ASSESSMENT OF WAREHOUSE OPERATIONS BASED ON ESSENTIAL PERFORMANCE OPTIMIZING COMPONENTS AMONG PRIVATE PHARMACEUTICALS IMPORTERS IN ADDIS ABABA

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PURPOSE OF THE RESEARCH

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MASTER OF ARTS IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Adviser: - MATEWOS ENSERMU (PhD)

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Declaration

I, Samuel Tadesse, declare that a thesis entitled "***Assessment of warehouse operations based on essential performance optimizing components among private pharmaceuticals importers in Addis Ababa"*** is my original research work and has never been submitted to any other university for any Degree. I also declare that all the resources used in this research have been acknowledged clearly.

Declared By:

Samuel Tadesse

Date: _____

Signature_____

Statement of Certification

This is to certify that, research undertaken by Samuel Tadesse under my advice entitled "***Assessment of warehouse operations based on essential performance optimizing components among private pharmaceuticals importers in Addis Ababa***" submitted to the Addis Ababa University, School of Commerce in partial fulfillment of the requirements for the Degree of Master of Arts, in Logistics and Supply Chain Management complies with the regulations of the Addis Ababa University and meets the accepted standards concerning originality and quality.

Name: Matewos Ensermu (PhD)

Signature: _____

Date: _____

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ACRONYMS

ADC- Automatic Data Collection Unit.

CCD- Charged Coupled Device.

EFDA- Ethiopian Food and Drug Authority.

FEFO- First Expiry First Out.

FIFO- First In First Out

GDP- Good Distribution Practice.

GMP- Good Manufacturing Practice.

GRP- Good Regulatory Practice.

GSP- Good Storage Practice

HVAC-Heat Ventilation Air Conditioner

JSI- John Snow Inc.

NRA- National Regulatory Authority

PPE- Personal Protection Equipment.

QMS- Quality Management System.

RFID- Radio Frequency Identical Device.

SDP- Service Delivery Points.

SKU- Store Keeping Unit.

SOP- Standard Operation Procedures.

TRS- Technical Reports Series.

TTSP- Time and Temperature Sensitive Products.

WHO- World Health Organization.

WMS- Warehouse Management System

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Abstract

This study evaluates warehouse performance optimization among private pharmaceutical importers in Addis Ababa. Utilizing a descriptive study design with a mixed research approach, data were collected from 52 private pharmaceutical importing companies through structured questionnaires and personal evaluations. The data were analyzed using descriptive statistics and Kendall's W Test, with results presented in tables.

The analysis revealed that essential components for optimal warehouse performance include infrastructure and planning. Key factors such as the condition of the ceiling, walls, floor, cleanliness, ventilation, lighting, protection from rodents and insects, and maintained temperatures were identified as crucial. Additionally, the layout and operational efficiency, including separate receiving and dispatch areas, secured receipt areas, designated spaces for expired and damaged products, and sufficient aisle space, were highlighted as vital.

Warehouse equipment, such as the presence of pallets, pallet jacks, and operable fork trucks, also contributed to optimized operations. Special storage requirements, including a cold chain system, properly operating refrigerators, solar-powered refrigerators, and designated areas for hazardous and flammable materials, were noted as important for performance optimization.

Inventory management emerged as a crucial component for performance optimization. Key practices include maintaining electronic and paper inventory records, ledgers, periodic physical inventory counts, FEFO (First Expired, First Out) distribution systems, and the proper disposal of expired and damaged products. Security and safety, along with effective human resource management—responsible management, staff training, job description postings, SOP postings, orientation for new hires, and sufficient capacity—were also identified as essential for optimizing warehouse performance.

Key terms: Pharmaceuticals, Warehouse, Performance, Optimization

CHAPTER ONE

1. INTRODUCTION

This research aims to evaluate the warehouse operation performance based on essential components that are required within pharmaceutical importing companies, with a specific focus on private entities operating in Addis Ababa city. The study assessed the performance of warehouse management by selecting a sample of pharmaceutical firms and analyzing the extent to which they adhere to regulations established by the National Regulatory Body, guidelines outlined by the World Health Organization. The findings of this study are expected to provide valuable insights for future research endeavors in this domain.

This chapter encompasses background of the study, research problem, research objective (general and specific) research question, scope of the study, Delimitation & Limitation of the study, significance of the study, definition of (Operational) terms and Organization of the study.

1.1 Background of the study

According to Smith (1998:3) 'The main function performed by a Warehouse is Receiving goods from the source, Storing the goods until they are required, Picking the goods when they are required and Shipping the goods to the appropriate users'. As to description of IIMM ,(2020) 'A warehouse is a place to store the stock or the inventory most of the tasks that occur in a warehouse are related to inventory management. These tasks include accumulating the receipt of products, issuing of products recording changes and tracking the movement of inventory, at times considered to be processing of the inventory from entry to exit'.

Storage and distribution are important activities in the supply chain management of medical products. Various people and entities may be responsible for the handling, storage and distribution of medical products. Medical products may be subjected to various risks at different stages in the supply chain, for example, purchasing, storage, repackaging, relabeling, transportation and distribution. (WHO, 2019a:195).

Public health considerations demand that medical products should not be treated in the same way as ordinary commodities. Their manufacture and subsequent handling within the distribution chain, both nationally and internationally, must conform to prescribed standards and be rigorously controlled. These precautions serve to assure that patients receive quality- assured medical products, and to prevent the infiltration of substandard and suspected falsified medical products into the supply system. (WHO, 2019b). The medical products sector is one of the most regulated of all industries, because of the impact of the diverse range of medical products on health, the difficulty in assessing their quality, safety and efficacy or performance and the complexity of their development, production, supply and surveillance(WHO,2021b).

The import of medical products should be undertaken by an importer or agency authorized by the NRA as per national and regional legislation. This normally does not include medical products in transit.(WHO, 2019b:223). In order to avail a pharmaceutical product with its integrity un-infringed and with efficacy aimed for the storage and transportation channels should be in compliance with regulations set for this special commodity. The World Health Organization has set special regulations and guidelines to be in practice for stake holders found at a different stages pharmaceutical supply chain route. This is shown on the guideline in (WHO, 2019a)." This guideline is intended to be applicable to all entities involved in any aspect of the storage and distribution of medical products, from the premises of the manufacturer of the medical product to his or her agent, or the person dispensing or providing medical products directly to a patient. This includes all entities involved in different stages of the supply chain of medical products, manufacturers and wholesalers as well as brokers, suppliers, distributors, logistics providers, traders, transport companies and forwarding agents and their employees"

Pharmaceutical warehouse operations within importing companies are pivotal in ensuring the efficient, safe, and compliant storage and distribution of pharmaceutical products. However, these operations are fraught with multifaceted challenges spanning *infrastructure, layout and operational capacity, warehouse equipment, inventory management, special storage areas, safety and security protocols, and human resource management.* Addressing these challenges is imperative to safeguarding product integrity, meeting regulatory requirements, and enhancing overall operational efficiency in pharmaceutical supply chains. This study focused on private

pharmaceutical importing companies' situated in Addis Ababa, and actively working during the research period

Private pharmaceutical importers, distributors, wholesalers, and retail premises will benefit from this study, as it aims to identify shortcomings in their routine warehousing management practices. By addressing these challenges, the study will help enhance operational efficiency, ensure product integrity, and meet regulatory requirements in pharmaceutical supply chain management.

1.2 Problem Statement

Pharmaceutical warehouse operations within importing companies are confronted with a multitude of challenges spanning infrastructure, layout, operational capacity, warehouse equipment, inventory management, special storage areas, safety and security, and human resource management. These challenges pose significant impediments to the efficient, safe, and compliant storage and distribution of pharmaceutical products, thereby jeopardizing product integrity, regulatory compliance, and overall operational efficiency these general problems are present in Pharmaceutical Importers in Addis Ababa.

Specifically, the following problems persist within pharmaceutical warehouse operations in importing companies:

1. **Inadequate Infrastructure and Operational Capacity:**

    - Many pharmaceutical warehouses operated by importing companies suffer from insufficient infrastructure and operational capacity, leading to congestion, inefficiencies, and compromised storage capabilities. Inadequate space utilization, outdated facility design, and limited operational resources hinder workflow optimization and impede the timely and efficient handling of pharmaceutical products.

2. **Suboptimal Warehouse Equipment**:

- Importing companies often grapple with suboptimal warehouse equipment, including outdated storage racks, inadequate material handling systems, and insufficient temperature-controlled units. Inadequate equipment compromises product integrity, increases the risk of handling errors, and impedes operational efficiency, resulting in delays, damages, and regulatory non-compliance.

3. **Ineffective Inventory Management**:

    - Poor inventory management practices, such as inaccurate forecasting, inadequate tracking systems, and inefficient stock rotation, affect pharmaceutical warehouse operations. Inventory discrepancies, stock outs, and wastage arise due to insufficient visibility, traceability, and control over inventory levels, compromising product availability, quality, and compliance.

4. **Challenges in Special Storage Areas:**

    - Pharmaceutical warehouses often lack dedicated special storage areas for temperature-sensitive products, hazardous materials, and controlled substances. Inadequate monitoring, maintenance, and segregation practices in special storage areas pose risks to product integrity, regulatory compliance, and patient safety, exacerbating the challenges of maintaining proper storage conditions.

5. **Safety and Security Vulnerabilities:**

    - Safety and security vulnerabilities within pharmaceutical warehouses, including inadequate risk assessments, insufficient training programs, and vulnerabilities in physical and cyber security systems, compromise employee safety, product integrity, and regulatory compliance. These vulnerabilities expose warehouses to the risk of accidents, theft, tampering, and unauthorized access, posing threats to personnel, products, and sensitive information.

6. **Human Resource Management Challenges:**

    - Importing companies face various human resource management challenges, such as staffing shortages, inadequate training programs, high turnover rates, and non-

compliance with labor regulations. Inadequate staffing levels, lack of skills training, and poor employee engagement undermine warehouse productivity, morale, and regulatory compliance, exacerbating operational inefficiencies and compliance risks.

Addressing these pressing challenges is imperative to optimizing pharmaceutical warehouse operations within importing companies. By identifying and mitigating the root causes of these problems, importing companies can enhance operational efficiency, ensure product integrity, comply with regulatory requirements, and safeguard patient safety in the pharmaceutical supply chain.

Pharmaceutical Importers should strictly implement GSP and GDP and abide by the Laws, Regulations and Guidelines set for the attainment of optimum performance of the warehouse management of pharmaceutical products that they are importing and distributing. So as to deliver this special commodity with its integrity intact and efficacy uncompromised to the final user. For this purpose, they should acquire organized and well-structured storage area properly functioning warehousing management practice. As the World Health Organization describes (WHO, 2021b:275). Quality management system: An appropriate infrastructure comprising the organizational structure, procedures, processes, resources and systematic actions necessary to ensure adequate confidence that a product or service will satisfy given requirements for quality.

