of Ethiopia to overcome the problems and assure uninterrupted supply of pharmaceuticals to the public with a larger mandate to supply the entire country with both Program and Essential pharmaceuticals. The goal of EPSA is to distribute Pharmaceuticals (Medicines, Medical Laboratory Reagents, Medical Supplies, Medical Equipment and Chemicals) to all public facilities within the country. EPSA's current supply chain starts with the import of most drugs via the port of Djibouti, Ethiopian Airlines, Local private Manufacturers, Importers and wholesalers. These products transported to Central Pharmaceutical warehouses located in Addis Ababa and Adama; then distributed to nineteen EPSA distribution Hubs located in different geographical location of the country, since it follows Hub based distribution network for the success of the distribution to lower level health service delivering points and other entities involved in the pharmaceutical supply chain ((Revised Pharmaceutical Supply Transformation Plan.2018)

Ethiopian Pharmaceutical Supply Agency warehouses are a type of distribution warehouses involved in receipt of pharmaceuticals products which are perishable and nonperishable in bulk and distributing to its Hubs, Service Delivering Points, and other entities involved in the pharmaceutical supply chain by implementing hub network types of warehousing strategies for the success of the physical distribution of pharmaceuticals (World Bank 2009).

1.3 Statement of the Problem

Warehouses also known as distribution centers have been around for hundreds of years, since the time that European explorers began creating shipping and trade routes between continent. Once these were established, large consignments shipped between countries, and it became necessary to create places to store the stock and it became an important part of the complete business logistics and supply chain management, (Warehouse and Distribution 2015).

Pharmaceutical warehousing or warehouse operation management is the physical movement of stock into, though, and out of pharmaceutical warehouse. warehousing is a key element of pharmaceutical supply chain management. It ensures the constant availability and flow of essential quality health commodities, in appropriate quantities, in a timely and cost-efficient manner,

through the supply chain system. key warehouse function is, warehouse operation management (USAID/DELIVER PROJECT TASK ORDER-4 March 2014).

While storing stock is a key function of warehousing, the need for large warehouses and large holdings of stock may reflect inefficiency in the supply chain. In an ideal supply chain, large warehouses storing large volumes of products are unnecessary because products should enter and exit the warehouse quickly and efficiently on their way to the service delivery point. The task before all supply chain practitioners have to determine how much storage space is truly necessary if operations are as efficient as possible. The warehousing domain of the supply chain faces problems created higher up the chain, such as poor quantification leading to incorrect stock procured, mistakes in orders, and insufficient financing, in addition warehouses may be challenged by insufficient human resources, poor physical infrastructure, and a lack of good systems to effectively track products throughout the system. These barriers lead to stock-outs, overstocking, and wastage of health resources. These are major problems in low-income country settings where resources for health are already limited. A well-functioning warehouse has a strong governance structure, a smooth operations management system, sufficient and qualified human resources, and the ability to monitor performance, (Promising Practice/Warehouse and inventory management, Nov,2018).

The data for the practical problems had been collected from materials published by the agency, business process reengineering document of the agency, technical assessment conducted by the agency in collaboration with the agency main partners and stakeholders, observation and discussion with some selected agency staffs, warehouse managers, warehouse operatives and other staffs directly or in directly related to warehouse operation management activities.

Problems and challenges related to pharmaceutical warehouse operation management are quality of warehouse operation management productivity which is affected by some warehousing factors like infrastructure, warehouse layout design, (architectural, location and arrangement of stock), working environment, warehouse material handling equipment, stock keeping unit warehouse management system, lack of documented warehouse operation management guideline, overall lack or unavailability of pharmaceutical warehouse operation performance metrics(KPIs), and it also challenged by lack of good systems to effectively track and monitor performance.

1.4 Research Question

a. How are standard warehouse operation management implemented at Ethiopian Pharmaceutical Supply Agency (EPSA) pharmaceutical warehouse?

b. To what extent perceived warehousing factors affect productivity of warehouse operation management at EPSA pharmaceutical warehouse?

c. What are the barriers to implement standard warehouse operation management performance metrics at EPSA pharmaceutical warehouses; if any metrics at PSA?

d. How important is warehouse operation performances measurements/metrics for EPSA pharmaceutical warehouse?

e. Which warehouse operation management performance metrics are relevant to EPSA Pharmaceutical warehouses?

1.5 Research Objective

1.5.1 General Objective

- To assess the current pharmaceutical warehouse operation management practices at CEPSA Pharmaceutical warehouses and to offer suitable suggestions for the improvement of pharmaceutical warehouse operation management practices to CEPSA.

1.5.2 Specific Objectives

- To assess to what extent which warehousing factors affect pharmaceutical warehouse operation productivity at CEPSA pharmaceutical warehouses.
- To asses' barriers to implement standard pharmaceutical warehouse operation management performance metrics at CEPSA Pharmaceutical warehouses.
- To get an insight in to how important is warehouse operation management performance metrics to CEPSA pharmaceutical warehouse.

- To assess degree of relevance of selected warehouse operation management performance metrics to CEPSA Pharmaceutical warehouses.

1.6 Significance of the Study

As warehouse operation performance measurements are becoming more and more important issue warehouse operation management become focus, measuring warehouse operation performance helps the agency to identify, success, helps the agency to clearly monitor and control its activity which will help the agency in meeting its strategic objectives, by easily identifying factors which hinder success and to design a strategic plan to alleviate bottlenecks for improvements of the agency performance in the pharmaceutical supply chain, to make decisions based on visible facts.

Assessing warehouse operation management has been largely ignored in research literature (Johnson, and Ginnis, 2010). Performance measurement and metrics have also been considered to be a complex matter, and operating the measurements is often inadequately understood followed by weakly formulated definitions of what will be measured (Melnyk, Stewart, & Swink, 2004). However, when it comes to the control of a warehouse, metrics make it possible for the work force to better evaluate and govern their area of responsibility (Melnyk et.al, 2004) and thereby solve problems before it's too late (Ilies, & Crisan, 2009).

This study address in describing gap in pharmaceutical warehouse operation management at CEPSA pharmaceutical warehouses, and it also create opportunities for additional research on pharmaceutical warehouse operation management issues.

1.7 Scope of the Study

The study is conducted in Addis Ababa focus on assessment of warehouse operation management in CEPSA pharmaceutical warehouses. The study subjects were all CEPSA pharmaceutical warehouse managers, and other staffs directly or indirectly related to CEPSA pharmaceutical warehouses. Method of assessment was cross sectional descriptive statistics conducted from 25-Feb-2019 to 27-March-2019 using self-administered questionnaire.

1.8 Limitation of the Study

As the Study was cross sectional quantitative descriptive study conducted using self-administered data collection tool ; the researcher has no control over the variables; the researcher can only report what had been happening in the time period of the research in that specific organization and the quality of information secured depends heavily on the ability and willingness of the respondents(A respondent may interpret questions or concept differently from what was intended by the researcher. and/or A respondent may deliberately mislead the researcher by giving false information).

The other limitation is the study is conducted in one organization focusing on pharmaceutical warehouse operation management and purposively selected study samples that directly or indirectly related to the assessment and the assessment finding is generalized to CEPSA pharmaceutical warehouses only.

1.8 Definition of Terms

1.8.1 Warehouse

Is "a commercial building for buffering and storage of goods, or an intermediate area for storage of raw materials or products until they are needed for production or consumption", (Sakil 2013)

A warehouse is a facility in the supply chain to consolidate products to reduce transportation cost, achieve economies of scale in manufacturing or in purchasing or provide value-added processes and shorten response time, (Ramaa. A, Subramanya. N, and, Rangaswamy. M 2012).

1.8.2 Warehouse Operation Management

Managing the process of receiving, put away, internal replenishment, order picking, accumulating, sorting, packing, cross docking, shipping, and other warehouse related activities managing, inventory, warehouse material handling equipment, warehouse layout design, and personnel, (Ramaa. A, Subramanya. N, and, Rangaswamy. M 2012).

1.8.3 Order Picking

Picking items from their location or storage, based on the pick list (USAID/DELIVER PROJECT TASK ORDER-4 March 2014).

1.8.4 Receiving

Receiving includes the tasks related to accepting usable commodities from outside suppliers and preparing those commodities for storage in the warehouse. (Jhon. B and Steven. H,2011).

1.8.5 Shipping

The tasks that help prepare usable commodities for shipment to customers and the placement of those commodities on vehicles for transport to the customers. (Jhon. B and Steven. H,2011).

1.8.6 Storage

The task of moving usable commodities from the receiving area and placing them in pre-defined locations within the warehouse—either on the floor, shelf, or rack—until they are ready to leave the warehouse. (Jhon. B and Steven. H,2011).

1.8.7 Retrieval

The task of moving usable commodities from one or more locations—for example, the floor, shelves, or racks—and transport them to the shipping area where they can be processed for shipment to customer, (Jhon. B and Steven. H,2011).

1.8.8 Warehouse Layout designing

Assessing the space requirements of a warehouse or other storage facility and specifying how that space should be organized to facilitate identifiable warehouse activities. (Jhon. B and Steven. H,2011).

1.8.9 Material Handling Equipment

Are: conveyors, fork lifts, automated guided vehicles (AGVs), shuttles, overhead cranes and power-and-free conveyors. Trolley, Ladders, Pallets, (Wooden, Plastic, steel,) Hand pallet trucks, High lift pallet jack, Electric stacker, heavy duty wrapping and packaging benches, plastic strapping machine, tape dispenser and other, (Jhon. B and Steven. H,2011).

1.8.10 Ergonomics

Ergonomics (or human factors) is a way to work smarter, more efficiently with less effort and discomfort to the human body, (International Journal of Engineering and Technology).

1.8.11 Pharmaceuticals

Pharmaceuticals are all health commodities which are used for the diagnosis, treatment, and Prevention of health problems which includes medicines, chemicals, medical laboratory reagents, medical equipment and supplies. Which are subject to control by pharmaceutical legislation in both the exporting state and the importing state (Proclamation No 553/2007).

1.9 Organization of the Study

The thesis organized in to five chapters. The first chapter Contain introduction which includes background of the study, background of the organization, statement of the problem, research questions, objectives of the study, scope of the study, limitations of the study, significance of the research, definition of terms and organization of the study. The second chapter contain related literature review which focuses on theoretical and Empirical review of warehouse operation management.

The third chapter contain methodology containing study area description, study design; data collection methods and instruments; study population, sample size, sampling, methods, dat, and ethical considerations. chapter four contain findings of the study including data presentation, analysis of the findings, and discussion the fifth chapter contains summary conclusion and recommendation on the basis of the research findings.

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical Review of the Study

2.1.1 Supply Chain Management

A supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request. The supply chain includes not only the manufacturer and suppliers, but also transporters, warehouses, retailers, and even customers themselves. Within each organization, such as a manufacturer, the supply chain includes all functions involved in receiving and filling a customer request. These functions include, but are not limited to, new product development, marketing, operations, distribution, finance, and customer service. A typical supply chain may involve a variety of stages. These supply chain stages Include, Customers, Retailers, Wholesalers/ distributors, Manufacturers Component/raw material suppliers Each stage in a supply chain is connected through the flow of products, information, and funds. These flows often occur in both directions and may be managed by one of the stages or an intermediary (Sunil.C, and Peter.M, 2007).

Companies currently adopting the supply chain concept view the entire set of activities from raw material production to final customer purchase to final disposal as a linked chain of activities. To result in optimal performance for customer service and cost, it is felt that the supply chain of activities should be managed as an extension of the partnership. This implies many issues, but three critical ones include, Flow of materials. Flow of information and Sharing of information, mostly through the Internet, and Fund transfers. In addition, a new trend is to manage the recovery, recycling, and reuse of material. The primary supply chain management approach is a conceptual one. All portions of the material production, from raw materials to final customer, are considered to be a linked chain. The most efficient and effective way to manage the activities along the chain is to view each separate organization in the chain as an extension of one's own organization.

There can be many organizations in the supply chain of organizations that represent the flow from raw silicon used to make computer chips to the delivery and disposal of the computer itself: To manage a supply chain, one must not only understand the network of suppliers and customers along the chain but must also try to efficiently plan material and information flows along each chain to maximize cost efficiency, effectiveness, delivery, and flexibility. This clearly not only implies taking a different conceptual approach to suppliers and customers but also implies a highly integrated information system and a set of performance measures. Overall, the key to managing such concept is with rapid flows of accurate information and increased organizational flexibility (J. R. Tony Arnold, Stephen N. Chapman, and Lloyd M. Clive, 2008).

In a supply chain, warehousing function is very critical as it acts as a node in linking the material flows between the supplier and customer in today's competitive market environment companies are continuously forced to improve their warehousing operations, and many companies have also customized their value proposition to increase their customer service levels, which has led to changes in the role of warehouses, (Rama. A, Subramanya. N, and Rangaswamy. M. 2012).

Once a warehouse mission is determined, managerial attention focuses on establishing the operation. A typical warehouse contains materials, parts, and finished goods on the move. Warehouse operations consist of break-bulk, storage, and assembly procedures. The objective is to efficiently receive inventory, possibly store it until required by the market, assemble it into complete orders, and initiate movement to customer. This emphasis on product flow renders a modern warehouse as a mixing facility. As such, a great deal of managerial attention concerns how to perform storage to facilitate efficient materials handling. The first consideration focuses on movement continuity and scale economies throughout the warehouse. Movement continuity means that it is better for a material handler with a piece of handling equipment to perform longer moves than to undertake a number of short handlings to accomplish the same overall move. Exchanging the product between handlers or moving it from one piece of equipment to another wastes time and increases the potential for product damage. Thus, as a general rule, longer warehouse movements are preferred. Goods, once in motion, should be continuously moved until arrival at their final destination. Scale economies justify moving the largest quantities or loads possible. Instead of moving individual cases, handling procedures should be designed to move cases grouped on pallets, slip sheets, or containers ((Donald.J, David.j, and Cooper.M,2002).

2.1.2 Pharmaceutical Supply Chain

The pharmaceutical supply chain is somehow different from other supply chains of physical goods because of its urgency, importance, storage, transportation, regulation. The pharmaceutical supply chain covers drug research, development, manufacture, Storage, and distribution to a range of health care services and ancillary businesses that help effective functioning of these different stages. The pharmaceutical and healthcare industry is hugely complex because it involves so many markets, products, processes and intermediaries. It is also globally heavily regulated and used by everyone in life, (Moniruzzaman .M 2016).