All parties involved in the distribution of pharmaceutical products have a responsibility to ensure that the quality of pharmaceutical products and the integrity of the distribution chain is maintained throughout the distribution process from the site of the manufacturer to the entity responsible for dispensing or providing the product to the patient or his or her agent. (WHO, 2010:243). There should be collaboration between all entities, including governments, customs agencies, law enforcement agencies, regulatory authorities, manufacturers, distributors and entities responsible for the supply of medical products to patients to ensure the quality and safety of medical products; to prevent the exposure of patients to substandard and falsified products and to ensure that the integrity of the distribution chain is maintained. (WHO, 2019a).

According to the general principles, good pharmaceutical products storage practice should deploy adequate number of qualified personnel to achieve Pharmaceutical quality assurance

objective of the company. The premises and facilities (storage area and location) should have sufficient area, capacity and different sections to perform the activities. Furthermore, the premise is required to be clean and dry with acceptable temperature and humidity limits. Equipped with different receiving and dispatch area to avoid any mix ups, have secured quarantine status, controlled and locked area for highly active (radioactive), Narcotic and psychotropic substances.

As Yelbeneh A.(2020:55) in his research paper emphasized, 'the practice of private pharmaceutical importers were highly regulated, regularly inspected and evaluated by EFDA. So in addition to the activities performed by EFDA to ensure appropriate practice standards are met by the importers, the researcher recommends EFDA to devise a plan to assess the quality of service delivery and work with importers in order to help them to improve customer satisfaction in all dimension of the service delivery'. .

In addition to the above expressed duties, in order to have a good storage and distribution practice companies importing pharmaceutical products should maintain comprehensive written records. Labeling of products and storage area is crucial task, performing regular stock monitoring and inspection to control any obsolete and outdated products is un-waivered. Dispatched products have to be transported with their integrity intact and not impaired through the journey to the end user...

To look after all the mentioned and remaining activities that have to be performed by Importing companies warehousing practice, Quality Management System (QMS) has to be implemented to control how much works are appropriate and properly functioning. But as to researcher's information some of the importing companies have not managed to have QMS and there are indications that a number of Private Pharmaceutical Importing companies in Addis Ababa are not fulfilling the regulations and requirements stipulated in full extent. Therefore, there are gaps to be seen and investigated. From the solutions this research yields, all the stake holders and at most the end users of the pharmaceutical products will be beneficiaries.

1.3 Research general objective

The general objective of this research is to assess and analyze the Pharmaceuticals Warehouse Management Practices with requirement tools and regulation set for compliance on sample private Pharmaceuticals Importing companies in Addis Ababa.

1.3.1 **Specific objectives**

- To examine the Infrastructure of Pharmaceutical storage area of some private Pharmaceuticals Importing companies in Addis Ababa.
- To identify the Layout and Operation Capacity of some private Pharmaceuticals Importing companies in Addis Ababa.
- To assess Warehouse Equipments of some private Pharmaceuticals Importing companies in Addis Ababa.
- To analyze the Special Storage Area of some private Pharmaceuticals Importing companies in Addis Ababa.
- To evaluate Inventory Management practice of some private Pharmaceuticals Importing companies in Addis Ababa.
- To examine the Security and Safety practices of some private Pharmaceuticals Importing companies in Addis Ababa.
- To assess the Human Resource utilization status of some private Pharmaceuticals Importing companies in Addis Ababa.

1.4 Research question

i. Does the Infrastructure of the Warehouses satisfactorily fulfill the requirements for aimed purposes in private Pharmaceuticals Importing companies at Addis Ababa?
ii. Are the Layout and Operation Capacity good enough in the private Pharmaceuticals Importing companies of Addis Ababa?
iii. How adequate and efficient Warehouse Equipments are for some private Pharmaceuticals Importing companies in Addis Ababa?
iv. What looks like the Special Storage area of some private Pharmaceuticals Importing companies in Addis Ababa?

v. How is the Inventory Management practice of these private Pharmaceuticals Importing companies of Addis Ababa?
vi. Do these private Pharmaceuticals Importing companies in Addis Ababa have Security and Safety practices in their warehousing practices?
vii. How do the Human Resource utilization of these Private Pharmaceutical Importing firms is impacting their performance?

1.5 Scope of the study

This study has been conducted on selected fifty two privately owned pharmaceutical importing companies actively working in Addis Ababa city. The assessment mainly focuses on operations of their warehouse based on the essential components that helps to optimize the performance of their warehouse function as Infrastructure, Layout and Operational Capacity, Inventory management, Equipment, special storage area, Security and Safety and Human resource management utilization of status.

To collect the necessary information and data, the study will interview workers directly involved in the Pharmaceutical Warehousing and the management (Technical managers, Quality assurance managers and Warehouse manager) and other warehouse supporting staff.

Due to financial resource and time shortage only fifty-two companies are investigated. Though this may not produce the full image of the importers but will give an insight where the status of these companies in their operation performance.

1.6 Delimitation of the study

Due to time and financial setback, the study only covers selected entities. Additionally, has not endorsed the Regulatory Body and Administrative offices that could have a positive or negative influence on warehousing practice performance will not be a part of the study.

1.7 Limitation of the study

The study is implemented to study only private pharmaceutical importing companies situated in Addis Ababa. Those public and Region based pharmaceutical companies are excluded due to geographical inconvenience. Even among the private once, the study covers some of them. This

is due to financial shortage to cover all. Due to this reason the study may show a clue and view of the warehousing practice of the companies in some extent, but not with full information.

The other limitation, as warehouse management can be affected by various reasons and a wide range of factors. Meanwhile, this study will only take some of the factors and tries to find their answer.

1.8 Significance of the study

The study will envisage the challenges of the private Pharmaceutical companies encounter in their Warehouse operational practice of service delivery activity, utilization of the warehouse components essential for optimization of the work and how they will overcome the problem in the future.

It will show a direction to the companies and other stake holders how to practice GSP and GDP in compliance with requirements and regulations to achieve the desired goal.

It will be a clue and information to scholars and other stake holders, as well as a starting idea for further studies for those who need to study further.

1.9 Operational terms (definition)

Medical product – is a term that includes medicines, vaccines, diagnostics and medical devices or emergency health kits containing medicine and medical products intended for human use, for medical research and health promotion presented in its finished dosage or package form that is subject to control by legislation under the mandate of the authority. It also contains raw materials and bulk products for purpose of medicine or medical devices manufacturing by local pharmaceutical manufacturers or research as well as components, spare parts, accessories of medical device

Standard operating procedure (SOP): A set of instructions having the force of a directive, covering those features of operations that lend themselves to a definite or standardized procedure without loss of effectiveness. Standard operating policies and procedures can be effective catalysts to drive performance improvement and improve organizational results

Expiry date The date given on the individual container (usually on the label) of a drug product up to and including which the product is expected to remain within specifications, if stored correctly. It is established for each batch by adding the shelf-life to the date of manufacture

Labeling - The action involving the selection of the correct label, with the required information, followed by line clearance and application of the label.

Pharmaceutical product -Any medicine intended for human use or veterinary product administered to food-producing animals, presented in its finished dosage form or as a starting material for use in such a dosage form, that is subject to control by pharmaceutical legislation in both the exporting state and the importing state.

Storage -The storing of pharmaceutical products and materials up to their point of use.

Quality management system. An appropriate infrastructure comprising the organizational structure, procedures, processes, resources and systematic actions necessary to ensure adequate confidence that a product or service will satisfy given requirements for quality

Supplier A person providing pharmaceutical products and materials on re- quest. Suppliers may be agents, brokers, distributors, manufacturers or traders. Where possible, suppliers should be authorized by a competent authority.

Quarantine The status of starting or packaging materials, intermediates, or bulk or finished products isolated physically or by other effective means while a decision is awaited on their release, rejection or reprocessing

Shelf life The period of time during which a pharmaceutical product, if stored correctly, is expected to comply with the specification as determined by stability studies on a number of batches of the product. The shelf life is used to establish the expiry date of each batch.

1.10 Organization of the study

The report is presented in Five Chapters. The First chapter covers the introductory part of the study. It includes background of the study, Research problem, objectives and question. In addition, scope, limitation and significance of the study is have been included. The Second

chapter encompasses theoretical and empirical literature review, theoretical and conceptual frameworks of the study are summarized. In chapter Three there is description of the study, research design and approach. Data collection, analysis, and validity is covered. The Fourth chapter enumerates the study results, discussion and interpretation. The final and the Fifth one show the summary of the study findings, conclusions and recommendations.

CHAPTER TWO
2 REVIEW OF RELATED LITERATURE

2.1 Theoretical literature review.

2.1.1What is the Definition of Warehousing?

According to Schneider (2023)' Warehousing refers to the storing of goods and products before distribution or sale. Warehouses act as temporary storage facilities, and sometimes as fulfillment centers, distributors, or other service providers in the supply chain, helping create a smooth flow of products from businesses to consumers'.

'In addition to storage, many modern warehouses also offer value-added services such as order fulfillment and packaging, labeling, and kitting. Overall, warehousing plays a vital role in ensuring that businesses can manage their inventory effectively, minimize costs associated with distribution, and ensure customer satisfaction.'(Jenkins, 2024)

2.1.2 History and Background of Warehousing

Warehousing for the purpose of commercial gains at least as old as recorded history. In early writings, man was described as having stored excess food and keeping animals for emergency Surplus, as civilization developed, local warehouses were introduced, and Merchandise was stored in connection with shipping, trading and manufacturing activities. When transportation branched out from local to cross -country, warehouse become more than Local store houses, When major trade points developed during the Middle Ages, Warehousing was established to handle the Storage of shipped items The first major commercial ware house was built in Venice ,a center of major trade Routes (Smith, 1998:3)

Warehouses evolve. Technology has moved on apace as a result, opportunities to improve efficiency and effectiveness within the Warehouse are constantly being introduced. This, together with increasing demands from customers, and internal pressures to reduce cost. Yet improve Service levels, can prove a significant challenge to warehouse and logistic Managers everywhere. (Richards, 2011:2)

Warehousing systems have progressed throughout history; they have advanced from local store houses during the middle-ages to multimillion- dollar facilities. Yet, during this time, the fundamental principles of warehouse may have remained the same. (Smith, 1998: 4)

According to Richards (2011:8)' The Role of Supply chain is to deliver the right products, in the correct quantity, to the right customer, at the right place, at the right time in the right condition, at the right place. The warehouse place is a significant part in this. Delivering the right product in the right quantity relies on the warehouse picking and dispatching accurately, delivering to the right customer at the right place, on time, requires the product to be labeled correctly and loaded on to the correct vehicle with sufficient time to meet the delivery deadline. In the right condition means, that the warehouse to ensure the product leaves the warehouse and damage free. Finally at the right price requires cost-efficient operations that that delivers value for money'.

2.1.3 Warehouse Management

According to Jenkins, (2024) Warehouse management encompasses the principles and processes involved in running the day-to-day operations of a warehouse. At a high level, this includes receiving and organizing warehouse space, scheduling labor, managing inventory and fulfilling orders.

Warehouse operations are generally invisible to customers, but they play a vital behind-the-scenes role in ensuring on-time delivery. To achieve this goal, good warehouse management ensures all warehouse processes run as efficiently and accurately as possible.

A disorganized, inefficient warehouse can create trouble for businesses, leading companies to miscount inventory, order stock it doesn't need and send out the wrong shipments to customers - all of which can lead to financial losses. So it's little wonder why companies are increasingly seeking ways to optimize their warehouse operations, often by identifying inefficiencies and

automating much of the tedious, manual work that can result in human error. When a company improves its processes, keeping stock levels balanced based on customer demand and moving inventory efficiently through the warehouse, it can fulfill orders accurately and on time while keeping supply chain costs in check. Even making simple changes to warehouse operations, such as revising delivery routes, can enhance the speed, reliability and cost of warehouse processes. (Jenkins, 2024).

2.1.4 Warehouse Management Processes

As stipulated by Jenkins. (2024) Warehouse management includes six core processes. Each process influences the efficiency of the next, so every step must be optimized for the warehouse operation to run like a well-oiled machine:

- **Receiving.** Check in and log incoming items. Verify that you're receiving the right quantity, in the right condition, at the right time.
- **Put-away.** Move items from the receiving dock to their correct storage locations.
- **Storage.** Safely store and logically arrange inventory to enable fast and accurate picking.
- **Picking.** Collect the items needed to fulfill sales orders.
- **Packing.** Prepare the picked items for shipment. They must be safely packed into the correct packaging with an accurate packing slip.
- **Shipping.** Send out the finalized sales orders, ensuring that they are on the right vehicle, at the right time, with the correct documentation, so customers receive their orders on time.

2.1.5. Pharmaceuticals warehousing

Antoine, N.(2022) describes that 'Pharmaceutical products must be manufactured, transported, stored, and distributed in a specific manner that meets the specific product requirements designated by the manufacturer. Quality of products is defined by purity, correct identification, efficacy, and safety of use. The correct storage conditions are critical to maintaining quality. Customers and patients have a right, legally and ethically, to expect quality pharmaceuticals that do what they claim to do. When storage conditions are poor, with variances in temperature and humidity – the quality of the product can be compromised, resulting in it being less effective, or even creating volatile compounds.

USAID/DELIVER, (2014) ‘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) project’.

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. 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.(USAID/DELIVER , 2014).

Best Practices are the most efficient (takes the least amount of effort) and effective (delivers the best result) way of accomplishing something. They’re techniques or methodologies that, through experience and research and quantification, produce better results than whatever was previously done. Better can mean a lot of different things; in general, though, we’re talking faster, cheaper and easier. (SmartTurn, 2009:4).

2.1.6. Attributes of good Pharmaceutical Warehouse

‘A 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, 2014)

As a guideline, USAID/DELIVER, (2014). for warehousing health commodities envisages, in order to have a quality functioning Pharmaceutical Warehouse Management practice, proposed

categories to be assessed. They are ***Infrastructure, Layout and operational Capacity, Warehouse Equipment, Special Storage, Inventory Management, Security and Safety and Human Resource***. The best performance will be exhibited where these categories are properly functioning theoretically.

Infrastructure

An appropriate infrastructure comprising the organizational structure, procedures, processes resources and systematic actions necessary to ensure adequate confidence that a product or service will satisfy given requirements for quality. (WHO, 2021b).

Storage areas should be designed or adapted to ensure good storage conditions. In particular, they should be clean and dry and maintained within acceptable temperature limits. Where special storage conditions are required (e.g. temperature, humidity) these should be provided, checked and monitored. (WHO, 2010)

The correct choice of warehouse site(s) and the associated pre-development site investigation process is a critical strategic decision for any logistics operation. The goal of supply chain system design is to minimize whole system inventory holding and distribution costs while ensuring an acceptable service level for patients and end-users. The overall efficiency of storage and distribution systems is a major driver for commercial organizations; (WHO, 2015)

Location: -The warehouse must be accessible …. a medical store should be located by itself on a separate plot of land. Road access must be adequate for the largest vehicle that may need to come into the store. *Drainage* -Build the warehouse on a raised foundation to allow rainwater to drain away from the store.

Building: - *Doors*-Plan the dimensions of the doors to ensure they are wide enough to allow for the free and easy movement of product and handling equipment….Ensure doors are strong and reinforced for adequate security. *Warehouse floors*- must meet stress and strength requirements; otherwise, they may fail because of pressure from loaded racks. *Roof &ceiling* -consider the slope of the roof and the placement of roof support columns, and their impact on height clearances for rack configuration and other warehouse operations. Avoid using non-insulated galvanized steel metal sheeting for the roofing because it will get very hot. *Windows* -to reduce

the need for air-conditioning, place windows high and wide enough for adequate ventilation. The height of the windows should ensure that shelves will not block them; install wire mesh and grating to keep out insects and to deter burglars.

Lighting: - To reduce either florescent or incandescent bulb lighting, plan the storeroom with as much natural light— indirect sunlight—during the day, as possible. Florescent lighting emits ultraviolet rays, which can harm certain products. Incandescent bulbs emit heat. At the same time, ensure that the products themselves are not in direct sunlight

Power: - If the main source of electricity is not reliable, install a solar panel generator or alternative supply of electricity for cold rooms and refrigerators. (USAID/DELIVER, 2014).

Where possible, and where necessary, ensure that all temperature controlling equipment for TTSPP storage (i.e. refrigerators, freezers, building management systems, heating, ventilation and air-conditioning (HVAC) systems, compressors, air-handling units, monitoring systems, alarms and related computer equipment) are connected to an uninterrupted power supply (UPS) system. Where a generator and associated control equipment is used it should. (WHO, 2011)

Temperature and humidity control: - Provide thermostatic temperature control systems for all temperature controlled rooms, cold rooms, freezer rooms, refrigerators and freezers, used to store TTSPPs. Comply with the following minimum requirements: • System able continuously to maintain air temperatures within the set point limits throughout the validated storage volume; • Control sensors accurate to ± 0.5 °C or better; • Control sensors calibrated as described in clause ; • Control sensors located in areas where greatest variability in temperature is expected to occur in order to maximize available safe storage volume; • Control sensors positioned at the hot and cold spots determined by temperature mapping, even if affected by door opening, unless recommendations are being made not to store products in such areas; and • Control sensors independent of the temperature monitoring system (WHO, 2011).

Layout & Operational Capacity

‘The current study revealed that, in the majority of the facilities surveyed (80%), the receiving area/ space wasn’t convenient for the movement of goods and materials’.(Yemenu.et.al 2021) The most important step in optimizing warehouse operation management is to modify the

internal warehouse layout for proper storage and efficient stock flow through the warehouse. Warehouse design negatively impacts productivity when staff must travel through inefficient layouts or work in inadequately designated and marked areas. A good warehouse consists of enough space for the entire inventory and sufficient area for staff to work and maneuver. (USAID GLOBAL HEALTH SUPPLY CHAIN PROGRAM, 2021:4).

To develop a workable layout and to calculate storage requirements at a large warehouse, which may serve multiple purposes; it is important to identify the various warehouse activities that would influence layout planning, determine the space requirements and ideal layout for each activity, and then reconcile space requirements with any constraints. To optimize storage space, larger warehouses may require pallets, racking, shelving, and/or material-handling equipment, such as forklifts (USAID | DELIVER, 2011).

In the technical reports described by WHO, (2015). It is pointless to search for sites without first knowing the size of the building required. Clearly the design of the final building will ultimately be determined by actual site conditions; however, it is perfectly possible to make a preliminary estimate of the building footprint before any site has been acquired. An efficient warehouse layout should be as compact as possible, typically square to rectangular in plan. Awkwardly shaped sites that require non-rectangular layouts are unlikely to be a good choice

Storage areas should be designed or adapted to ensure appropriate and good storage conditions. In particular, they should be clean and dry and maintained within acceptable temperature limits. Pharmaceutical products should be stored off the floor and suitably spaced to permit cleaning and inspection. Pallets should be kept in a good state of cleanliness and repair… Storage areas should be clean and free from accumulated waste and vermin. Organizations in charge of distribution must ensure that premises and storage areas are cleaned regularly. There should also be a written programme for pest control. The pest control agents used should be safe and there should be no risk of contamination of pharmaceutical products. There should be appropriate procedures for the clean-up of any spillage to ensure complete removal of any risk of contamination. (WHO, 2010:249)

Storage areas should be of sufficient capacity to allow the orderly storage of the various categories of medical products. Storage areas should be appropriately designed, constructed,

maintained or adapted. They should be kept clean and there should be sufficient space and lighting. Precautions should be taken to prevent unauthorized persons from entering storage areas. Medical products should be stored off the floor and suitably spaced to permit ventilation, cleaning and inspection. Suitable pallets should be used and kept in a good state of cleanliness and repair. Medical products should be stored in conditions which assure that their quality is maintained. Stock should be appropriately rotated. The "first expired/first out" (FEFO) principle should be followed. Narcotic medical products should be stored in compliance with international conventions, national laws and regulations on narcotics. (WHO, 2019b).

The most critical factor in planning a warehousing is space. How materials are stored and how workflows are designed have a profound effect on the efficiency of the personnel and their ability to improve service delivery for their customers… Layout planning is the discipline of assessing the space requirements of a warehouse or other storage facility and specifying how that space should be organized to facilitate identifiable warehouse activities. (USAID/DELIVER, 2014)

Select and/or develop storage sites to minimize risks from natural hazards such as floods, landslides and earthquakes and extreme weather conditions such as hurricanes and tornadoes. Provide vehicular access to storage buildings sufficient to accommodate the largest vehicles visiting the site, including emergency vehicles

According to WHO, (2015). Keep the site free of accumulated dust, dirt, waste and debris. Ensure that pests are kept under control within the site area. Collect waste in designated closed containers and arrange for safe disposal at frequent intervals. Reason: To help protect storage buildings against ingress by dust, dirt and pests.

Ensure that the storage buildings are well laid out and contain all the necessary storage areas, goods assembly, receiving and dispatch bays and office accommodation needed for efficient operation of the TTSPP store. (WHO, 2015)

Loading and Receiving Bays:- Ensure that receiving and dispatch bays are designed to avoid conflict between incoming and outgoing goods and are protected from direct sunlight, dust, dirt, rain, snow and wind, and from extremes of heat, cold and solar radiation that could damage

TTSPPs, and measures are taken to minimize pest activity in these areas. Reason: Protection against damage and maintenance of product quality. Provide receiving areas with suitable equipment to clean reusable transport containers after their contents have been unloaded, and before the containers are stored for re-use. Reason: Protection against contamination of outgoing TTSPPs. (WHO, 2015).

Warehouse Equipments

USAID/DELIVER,(2014) .Warehouse managers are responsible for all aspects of materials management, including a total systems approach to plan, acquire, store, move, and control the inventory of materials. To complete these essential warehouse operations, materials must be well-organized, including equipment, such as racking systems and material handling tools.