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2.1.3 Operation

Operations is that part of a business organization that is responsible for producing goods and/ or services, goods are physical items that include raw materials, parts, subassemblies such as motherboards that go into computers, and final products such as cell phones and automobiles. Services are activities that provide some combination of time, location, form, or psychology value. Examples of goods and services are found all around you. Every book you read, every video you

watch, every e-mail you send, every telephone conversation you have, and every medical treatment you receive involves the operations function of one or more organizations; So does everything you wear, eat, travel in, sit on, and access the internet. The operations function in business can also be viewed from a more far-reaching perspective; it determines the collective success or failure of companies', has an impact on the ability of a nation to compete with other nations, and on the nation's economy. The ideal situation for a business organization is to achieve a match of supply and demand, (Stevenson.W, 2012).

Warehouses have different operations. However, most of them share some general pattern of material flow, and typical warehouse operations include: receiving, put away, internal replenishment, order picking, accumulating, sorting, packing, cross docking, and shipping, (Ramaa. A, Subramanya. N, and, Rangaswamy. M 2012).

Once a warehouse mission is determined, managerial attention focuses on establishing the operation. A typical warehouse contains materials, parts, and finished goods on the move. Warehouse operations consist of break-bulk, storage, and assembly procedures. The objective is to efficiently receive inventory, possibly store it until required by the market, assemble it into complete orders, and initiate movement to customer. This emphasis on product flow renders a modern warehouse as a mixing facility. As such, a great deal of managerial attention concerns how to perform storage to facilitate efficient materials handling. The first consideration focuses on movement continuity and scale economies throughout the warehouse. Movement continuity means that it is better for a material handler with a piece of handling equipment to perform longer moves than to undertake a number of short handlings to accomplish the same overall move. Exchanging the product between handlers or moving it from one piece of equipment to another wastes time and increases the potential for product damage.

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2.1.4 Warehouse

A warehouse is a facility in the supply chain to consolidate products to reduce transportation cost, achieve economies of scale in manufacturing or in purchasing or provide value-added processes and shorten response time. Warehousing has also been recognized as one of the main operations where companies can provide tailored services for their customers and gain competitive advantage. There are various types of warehouses: they can be classified into production warehouses and distribution centers and by their roles in the supply chain they can be classified as raw materials warehouses, work-in-process warehouses, finished good warehouses, distribution warehouses, fulfillment warehouses, local warehouses direct to customer demand, and value-added service warehouses, (Ramaa. A, Subramanya. N, and, Rangaswamy. M 2012).

Warehouses are usually large plain buildings used for commercial purposes for storage of goods and are commonly used by exporters, importers, wholesalers, manufacturers. Warehouses or distribution center are usually equipped with loading docks to load and unload trucks and they have cranes and forklifts for moving goods, and are placed on ISO standard pallets loaded into pallet racks, (Sakil. S,2013).

Health commodities warehouse is much more than a building that provides a space for storage. It must be designed to receive, store, and organize products efficiently and must provide effective distribution for life-saving commodities. This requires adequate shipping/ receiving docks, storage in appropriate conditions for the commodities, and adequate work space to access and compile onward shipments for products going to regional or district warehouses or service delivery points (SDPs). You will improve the efficiency of the warehouse and lower overall operating expenses if you carefully plan for the needed conditions for all of these functions, (USAID/DELIVER PROJECT TASK ORDER-4,2014).

Warehouses are crucial components of most modern supply chains. They are likely to be involved in various stages of the sourcing, production and distribution of goods, from the handling of raw materials and work-in-progress through to finished products. As the dispatch point serving the next customer in the chain, they are critical to the provision of high customer service levels, (Sakil.S 2013).

Warehouse also classified by the customer they serve, as a retail distribution center, a service parts distribution center, a catalogue fulfilment or e-Commerce distribution center, third party logistics warehouse, and perishable warehouse, (Jon. B and Steven. H 2011).

Warehouse also classified as, a distribution, production and contract warehouses a distribution warehouse is a warehouse in which products from different suppliers are collected (and sometimes assembled) for delivery to a number of customers. A production warehouse is used for the storage of raw materials, semi-finished products and finished products in a production facility. A contract warehouse is a facility that performs the warehousing operation on behalf of one or more customers, (Van den Berg.P, and Zijm.M 1999),

Warehouse also classified as centralized and decentralized according to which geographic area they supply to, centralization generally refers to the allocation of the warehouse service to one particular business unit which provides service to the whole firm where the decisions are made at the central location for the entire network, and it have its own advantage and disadvantage. Advantages of centralized warehouses are, improvement in productivity through balancing, increase in available knowledge, bundling of product flow, combined use of production flows, control on the system, uniformity in the process, and improved efficiency, and disadvantages of centralized warehouses are, customer desire of self-pickup is not provide, problem of concentration of customers in only certain markets in homogeneous customer structure, long internal transport paths in large central warehouses with higher cost for the infra structure, slow process of decision making, less flexibility, high initial cost, and long bureaucracy in the system. Decentralized warehouse approaches give the individual business unit autonomy, and independency over resources without any major consideration over the remaining unit unless there is a necessity for the overall organization policy. In this approach each facility identifies its most effective strategy without considering the impact on the remaining facilities in the network which leads to local optimization, and the main characteristics are empowerment of individual business unit, flexibility. They provide as good service as the centralized warehouse in terms of customer service level. Advantages of decentralized warehouses are, agility, quality, innovation, low startup cost, increase in responsiveness and improvement in reliability. The limitations are lack of centralized control, and duplication of resources, (Mahesh.K, Ranjit.V, and Sridahr.K 2008)

In today's time it is worth remarking to consider the concept of just in time logistics in which products flows more quickly, and flow time and in transit inventory are reduced by keeping the product moving by avoiding start and stop movement which reduces the use of extra warehouse handling material and additional space requirements by avoiding layouts that impede smooth flow of commodity by identifying and resolving bottlenecks for smooth flow, and warehouse requires labor, capital (storage and handling equipment), and information systems all of which are expensive, and it is important, to better match supply with demand, and to consolidate products(Johon. B and Steven. H 2011).

2.1.5 Warehouse Layout Design

In distribution logistics where shorts lead-times and flexibility are essentials warehouse design and operations become more important and complex. Furthermore, the ever-increasing variety of products and the constant changes in customer demand has placed a tremendous emphasis on the ability to establish efficient logistic operations. Warehouse design and operations will be determinant to have quality, efficiency and flexibility. Typically, a design runs from a functional description, through a technical specification, to equipment selection and determination of the layout. A layout must be modular, adaptable, compact, accessible and flexible and must be capable to respond to changing conditions, to improve space utilization and to reduce congestion and movement. For these reasons, warehouse design is a highly complex task, where, sometimes, trade-offs have to be made between conflicting objectives, (Carla. G, Sameiro.C, and Guilherm.P 2016),

Warehouse layout sets the stages of order picking, the most important activity in the warehouse. If products are staged for quicker retrieval in the warehouse customer will receive good service at lower cost everyone knows how to lay out a warehouse conventional knowledge says putting the fastest moving SKUs in the most convectional location, (Johon. B and Steven. H 2011).

Warehouse layout is dictated by the type of warehousing operation and the need to achieve an efficient flow of goods into and out of the building; it is also constrained by the physical layout of the site and available road access points. In addition, it is affected by the need to allow for future expansion. Remember too that the internal layout is certain to be changed over the life of the building, both to accommodate new product lines and to implement new warehouse technologies.

Designing the building for long-term flexibility is therefore critically important, (World Health Organization 2014).

The main objectives of layout planning are to use space efficiently, promote the efficient handling of commodities, provide economical storage, provide flexibility to meet changing warehousing requirements. In a standard warehouse or storage facility, two main activities require space or layout planning, receiving/shipping and storing/retrieval, because the shipping and receiving tasks are often done in the same general location within the warehouse, they are often analyzed together, and the layout should also include a plan for storing unusable commodities—separating unusable from usable stock—and moving the unusable stock to a pre-defined location within the store where it will remain until it can be evaluated and removed from the warehouse for proper disposal. Unusable stock is usually defined as commodities that have either expired or have been damaged and cannot be safely consumed by customers. Unusable stock may include items that were rejected during receiving/quality control inspection or expired or damaged items in stock. Unusable stock can also include anything that the warehouse cannot use—e.g., broken furniture/equipment, broken pallets, and non-reusable packing materials. When a layout plan is being developed, the storage of unusable commodities is often overlooked, but it may be just as important as receiving/shipping and storing/picking. This is especially true in dysfunctional warehouses where commodities often expire or become unusable. In warehouses where space has not been specifically allocated for storing items that can no longer be used; to accommodate these items, it is often necessary to use space that was dedicated for other activities, (USAID/DELIVER PROJECT TASK ORDER-4,2014).

The layout problem for a pick area concerns the determination of the number of blocks, the number of aisles in a pick zone, the length and width of aisles in a block, and the position of the depot for the decision issues in pick area design. The common goal is to find a ‘best’ warehouse layout with respect to some certain objective functions among the layouts, which fit a given set of constraints and requirements. The most common objective function is the travel distance. The number of aisles in a pick zone, that is., the zone size, has large impact on the pick-and pass order picking system performance. The layout of the storage racks within a pick zone also impacts the performance of a pick-and-pass order picking system, (Mengfei. Yu ,2008).

Warehouse layout consisted of a variety problem the main one is storing, architectural design and general layout problem, picking response time for the order processing, minimization of travel distance in the warehouse routing of picker, personnel and machine scheduling problem, (Vassilios. V. and Ptapios A, 2011).

2.1.6 Warehouse Management System

Historical warehouse system functionality focused on receiving replenishment shipments, stock put away, and order picking. warehouses today must offer a broader range of services as they are frequently performing some light manufacturing. 'They are also required to manage more inventory on a just-in-time basis, (Donald.J, David.j, and Cooper.M,2002).

Warehouse management system (WMS) is basically just a software to track and manage warehouse activities at a minimum the data base tracks all products arriving and all products shipped out, and the next significance increase in functionality is to add a stock locator system this is the ability to manage an inventory of storage location in addition to an inventory of products, this characteristics makes possible the most fundamental capability of a WIM which is the stock locator system which supports direct put a way, direct picking, and track real time warehouse activities, (Johon B. and Steven. H. 2011).

The implementation of WMS for a company demands significant investment and time period (several months) which has to be justified with the benefits obtained after implementation. The justification involves the excellent analysis of the current situation of the warehouse and warehouse operation for a specific period of time tuning the WMS. The firm should be prepared to change the entire process and system storage. Only WMS implementations without changing processes does not lead to cost savings or efficiency improvements, it will only reduce errors due to human factors. Another issue in recent days has been the degree of technology to utilize in warehousing operations. The choice spans from conventional warehousing –racking and shelving with fork-lift or even manual operations through to fully automated systems with conveyors and automated guided vehicles (AGVs) and from carousels to robotic applications. The reasons for the choice of a particular technology level are not always clear cut, and run the gamut of financial, marketing and other factors, from company’s image or flexibility for future change through to

personal perception of the appropriateness of a particular technology to a particular business or company (Sneha.V., 2016).

2.1.7 Warehouse Material Handling Equipment

The new market forces, together with the fast-technological developments in material handling, have affected the operation within warehouses tremendously. Shorter product life cycles impose a financial risk on high inventories and, consequently, on the purchase of capital-intensive high-performance warehousing systems. Material handling depend as the movement of materials (raw materials, scrap, semi- finished and finished products) to, though, and from productive processes; in warehouses and storage; and in receiving and shipping areas. Material handling concerns material flow and warehousing. Typical material flow devices are: conveyors, fork lifts, automated guided vehicles (AGVs), shuttles, overhead cranes and power-and-free conveyors. Warehousing concerns those material handling activities that take place within the warehouse, receiving and shipping areas, that is., receiving of goods, storage, order-picking, accumulation and sorting and shipping (Van den Berg.P ,and Zijm.M ,1999).

Materials handling is the short-distance movement that takes place in or around a building such as a plant or distribution center. For a distribution center, this means the unloading and loading of transport vehicles and the dispatch and recall of goods to and from storage. In addition, the racking systems used in distribution centers are usually considered to be part of materials handling. Some objectives of materials handling are to increase cube utilization by using the height of the building and by reducing the need for aisle space as much as possible; To improve operating efficiency by reducing handling. Increasing the load per move will result in fewer moves; To improve the service level by increasing the speed of response to customer needs. There are many types of materials handling equipment. For convenience, they can be grouped into three categories: conveyors, industrial trucks, and cranes and hoists. Conveyors are devices that move material (or people) horizontally or vertically between two fixed points. They are expensive, create a fixed route, and occupy space continuously. As a result, they are used only where there is sufficient throughput between fixed points to justify their cost. Industrial trucks are vehicles powered by hand, electricity, or propane. Diesel and gasoline are not used indoors because they are noxious and lethal. Industrial trucks are more flexible than conveyors in that they can move anywhere there is

a suitable surface and no obstructions. They do not occupy space continuously for these reasons, they are the most often-used form of materials handling in distribution centers and in manufacturing. Cranes and hoists can move materials vertically and horizontally to any point within their area of operation. They use overhead space and are used to move heavy or large items. Within their area of operation, they are very flexible, (J. R. Tony Arnold, Stephen N. Chapman, and Lloyd M. Clive, 2008)

2.1.8 Human Resource Management and Supervision

Human resource management (HRM) is a critical activity, and also some researches show that frontline service employees (FLSES) actions will lead to significant results in successful service operation. In contrast, much customer dissatisfaction is reported by the firms that did not implement suggested idea. HRM includes five major and related steps: recruitment, selecting, training, compensating, and supervising. The outcomes of this process are qualified employees who had the chance to enter the firm, then to have the opportunity to develop and progress the people who work in organization. In the case of labor diversity, the labor should be hired and empowered fairly, without regard to any other factors, and employer must be careful not to violate employees' privacy rights. Only necessary data about workers should be gathered. Also these data must be secured, and employers should be sensitive about disclosing such data about employees. Every new employee should receive pre-training, organization's structure and policies, working hours, should also be introduced to co-workers, and training programs are useful for both new and existing personnel which help them to perform better. As an element of HRM, supervision is chiefly a role to prepare environmental activities that lead to better performance for both employee and the organization, (Reza.F, Shabnam.R, Laleh,K,2011)

2.1.9 Warehouse Operation Management

Warehousing takes up to between 2% and 5% of the cost of sales of a corporation and with today's highly competitive global business environment organizations are emphasizing on return on assets, and hence minimizing warehousing costs has become an important business issue. Many firms are automating their basic warehousing functions to achieve the increase in throughput rates or

inventory turns required for their warehousing operations to be cost effective, (Heung. S. and, Gyu. S. 2006).