According to USAID/DELIVER (2014) The following criteria are typically used to select warehouse equipment:

Today, with improved technology, modern material handling equipment has become more complex. But not every warehouse needs the most sophisticated and modern equipment, which will require greater initial costs, higher maintenance, and training. Extensive research and analysis is needed before the final equipment selection is made, based on what is actually required in the warehouse…. The average user or warehouse management team can easily be overwhelmed. A good starting point in specifying material handling equipment is to review and examine the following criteria:

- Human—Who are the personnel that will be using the equipment?
- Mechanical—Which equipment best fit the inventory and the ware- house?
- Operational—What are the operating conditions in the warehouse? (USAID/DELIVER 2014)

Special Storage

Where quarantine status is ensured by storage in separate areas, these areas must be clearly marked, and their access restricted to authorized personnel. Any system replacing the physical quarantine should give equivalent security. (WHO, 2010)

Highly active materials, narcotics, other dangerous drugs, and substances presenting special risks of abuse, fire or explosion should be stored in safe and secure areas.(WHO, 2010)

Quarantine area: - Provide a quarantine area for the isolation of returned, faulty, recalled and otherwise withdrawn goods pending a decision on disposal or re-stocking by the qualified person or department. Materials within quarantine areas must be clearly identified with their status. — with temperature control, for items returned for re-stocking; —with temperature control, for items recalled for testing; — without temperature control, for items awaiting disposal. The quarantine area may be a physically separated zone, or it may be defined using a suitable stock control information system, or by a combination arrangement. Reason: Items for re-stocking, testing and disposal should be kept separate to avoid the risk of inappropriate use. (WHO, 2015).

Inventory Management

. All finished drug products should be identified by labeling, as required by the national legislation, bearing at least the following information: (a) the name of the drug product; (b) a list of the active ingredients (if applicable, with the International Nonproprietary Names), showing the amount of each present, and a statement of the net contents, e.g. number of dosage units, weight or volume; (c) the batch number assigned by the manufacturer; (d) the expiry date in an un coded form; (e) any special storage conditions or handling precautions that may be necessary; (f) directions for use, and warnings and precautions that may be necessary; and (g) the name and address of the manufacturer or the company or the person responsible for placing the product on the market.(WHO,2019b).

As described by USAID/DELIVER (2014). Warehouses, clinics, and any facility that stores products—including your food pantry at home—need to have an inventory management system to determine when to order products, how much to order, and how to maintain an appropriate stock level for all products to avoid shortages and oversupply….In general, there are two ways to manage inventory in a warehouse: manually or an automated system.

Manual Inventory: -

Public health warehouses commonly use manual inventory systems, which are hand-written stock keeping records, such as ledgers, stock cards, and bin cards…A manual system is

organized according to date and transaction reference, which is the unique number of the corresponding transaction record for a receipt or issue, and/or the name of the facility from which products are received and issued. They record receipts; issues, losses, and adjustments; balance on hand; and, sometimes, batch or lot numbers and expiry dates. They also record the date and results of physical inventories; i.e., when items are counted to verify the quantity in storage.

Manual inventory management methods are a low-cost, effective way to manage inventory for a limited number of SKUs, if the volume doesn't reach an overwhelming amount. (USAID/DELIVER, 2014).

BIN CARD

A bin card is an individual stock- keeping record that contains information about a single product, by lot or batch number. **See figure 1** (Source USAID/DELIVER, 2014)

Every item in that lot has the same expiration date. For example, one bin card could have information about a single lot of paracetamol at a storage facility. The card should note the stock on hand for that lot only, as well as any losses and adjustments for that lot. Bin cards are usually displayed on or at the bins—or shelf or pallet position where the lot is located.

Figure No. 1

BIN CARD								
Commodity Lot/ Batch No.:				Proct Name & Description:				
Unit:				Expiry Date :				
Date	Transaction Reference	Received from/Issued to	Quantity Received	Quantity Issued	Losses	Adjustments	Quantity on Hand	Initials

Figure No.2

INVENTORY CONTROL CARD								
Product Name:								
Unit:				Product Code :				
Date	Transaction Reference	Received from/Issued to	Quantity Received	Quantity Issued	Losses	Adjustments	Quantity on Hand	Initials

Inventory control card

According to USAID/DELIVER, (2014). An inventory control card is an individual stock keeping record that holds information about all the lots of a single product. Keep one inventory control card for each product. The inventory control card can summarize many bin cards for a particular product. For example, one inventory control card could hold information about all the paracetamol in a storage facility. It should note the total stock on hand of paracetamol in the warehouse, as well as the record of losses and adjustments, without regard to lot number or where the product is located in the warehouse. To ensure that each lot is managed correctly, in larger warehouses, which may have many lots of each product stored in different places, it is usually advisable to maintain both inventory control cards and bin cards. In smaller store- rooms, a single stock keeping record, such as a stock card or inventory control card, would be sufficient. **See figure 2** (Source USAID/DELIVER, 2014)

Store Ledger

A stores ledger is a stock keeping record that contains the same information as the inventory control card. However, unlike inventory control cards, a stores ledger is bound like a book. In some countries, government policy requires the use of stores ledgers.

Managers may believe that ledgers increase accountability, because missing pages are obvious. However, the ledger format is less desirable than individual cards, because it is easy to run out of space for an individual product and it is also difficult to add new products .Individual inventory control cards can be alphabetically organized as new cards are added .In many countries, the Ministry of Finance determines the format of stock keeping records; all government units use the same format because commodities are considered assets of the government and must be accounted for carefully.

Automated Inventory Management: -

As the quantity and volume of products increase—either stored in or moved through a warehouse—more and more warehouse managers are turning to computerized warehouse management systems (WMS) to keep track of inventory. These systems can be a stand-alone

software product, or a module within an Enterprise Resource Planning (ERP) system that includes the entire supply chain.

The tasks commonly supported by a WMS include—

- Receiving: Receipt of products into the warehouse, quality assurance for some products, and staging of products for put-away.
- Put-away: Placing products into storage locations after they have been delivered to the warehouse.
- Replenishment: Moving products from secondary storage to primary storage locations to facilitate picking.
- Picking/packing: Gathering the products listed in a customer order and packaging them for shipment
- Shipping: Loading packages onto transport for distribution to customers
- Management reporting: Compiling and presenting data on inventory levels and locations, inventory aging, customer orders, order fulfillment rates, and purchase orders.
- Cycle counting: Doing physical inventories on a rotating basis, usually according to the value and throughput of each product or physical location.

Automatic data collection (bar-coding and radio frequency)

ADC can be a practical complement to computerized warehouse management systems. Bar-coding is probably the best known of the ADC technologies; others, similar to ADC, are voice systems, radio frequency identification (RFID), pick-to-light, laser scanners, charged-coupled device (CCD) scanners, handheld batch and radio frequency (RF) terminals, vehicle-mounted computers, and wearable computers. (USAID/DELIVER, 2014)

Security & Safety

Safety: -

Fire

To prevent damage to products from fire, do the following:

Install a sprinkler system, if possible, Keep standard fire extinguishers available in every storage facility, following national regulations—see the various types of extinguishers in the text box to determine which are appropriate, Visually inspect fire extinguishers every 2–3 months to ensure that pressure is maintained and the extinguisher is ready for use, Service fire extinguishers at least every 12 months, Place smoke detectors throughout the storage facility; check them every 2–3 months to ensure they are working properly, Strictly prohibit smoking in the store, Conduct fire drills for personnel every six months, Clearly mark emergency exits and check regularly to be sure they are not blocked or inaccessible, Display fire precaution signs in appropriate places in the storage facility, especially locations where flammables are stored, Use sand to extinguish fires if there are no fire extinguishers or sprinkler system. Place buckets of sand near the door Ensure that medical store staff are trained in how to use the specific fire extinguisher or other equipment available at your warehouse. (USAID/DELIVER, 2014).

First aid kit

Keep a well-stocked first aid kit for employees or visitors, Place the kit in a central location that is easily accessible to all employees. Ensure it is clearly marked and that all employees know its location contents, Provide first aid training to selected employees. (USAID/DELIVER, 2014)

Personal protection equipment.

Personal protective equipment (PPE) protects workers from workplace injuries. Warehouse operations present a wide variety of hazards for the worker and proper precautions should be taken. Typical PPE used in warehousing situations are—***steel-toe shoes or work boots, hard hats, gloves***. (USAID/DELIVER, 2014)

Security

Limiting access into the warehouse compound and the warehouse itself is the first step to ensure a secure environment for the commodities. Fencing, or a perimeter wall topped with wire, is often used to surround the compound. Security guards at the entrances are also advisable. Having a guest/visitor registration book will also help track who is coming and going…Ensure the entrance to the warehouse building has a sturdy door, with at least one lock. If the situation allows, install two locks with keys and give the keys to two different people; this is the best way

to ensure that one person never goes into the warehouse alone. Outfit all windows and other ventilation openings with metal bars.(USAID/DELIVER, 2014)

According to WHO, (2015). Provide suitable fire detection and firefighting equipment, including fi re hydrants, in all TTSPP storage areas and ensure that: — systems and equipment are appropriate for the class of occupancy and product storage arrangements and are approved by the local fire authority; and — equipment is regularly serviced in accordance with the equipment manufacturers' recommendations and local regulations. Reason: Protection of property and life.

Implement a programme to keep all areas free of pests. This should include enclosed receiving and loading bays. Maintain records to demonstrate compliance with a robust pest control programme. Reason: Protection against damage and contamination of TTSPPs. (WHO, 2015).

Human Resource

There should be an appropriate organizational structure. This should be presented in an authorized organizational chart. The responsibility, authority and interrelationships of personnel should be clearly indicated. (WHO, 2019). 'Regarding human resources management, only 60% of the facilities have enough personnel to run warehouse operations and among them, only 40% of the warehouse personnel have had at least one on the job training. Employing an adequate amount of warehouse personnel and providing necessary training is a crucial element to improve the productivity of warehouse operations. (Yemenu et.al. 2021)

While space and equipment are important, having well-trained people with the appropriate supervision and accountability is the most essential factor in determining whether your warehouse is productive and successful or not. In addition, hiring too few people can be as detrimental as hiring too many—too few staff can result in unacceptable order turnaround times and customer dissatisfaction. Too many staff can result in poor productivity and increased cost. Finding the correct mix is critical, particularly when there are unpredictable highs and lows in the workload. (USAID/DELIVER ,2014).

Yelbeneh.(2020:54). Since majority of the attributes and indicators of the service quality dimensions were directly related to employees, the researcher recommends private pharmaceutical importers to have regular evaluation and training program for employees

regarding the attributes of service quality dimensions in order to improve the quality of service delivered by the employees.

Entities involved in the storage and distribution of medical products should have a comprehensively designed, documented and correctly implemented quality system that incorporates good storage practices, good distribution practices, quality risk management principles and management review. (WHO, 2019).

2.2 Empirical literature review

Despite the extensive studies on the service quality in Ethiopia in different sectors, there is still a huge theoretical gap to identify the critical factors on service quality affecting the satisfaction of customers and identifying service quality dimensions which play the most important role in customer satisfaction in the pharmaceutical sector specifically at distributor level. (Yelbeneh,2020). .

According to Lemma, (2018:10). Although 70% of the country's pharmaceutical need is met by the public sector, the private sector is a critical component of the pharmaceutical supply chain in Ethiopia. About 114 importers registered with FMAHCA have renewed their licenses to import and distribute medicines from international manufactures to wholesalers and retailers.

Laws- generally define the roles and responsibilities of institutions, in this case, a regulatory authority, ministry of health or other relevant organizations. They define the products, persons and activities that are to be regulated and state what is permitted and what is not.

Regulations- are a diverse set of instruments by which governments place requirements on enterprises and citizens. Regulations usually state at high level the conditions to be met and the requirements defined in laws.

Guidelines-(and other guidance documents) provide further detail on how the regulated stakeholders can comply with laws and regulations. Guidelines may also provide details of the processes of enforcement of the respective legislation (laws and regulations). (WHO, 2021b:277)

The Ethiopian Food and Drug Authority (EFDA) is a federal regulatory body established under Proclamation No. 1263/2021 and its mandate defined under regulation No. 531/2023. EFDA was

established to safeguard the public's health by ensuring the safety and quality of food, the safety, quality, and efficacy of medicines, the safety, quality, and functionality of medical devices, as well as the safety of cosmetics and other health products. EFDA is a National Regulatory Body of Ethiopia which is under the Ministry of Health. The Authority is responsible to ensure the quality, safety and/or efficacy of medicines, food and medical devices.(EFDA, 2023)

2.3 Theoretical framework of the study

1. **Inadequate Infrastructure and Operational Capacity:**

    - Many pharmaceutical warehouses operated by importing companies suffer from insufficient infrastructure and operational capacity, leading to congestion, inefficiencies, and compromised storage capabilities. Inadequate space utilization, outdated facility design, and limited operational resources hinder workflow optimization and impede the timely and efficient handling of pharmaceutical products.

2. **Suboptimal Warehouse Equipment**:

    - Importing companies often grapple with suboptimal warehouse equipment, including outdated storage racks, inadequate material handling systems, and insufficient temperature-controlled units. Inadequate equipment compromises product integrity, increases the risk of handling errors, and impedes operational efficiency, resulting in delays, damages, and regulatory non-compliance.

3. **Ineffective Inventory Management**:

    - Poor inventory management practices, such as inaccurate forecasting, inadequate tracking systems, and inefficient stock rotation, affect pharmaceutical warehouse operations. Inventory discrepancies, stock outs, and wastage arise due to insufficient visibility, traceability, and control over inventory levels, compromising product availability, quality, and compliance.

4. **Challenges in Special Storage Areas:**

    - Pharmaceutical warehouses often lack dedicated special storage areas for temperature-sensitive products, hazardous materials, and controlled substances. Inadequate monitoring, maintenance, and segregation practices in special storage areas pose risks to product integrity, regulatory compliance, and patient safety, exacerbating the challenges of maintaining proper storage conditions.

5. **Safety and Security Vulnerabilities:**

    - Safety and security vulnerabilities within pharmaceutical warehouses, including inadequate risk assessments, insufficient training programs, and vulnerabilities in physical and cyber security systems, compromise employee safety, product integrity, and regulatory compliance. These vulnerabilities expose warehouses to the risk of accidents, theft, tampering, and unauthorized access, posing threats to personnel, products, and sensitive information.

6. **Human Resource Management Challenges:**

    - Importing companies face various human resource management challenges, such as staffing shortages, inadequate training programs, high turnover rates, and non-compliance with labor regulations. Inadequate staffing levels, lack of skills training, and poor employee engagement undermine warehouse productivity, morale, and regulatory compliance, exacerbating operational inefficiencies and compliance risks.

Addressing these pressing challenges is imperative to optimizing pharmaceutical warehouse operations within importing companies. By identifying and mitigating the root causes of these problems, importing companies can enhance operational efficiency, ensure product integrity, comply with regulatory requirements, and safeguard patient safety in the pharmaceutical supply chain.

2.4 Conceptual framework (essential components to optimal pharmaceutical warehouse operation)

Infrastructure

Layout and Operational Capacity

Warehouse Equipments

Inventory Management

Special Storage Area

Safety and Security

Human Resource Management

2.5 Identified literature gap

The gap the researcher found from the past studies done, though there are no sufficient research's conducted specially on private pharmaceutical importers warehouse operational performance, they focused on the warehousing processes. These processes are like, Receiving, Put away, Storage, Picking and Packing and Dispatch of products. These are routine activities that are performed inside the warehouse. In fact these operational processes could affect the performance of the company.

The aim of this study, therefore, to address the other factors that are possibly would have an impact on the pharmaceutical warehouse operational performance which are described on the conceptual framework and the objective of this study. The study will reveal the results within these categories selected for the research**.**

CHAPTER THREE

3. METHODS OF THE STUDY

3.1 Description of the study area

The study is held in Ethiopia, Addis Ababa city. The city is a capital of Ethiopia, where the Head Quarter of AU and ECA is situated, many international NGOs and Embassies of different Countries resided. The country's Government and subordinate organizations are also operating their functions here. The population of the city estimated to be three Million and above. Besides, the country's major business and economic transactions run here in the city. Accordingly, most of the Pharmaceutical Importing companies of the country run their business here in Addis. The study is done on pharmaceutical importing companies, that are licensed according to "Medicine and medical devices import, export and wholesale control directive " number 872/2022 from EFDA 602 in number though actively working pharmaceutical importers were 117 during the study period. From these companies, the study performed its study on 52 Private Pharmaceutical importing premises. As stated in the concepts, the pharmaceutical products warehouses, Operational activities and working personnel in one hand and the firm's management body who are directly involved in the work have been studied.

3.2 Research Design

The study was cross-sectional and descriptive based on essential components necessary for warehouse performance optimization in the Institutions to be studied.

3.3 Research Approach

The study utilizes both Qualitative and Quantitative research approaches.

3.4 Population and Sample

The study is implemented from 602 existing pharmaceuticals, medical supplies, food, cosmetics, and laboratory reagent importers, 117 importers that import only Pharmaceuticals are selected as a total population. To find the number of samples the researcher used and calculated the simplified sampling formula of (Yamane 1967:886) with 90% confidence interval 54 Private Pharmaceutical Importing companies operating in Addis Ababa city were selected.

n= N/ 1+N(e)2

Where n = number of samples

N=number of populations

e = where the margin of error to be accepted

n=117/1+117(0.1)2

n=53.91

n=54

The non-probability technique with Judgmental Sampling of the companies according to their period of service is grouped. From each company selected at least one interviewee is employed. For the Quantitative study, the incumbent professional (warehouse manager) are interviewed to assess the technical performance of the warehouse activity and along with the researcher or its delegated person the supervisor (technical manager) fills out the structured questionnaire to evaluate the warehouse performance matrix. For a Qualitative study, the supervisor or general manager will be interviewed to obtain necessary information about the Quality Management System (QMS) employed for the warehouse operational practices. Finally, a comprehensive single summarized data was taken from each company though two or three respondents have responded from each company.

3.5 Data Sources and Types

Both primary and secondary data sources are implemented. The observation check list is employed to collect Secondary data from each premise to be studied. Primary quantitative data are collected using a structured performance matrix. Qualitative data is collected from the respondents positioned in the supervisory or managerial position through an interview guide prepared and all summarized into a single valuated response questionnaire for analysis.

3.6 Data collection Procedures

Data is collected by the researcher and a well-trained Pharmacy professional who are delegated for this special purpose by testimonial letter. The data collectors have been given the necessary information about the mechanism to be utilized to fill the structured checklist with the incumbent in the job. The warehouse performance measurement matrix is filled with the supervisor or technical manager by observing the activities physically in person. The interview is conducted in an office with a pre-prepared quality management system assessment questionnaire and notes have been taken for valuation and summarized to a single data to represent the company.

3.7 Method of data analysis and Presentation

The Quantitative data collected completeness is checked and entered into SPSS version 28. Frequencies, Mean, and Proportions are computed to analyze descriptive analysis. The chi-square test and Odds ratio are employed to identify the statistical association between practicality and other independent variables. P-Value and 90% confidence intervals are analyzed to know the statistical significance. Further warehouse (Activity) practice regression analysis is performed to see the relative effects of factors associated with good warehouse management practice in the bi-variate analysis. Qualitative data is coded and grouped into thematic areas.

3.8 Validity and Reliability test

Validity is measured by factor analysis with data triangulation, methodical triangulation, and analysis triangulation. Additionally, data triangulation from other studies was performed in prior periods. Reliability is measured by the consistency of the results and the representation of the total population examined. It is measured by Cronbach's Alpha. Multiple correlations too analyzed.(see table 3.1)

Table 3.1 Cronbach's alpha Reliability and Correlation test table

Item-Total Statistics

		Corrected	Squared	Cronbach's
Scale Mean if Item Deleted	Scale Variance if Item Deleted	Item-Total Correlation	Multiple Correlation	Alpha if Item

					Deleted
Warehouse infrastructure and Planning	426.595	3191.011	.670	.551	.722
Layout Planning and Operations Efficiency	423.413	3451.324	.458	.432	.760
Warehouse Equipment	421.143	3628.009	.429	.317	.766
Special Storage Requirements	452.749	2806.044	.535	.347	.753
Inventory Management	422.766	3597.934	.450	.487	.763
Security and Safety	426.865	3364.138	.514	.470	.750
Human Resources	440.078	2829.602	.567	.492	.741

Table 3.2 Table to Cronbach's Reliability test of total matrix.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.779	.790	7

3.9 Ethical Consideration

As green light is given to the researcher to precede the study by the school, an Ethical letter have been sought from Addis Ababa University and the Ethiopian Food and Drug Authority which is

the regulatory body of the importers describing the purpose of the study. The aim of the study is communicated with every firm's managing person and to respondents by explaining the importance of the study. Before the beginning the data collection verbal consent of every respondent had been taken. Confidentiality of the data collected respondents and the companies is guaranteed by the anonymity. The respondents had the right to refuse answering any of or all off interview questions. Privacy of the respondents had been secured. No one without the authorization of the researcher had access to data and documents.

3.10 Research Instruments

The interview questionnaire which is prepared by the researcher based on the categories to be studied is utilized for qualitative data collection of the study. The quantitative data is collected by structured Warehouse Self-Assessment Tool which is adopted from and modified a little for the study convenience from "Guidelines for Warehousing Health Commodities" module, which is prepared as a standard tool for developing countries. (USAID/DELIVER, 2014)

CHAPTER FOUR

4 RESULTS AND DISCUSSION

4.1 Introduction

In this chapter, the data collected from respondents have been analyzed and interpreted. The chapter begins by presenting response rate of respondents, then background information of respondent under the demographic variables followed by descriptive statistics is enumerated.

4.2 Respondents

About 54 questionnaires were prepared and distributed whereas two of them were un responded. The rate of the respondents is illustrated as follow in the (see table 4.1)

Table 4.1 illustration for respondents for the questionnaire.