Once a warehouse mission is determined, managerial attention focuses on establishing the operation. A typical warehouse contains materials, parts, and finished goods on the move. Warehouse operations consist of break-bulk, storage, and assembly procedures. The objective is to efficiently receive inventory, possibly store it until required by the market, assemble it into complete orders, and initiate movement to customer. This emphasis on product flow renders a modern warehouse as a mixing facility. As such, a great deal of managerial attention concerns how to perform storage to facilitate efficient materials handling. The first consideration focuses on movement continuity and scale economies throughout the warehouse. Movement continuity means that it is better for a material handler with a piece of handling equipment to perform longer moves than to undertake a number of short handlings to accomplish the same overall move. Exchanging the product between handlers or moving it from one piece of equipment to another wastes time and increases the potential for product damage. Thus, as a general rule, longer warehouse movements are preferred. Goods, once in motion, should be continuously moved until arrival at their destination. Scale economies justify moving the largest quantities or loads possible. Instead of moving individual cases, handling procedures should be designed to move cases grouped on pallets, slip sheets, or containers. The overall objective of materials handling is to eventually sort inbound shipments into unique customer assortments. The three primary handling activities are receiving, in-storage handling, and shipping, (Donald.J, David.j, and Cooper.M,2002).

It is necessary to allocate warehouse resources efficiently and effectively to enhance the productivity and reduce the operation costs of the warehouse, one vital area determining the efficiency of warehouse is the determination of the proper storage locations for potentially thousands of products in a warehouse. Various factors affecting the storage assignment like order picking method, size and layout of the storage system, material handling system, product characteristics, demand trends, turnover rates and space requirements are being extensively studied. It has been suggested that selecting appropriate storage assignment policies (random, dedicated or class-based) and routing methods (Transversal, return or combined) with regards to above factors is a possible solution to improve the efficiency. Various decision support models

and solution algorithms have also been established to solve warehouse operation planning problems, (Sneha.V,2016).

A warehouse reorganize and repackage products; products typically arrives packaged on large scale and leaves packaged on smaller scale in other words ,an important function of the warehouse is to break dawn large chunks of product and redistribute it in smaller quantities some SKU may arrive from the vendor or manufacturer in pallet quantities, but shipped to customers in case on other side products may arrive in cases but shipped out as each and some very fast moving items as pallets and may be shipped out as each. In such an environment the dawn stream warehouse operation are becomes more labor intensive in general the smaller the handling unit the greater the handling cost. Even though warehouse can serve quite different ends, most share the same general pattern of material flow. essentially they receive bulk shipments, stage them for quick retrieval; then in response to customer request retrieve and sort SKUs and ship them out to customers, (World Health Organization,2014).

Warehouse management is, nowadays, a great challenge in the field of supply chain management. Inventory level management, warehouse design, warehouse operations and space optimization and costumers' requirements are some examples of important challenges in this context. Warehouses must be flexible structures to provide quality, efficiency and effectiveness of the logistics operations in a very demanding, competitive and uncertain market. On the other hand, modern supply chain management principles compel companies to reduce or eliminate inventory levels. Additionally, a warehouse requires labor, capital and information technologies, there are four main reasons why warehouses are useful: to consolidate products in order to reduce transportation costs and to provide customer service; to take advantage of economies of scale; to provide value-added processing and to reduce response time. Thus, warehouses will continue to be an important node at the logistic network. In distribution logistics where shorts lead-times and flexibility are essentials warehouse design and operations become more important and complex. Furthermore, the ever-increasing variety of products and the constant changes in customer demand has placed a tremendous emphasis on the ability to establish efficient logistic operations. Warehouse design and operations will be determinant to have quality, efficiency and flexibility, (Carla.G, Sameiro. C, Guilherme.P,2008).

Warehouses have always been paid a great deal of attention from managers due to the large potential impact it can have in creating customer value. Like most areas the key objectives for managing warehouses have changed over time to create additional competitiveness. The first objectives within warehousing related to maximizing the utilization of resources within the warehouse. The more expanded concept inventory control aimed to maximize profits while providing good customer service (Tompkins & Smith, 1998). The objective of present warehouse management is to efficiently and effectively organize the processes in a warehouse (Faber.N, 2013).

Several sources imply that keeping good control over a corporation's warehouse(s) is of great importance. As an example, the competitive power of an entire company as well as the complete supply chain may be derived from outstanding performance within the warehouse or distribution center; in a broader context, a company's warehouse operations can influence the firm's corporate performance in manners such as logistics costs, customer service and business alignment.

Warehousing is however a correlation between logistics cost and good customer service; the higher customer service a company aims for, the greater logistics costs one can expect, which is one of the greatest trade-off' companies face in warehouse management (Van Den Berg, 2012). Similar reasoning is presented by Gwynee Richards (2014), in his illustration of warehouse management trade-offs between high customer service, low cost and low inventory.

Warehouse operation management is the management of flow of materials through all kinds of logistics facilities in a strictly defined sequence of transformations performed on these materials. These transformations may involve transformations of time, place or form of handled materials. In the first case, it concerns buffering and storage of materials in logistic facilities. Place transformation is understood as a movement and transport of materials within warehouse. However, during the form transformation, materials are processed due to their physical form, that is co-packed, consolidated, unconsolidated, assembled, packaged, and other additional activities, (Michał Kłodawski et al, 2017)

2.1.10 Warehousing Activities

Warehouse process is a set of actions which are associated with receiving, storage, picking and shipping of material goods, in a suitably adapted places for this purpose, and under certain organizational and technological conditions. Therefore, it can be concluded that warehouse process includes such sub-processes as receiving, storage, picking and shipping. Nevertheless, it is a very general approach, and warehouse process may take many different forms, and include multiple sub-components. Selection and appropriate connection of this process elements (sub processes) is determined by functions and tasks of logistics facility. In fact, production warehouses, distribution warehouses or crossdocking warehouses usually perform variety kinds of transformations. Each of these warehouse process components is characterized by an appropriate sequence of actions that have to be performed to complete a given goals and objectives. It is closely related to materials and information transformation by labor resources (labor resources include warehouse employees, transport means, warehouse equipment, tools for information flow management, and other. (Michał Kłodawski et al.2017)

The normal physical activities in a warehouse classified as receive, put away, storage, pick, pack/ship and cross docs, as well as other descriptions that are relevant to the topic.

- Receiving is the first activity that is managed in a warehouse. The activity may start with a notification of incoming goods, which allows the workers to arrange coordinated unloading of the incoming goods. Normally the goods is also scanned and registered in the company's WMS. Receiving represents about 10 % of the cost in a normal warehouse.

- Put-away Prior to the put-away of a stock keeping unit (SKU) is being made, it's important that a (convenient) storage location is selected for storage. The reason for this is because the storage location many time reflects how quickly and how cost-efficient it later on will be retrieved for a customer. To do this, the warehouse staff needs to be able to control the inventory, and the storage locations. Workers and managers need support to able to quickly access information about available storage locations, things to consider can be, how much weight a storage location tolerate, how spacious they are, how easily they are accessed. The put-away can then be realized with the help of various equipment such as forklifts, roll

trolleys or conveyers. Put-away usually corresponds to about 15 % of warehousing operating payments.

- Storage there are two main storage types, dedicated storage and shared storage. In general, a unique address is assigned to every single location in a warehouse, regardless if it's dedicated or shared location. A dedicated location is a storage, which is reserved for a specific and allocated SKU. In this manner, high frequent SKUs are assigned to more convenient locations, which streamlines order picking. However, a consequent of dedicated storage is often that volume utilization becomes insufficient. The other type of storage, shared storage, can on the other hand be used to improve space utilization. Here, SKUs can be assigned to several locations. Once such a location becomes empty, another SKU can be assigned to this specific location. Consequently, the utilization of the inventory will be higher, the tradeoff is of course that a SKU can be located in many different locations and can thus be harder to find without good systems in place.

- Picking, normally order-picking (retrieving a SKU from storage location) represents about 55 % of total warehouse operating costs. But it can also be further broken down to traveling, searching, extracting and paperwork and other activities. As a mean to get the right information to the order pickers, pick-lines are used, which contain instructions on what to pick, in what quantity and in what units of measure. Each pick-line corresponds to a specific location in the warehouse. It should further be notable that a pick-line may consist of several picks from the same location. Of course picking have been of large interest for automating due to high operating cost and manual handling.

- Packing is also a quite labor-intensive activity because of the magnitude of orders (and SKUs) that are handled, often inspections take place at this stage as well. The inspections are performed to control that the orders are complete and accurate, order accuracy is a crucial measure and important to create good service to customers. Inaccurate orders can generate both expensive returns and poor reputation. In general, the numbers of units that are handled in the shipping dock are lower compared to that of picking. The reason for this is because customers ask for consolidated shipments, which means that orders are packed

together on a single carrier (e.g. pallet or case), which enables economics of scale benefits due to lowered shipping and handling expenses. However, there are customers, example. e-commerce actors such as Amazon, who are more likely to ship goods separately, even though one customer buys two books just a quarter of an hour apart from each other.

In this case, rapid response is more important, and shipments can be sent separately because it's not a concern for customers, (Bartholdi & Hackman 2011).

2.1.11 Warehouse Operation Performance Measurement

A metric is a verifiable measure stated in either quantitative or qualitative terms defined with respect to a reference point. Without metrics, no firm could expect to function effectively or efficiently on a daily basis. Metrics give us: Control by superiors, reporting of data to superiors and external groups. Metrics communicate expectations, identify problems, direct a course of action, and motivate people. Building the right metrics is vital to a company. Problems must be anticipated and corrective action taken before they become severe. Thus, companies cannot risk waiting to react until the order cycle is completed and feedback from customers is received (R. Tony, Stephen N, Lloyd M,2008)

Assessing warehouse operation performance has been largely ignored in research literature (Johnson, and Ginnis, 2010). Performance measurement and metrics have also been considered to be a complex matter, and operating the measurements is often inadequately understood followed by weakly formulated definitions of what will be measured (Melnyk, Stewart, & Swink, 2004). However, when it comes to the control of a warehouse, metrics make it possible for the work force to better evaluate and govern their area of responsibility (Melnyk et.al, 2004) and thereby solve problems before it's too late (Ilies, & Crisan, 2009). Performance measurement is also desirable to generate the greatest paybacks, (Johnson & Ginnis, 2010).

To simplify, warehouse performance measurements are made to ensure, good customer service that a philosophy of continuous improvement exists among the staff and that issues are discovered before they harm the operations (Gwynne.R, p 230).

2.2 Empirical Review

The evolving technology changed the warehousing method a lot logistics being carried out at a quicker pace and with a very little scope for error. Although many technologies evolving every day, many problems are arising making warehousing more complex this in turn is affecting the whole supply chain management; most of the problems are the need to change all mechanical or manual system in place with automated system, the requirement to satisfy customer need without much customization, and integration of the warehouse data with the whole supply chain application and to be compatible global supply chain in cost effective manner. The current warehouse requires to execute, smaller transaction, receive, ship more international orders, and less time to process an order with less margin of error, (Mahesh.K, Ranjit.V, and Sridahr. K, 2008).

Research on consafe logistics customers developing performance measurement system for warehouse operation activities based on the SCOR model, customer with a warehouse operation management system from consafe logistics, where previously, there had been no standardized model used to define warehouse operation performance metrics, (Per.A & Jonathan.F 2014)

The SCOR-model has been developed to describe the business activities associated with all phases of satisfying a customer's demand. The model itself contains several sections and is organized around the six primary management processes of Plan, Source, Make, Deliver, Return and Enable by describing supply chains using these process building blocks, the model can be used to describe supply chains that are very simple or very complex using a common set of definitions. As a result, disparate industries can be linked to describe the depth and breadth of virtually any supply chain. The model has been able to successfully describe and provide a basis for supply chain improvement for global projects as well as site-specific projects, (SCOR Eleventh Edition P-i2, October 2012)

The purpose of the survey by Axelsson & Jonathan, (2014) was to develop a performance measurement system for warehousing required focus on two main parts of SCOR: the development of a process model, to find an aligned set of metrics, and trying to figure out what clients want to measure. Survey result shows the respondents seem to use metrics related to receiving, put away replenishment, storage picking, packing, shipping, loading, and delivery metrics. 33% found that

picking, packing, shipping loading, delivery metrics were most important, 8% found that receiving, put away, replenishment metrics were most important and 22% answered that storage metrics were most important; and additional categorizations that were found Failure, customer, complaints, safety & illness as well as overall metrics. fewest found that return metrics were important, and picking metrics were the most representable among outbound metrics.

The purpose to develop a performance measurement system for warehousing required focus on two main parts of SCOR: the development of a process model and to find an aligned set of metrics.

Leon .G. et al (2002) revealed on its data envelope analysis ,analysis on 150 warehouses reveals that for almost every segment of the warehousing industry, fewer than 20% to 30% are efficient, and for the vast majority of warehouses it appears there are significant opportunities for improvement in operational efficiency.

An approach to organizing and determining the sequence of activities performed on logistic units in warehouse facilities. Main attention was paid to what should be taken into consideration for selecting a specific strategy of materials handling. It includes not only costs that result from the way of materials handling, but also the time-consuming of warehouse operations, as well as other technological and organizational factors. These factors are e.g. availability of warehouse space or labor resources which will enable performance of individual storage operations in acceptable time and cost. Procedure of selection materials handling strategy was presented by using probabilities dependent on mentioned factors. It was also indicated that the value of the probability of selection of a given strategy can be modified by the relevant investments and reorganizations of warehouse areas and introduce to construct mathematical models for different variants (strategies) of materials transformations in logistics systems. Subsequently, it will allow to carry out a wide range of analysis related to construction and organization of processes occurring such facilities, based on them, logistics facilities can be evaluated in terms of performance and costs of warehouse processes, as well as their reliability (reliability of logistics facility is understood as a readiness of it to implementation of customer orders at specified time and on specified level of quality) (Michał Kłodawski et al 2017).

2.3 Conceptual Framework

Once a warehouse mission is determined, managerial attention focuses on establishing the operation. A typical warehouse contains materials, parts, and finished goods on the move. Warehouse operations consist of break-bulk, storage, and assembly procedures. The objective is to efficiently receive inventory, possibly store it until required by the market, assemble it into complete orders, and initiate movement to customer. This emphasis on product flow renders a modern warehouse as a mixing facility. As such, a great deal of managerial attention concerns how to perform storage to facilitate efficient materials handling. The first consideration focuses on movement continuity and scale economies throughout the warehouse. Movement continuity means that it is better for a material handler with a piece of handling equipment to perform longer moves than to undertake a number of short handlings to accomplish the same overall move. Exchanging the product between handlers or moving it from one piece of equipment to another wastes time and increases the potential for product damage. Thus, as a general rule, longer warehouse movements are preferred. Goods, once in motion, should be continuously moved until arrival at their destination. Scale economies justify moving the largest quantities or loads possible. Instead of moving individual cases, handling procedures should be designed to move cases grouped on pallets, slip sheets, or containers. The overall objective of materials handling is to eventually sort inbound shipments into unique customer assortments. The three primary handling activities are receiving, in-storage handling, and shipping, (Donald.J, David.j, and Cooper.M, 2002).