Frequency	Frequency	Valid Percentage
Non- Respondent	2	3.7
Respondent	52	96.3
Total	54	100

Source own Survey, 2024

As its shown in the table from the distributed questionnaires, only 2 of them were not responded but the remaining 52 Questionnaires returned back for analysis. This number of respondents and response rate is sufficient to say it represents the survey sample.

4.3 Respondents' Demographic Information

4.3.1 Job (Work) Position

Table 4.2 the respondents' job (work) position of the respondents during the interview.

Job (Work) Position

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Technical Manager	20	38.5	38.5	38.5
	Warehouse Manager	29	55.8	55.8	94.2
	Owner's & Technical Manager	3	5.8	5.8	100.0
	Total	52	100.0	100.0	

Source Own Survey, 2024

Table 4.2

As the above table illustrates, the respondents' job (work) Position in their respective organization 20 (38.5%) of the total respondents were Technical Managers. The 29 respondents (55.8%) percent were serving their respective organization as Warehouse Managers. The remaining 3 individuals who represent (5.8%) of the respondents were Owner's of the company and as well they are serving as a Technical Managers. All are directly involved in the warehouse operations. (See Table 4.2)

4.3.2 Gender of the respondents

Among the respondents who are willingly answered the interview 28 persons which cover (53.8%) of them were Female and the remaining 24 individuals (46.2%) by percent were Males. (see Table 4.3)

Table 4.3 respondents' gender of the interview.

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	24	46.2	46.2	46.2
	Female	28	53.8	53.8	100.0
	Total	52	100.0	100.0	

Source Own Survey, 2024 Table 4.3

4.3.3 Educational Background of the Respondents

The educational background of the respondents who voluntarily responded to our questionnaire is described as follow, 6 individuals among the 52 respondents have Masters' Degree which covers (11.5%), 37 individuals (88.5%) by percent are bachelor's degree holders and 9 of them are (17.3%) of them have University diploma holders. All of them are Pharmacy professionals. (see Table 4.4)

Table 4.4 educational back ground of the respondents during the interview.

Educational Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma	9	17.3	17.3	17.3

	Bachelor's Degree	37	71.2	71.2	88.5
	Masters	6	11.5	11.5	100.0
	Total	52	100.0	100.0	

Source Own Survey, 2024

4.3.4 Age of the Respondents

As the table below enumerates among the respondents who participated in this research ,11 individuals were between 20-30 years of age (21.2%), 15 out of 52 were 30-40 years of age that amounts (28.8%), 21 people were 40-50 years which is (40.4%) and the remainders were (11.5%) which is 5 in number. (see Table 4.5 & Pie Chart 4.2)

Table 4.5 Age of the respondents the interview.

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-30 years	11	21.2	21.2	21.2
	30-40 years	15	28.8	28.8	50.0
	40-50 years	21	40.4	40.4	90.4
	50 years and above	5	9.6	9.6	100.0
	Total	52	100.0	100.0	

Source Own Survey, 2024 Table 4.5

Table 4.6 The respondents work experience related to pharmaceutical warehouse.

Related Work Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5 years	12	23.1	23.1	23.1
	5-10 years	12	23.1	23.1	46.2
	10-15 years	17	32.7	32.7	78.8
	15- years	11	21.2	21.2	100.0
	Total	52	100.0	100.0	

Source Own Survey, 2024 Table 4.6

4.3.5 Related Work Experience of the respondents

As the above Table shows the respondents of the research enquiry work experience in the warehouse of pharmaceutical products , 12 of them (23.1%) were experienced for 1-5 years, 12 of them 5-10 years' work experience that covers(23.1%), those who have experienced in the field for 10-15 years were a bit more who covers 17 people by percent (32.7%) and who have long period of experience were 11 people who served 15 years and above cover (21.2%) of the total respondents.(see Table 4.6)

4.3.6 Address of the Respondents by Sub-City

It's expressed that this research sampling technique was Non-probability, Convenience method. Therefore, from the 11 sub-cities of the Addis Ababa City, this research has covered almost half of the city by observing 6 sub-cities. Among them, Bole sub-city has covered 44.2% which is 23 importing companies in number, Nefas Silk Lafto sub-city 23.1% which represent 12 in number, Akaki takes 5.8% of them with 3 companies in number, Lemi kura and Lideta sub-cities have equal number 4 that covered 7.7% respectively and finally the other was Yeka that has 6 in number and 11.5% coverage. (see Table 4.7)

Table 4.7 the respondents company's address.

Address of Respondent Company's

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bole	23	44.2	44.2	44.2
	N/Lafto	12	23.1	23.1	67.3
	Akaki	3	5.8	5.8	73.1
	Lideta	4	7.7	7.7	80.8
	L/Kura	4	7.7	7.7	88.5
	Yeka	6	11.5	11.5	100.0
	Total	52	100.0	100.0	

Source Own Survey, 2024

Table 4.7

4.4 Descriptive Statistics and tests of Dependent and Independent Variables

This research valuation for independent variables is given by experts (Professionals) after physically and personally observing the warehouses which have been under investigation; therefore, the researcher believes that the valuation yielded the result.

After the study completed different tests were for conducted on the dependent and independent variables for the consistency, Normality, Reliability, Multi-Co-linearity of the variables.

4.4.1 Normality test

Tests of Normality

	Shapiro-Wilk		
	Statistic	Df	Sig.

Optimized Warehouse Performance (Dependent Variable)	.983	52	.669

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Source Own Survey, 2024

Table 4.7

The above table indicates that the dependent variable with the statistical Shapiro-Wilk

value of .983. Theoretically Shapiro – Wilks Value 0-1 is indicating normality of the variables. So, the researcher accepted the value to conduct the analysis.

4.5 Descriptive statistics and Kendall's W test

Respondents' feedback was taken with the (65) items (parameters) corresponding to the seven (7) components, which are cornerstones for optimization of Pharmaceuticals warehouse performance Statistical analysis software, SPSS version 28 is used to analyze data. The composite mean scores and standard deviations have been computed for all the variables of the dimensions. The mean rank and Kendall's coefficient of concordance (W) was also computed using Kendall's W Test for every table.

4.5.1 Warehouse Infrastructure and Planning

In this section the research examined the physical appearance of the warehouses and valued 0-1 according to 14 sub questions enumerated in the questionnaire

Table4.8 Summary of the response for inquiry of Warehouse Infrastructure and planning of private pharmaceuticals importing companies of Addis Ababa.

Kendall's W test and Descriptive Statistics

Warehouse infrastructure and planning	N	Minimum	Maximum	Sum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic	Mean Rank	Statistic
Is the ceiling in good condition	52	.75	1.00	51.50	.9904	9.69	.04855
is the ceiling or wall show staining indicating leaking roof	52	.00	1.00	45.25	.8702	8.24	.25481
Is the floor in good condition level free of dust	52	.00	1.00	47.50	.9135	8.87	.23160
Are the walls in good condition, clean and painted	52	.00	1.00	46.50	.8942	8.52	.22873
Is there adequate lighting without direct sunlight	52	.00	1.00	43.75	.8413	8.00	.27577
Is the store room fitted with Air-conditioner or ventilation	52	.00	1.00	29.50	.5673	4.99	.33253
Is there working thermometer and temperature charts utilized	52	.75	1.00	50.75	.9760	9.39	.07442
Is the storage area visually free from harmful insects and rodents	52	.50	1.00	51.50	.9904	9.76	.06934
Are there frequent interruptions from the main electrical supply	52	.00	1.00	9.25	.1779	2.75	.36828
Does the staff report breakers tripping	52	.00	1.00	25.00	.4808	4.62	.41963
Does the warehouse have a generator	52	.00	1.00	45.50	.8750	8.92	.32652
Can the generator handle the full site load	52	.00	1.00	38.75	.7452	7.06	.34828
Is adequate budget to purchase fuel for the generator	52	.00	1.00	44.75	.8606	8.71	.32993
Is there maintenance plan on file for the generator	52	.00	1.00	31.50	.6058	5.48	.34777
Valid N (list wise)	52						

Source Own Survey, 2024

Key Insights:

According to the respondents and the evaluation of the investigators point of view among 14 parameters evaluated in each warehouses Infrastructure and planning, the following results were found.

Kendall's W Coefficient of Concordance=.686

Best performing areas:

Free from harmful insects and rodents: Mean rank = 9.76 and SD =.069, this is the best performing of the companies. Ceiling condition: Mean rank = 9.69 and SD= .049, Thermometer and temperature charts: Mean rank = 9.39 and SD.=074, The presence of generator Mean rank=8.92 and SD .326, The cleanness and level of the flour Mean rank=8.87 and SD= .231, Adequate budget for fuel to generator(although some said they simply buy when there is a need) Mean mark=8.71 and SD= .330, The cleanness of the wall and painting condition Mean mark =8.52 and S=D .229 The ceiling of the warehouse staining to evaluate the rain water leakage Mean mark=8.24, and SD= .255 The lighting condition of more warehouses seems good but in some instances the investigator have observed the morning and late afternoon time sunlight enters through the glass windows to the stored commodities though it is tertiary packages (cartons)Mean mark=8.0 and SD= .276, Either the generator handle to cover the whole site, in some warehouses that are rented from or big buildings the companies are dependent on the buildings power source than their own as the researcher and other investigators have seen in person Mean mark=7.06 and SD= .348, Maintenance plan for the generator some of them do not have a plan. But, they claimed that they simply maintain where there is a need and the investigator could not find a documented plan in most of the companies being under investigation. Mean mark=5.48 and SD=.348

Areas for Improvement:

Frequent electrical interruptions, this is not only the problem of the pharmaceutical companies. Interruption of electricity in our city, Addis Ababa, is very common and frequently happening problem. Mean rank = 2.75 and SD=.368. Breakers tripping reports, this too is very uncommon practice in most of the companies for there is no assigned worker to follow-up the electricity tripping even at the working hours. Mean rank = 4.62 and SD=.420 and finally for this section,

which is significant but non-emphasized issue is, Storeroom air-conditioning/ventilation: Mean rank = 4.99 and SD=.332

4.5.2 Layout Planning and Operation Efficiency

This section assesses the efficiency and planning of warehouse layout and operations. Nine (9) parameters were used to determine how strongly or weakly the premises are performing

Table4.9 Summary of the response for inquiry of Warehouse Layout planning and operation efficiency of private pharmaceuticals importing companies of Addis Ababa.

Kendall's W test and Descriptive Statistics

Layout planning and efficiency	N	Minimum	Maximum	Sum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic	Mean Rank	Statistic
In average week is there any day that order not processed	52	.00	1.00	43.50	.8365	5.58	.35315
In average week is there any day that receipts are not processed	52	.00	1.00	12.00	.2308	2.16	.41375
Can delivery vehicles access loading/receiving bays	52	.50	1.00	48.50	.9327	5.83	.15746
Are receiving and dispatch areas separated	52	.00	1.00	47.75	.9183	5.82	.20841
In the receiving area is there sufficient secured area	52	.00	1.00	36.25	.6971	3.98	.30653
Is there designated space for expired or damaged products	52	1.00	1.00	52.00	1.0000	6.49	.00000
Is there sufficient secured space to assemble outgoing deliveries	52	.00	1.00	36.75	.7067	4.00	.28749
Is the existing space for pallet stacking less than 75% full	52	.00	1.00	45.75	.8798	5.59	.25957
Are aisles b/n stacked pallet clear of stored products	52	.00	1.00	46.50	.8942		.21775
Valid N (list wise)	52						

Source Own Survey, 2024

Key Insights:

Kendall's W Coefficient of Concordance=.410

Best performing areas:

It's very welcomingly good practice that almost all observed and investigated pharmaceutical importing companies have arranged a place for damaged and expired products Mean Rank=6.49 with SD=.000 and the in many companies (The bays quality differs) delivery vehicles either to load or unload products could access the warehouse. Mean Rank=5.83 and SD=.157. The other good practice receiving and dispatch areas for pharmaceuticals at least separated by portioning of the area. Mean Rank5.82=SD208. While the investigation period most of the companies' warehouses were not full by medicines. So, pallet stacking with less than 75% was not significantly seen. Mean Rank 5.59 and SD=.259. As the professionals on interview have mentioned, if there are products on warehouse for sell, there are no weeks that dispatch orders are not performed. Mean Rank 5.58 and SD=.353. and aisles are not occupied by some places. Mean Rank=5.56 and SD=.218.

Areas for improvement.

No sufficient secured areas were observed for receiving products in most of the observed companies. Mean Rank=3.98 and SD=.306 and the poorly performed area is receipt of products in average week, but due to severe problems not a good performance. Mean Rank 2.16 and SD=.413

4.5.3 Warehouse Equipment's

This section reviews the availability and condition of equipment used in the warehouse.

During the interview (Questionnaire investigation) the interviewee and the interviewer mutually valuated the 8 (eight) sub-component questions and the result computed is as follows.

Kendall's W Coefficient of Concordance=.617

Table4.10 Summary of the response to the inquiry of Warehouse equipment of private pharmaceuticals importing companies of Addis Ababa.

Kendall's W test and. Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean		Std. Deviation
Warehouse Equipment's	**Statistic**	**Statistic**	**Statistic**	**Statistic**	**Statistic**	**Mean Rank**	**Statistic**
Are there sufficient pallets Available	52	1.0	1.0	52.0	1.000	5.43	.0000
Are there sufficient pallet jacks available	52	.00	1.00	49.25	.9471	5.13	.20613
is there an operable fork truck with a maintenance schedule	52	.00	1.00	3.25	.0625	1.25	.22620
Is there a storage system utilized and is in good condition	52	.00	1.00	50.00	.9615	5.13	.15166
Is there adequate aisle space	52	.00	1.00	42.50	.8173	4.35	.33620
Are medicines stacked above 2.5M	52	.00	1.00			4.83	.175
Are cartons in good condition	52	.00	1.00.			4.70	.278
Are cartons up floor for protection	52	.00	1.00			4.35	.336
Valid N(with list)	52						

Source Own Survey, 2024

Key Insights:

Best performances: -In all the observed warehouses there are enough pallets available. Mean rank= 5.43 with SD.000. there were no products on floor Mean Rank 5.17 and SD=.089. Most of the companies' have pallet jacks to lift pallets, but some uses carrier trolleys to move products with carton packages. Mean Rank=5.13 and SD=.206

Areas for improvement: - in some organization's cartons filled with pharmaceuticals are not in a good firmly condition, even seen stacked in the pallet above 2.5 meters one over the other, and the aisle space is not adequate to move pallet jacks and trolleys loaded with pharmaceuticals ranging the Mean rank= 4.83, 4.70 and 4.35 with SD= .175, .278 and .336 respectively.

Whereas none of the companies' regardless of only one uses Operable fork truck. (in fact it was not functioning during the investigation) and there was no scheduled maintenance plan documented. Mean Rank= 1.25 with SD=.226

4.5.4 Special Storage Requirements

One of the most essential, components of the warehouse is the special storage areas that special entities particularly those requiring cold storage to be placed on and secured. To investigate the status of these areas condition with 10(ten) sub- components were questioned and even observed personally by the researcher himself and his delegated observants. The result showed

Kendall's W Coefficient of Concordance= .49

Table4.11 Summary of the response for inquiry Special storage Requirements of private pharmaceuticals importing companies of Addis Ababa.

Kendall's W test and Descriptive Statistics

Special Storage Requirements	N	Minimum	Maximum	Sum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic	Mean Rank	Statistic
Does the store product require cold chain and does it have facilities	52	.00	1.00	42.00	.8077	7.23	.39796
is there sufficient capacity for cold chain product	52	.00	1.00	40.50	.7788	7.06	.40114
Are all fridges and cold rooms operational	52	.00	1.00	34.25	.6587	6.40	.42307
Are temperatures monitored for each desecrate unit	52	.00	1.00	27.50	.5288	5.56	.41021
Do the refrigerators run on solar power?	52	.00	.50	.50	.0096	2.88	.06934
If cold chain facilities run on electricity is there back up power(generator)?	52	.00	1.00	42.00	.8077	7.23	.39796
Is there funding for the source of power	52	.00	1.00	42.00	.8077	7.23	.39796
Is there designated area for flammable hazardous items?	52	.00	1.00	6.00	.1154	3.42	.32260
Are flammable/Hazardous items separately away from the main building	52	.00	1.00	8.00	.1538	3.62	.36432
Are high value commodities kept in locked or caged area	52	.00	1.00	15.75	.3029	4.37	.45465
Valid N (list wise)	52						

Source Own Survey, 2024

Key Insights:

Best Performing Aspects**:** Cold chain facilities, backup power and the funding of power sources(generator)Mean Ranks = 7.23 and SD=398 equally for three of the components. In fact, there are premises which don't even have cold chain facilities, but they are negligible in number. Most of the companies have sufficient capacity to hold cold chain products Mean Rank=7.06 and

SD= .401. Those companies that kept products in the cold rooms and refrigerators have made them operational apart from those, do not have the products and switched off their cold rooms. There are temperature monitoring apparatuses in all the warehouses but, there are no enough in different desecrate areas mounted. Mean Rank=5.56 with SD=.410 In the other hand only few warehouses have arranged a special storage area for high value commodities, even some do not understand the necessity of such a locked area. Mean Rank=4.37 and SD= .454

Areas for Improvement: - Flammable/Hazardous items were not found in all the investigated premises and there is no designated area prepared as well Mean Rank=3.62 and 3.42 with SD= .362 and .322 respectively. No company get used solar power refrigerator. Mean Rank=2.88 and SD=.069

4.5.5 Inventory Management

This section examines the procedures and effectiveness of inventory management. Here the investigator used the components' 8(eight) parameters in the questionnaire to evaluate the status of the inventory management.

Kendall's W Coefficient of Concordance= .548

Table4.12 Summary of the response for inquiry of Inventory Management of private pharmaceuticals importing companies of Addis Ababa.

Kendall's W test and Descriptive Statistics

Inventory Management	N	Minimum	Maximum	Sum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic	Mean Rank	Statistic
Are electronic and paper inventory records updated	52	.00	1.00	50.00	.9615	5.32	.15954
Are ledgers maintained and correspond to bin cards	52	.00	1.00	46.25	.8894	4.62	.20659
Are ledgers legibly maintained - Audit a sample	52	.00	1.00	29.75	.5721	3.13	.40017
Is there a process to resolve discrepancies	52	.00	1.00	50.00	.9615	5.32	.16704
Is there a system for rolling stock checks	52	.00	1.00	8.50	.1635	1.78	.36677
Are physical inventory stock counts at least every 3 months	52	.00	1.00	45.00	.8654	5.02	.34464
Is the write off and destruction of damaged or expired stock processed regularly	52	.00	1.00	49.25	.9471	5.26	.18745
Are products organized according to FEFO	52	1.00	1.00	52.00	1.0000	5.57	.00000
Valid N (list wise)	52						

Source Own Survey, 2024

Key Insights:

Best Performing Aspects: - All the pharmaceutical importing companies investigated by this research in Addis Ababa use FEFO (First Expire First Out) inventory management system. Mean Rank=5.57 and SD= .000 They utilize either electronic or paper(manual) and some both, eventually few premises have not updated the inventory records. Almost all have reported that they have a mechanism to resolve discrepancies. Mean Rank= 5.32 for both parameters and SD=.167 and .160 respectively. Additionally, the premises approved, though their periodic write off program differs, regularly process destruction of damaged and expired stocks. Mean Rank=5.26 with SD=.187, Regarding physical inventory stock counts, they claimed they do but, their timetable differs from monthly to yearly. Mean Rank=5.02 and SD=.206

Areas for Improvement: Corresponding ledger to bin cards is not observed as the ledger book is utilized by finance department for monetization purpose and some do not have even a ledger. Mean Rank= 4.62 and SD= .344 Considering the ledgers, the investigators have seen financial ledgers in the premises use it but not updated though legible. Mean Rank=3.13 with SD=.400 Finally only two companies claimed to use system of Rolling Stock. Mean Rank=1.78 and SD=.367

4.5.6 Security and Safety

This section reviews the security measures and safety protocols in place at the warehouse. 8(eight) parameters of the component were used for data gathering through the questionnaire.

Kendall's W Coefficient of Concordance= .686

Table4.13 Summary of the response for inquiry of Security and Safety of private pharmaceuticals importing companies of Addis Ababa.

Kendall's W test and Descriptive Statistics

Security and Safety	N	Minimum	Maximum	Sum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic	Mean Rank	Statistic
Building perimeter surrounded by fence, wall or entry guard	52	.00	1.00	47.50	.9135	5.16	.27064
Is entry to the warehouse limited to designated staff	52	.00	1.00	49.50	.9519	5.32	.19827
Are windows intact and bulgler free	52	.00	1.00	50.50	.9712	5.44	.15382
Are doors and windows solid and well-secured	52	.00	1.00	51.00	.9808	5.51	.13868
Is the store well secured with lock and key accessible only in working hours	52	.00	1.00	51.00	.9808	5.51	.13868
Is firefighting equipment available and serviced within last year	52	.00	1.00	45.75	.8798	4.90	.25481
Are staff trained how to operate the firefighting equipment	52	.00	1.00	11.50	.2212	2.21	.38557
Are there items for Personal Protective Items (PPE)	52	.00	1.00	7.00	.1346	1.94	.34464
Valid N (list wise)	52						

Source Own Survey, 2024

Key Insights:

Best Performing Aspects: It is mentioned in all the premises that the warehouse key is only in the hand of the warehouse managers and not accessible out of working hours unless conditions forced them to work out of working hours by the decision of the management. Doors and windows are intact mostly made from metal. Windows are secured (the glass ones are protected by metal tubulars from outer side) and by far bulgler free. Mean Rank=5.51, 5.51 and 5.44 and SD= 1.39, 1.39 and .154 respectively. In most of the companies' warehouse there is a caution posted on their doors as entrance is not allowed to those who are not working in the warehouse. Mean Rank=5.32 and SD=.198 Apart from those premises which are situated in the big multi

floor buildings, the ones built in the land are protected by well protected fence of blocks and all have their own guards. Mean Rank=5.16 with SD= .271

Areas for Improvement: in all the pharmaceutical warehouses there are fire fighting equipment's mounted in their wall but, few are not serviced, some are only mounted either outside or inside the warehouse. Mean Rank=4.90 and SD= .255 Most of the companies did not train their staff how to utilize the equipment to combat if fire happened Mean Rank 2.21 and SD= .386 Regarding Personal Protective Equipment's (PPE) only one company issued protective glove to laborers in the warehouse. Professionals (pharmacists) wore their white gowns. Some companies gave to their laborers' a working overcoat. No other protective equipment is being used during the investigation period. Mean Rank= 1.94 and SD=.344

4.5.7 Human Resources

This section evaluates the management and capacity of human resources within the warehouse. In this section the researcher collected data with the last component encompassing 8(eight) parameters of the questionnaire. ***Kendall's W Coefficient of Concordance= .537***

Table4.14 Summary of the response for inquiry of Human Resource of private pharmaceuticals importing companies of Addis Ababa.