Different empirical evidences shows the importance of proper implementation of warehouse operation management activities and performance metrics which affected by different factors, as warehouse process determines the sequence of warehouse operations; the operations are related to internal transport, cargo form transformation and cargo buffering between their input and output from the warehouse which in turn affected the existence of good infrastructure, warehouse material handling equipment, good inventory management system in place, clearly defined warehouse layout design, human resource regular supportive supervisory visit ,and top management commitment.

This study describe the overall current warehousing operation management practices , assess to what extent perceived warehousing factors affect productivity of warehouse operation

management, identify barriers to implement standard warehouse operation performance metrics, to assess the level of importance of selected warehouse performance metrics perceived to be important at PSA store to improve warehouse operation management and to creates better understanding of the warehouse operation management performance metrics complexity and need to be manage carefully to keep the logistics and supply chain activity flow smoothly Provide recommendation for the agency, other stake holders and partners, will pave the way for further studies on the importance of warehouse operation performance metrics for warehouse operation management efficiency and effectiveness and It will contribute to the field of logistics and supply chain management by documenting the findings.

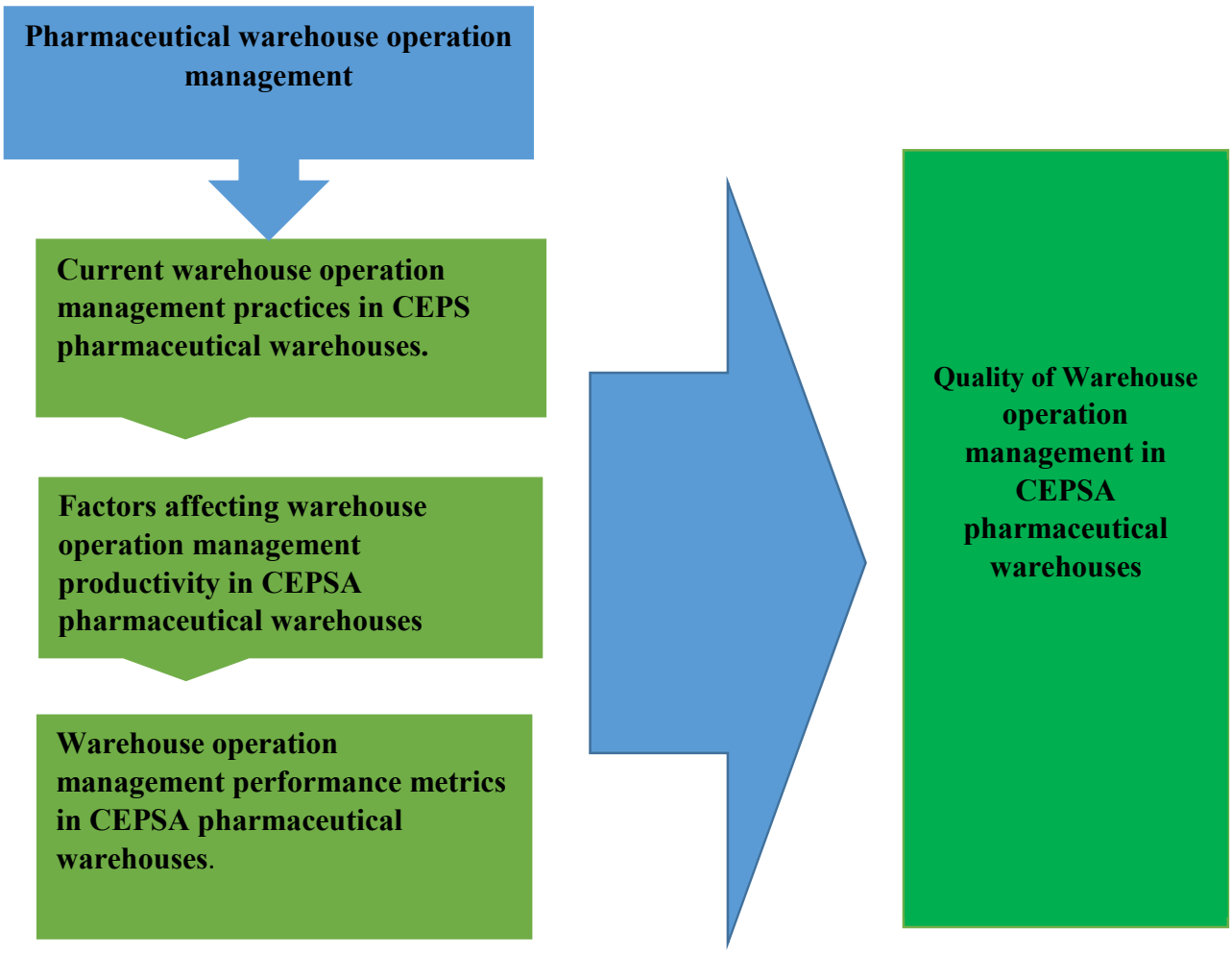

Figure 2.1 Conceptual frameworks (Own Model) (Modified from Michał Kłodawski, Marianna Jacyna, Konrad Lewczuk, Mariusz Wasiak,2017).

CHAPTER THREE

METHODOLOGY

3.1 Introduction

Research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically. In it one studies the various steps that is generally adopted by a researcher in studying research problem along with the logic behind them. It shows not only the research methods/techniques but also the methodology. It implies not only need to know how to develop certain indices or tests, how to calculate the mean, the mode, the median or the standard deviation or chi-square, how to apply particular research techniques, it also shows which of these methods or techniques, are relevant and which are not, and what would mean and indicate and why, and it shows the need to understand the assumptions underlying various techniques and the need to know the criteria by which one can decide for that certain techniques and procedures will be applicable to certain problems and others will not. All this means that it is necessary to design methodology for research problem as the same may differ from problem to problem. From what has been stated above, we can say that research methodology has many dimensions and research methods do constitute a part of the research methodology. The scope of research methodology is wider than that of research methods. The designing and methodological aspect of a particular study is the roadmap that the study should follow in its way towards the desired outcome. designing the research would employ; the data sources and methods of collection; the target population, unit of analysis and respondents; the types of instruments and their development procedure; the dimensions and corresponding measurement items; and data processing, analysis and presentation procedures, (C.R. Kothari 1990).

3.2 Description of the Study Area

Ethiopian Pharmaceuticals Supply Agency(EPSA) central pharmaceutical warehouses located in Addis Ababa the capital city of Ethiopia. It is administratively sub-divided into 10 sub-cities (City Government of Addis Ababa, 2012).

3.3 Research Approach

The Research approach is a quantitative method, involving the generation of data in quantitative form which is subjected to quantitative statistical analysis and presentation of the quantitative data in graph, table and narration. The purpose of the approach is to describe characteristics this usually means survey research where a sample of population is studied (questioned) to determine characteristics.

3.4 Study Design

The research design is a descriptive cross-sectional design and this particular study had been quantitatively assessed perceived, current warehouse operation management practices at CEPSA pharmaceutical warehouses, perceived degree of warehousing factor affecting warehouse operation management productivity at CEPSA Pharmaceutical warehouses, to barriers to implement standard warehouse operation management performance metrics at CEPSA pharmaceutical warehouses. Importance of perceived warehouse operation management performance metrics at EPSA Pharmaceutical warehouses, and to assess perceived degree of relevance of warehouse operation management performance metrics to CEPS pharmaceutical warehouses

Then study describes and critically assesses the factors of the performance of warehouse operation management at CEPSA pharmaceutical warehouses. Moreover, obtaining information from study subject at a single point in time from 25-Feb-2019 to 27-Mar-2019. The finding and conclusion of the study depend on the utilization of statistical data collection and analysis using SPSS Version 24 and Excel 2016.

3.5 Unit of analysis

Ethiopia Pharmaceutical Supply Agency Central Pharmaceutical Warehouses, and the study subjects were warehouse managers and others department which has direct relation with warehouse like Warehousing and inventory management, distribution and fleet management, Forecasting and operational research and indirectly related to pharmaceutical warehouse management. As far as the unit of analysis is concerned, the pharmaceutical warehouses of the

agency were taken to be the unit of analysis for this particular study. and every warehouse personnel's and other related department of the agency were subject of the assessment. Warehouse personnel and related department were chosen because of the fact that they are most accustomed with and have the relevant information pertaining to the pharmaceutical warehouse activities of the agency

3.6 Study Population and Sample Size

Central Pharmaceutical Supply Agency staffs were the study population, and due to the very small number of the target population, which is 69 in number, it will be decided to consider the entire population in the study, to conduct census survey, rather than sampling from the population. This is on the basis of the suggestion that if the target population is smaller (e.g. 100 or less) census survey is very appropriate and effective since virtually all population will be sampled in small populations to achieve a desirable level of precision (Israel, 1992).

3.7 Data Source Type, and Data Collection Procedures

The data source was primary data collected from target population using structured self-administered questionnaire handled by interviewer and the subject of the assessment had been those target populations selected purposely.

Primary sources of data are used for the purpose of conducting this particular assessment. primary data was the information that the researcher collected directly from the people involved in the survey regarding the specific topic, and it have the likely advantage that the data was collected with the research's purpose in mind, whereby ensuring the resulting consistency of the information with the research questions and purpose. The primary was collected through a well-developed questionnaire from the purposively sampled population of the agency.

The questionnaire was designed in a way that enabled to capture the demographic information of respondents, on the one hand, and their evaluation of warehouse operation management performance, as far as the procedure of data collection is concerned, initially respondents will be communicated to explain the purpose and nature of the study so as to achieve the desired response rate. Then questionnaire was distributed and collected physically from the potential respondents

at their site by the researcher. The layout of the questionnaire was kept very simple to encourage meaningful participation by the respondents. The questions were kept as concise as possible with care taken to the actual wording and phrasing of the questions.

The data had been collected by using a pre developed self-administered structured questionnaire developed from warehouse operation management cheek Sheet, (warehouse operation check sheet 1998 CATTAN Service group. Inc), and Likert scale examples for survey, (Iowa State University2010) and from Bartholdi & Hackman (2011) warehouse and distribution science.

As tried to mention on the preceding part, questionnaire had been employed as the instrument of data collection. multi-item scales that were used to capture factors/dimensions of the theoretical constructs, namely on current warehouse operation management practices, degree of perceived warehousing factors affecting warehouse operation productivity, barriers to implement warehouse operation performance metrics and importance of warehouse operation performance metrics to the agency pharmaceutical warehouse. It is developed on the basis of an extensive review of literature. The items were measured on five-point Likert scale that range from strongly disagree to strongly agree and Likert scale that ranges from very extremely to not at all, and from Highly important to Not important at all, also some additional questions related to the study objective, respondents will be questioned, or requested to allocate/select scores for each of the items on the instrument by taking their knowledge and actual situation in mind.

Basically, the instrument is developed based on the objectives of the study and research questions.

3.8 Ethical Consideration

The selected organization was communicated with formal letters from Addis Ababa University College of Business and Economics School of Commerce. The study was conducted in the organization after getting permission from authorized body, and participants of the study were asked for consent before participating in the study. During the consent process information had been provided regarding the purpose of the study, why and how they were selected to be involved in the study, and what had been expected of them and that they can withdraw from the study at any time. Participants also assured about confidentiality of the information obtained in the course of the study by not using personal identifiers and data analyzed anonymously and in aggregates.

3.9 Data Analysis

The quantitative data is entered and analyzed using the Statistical Package for the Social Sciences version 24 (SPSS V24) and excel 2016. Descriptive statistics computed (mean, median and percentage) and results presented using tables, graphs, and in narration form.

3.10 Validity and Reliability

Sound measurement must meet the tests of validity, and reliability. In fact, these are the major considerations one should use in evaluating a measurement tool. “Validity refers to the extent to which a test measures what we actually wish to measure. Reliability has to do with the accuracy and precision of a measurement procedure, (Kothari.C 1990), and as Barry.Z,and Griffin.C (2009) good measures should be both consistent and accurate. Reliability represents how consistent a measure is, in that the different attempts at measuring the same thing converge on the same point. Validity is the accuracy of a measure or the extent to which a score truthfully represents a concept.

3.10.1 Validity

Researchers have attempted to assess validity in many ways. They attempt to provide some evidence of a measure’s degree of validity by answering a variety of questions. Is there a consensus among other researchers that the attitude scale measures what it is supposed to measure? Does the measure cover everything that it should? Does the instrument measure correlate with other measures of the same concept? Does the behavior expected from the instrument measure predict actual observed behavior? (Wiliam G.Z Eighth Edition)

A determination of content validity involves judgment. First, the designer may determine it through a careful definition of the topic, the items to be scaled, and the scales to be used. This logical process is often intuitive and unique to each research designer, (Donald R.C 1990). As discussed above, the researcher has will employ most of these methods and it was found to be valid.

3.10.2 Reliability

Reliability is concerned with estimates of the degree to which a measurement is free of random or unstable error. Reliable instruments can be used with confidence that transient and situational factors are not interfering. Reliable instruments are robust; they work well at different times under different conditions. This distinction of time and condition is the basis for frequently used perspectives on reliability-stability, equivalence, and internal consistency, (Donald R.C 1990).

The test of reliability is another important test of sound measurement. A measuring instrument is reliable if it provides consistent results. Reliable measuring instrument does contribute to validity, but a reliable instrument need not be a valid instrument, (Kothari C.R 1990).

As William G.Z. (Eighth edition) the Cronbach alpha (α) test method used to determine internal consistency of the data collection tool. According to Gliem, and Gliem (2003) the Cronbach's alpha reliability coefficient normally ranges between 0 and 1. However, there is no lower limit to the coefficient. The closer of Cronbach's alpha reliability coefficient to 1 the greater the internal consistency of the items in the scale and the following rules of thumb that is if Cronbach's alpha reliability coefficient is >0.9 Excellent,>0.8 Good,>0.7 Acceptable,>0.6 Questionable,>0.6 Questionable,>0.5 poor, and < 0.5 Unacceptable. It should also be noted that an alpha Cronbach's reliability coefficient 0.8 is probably a reasonable goal. It should also be noted that while a high value for Cronbach's alpha indicates good internal consistency of the items in the scale.

The data collection instrument tool internal consistency determined by piloting the data collection instrument tool to 12 willing pilot study participants at Ethiopian Pharmaceutical Supply Agency Adama Hub, and by evaluating the average correlation among items in the scale of respective dimension the resulting Cronbach alpha (α) of dimension reliability found to be as shown on the below table.

Table 3.4.10.2.1 Cronbach alpha(α) values generated from SPSS Version 24

S/No	Item Scale	No of item	Cronbach alpha (α)
1	Current pharmaceutical warehouse operation management practices at CEPSA at Pharmaceutical warehouses	09	0.778
2	Selected warehousing operation management factor affecting warehouse operation management productivity at CEPSA Pharmaceutical warehouses	12	0.824
3	Selected warehouse operation management performance metrics perceived importance to CEPSA Pharmaceutical warehouses	12	0.908

As depicted on above table the result obtained from the pilot test it implies that all Cronbach alpha(α) values for the respective dimensions are well above the suggested cut-off value 0.7 (Cronbach, 1951), implying the reliability of the instrument that measures the study constructs. The items under the respective scales properly measure the dimension of concern. The lowest alpha value is 0.778 which is participant opinion on current warehouse operation management practices at CEPSA, pharmaceutical warehouses followed by Cronbach alpha(α) values 0.824 which is pertaining to participants perceived factor affecting pharmaceutical warehouse operation management productivity at CEPSA pharmaceutical warehouses and the highest is 0.908 which is related to perceived importance of selected pharmaceutical warehouses operation management performance metrics to CEPSA pharmaceutical warehouses.

CHAPTER FOUR

DATA ANALYSIS, RESULT AND DISCUSSION

4.1 Introduction

Once there is a warehouse operation management performance metric to look at people have less subjective opinion about the reality, and if an organization starts to measure the efficiency of a process that will probably increase performance by 20% to 30% without actual measurable changes to the process, and if in company's opinions, a corporation wants a higher level of performance 50% to 80% attention must be paid to the metric and some business processes reengineering(BPR) action like best practices must be implemented. Its however hard to go beyond 85% without starting reinvent, and more closely control the processes, and its metrics, (Axelsson & Jonathan, 2014)

The survey consists of six questions, and the content in the survey was based on relevant literatures and what has been collected during the empirical study. The survey consisted of, Question on Demographic information of the study participants; Likert Scale Questions on perceived pharmaceutical warehousing operation management practices on selected warehouse operation management attributes; Likert Scale question on selected perceived warehousing factor affecting warehouse operation management productivity in CEPSA pharmaceutical store ,two multiple question to asses perceived barriers to implement standard warehouse operation management performance metrics at CEPSA pharmaceutical warehouses, and perceived importance of warehouse operation management performance measurement to CEPSA pharmaceutical warehouses.

The data analysis, presentation and discussion mainly focused on, response rate, finding the answers to the research questions and following statistical procedures, emphasis has been put on two things, first demographic information of respondents followed by presentation of quantitative descriptive statistics to answer the remaining five research questions and finally a summary of the analysis presented.

4.2 Response Rate

The survey was distributed to 69 selected employ of CEPSA which directly or indirectly related to pharmaceutical warehousing operation management, there were 100% response rate as seen from table 4.2 below.

The table also illustrates that there were 69 respondents, all of them fully answered the question fully.

Table 4.2.1 Overview of the survey participant's response rate; Source SPSS Version 24

	Recipients	Actual Recipients	Respondents	Percentage
Total	69	69	69	100%

4.3 Respondents Demographic Information

As shown on chart 4.3.1 on the below graph regarding educational qualification and education level of the study participant (n=69), significantly higher percentage of the respondents (54%) of participants were pharmacy first degree holders, next (22%) pharmacy diploma holders followed by 12%, 6%,3%,3% pharmacy second degree holders, other profession, Medical laboratory technologist first and second degree holders and the least 1% second degree arts in logistics and supply chain management.

Distribution of study participant(n=69) by years of experience as shown on chart 4.3.2 most study participants have five to ten years work experience in the study area (48%),22% have ten to fifteen years' followed by one to five years (19%,), 12% less than one-year experience (12%), and none have experience greater than fifteen years in the participant study, and Distribution of study participant by their current practicing position as depicted on chart 4.3.3 significantly higher percentage of participant pharmaceutical warehouse managers(26%) ,Pharmaceutical inventory management officer(20%),Pharmaceutical fleet and distribution management officer(20%),participant from other department(13%),pharmaceutical forecasting capacity building operational research officer(10%),pharmaceutical fleet and distribution coordinator(8%)

followed by 1% pharmaceutical warehouse management team leader and 1% pharmaceutical inventory management team leader.

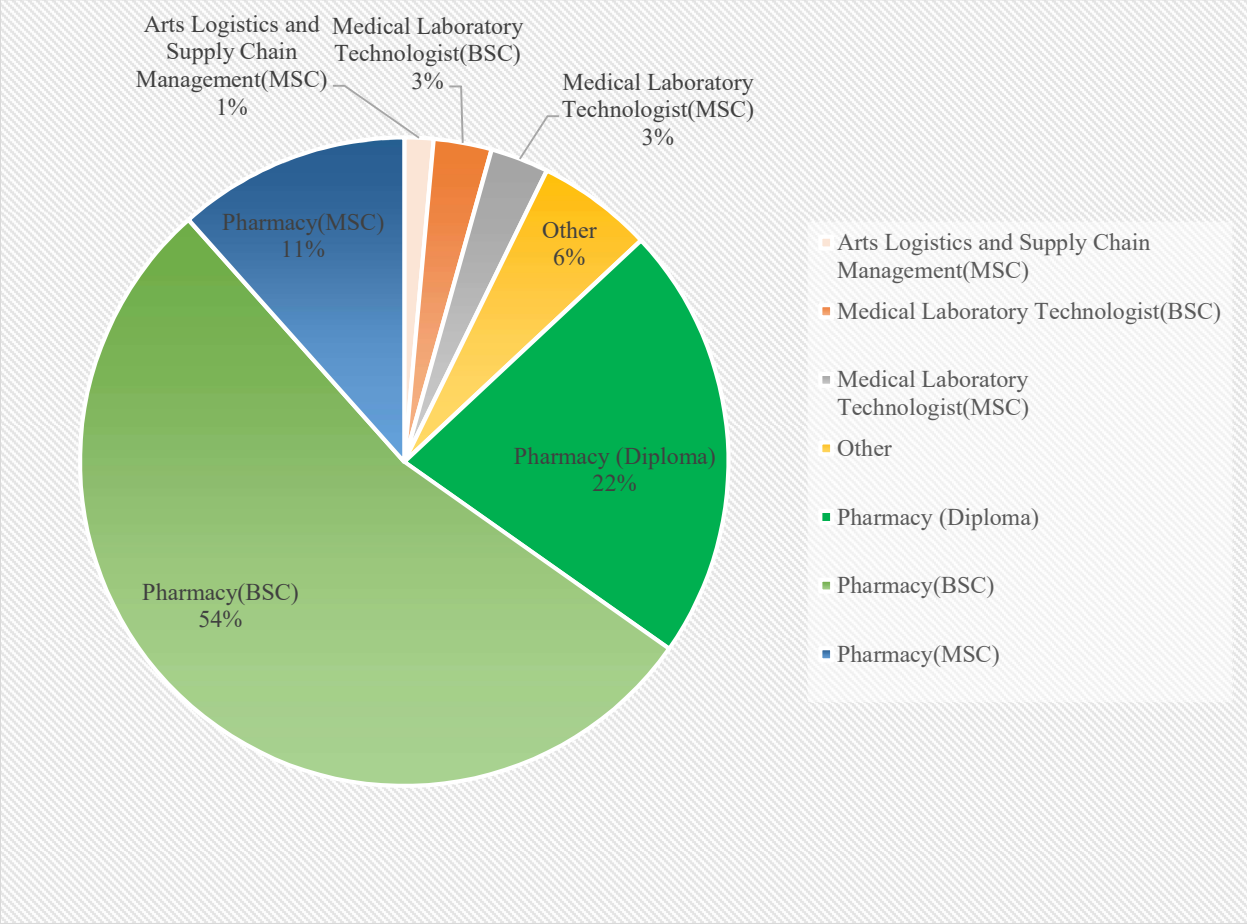

Chart 4.3.1 Study Participant by Profession and Educational Level(n=69) Source SPSS Version 24 and Excel 2016

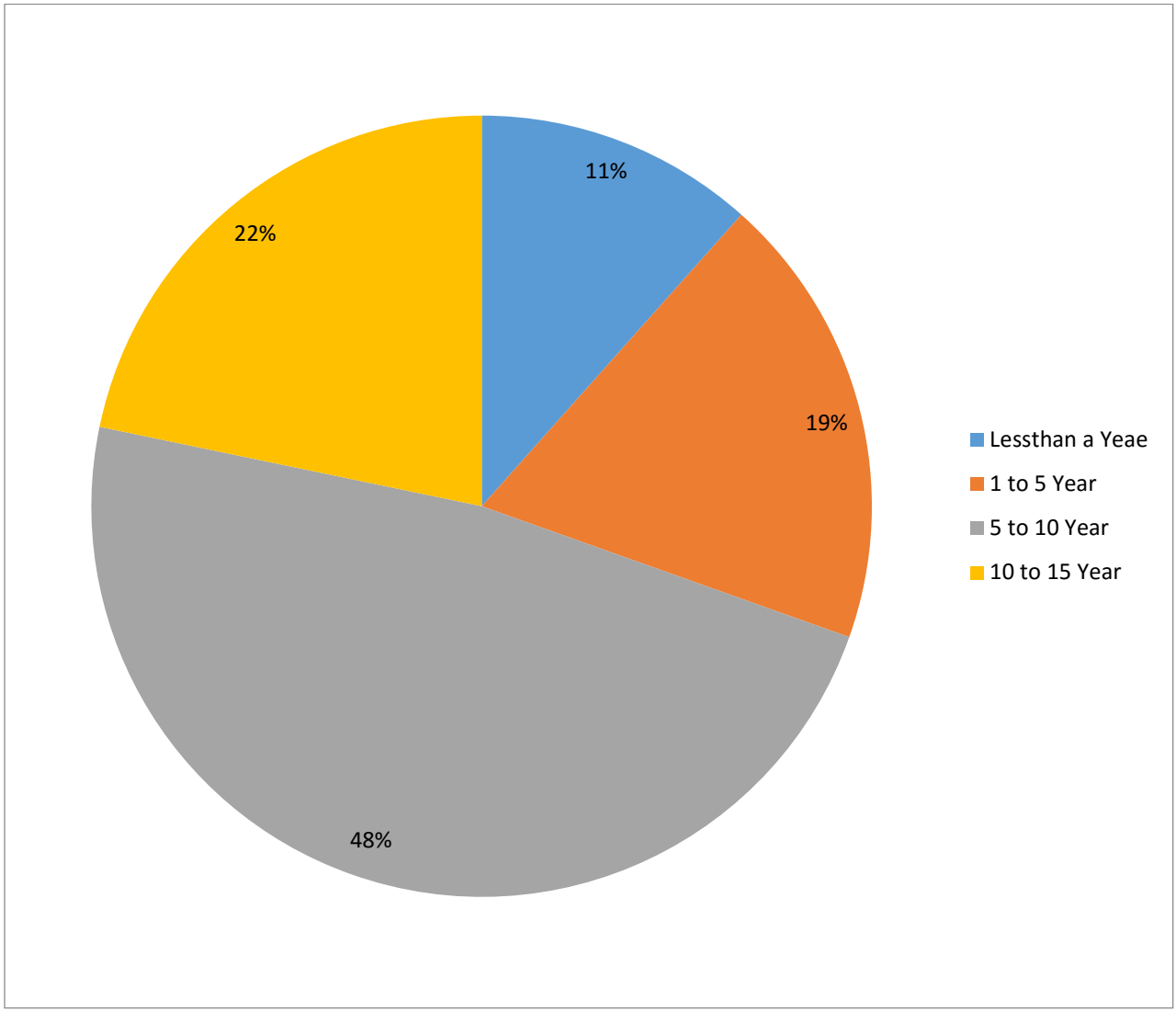

Chart 4.3.2 Study Participants by Experience in Years(n=69) Source SPSS Version 24 and Excel 2016

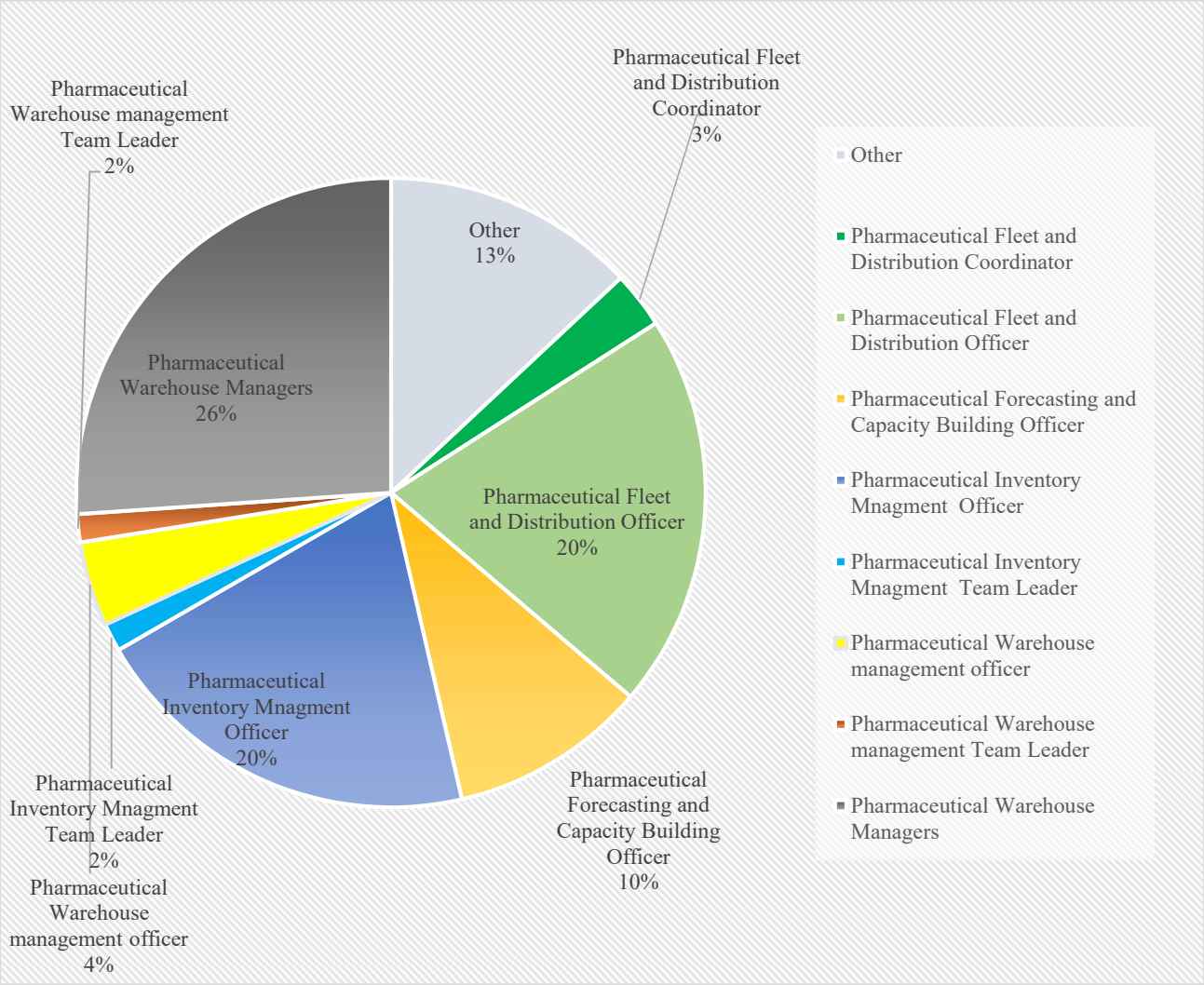

Chart 4.3.3 Study Participant Distribution by current practicing position at CEPSA(n=69)

Source SPSS Version 24 and Excel 2016

4.4 Descriptive Analysis

Descriptive statistics had been conducted in an effort to examine the mean, median, mode scores, the corresponding standard deviations and standard error under the respective scales of each of the measurement items of selected dimension of pharmaceutical warehouse operation management and the distribution of nominal factors related to pharmaceutical warehouse operation management. As the analysis has the importance of answering some of the research questions on the basis of the perceptions of the respondents on perceived level of selected attributes on current pharmaceutical warehouse operation management practice 'and perceived level of selected attributes affecting pharmaceutical warehouse operation management productivity, to identify perceived barriers to implement pharmaceutical warehouse operation performance metrics, to identify perceived importance of warehouse operation management performance metrics to CEPSA pharmaceutical warehouse and to determine level of importance of some selected pharmaceutical warehouse operation management performance metrics.

4.4.1 The First Research Question

The first research questions ask study participant to rate selected items of pharmaceutical warehouse operation management current practice at CEPSA pharmaceutical warehouses on their perception. Table 4.4.1.1 shows that according to the respondent warehousing function attributes listed at item number two on the table rated as agree by (65%) which is mostly practiced warehousing function,(61%) of participant agree on warehousing function attributes listed on item number one , followed by (53% to 58%) study participants agree on warehousing function attributes listed on the table from item number three to item number eight practiced at CEPSA Pharmaceutical warehouses and the least practiced warehousing function attributes listed on item number nine (28%) and item number eight (39%).

The mean, median, values of each of the measurement items of selected warehouse operation management functions calculated between 2.0 and 3.0, and the mode appeared between 2 and 4 with standard deviations 1.0. The lowest mean, and median, value appeared in the case of selected current pharmaceutical warehousing operation management function listed on table 4.1.1.2 from item number one to three followed by the mean and median score of pharmaceutical warehouse

operation management function listed on item number four to nine listed on table 4.1.1.2 having mean and median values of 3.0.

The mean and median scores of the current pharmaceutical warehouse operation management practices measurement items indicates study participant in the agency believe that lower efforts have been made by the agency in the case of current pharmaceutical warehouse operation management practices in the area of warehousing function items listed on table 4.1.1.2 from item number four to nine, and in the case of items listed on current warehousing operation management practices from item number one to three is moderate showing that relatively moderate effort have been exerted to improve these warehousing function. This implies the fact that the attempts made by the agency are not substantial in improving the selected pharmaceutical warehouse operation management function.

Concerning standard deviation of values of each of the measurement items of current pharmaceutical warehouse operation management practices at CEPSA, indicates that the perception of the respondents on the issue are in the likely opinions on all of the study participants case. It is also acceptable as the study utilized all population and also it is believed that the standard error of mean is relatively very low (between 0.106 and 0.135). In fact, the standard error is an indication of the reliability of the mean. A small SE is an indication that the sample mean is a more accurate reflection of the actual population mean. A larger sample size will normally result in a smaller SE of M (while SD is not directly affected by sample size) as this study used.

Table 4.4.1.1 Participant perception of current pharmaceutical warehouse operation management practices at CEPSA pharmaceutical warehouses generated from SPSS Version 24 and manipulated on excel 2016

Survey Scale: 1=Strongly Agree 2=Agree 3=Neutral 4=Disagree 5=Strongly Disagree						
Item List	# 1's	#2's	#3's	#4's	#5's	Total%
1. A Clear diagrammatic warehouse layout design in use for space allocation and easy movement of materials in CEPSA Pharmaceutical warehouse.	22%	39%	14%	23%	1%	100%
2. Standardized and documented receiving procedures currently used in CEPSA Pharmaceutical warehouses.	16%	49%	19%	14%	1%	100%
3. Standardized and documented order picking, and replenishment procedures currently used in CEPSA Pharmaceutical warehouses.	12%	45%	26%	17%		100%
4. Accurate Pharmaceutical inventory management control system in use in CEPSA.	7%	51%	23%	19%		100%
5. Standardized and documented storage, and put away procedures currently used in CEPSA Pharmaceutical warehouses.	12%	41%	25%	20%	3%	100%
6. A well-marked storage and pick location in practice.	12%	42%	26%	20%		100%
7. Standardized and documented procedures which ensures accurate shipping in CEPSA Pharmaceutical warehouses.	12%	42%	28%	19%		100%
8. Adequate material handling equipment in quality and quantity in use and all staffs are aware of proper use in CEPSA Pharmaceutical warehouses.	10%	29%	25%	26%	10%	100%
9. Properly planed and scheduled supportive supervision in CEPSA Pharmaceutical warehouses.	6%	22%	29%	36%	7%	100%

Table 4.4.1.2 Statistical result on participant perception of current pharmaceutical warehouse operation management practices at CEPSA pharmaceutical warehouses generated from SPSS Version 24

S/ No	Item	Mean	Median	Mode	Std. De	Var	Skw	Std. E of Skw
1	A Clear diagrammatic warehouse layout design in use for space allocation and easy movement of materials in CEPSA Pharmaceutical warehouse.	2	2	2	1	1	0	0
2	Standardized and documented receiving procedures currently used in CEPSA Pharmaceutical warehouses.	2	2	2	1	1	1	0
3	Standardized and documented order picking, and replenishment procedures currently used in CEPSA Pharmaceutical warehouses.	2	2	2	1	1	0	0
4	Accurate Pharmaceutical inventory management control system in use in CEPSA.	3	2	2	1	1	0	0
5	Standardized and documented storage, and put away procedures currently used in CEPSA Pharmaceutical warehouses.	3	2	2	1	1	0	0
6	A well-marked storage and pick location in practice.	3	2	2	1	1	0	0
7	Standardized and documented procedures which ensures accurate shipping in CEPSA Pharmaceutical warehouses.	3	2	2	1	1	0	0
8	Adequate material handling equipment in quality and quantity in use and all staffs are aware of proper use in CEPSA Pharmaceutical warehouses.	3	3	2	1	1	0	0
9	Properly planed and scheduled supportive supervision in CEPSA Pharmaceutical warehouses.	3	3	4	1	1	0	0

4.4.2 The Second Research Question

The second research question was to grasp study participant perceived pharmaceutical warehouse operation management factor affecting warehouse operation management productivity at CEPSA pharmaceutical warehouses on their perception. Table 4.4.2.1 shows that according to the respondent warehousing function listed at item number three on the table rated as extremely affecting factor by (50%) which is mostly perceived affecting pharmaceutical warehouse management productivity at CEPSA pharmaceutical warehouse,(40% to 49%) of participant agree on warehousing function listed on item number(one, two, ,five, six, eight, eleven, twelve) perceived warehousing function extremely affecting pharmaceutical warehouse operation management productivity at CEPSA pharmaceutical warehouses followed by the lowest (34% to 35%) study participants agree on warehousing function listed on table 4.4.2.1 item number nine and item number ten extremely affecting warehouse operation management productivity at CEPSA Pharmaceutical warehouses.

The mean, median, and mode values of each of the measurement items affecting pharmaceutical warehouse operation management productivity calculated between 2.0 and 3.0. The lowest mean, and median, value appeared in the case of selected current pharmaceutical warehousing operation management function affecting productivity listed on table 4.4.2.1 on item number three followed by the mean and median score of pharmaceutical warehouse operation management function affecting factor listed on the remaining item number having mean and median values of 3.0.

The mean and median scores of pharmaceutical warehousing factor affecting pharmaceutical warehouse operation management productivity measurement items indicates; study participant in the agency believe item listed on number three on table 4.4.2.2 extremely affects pharmaceutical warehouse operation management productivity at CEPSA, and the agency have to work on this pharmaceutical warehouse operation management productivity affecting factor to improve pharmaceutical warehouse operation management productivity, and the remaining pharmaceutical warehouse operation management productivity affecting factor listed on table 4.4.2.2 indicates that a relatively moderate effort have been expected by the agency to improve these area of warehouse operation management productivity affecting factor at CEPSA pharmaceutical warehouses . This implies the fact that more effort is expected by the agency to

minimize the effect of these warehouse operation management productivity affecting warehousing factor to improve pharmaceutical warehouse operation management productivity and this area of warehousing function requires substantial action to improve pharmaceutical warehouses operation productivity.

Concerning standard deviation of values of each of the measurement items of pharmaceutical warehouse operation management productivity affecting factor at CEPSA pharmaceutical warehouses, indicates that the perception of the respondents on the issue are in the likely opinions on all of the study participants case. It, is also acceptable as the study utilized all population and also it is believed that the standard error of mean is relatively very low (between 0.110 and 0.132). In fact, the standard error is an indication of the reliability of the mean. A small SE is an indication that the sample mean is a more accurate reflection of the actual population mean. A larger sample size will normally result in a smaller SE of Mean (while SD is not directly affected by sample size) as this study used.

Table 4.4.2.1 participant perceived degree of warehousing factor affecting pharmaceutical warehouse operation management productivity at CEPSA pharmaceutical warehouses

Survey Scale: 1=Very Extremely 2=Extremely 3=Moderately 4=Slightly 5=Not at All						
Item	# 1's	#2's	#3's	#4's	#5's	Total%
1. Infrastructure.	12%	36%	36%	14%	1%	100%
2. Warehouse lay out design.	10%	39%	32%	14%	4%	100%
3. Location and arrangement of stock.	14%	36%	35%	14%		100%
4. Working environment(Ergonomics).	12%	33%	28%	22%	6%	100%
5. Warehouse material handling equipment.	16%	25%	35%	23%	1%	100%
6. Inventory management system in place.	12%	33%	38%	14%	3%	100%
7. Stock keeping unit(SKU).	14%	22%	42%	17%	4%	100%
8. Warehouse management system(WMS).	17%	29%	38%	13%	3%	100%
9. Lack of warehouse operation management guideline.	6%	29%	33%	26%	6%	100%
10. Lack of documented and functional warehouse performance metrics(KPIs').	4%	30%	32%	23%	10%	100%
11. Human Resource.	14%	20%	33%	26%	6%	100%
12. Properly planed and scheduled supportive supervision in CEPSA Pharmaceutical warehouses.	10%	17%	36%	29%	7%	100%

Table 4.4.5.1 participant perception on perceived degree of importance of warehouse operation management performance measurement/metrics to CEPSA pharmaceutical warehouse operation management to measure performance at CEPSA pharmaceutical warehouses generated from SPSS Version 24 and manipulated on excel 2016

S/ No	Item	Mean	Median	Mode	Std. De	Var	Skw	Std. Er of Skw
1	Infrastructure.	3	3	2	1	1	0	0
2	Warehouse lay out design.	3	3	2	1	1	0	0
3	Location and arrangement of stock.	2	2	2	1	1	0	0
4	Working environment (Ergonomics).	3	3	2	1	1	0	0
5	Warehouse material handling equipment.	3	3	3	1	1	0	0
6	Inventory management system in place.	3	3	3	1	1	0	0
7	Stock keeping unit(SKU).	3	3	3	1	1	0	0
8	Warehouse management system (WMS).	3	3	3	1	1	0	0
9	Lack of warehouse operation management guideline.	3	3	3	1	1	0	0
10	Lack of documented and functional warehouse performance metrics (KPIs').	3	3	3	1	1	0	0
11	Human Resource.	3	3	3	1	1	0	0
12	Properly planed and scheduled supportive supervision in CEPSA Pharmaceutical warehouses.	3	3	3	1	1	0	0

4.4.3 The Third Research Question

This research question wonted to grasp study participant believes on barriers to implement standard pharmaceutical warehouse operation management performance metrics at CEPSA pharmaceutical warehouses.

The result presented on chart 4.4.3.1 shows that 43.5% of study participant believes lack of standard operating procedures to follow and measure pharmaceutical warehouse operation management performance metrics as a major barrier followed by 33.3% believes absence of developed pharmaceutical warehouse operation management performance metrics at all as a major barrier,15.9% believes human resource limitation as a major barrier and there was one respondent who believes other barrier 1.4% (Lack of training and awareness in the area).

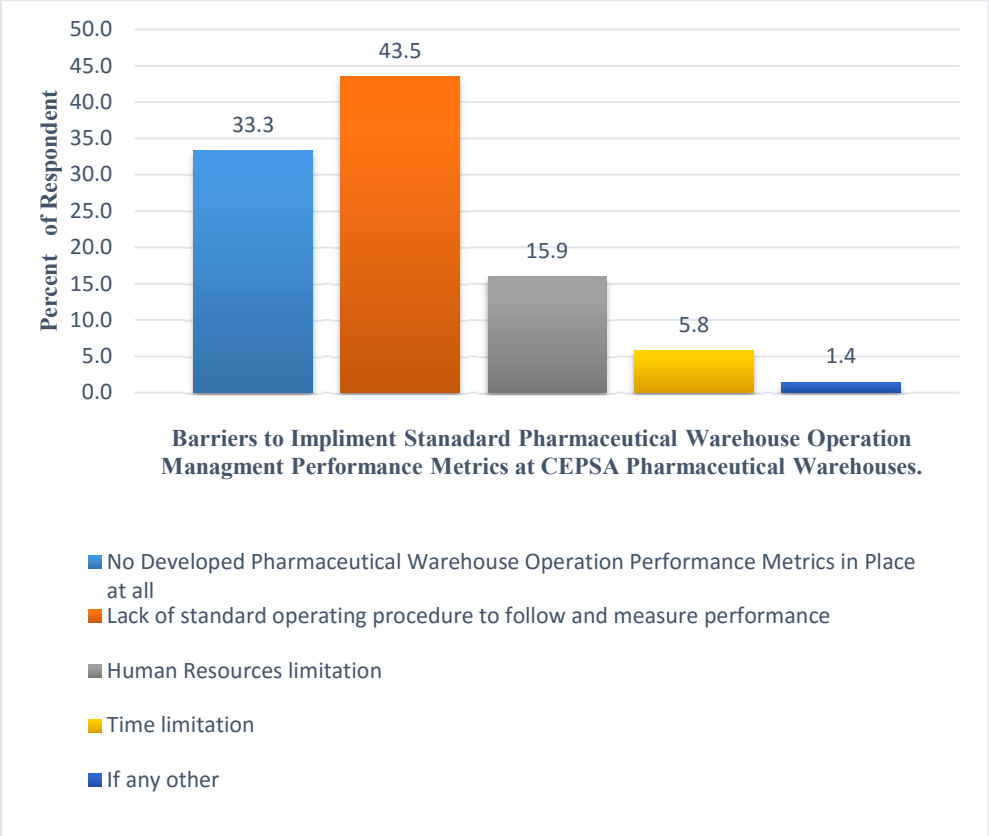

Chart 4.4.3.1 Participant believes on barriers to implement standard warehouse operation management performance metrics at CEPSA pharmaceutical warehouses generated from SPSS Version 24 and manipulated on excel 2016.

4.4.4 The Fourth Research Question

This research question was to grasp study participants believes on how important is warehouse operation performance measurement/metrics to CEPSA pharmaceutical warehouses.

The result presented on chart 4.4.4.1 shows that 89.9%% of study participant believes warehouse operation management performance measurement/metrics is very important to CEPSA pharmaceutical warehouses,8.7% study participant believes warehouse operation management performance measurement/metrics is little importance to CEPSA pharmaceutical warehouses followed by 1.4% neutral and 0% not relevant at all.

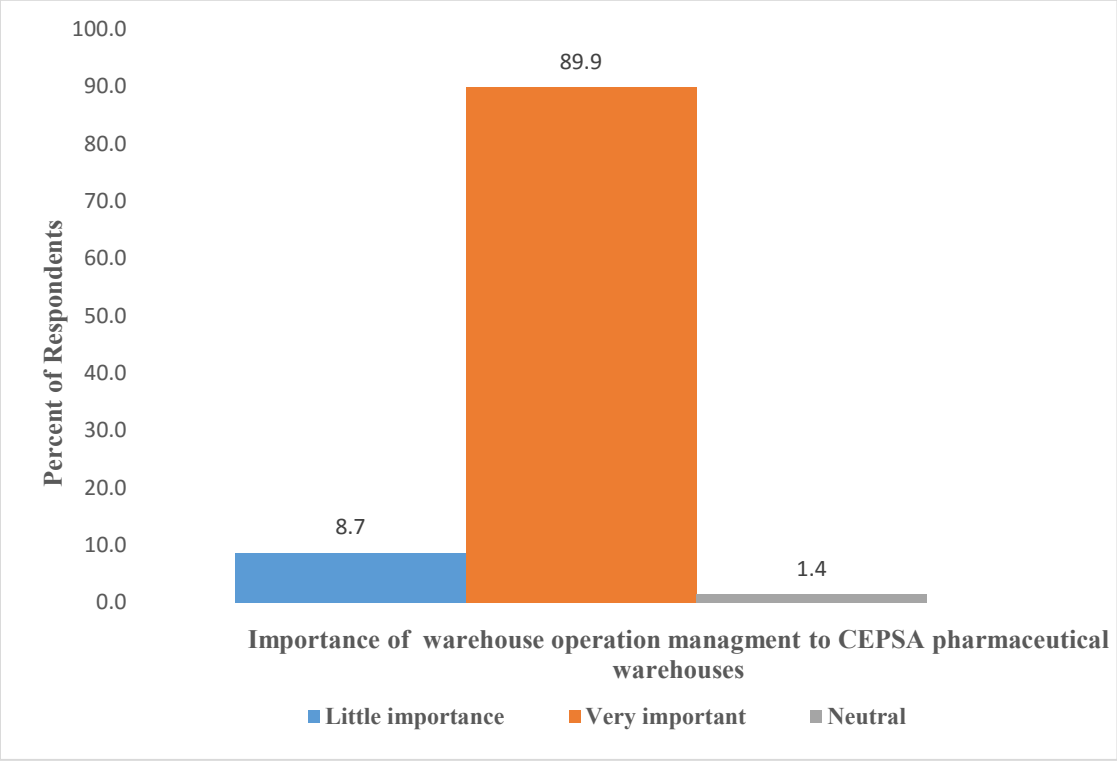

Chart 4.4.4.1 Participant believes on the importance of warehouse operation management performance metrics/measurement to CEPSA pharmaceutical warehouses generated from SPSS Version 24 and manipulated on excel 2016

4.4.5 The Fifth Research Question

The fifth research question was to grasp study participant perception on selected warehouse operation management metrics/measurements to CEPSA pharmaceutical warehouses operation management on their perception. table 4.4.5.1 shows that according to the respondent warehouse operation performance metrics/measurements listed in the table the most important warehouse operation management performance metrics according to the study participant perception are storage metric by (93%) of participant, Receiving metric by(92%) of participant ,Picking metrics by (90%) of study participant, Properly planed and scheduled supportive supervision by (90)% of participant, Put away metric by(89%) of participant, Order replenishment metric by (86%) of participant, Loading metric by(85%) of study participant, perceived to be relatively scored higher, followed by relatively the lowest rated metric Delivery metrics(81%) ,Safety and Illness metric(70%),Return metric(68%),Labor metric(66%) and the most least rated Return metrics as important metric by (45%) of study participant .

The mean and median values of each of the measurement items of perceived importance of warehouse operation management performance metrics found to be 2.0 and 3.0, and the mode values of each of the measurement items of perceived importance of warehouse operation management performance metrics found to be 1.0 and 2.0 The highest mean, and median, value appeared in the case of selected warehouse operation management performance metrics listed on table 4.4.5.2 on item number nine followed by the lowest mean score of perceived importance of pharmaceutical warehouse operation management performance metric for CEPSA found to be 2.0.

The mean scores of perceived importance of pharmaceutical warehouse operation management performance metric for CEPSA found to be 2.0. measurement items indicate; study participant in the agency believe except item listed on number nine on table 4.4.5.2 relatively important pharmaceutical warehouse operation management performance metrics to CEPSA, and the agency have to work on these pharmaceutical warehouse operation management performance metrics to improve and closely monitor the performance of pharmaceutical warehouse operation management productivity at CEPSA pharmaceutical warehouses.

Concerning standard deviation of values of each of the measurement items of on the perceived importance of pharmaceutical warehouse operation management performance metrics at CEPSA

pharmaceutical warehouses indicates that the perception of the respondents on the issue are in the likely opinions the study participants on all of the case. It, is also acceptable as the study utilized all population and also it is believed that the standard error of mean is relatively very low (between 0.089 and 0.132). In fact, the standard error is an indication of the reliability of the mean. A small SE is an indication that the sample mean is a more accurate reflection of the actual population mean. A larger sample size will normally result in a smaller SE of Mean (while SD is not directly affected by sample size) as this study used.

Table 4.4.5.1 Participant Perception of current pharmaceutical warehouse operation management practice at CEPSA Pharmaceutical warehouses generated from SPSS Version 24.and manipulated on excel 2016

Survey Scale: 1=Highly Relevant 2=Relevant 3=Low Relevant 4=Neutral 5=Not Relevant at all						
Item	# 1's	#2's	#3's	#4's	#5's	Total %
1. Receiving Metrics	49%	43%	1%	6%		100%
2. Put away Metrics	32%	57%	3%	9%		100%
3. Storage Metrics	55%	38%	1%	16%		100%
4. Picking Metrics	52%	38%	3%	7%		100%
5. Order Replenishment Metrics	41%	45%	3%	12%		100%
6. Loading Metrics	46%	39%	6%	9%		100%
7. Delivery Metrics	48%	33%	7%	12%		100%
8. Return metrics	29%	39%	6%	23%	3%	100%
9. Failure Metrics	12%	33%	16%	32%	7%	100%
10. Safety and Illness metrics	38%	32%	7%	22%	1%	100%
11. Labor metrics	33%	46%	7%	14%	7%	100%
12. Supportive Supervision Metrics	58%	25%	7%	79%	1%	100%

Table 4.4.5.2 statistical result on participant perception on perceived degree of importance of warehouse operation management performance metrics to measure to measure performance at CEPSA pharmaceutical warehouses generated from SPSS Version 24

S/N	Item	Mean	Median	Mode	Std. De	Vari	Skw	Std. E of Skw
1	Receiving Metrics	2	2	1	0.7	0.5	1.0	0.3
2	Put away Metrics	2	2	2	0.7	0.5	0.8	0.3
3	Storage Metrics	2	1	1	0.7	0.5	1.2	0.3
4	Picking Metrics	2	1	1	0.8	0.6	1.2	0.3
5	Order Replenishment Metrics	2	2	2	0.8	0.6	0.8	0.3
6	Loading Metrics	2	2	1	0.9	0.7	1.1	0.3
7	Delivery Metrics	2	2	1	0.9	0.8	1.0	0.3
8	Return metrics	2	2	2	1.0	1.0	0.8	0.3
9	Failure Metrics	3	3	2	1.1	1.2	0.3	0.3
10	Safety and Illness metrics	2	2	1	1.0	1.0	0.7	0.3
11	Labor metrics	2	2	2	0.8	0.7	0.7	0.3
12	Properly planed and scheduled supportive supervision in CEPSA Pharmaceutical warehouses.	2	1	1	1.0	1.0	1.5	0.3

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

In this research a pilot study conducted at Adama EPSA Hub, and a total of 12 willing study participants received the assessment question during the pilot study and all of them filled and returned the data collection instrument, Cronbach alpha(α) values for the respective dimensions were computed using SPSS Version 24 and Cronbach alpha(α) values for all of the respective dimensions, and it is found to be well above the suggested cut-off value 0.7 (Cronbach, 1951), implying the reliability of the instrument that measures the study constructs, that is. the items under the respective scales properly measure the dimension of concern. The lowest alpha value is 0.778 which is participant opinion on current warehouse operation management practices at CEPSA, pharmaceutical warehouses followed by Cronbach alpha(α) values 0.824 which is pertaining to participants perceived factor affecting pharmaceutical warehouse operation management productivity at CEPSA pharmaceutical warehouses and the highest is 0.908 which is related to perceived importance of selected pharmaceutical warehouses operation management performance metrics to CEPSA pharmaceutical warehouses following the reliability test result, the assessment had been conducted at CEPSA from 25-Feb-2019 to 27-Mar-2019 and a total of 69 study participant received the data collection tool all of them filled and returned the data collection tool which is 100% response rate.

Regarding educational qualification and education level of the study participant (n=69), significantly higher percentage of the respondents (54%) of participants were pharmacy first degree holders, next (22%) pharmacy diploma holders followed by 12%,6%,3%,3% pharmacy second degree holders, other profession, Medical laboratory technologist first and second degree holders and the least 1% second degree arts in logistics and supply chain management.

Distribution of study participant(n=69) by years of experience as shown on most study participants have five to ten years work experience in the study area (48%),22% have ten to fifteen years' followed by one to five years (19%,), 12% less than one-year experience (12%), and none have

experience greater than fifteen years in the participant study, and Distribution of study participant by their current practicing position as depicted on significantly higher percentage of participant pharmaceutical warehouse managers(26%) ,Pharmaceutical inventory management officer (20%), Pharmaceutical fleet and distribution management officer(20%), participant from other department(13%),pharmaceutical forecasting capacity building operational research officer (10%), pharmaceutical fleet and distribution coordinator(8%).

Regarding research question number one which asks the current pharmaceutical warehouse operation management practice at CEPSA pharmaceutical warehouses shows according to the respondent warehousing function listed at item number two on the table rated as agree by (65%) which is mostly practiced warehousing function,(61%) of participant agree on warehousing function attributes listed on item number one , followed by (53% to 58%) study participants agree on warehousing function attributes listed on the table from item number three to item number eight practiced at CEPSA Pharmaceutical warehouses and the least practiced warehousing function attributes listed on item number nine (28%) and item number eight (39%).

The mean, median, values of each of the measurement items of selected warehouse operation management functions calculated between 2.0 and 3.0, and the mode appeared between 2 and 4 with standard deviations 1.0. The lowest mean, and median, value appeared in the case of selected current pharmaceutical warehousing operation management function listed on table 4.1.1.2 from item number one to three followed by the mean and median score of pharmaceutical warehouse operation management function listed on item number four to nine listed on table 4.1.1.2 having mean and median values of 3.0

The mean and median scores of the current pharmaceutical warehouse operation management practices measurement items indicates study participant in the agency believe that lower efforts have been made by the agency in the case of current pharmaceutical warehouse operation management practices in the area of warehousing function items listed on table 4.1.1.2 from item number four to nine, and in the case of items listed on current warehousing operation management practices from item number one to three is moderate showing that relatively moderate effort have been exerted to improve these warehousing function. This implies the fact that the attempts made

by the agency are not substantial in improving the selected pharmaceutical warehouse operation management function.

Concerning standard deviation of values of each of the measurement items of current pharmaceutical warehouse operation management practices at CEPSA, indicates that the perception of the respondents on the issue are in the likely opinions on all the study participants case. It, is also acceptable as the study utilized all population and it is believed that the standard error of mean is relatively very low (between 0.106 and 0.135). In fact, the standard error is an indication of the reliability of the mean. A small SE is an indication that the sample mean is a more accurate reflection of the actual population mean. A larger sample size will normally result in a smaller SE of M (while SD is not directly affect affected by sample size) as this study used.

Regarding pharmaceutical warehouse operation management productivity affecting factor listed on **table 4.4.2.2** indicates that a relatively moderate effort has been expected by the agency to improve these area of warehouse operation management productivity affecting factor at CEPSA pharmaceutical warehouses. This implies the fact that more effort is expected by the agency to minimize the effect of these warehouse operation management productivity affecting warehousing factor to improve pharmaceutical warehouse operation management productivity and this area of warehousing function requires substantial action to improve pharmaceutical warehouses operation productivity.

Regarding the result presented on chart 4.4.3.1 shows that 43.5% of study participant believes lack of standard operating procedures to follow and measure pharmaceutical warehouse operation management performance metrics as a major barrier followed by 33.3% believes absence of developed pharmaceutical warehouse operation management performance metrics at all as a major barrier,15.9% believes human resource limitation as a major barrier and there was one respondent who believes other barrier 1.4% (Lack of training and awareness in the area) following this result the agency should do substantial work to improve this area.

The result presented on chart 4.4.4.1 regarding the importance of pharmaceutical warehouse operation management shows that 89.9%% of study participant believes warehouse operation management performance measurement/metrics is very important to CEPSA pharmaceutical warehouses,8.7% study participant believes warehouse operation management performance

measurement/metrics is little importance to CEPSA pharmaceutical warehouses followed by 1.4% neutral and 0% not relevant at all this shows most of the participant endorse the importance and they are motivated to work on pharmaceutical warehouse operation management performance metrics.

Regarding the importance of selected pharmaceutical warehouse operation management performance metrics most of the participants agree their importance listed on table 4.4.5.2 and the agency must develop and implement a simple and visible warehouse operation metrics to closely monitor and follow its success or failure in the area of warehouse operation management productivity.

5.2 Discussion

This study describe the overall current warehousing operation management practices , to assess to what extent perceived warehousing factors affect productivity of warehouse operation management, to identify barriers to implement standard warehouse operation performance metrics, if available, to assess the level of importance of selected warehouse performance metrics perceived to be important at PSA store to improve warehouse operation management and to creates better understanding of the warehouse operation management performance metrics complexity and need to be manage carefully to keep the logistics and supply chain activity flow smoothly.

A metric is a verifiable measure stated in either quantitative or qualitative terms defined with respect to a reference point. without metrics, no firm could expect to function effectively or efficiently on a daily basis. metrics give us: Control by superiors, reporting of data to superiors and external groups. Metrics communicate expectations, identify problems, direct a course of action, and motivate people. building the right metrics is vital to a company. Problems must be anticipated and corrective action taken before they become severe. Thus, companies cannot risk waiting to react until the order cycle is completed and feedback from customers is received (R. Tony, Stephen N, Lloyd M,2008)

Survey result done on consafe logistics customer shows the respondents seem to use metrics related to receiving, put away replenishment, storage picking, packing, shipping, loading, and delivery metrics. 33% found that picking, packing, shipping loading, delivery metrics were most

important, 8% found that receiving, put away, replenishment metrics were most important and 22% answered that storage metrics were most important; and additional categorizations that were found Failure, customer, complaints, safety & illness as well as overall metrics. fewest found that return metrics were important, and picking metrics were the most representable among metrics.

5.3 Conclusion

This research was conducted in an attempt to reveal the status of warehouse operation management current practices based on selected warehouse function at CEPSA pharmaceutical warehouse, perceived warehousing factor affecting warehouse operation management productivity in CEPSA pharmaceutical warehouse using selected warehousing factor, Selected barriers to implement standard warehouse operation management performance metrics at CEPSA pharmaceutical warehouse, Importance of warehouse operation management performance metrics to CEPSA pharmaceutical warehouse and degree of importance of selected pharmaceutical warehouse operation management performance metrics to CEPSA.

The following conclusions have been drawn on the bases of the findings of the data analysis effort.

A total of 69 respondents have filled and returned the survey questionnaire making the response rate about 100%.

Based on the standard deviation of values of each of the measurement items of current pharmaceutical warehouse operation management practices at CEPSA, indicates that the perception of the respondents on the issue are in the likely opinions on all of the study participants case. It, is also acceptable as the study utilized all population and also it is believed that the standard error of mean is relatively very low (between 0.106 and 0.135). In fact, the standard error is an indication of the reliability of the mean. A small SE is an indication that the sample mean is a more accurate reflection of the actual population mean. A larger sample size will normally result in a smaller SE of M (while SD is not directly affected by sample size) as this study used. Standard deviation of values of each of the measurement items of pharmaceutical warehouse operation management productivity affecting factor at CEPSA pharmaceutical warehouses, indicates that the perception of the respondents on the issue are in the likely opinions on all of the study participants case. It, is also acceptable as the study utilized all population and also it is believed that the standard

error of mean is relatively very low (between 0.110 and 0.132). In fact, the standard error is an indication of the reliability of the mean. A small SE is an indication that the sample mean is a more accurate reflection of the actual population mean. A larger sample size will normally result in a smaller SE of Mean (while SD is not directly affected by sample size) as this study used.

The result presented on barriers to implement standard pharmaceutical warehouse operation management metrics at CEPSA pharmaceutical warehouse shows that 43.5% of study participant believes lack of standard operating procedures to follow and measure pharmaceutical warehouse operation management performance metrics as a major barrier followed by 33.3% believes absence of developed pharmaceutical warehouse operation management performance metrics at all as a major barrier,15.9% believes human resource limitation as a major barrier and there was one respondent who believes other barrier 1.4% (Lack of training and awareness in the area) based on the findings the agency have to intervene the barriers to implement pharmaceutical warehouse operation management at the agency pharmaceutical warehouses.

The result presented found regarding the importance of pharmaceutical warehouse management shows that 89.9%% of study participant believes warehouse operation management performance measurement/metrics is very important to CEPSA pharmaceutical warehouses,8.7% study participant believes warehouse operation management performance measurement/metrics is little importance to CEPSA pharmaceutical warehouses followed by 1.4% neutral and 0% not relevant at all.

The mean scores of perceived importance of pharmaceutical warehouse operation management performance metric for CEPSA found to be 2.0. measurement items indicate; study participant in the agency believe except item listed on number nine on table 4.4.5.2 relatively important pharmaceutical warehouse operation management performance metrics to CEPSA, and the agency have to work on these pharmaceutical warehouse operation management performance metrics to improve and closely monitor the performance of pharmaceutical warehouse operation management productivity at CEPSA pharmaceutical warehouses.

Generally, the study findings have suggested that the levels of warehouse operation management are relatively moderate in the case of CEPSA as the perceived evaluation of the study participant.

5.4 Recommendation

According to Bhavin.S and Vivek.K(2017) All previous study reviews broadly focus on warehouse design and operational issues ignoring performance measures affecting each function of warehousing and overall productivity. Therefore, this paper tries to get an insight in to on selected current pharmaceutical warehouse operation management practice to identify the specific performance measures and methods, and explore their impact on the overall pharmaceutical warehouse operation management productivity at CEPSA pharmaceutical warehouses. Each individual section has been concluded with important findings identified gaps on current quality of pharmaceutical warehouse operation management which needs substantial effort to improve the quality of current warehousing operation management gaps and the agency should encourage future road map for research on pharmaceutical warehouse operation management and other unexplored directions in the overall pharmaceutical supply chain management functions.

REFERENCES

Beatriz del. T 2014 Material flow Design in a warehouse, Published by Division of Packaging Logistics, Department of Design Sciences, Faculty of Engineering, Lund University, Lund, Sweden.

Carla A. S. Geraldes, M. Sameiro F. B. S. Carvalho, Guilherme A. B. Pereira, A Warehouse Design Decision Model – Case Study Conference Paper, July,2008 Acessed at Research Gate

Donald J, David J, and, Cooper.M 2010, Supply Chain Logistics Management, First Edition. Published by Published by McGraw-Hill/Irwin.

Gwynne R,2014, Warehouse Management A complete guide to improving efficiency and minimizing costs in the modern warehouse.

Heung.H, and Gyu.C (2006), A performance evaluation model for order picking warehouse design, Computers & Industrial Engineering Vol. 51(2), pages: 335-342.

Johon. B and Steven. H 2011, Warehouse and Distribution Science, The Supply Chain, and Logistics institute, School of Industrial and System Engineering Georgia Institute of Technology Atlanta USA.

Johnson.A, and Ginnis, L. 2010 Performance measurement in the warehousing industry. IIE Transactions, Texas A&M University Libriaries.43: pp 220-230.

Moniruzzaman .M 2016, Supply Chain Management in Pharmaceutical Industries: A Study on Eskayef Bangladesh Ltd, BRAC University Institute of Governance and Development, Bangladesh.

Mahesh.K, Ranjit.V, and Sridahr.K,2008, Warehousing in theory and practice, University of Boras School of engineering.

Mengfei.Y,2008 Enhancing Warehouse Performance by Efficient Order Picking, Erasmus Research Institute of Management, Erasmus University Rotterdam.

Michał.K, Marianna., Konrad.L, Marius.W,2017 The Issues of Selection Warehouse Process Strategies, 10th International Scientific Conference Transbaltica, Faculty of Transport, Warsaw University of Technology, Poland Procedia Engineering 187,PP 451-45, Available online at www.sciencedirect.com

Melnyk, S. A. Stewart, D. M. Swink, M. (2004) Metrics and performance measurement in operations management: Dealing with the metrics maze. Journal of operations management, pp 211-215. Netherlands Maritime Institute of Technology,2015. Warehouse and Distribution, Netherlands.

Nynke.F 2013, Organizing warehouse management; International Journal of Operations & Production Management Vol. 33 No. 9, 2013 pp. 1230-1256 Emerald Group Publishing.

Promising Practices/Warehousing and inventory Management UN Commission on Life-Saving Commodities for Women's and Children's Health; Breif#3 in the Promising Practices supply chain Management Series Retrieved from http://siapsprogram.org/publication/promising-practices-in-supply-chain-management in Nov-2018

Per Axelsson & Jonathan Franke,2014 Performance measurement system for warehouse activities based on the SCOR® model, A research study in collaboration with Consafe Logistics AB, Sweden, Department of Industrial Management and Logistics, Lund University.

Ramaa. A, Subramanya. N, and, Rangaswamy. M 2012, Impact of Warehouse Management System in a Supply Chain. International Journal of Computer Applications (0975 – 8887) Volume 54– No.1, PP 14-20.

Reza.F, Shabnam.R, Laleh, K,2011, Logistics Operations and Management, first edition Published by Elsevier Inc.

Sakil. S,2013 A Study on Warehouse Management of REB: A Case Study of Central Warehouse, Dhaka. BRAC University Institute of Governance and Development, Bangladesh.

Sneha.V,2016, The study of Efficiency and Effectiveness of Warehouse Management in the context of Supply Chain Management, International Journal of Engineering Technology, Management and Applied Sciences, Volume 4, Issue 8, PP 160-169.

Supply Chain Council, 2012. Supply Chain Management Operations Reference (SCOR),11.0 Edition, Printed by Supply Chain Council, United States of America.

The Federal Democratic Republic of Ethiopian 2018, Ethiopian Pharmaceutical Supply Agency, Revised Pharmaceutical Supply Transformation plan 2018-2020.

USAID | DELIVER PROJECT, Task Order 4 2014, Guidelines for Warehousing Health Commodities. Arlington

Van den Berg.P, and Zijm.M 1999, Models for warehouse management: Classification and examples Faculty of Mechanical Engineering, Production and Operations International Journal of Production Economics Volume 59, PP 519-528.

Vassilios. V, and Patapios. A,2011, Warehouse layout problems: Types of Problems and solution algorithm. Journal of Computations and Modeling, Volume 1, No-1 PP 131-152.

William. J 2012, Operations Management, eleventh edition, Published by McGraw-Hill/Irwin.

World Health Organization 2014, Design and procurement of storage facilities, Geneva, Switzerland.

ANNEX

I'm a graduate student at Addis Ababa University School of Commerce in the Department of Logistics and Supply Chain Management. Currently, I'm conducting a research entitled 'Assessment of Pharmaceutical Warehouse Operation Management: in Case of Ethiopian Pharmaceutical Supply Agency' in partial fulfilment for the requirement for the award of Masters of Art in Logistics and Supply Chain Management.
As part of the research I am looking for your help in answering a short confidential paper-based survey, and you are selected as recipient I believe that your experience can help me to better understand the needs and objective of warehouse operation management and warehouse operation management performance metrics.

Purpose: this survey is designed to describe; the current pharmaceutical warehouse operation management practices, perceived warehousing factors affecting warehouse operation management activity, barriers to implement warehouse operation management performance metrics to measure performance and to get an insight in to the level of importance of warehouse operation performance metrics to measure warehouse operation management performance at Ethiopian Pharmaceutical Supply Agency(EPSA)
please be honest in filling this questionnaire as it will be used for research purposes, and the survey is confidential, and data will be analyzed in aggregate.

Please indicate your choice by putting the cheek mark(**X**) in selected cell, by writing statement and by encircling the multiple-choice question.

---

1. Demographic information

   a. Qualification

   ☐ Pharmacy (MSC) ☐ Pharmacy (Diploma
   ☐ Pharmacy (BSC) If other, specify _____
   ☐ Medical Laboratory Technologist (BSC)
   ☐ Medical Laboratory Technologist (MSC)
   ☐ Arts in Logistics and Supply Chain Management

   b. Currently Practicing Position _____

   c. Experience in years

   Less than a Year ☐ 1-5 Years ☐ 5-10 Years ☐

   10-15 Years ☐ 15-20 Years ☐ Greater than 20 Years ☐

2. Questions on current warehouse operation management practices in EPSA Pharmaceutical warehouse.

Level of agreement Score Strongly Agree=1, Agree=2, Neutral=3, Disagree =4, Strongly disagree=5						
S/No	Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	A clear diagrammatic warehouse layout design in use for space allocation and easy movement of materials in EPSA warehouses.					
2	Standardized and documented receiving procedures used currently in Central EPSA warehouses.					
3	Standardized and documented order picking and replenishment procedures used currently in Central EPSA warehouses.					
4	Accurate Inventory management control System in place					
5	Standardized and documented storage and put away procedures used currently in Central EPSA warehouses					
6	A well-marked storage and pick location in practice					
7	Standardized and documented procedures which ensures Accurate shipping in place.					
8	Adequate material handling equipment in quality and quantity in use and all staffs are aware of proper use					
9	Properly planned and scheduled supportive supervision in the warehouse					

3. Questions related to degree of perceived warehousing factor affect warehouse operation management productivity in EPSA Pharmaceutical warehouse.

Extent Score Very extremely=1, Extremely=2, Moderately=3,Slightly=4,Not at all=5						
S/No	Factors	Very extremely	Extremely	Moderately	Slightly	Not at all
1	Infrastructure					
2	Warehouse layout design (Architectural)					
3	Location and arrangement of stock					
4	Working environment (Ergonomics)					
5	Warehouse material handling equipment					
6	Inventory management system in place					
7	Stock keeping unit (SKU)					
8	Warehouse Management System (WMS)					
9	Lack of documented warehouse operation management guideline					
10	Lack of documented and functional warehouse operation management performance metrics (KPIs')					
11	Human resource					
12	Properly planned and scheduled supportive supervision in the warehouse					

_____

4. What are barriers to implement standard warehouse operation management performance metrics if any at EPSA Pharmaceutical warehouse?
    a. No developed warehouse operation performance metrics in place at all.
    b. Lack of standard operating procedure to follow and measure performance
    c. Human Resources limitation
    d. Time limitation
    e. If any other barriers _____

_____

5. How Important is warehouse operation management performance/Measurement to EPSA Pharmaceutical warehouse?

a. Not important at all

b. Little importance

c. Very important

d. Neutral

_____

6. Which warehouse operation management metrics are very relevant in your opinion to EPSA Pharmaceutical warehouse?

Degree of relevant 1=Highly relevant 2=Relevant 3=Neutral 4=Low Relevant 5=Not relevant at all						
S/No	Metric Category	Highly relevant	Relevant	Low Relevant	Neutral	Not relevant at all
1	Receiving metric					
2	Put away metric					
3	Storage metrics					
4	Picking metric					
5	Order replenishment metric					
6	Loading metric					
7	Delivery metric					
8	Return metric					
9	Failure metric					
10	Safety and Illness metric					
11	Labor metric					
12	Supportive supervision metric					

Thanks for your valuable time and effort.

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