Kendall's W test and Descriptive Statistics

Human Resources	N	Minimum	Maximum	Sum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic	Mean Rank	Statistic
Does the facility have responsible management (Supervisor)	52	1.00	1.00	52.00	1.0000	6.47	.00000
Is there an organizational structure and chart posted?	52	.00	1.00	18.00	.3462	3.05	.41466
Is there sufficient staff capacity in the warehouse to oversee warehouse management	52	.00	1.00	51.00	.9808	6.39	.13868
Are there records for external visit audits?	52	.00	1.00	11.00	.2115	2.49	.41238
Are there posted job descriptions for all positions in the warehouse?	52	.00	1.00	24.25	.4663	3.63	.33221
Are there Up-to-date SOPSs and posted?	52	.00	1.00	38.50	.7404	5.01	.27547
Are there active on-the-job training for staff?	52	.00	1.00	21.75	.4183	3.52	.43925
Is there a process for new hire orientation?	52	.00	1.00	40.75	.7837	5.43	.37387
Valid N (listwise)	52						

Source Own Survey, 2024

Key Insights:

Best Performing Aspect**s: -** All the premises being investigated have responsible management (at least Technical Manager and Warehouse manager), the staff capacity of the warehouses of the facilities differs according to the companies importing volume and capital expenditure to the work. Mean Rank=6.47 and 6.39 with SD= .000 and .139 respectively. Most of the respondents of the facilities said they have an orientation process for newly hired worker. Mean Rank=5.43 with SD= .374 Almost all companies have a written Standard Operating Procedures (SOPs) for the different functions performed in the warehouse. Whereas few of them have posted in the working area. Some documented and put in the file. Few of them have not made them Up-to-date. Mean Rank=5.01 and SD= .275

Areas for Improvement: Most of the companies said they have prepared and given Job description to their workers when they are hired. But none of the companies have posted respective job description in the warehouse for the workers. Regarding on-the-job training some mentioned they have periodic training program but only few have showed the yearly plan. Mean Rank= 3.63 and 3.52 with SD= .332 and .439 respectively. None of organization being evaluated have posted the organizational Chart in the warehouse. But some have one in the management office. Only two companies have shown a document for records of external visitors. Mean Rank= 3.05 and 2.49 with SD= .415 and .412 for the respective parameters**.**

CHAPTER FIVE

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter emphasizes the summary of the findings and conclusion of the results obtained from the data analysis. This research is conducted in private pharmaceutical importing companies actively working during the research period in Addis Ababa.

5.1 Summary of the Findings

This research undertook a comprehensive evaluation of several private pharmaceuticals importing companies' warehouse operation performance through the optimizing components observation of infrastructure and planning, and operations in Addis Ababa. The study utilized structured questionnaires and direct observations to assess multiple dimensions, including warehouse infrastructure and planning, layout planning and operational efficiency, warehouse equipment, special storage requirements, inventory management, security and safety, and human resources.

Warehouse Infrastructure and Planning: This section examined 14 parameters, revealing strong performance in areas such as the absence of harmful insects and rodents, good ceiling conditions, and the availability of temperature monitoring tools. The presence of power generator for the daily activity, the cleanness of the premises is in good condition However, significant issues included frequent electrical interruptions (though the problem is from the main grid) and inadequate air-conditioning or ventilation.

Layout Planning and Operation Efficiency: The study highlighted that most companies have designated spaces for expired or damaged products and accessible loading/receiving bays. Nonetheless, the lack of secure areas for receiving products and issues with processing receipts on certain days were noted as areas for improvement.

Warehouse Equipment: The evaluation showed that sufficient pallets were available, and products were elevated from the floor. However, the lack of operable fork trucks and inadequate maintenance schedules were significant shortcomings.

Special Storage Requirements: The findings indicated good performance in cold chain facilities, backup power availability, and funding for power sources. However, gaps were identified in the provision of designated areas for flammable/hazardous items and the use of solar-powered refrigerators.

Inventory Management: The study found that FEFO (First Expire First Out) was universally applied, and inventory records were generally up to date. However, issues were noted in the correspondence of ledgers to bin cards and the use of rolling stock systems.

Security and Safety: Warehouses were generally well-secured with restricted access and intact windows and doors. However, deficiencies were found in the training of staff on firefighting equipment and the provision of personal protective equipment (PPE).

Human Resources: All facilities had responsible management and sufficient staff capacity. However, the lack of posted organizational charts and poor maintenance of records for external visit audits were significant issues.

5.2 Conclusion

The evaluation of these private Pharmaceutical importing companies' warehouse infrastructure and planning in Addis Ababa revealed a mix of strengths and areas needing significant improvement. Strengths included effective pest control, structural integrity, and the presence of temperature monitoring tools, which are crucial for maintaining the quality of pharmaceutical products. The layout and operational efficiency of the warehouses showed reasonable accessibility and space management, with commendable provisions for handling expired or damaged products.

However, there were notable gaps in several critical areas. Electrical reliability emerged as a significant issue, with frequent interruptions impacting the operational efficiency. The lack of adequate ventilation and air-conditioning systems poses a risk to the optimal storage conditions

required for pharmaceutical products. Additionally, the absence of secure areas for receiving products and the inconsistent processing of receipts indicate potential weaknesses in logistical management.

The availability and maintenance of warehouse equipment also highlighted areas needing improvement. While pallets were generally sufficient, the lack of operable fork trucks and maintenance plans could hinder efficient warehouse operations. The provision of special storage requirements was another area with mixed results, with significant gaps in the handling of flammable/hazardous items and the lack of solar-powered refrigeration options. The absence of storage area for high value items is also the other gap identified.

Inventory management practices showed that while FEFO was universally applied other aspects such as the correspondence of ledgers to bin cards and the implementation of rolling stock systems were lacking. Security and safety measures were generally strong, but the lack of staff training on firefighting equipment and the provision of PPE were critical gaps.

Human resource management revealed that while responsible management and sufficient staff capacity were in place, the absence of posted organizational charts, SOPs, job description and inadequate maintenance of audit records highlighted areas for improvement.

5.3 Recommendations

The research revealed some strengths and weaknesses, based on the results and conclusion the researcher want to recommend some brief recommendation to Private Pharmaceutical Importing Companies working in Addis Ababa according to observed components.

Warehouse Infrastructure and Planning:

1. **Enhance Electrical Reliability:** Invest in reliable backup generators and ensure regular maintenance plans in place to address frequent power interruptions.
2. **Improve Ventilation:** Upgrade air-conditioning and ventilation systems to maintain optimal storage conditions and prevent product spoilage and avoid direct sun light to the products.

Layout Planning and Operation Efficiency:

1. **Develop Secure Receiving Areas:** Establish secure, designated areas for receiving products to enhance the safety and integrity of incoming shipments.
2. **Ensure Consistent Receipt Processing:** Implement automated systems or increase staffing during peak times to ensure the consistent processing of receipts.

Warehouse Equipment:

1. **Invest in Fork Trucks:** Acquire operable fork trucks and establish documented maintenance schedules to ensure equipment functionality.
2. **Optimize Aisle Space:** Reorganize warehouse layouts to provide adequate aisle space for the safe and efficient movement of goods.

Special Storage Requirements:

1. **Designate Areas for Hazardous Items:** Prepare and equip designated areas for storing flammable and hazardous items, ensuring they are separate from main storage areas.
2. **Explore Solar Power Options:** Investigate the feasibility of solar-powered refrigerators to enhance sustainability and reduce dependency on the grid.

Inventory Management:

1. **Ensure Ledger Correspondence:** Maintain accurate and updated financial ledgers that correspond with bin cards for precise inventory tracking.
2. **Implement Rolling Stock Systems:** Adopt rolling stock systems to improve inventory accuracy and minimize discrepancies.

Security and Safety:

1. **Train Staff on Firefighting Equipment:** Conduct regular training sessions for staff on the use of firefighting equipment to enhance emergency preparedness.

2. **Provide PPE:** Issue appropriate PPE for all warehouse staff to ensure their safety while handling products.

Human Resources:

1. **Post Organizational Charts and Job Descriptions:** Display organizational charts and job descriptions in visible areas within the warehouse to enhance transparency and role clarity.
2. **Maintain Audit Records:** Keep comprehensive records of external audits and visits to ensure compliance and facilitate continuous improvement.

By addressing these recommendations, pharmaceutical companies in Addis Ababa can significantly improve their warehouse infrastructure, operational efficiency, and overall safety, ensuring better compliance with industry standards and enhancing the quality-of-service delivery. These improvements will contribute to a more robust and reliable supply chain for pharmaceutical products, ultimately benefiting the public health sector.

5.4 Suggestion for future research

For future any research which intend to study further specially the private sector pharmaceuticals importing companies' performance, this study may give an insight where the problem areas are and strengths found. And as well the researcher believes studies like this will have a vital role in strengthening the pharmaceutical sector and finally the end user the society

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1.Structured Check list

SECTION A: WAREHOUSE INFRASTRUCTURE PLANNING		*Score*	*Maximum Score*
A1. Is the ceiling in good condition (not warped, free of holes)?	❑ *Yes* ❑ *No*		*1*

A2.	*Do the ceiling or walls showing any staining indicating a leaking roof?*	❑ *Yes* ❑ *No*		*1*
A3.	*Is the floor in good condition, level, free of dust and free of holes?*	❑ *Yes* ❑ *No*		*1*
A4.	*Are the walls in good condition, clean and painted?*	❑ *Yes* ❑ *No*		*1*
A5.	*Is there adequate lighting throughout without too much direct sunlight?*	❑ *Yes* ❑ *No*		*1*
A6.	*Is the storeroom fitted with air-conditioners or ventilation /fans capable of maintaining a temperature of <24C at midday?*	❑ *Yes* ❑ *No*		*1*
A7.	*Is there a working thermometer and are temperature charts utilized?*	❑ *Yes* ❑ *No*		*1*
A8.	*Is the storage area visually free from harmful insects and rodents?*	❑ *Yes* ❑ *No*		*1*
A9.	*Are there frequent interruptions to the main electrical supply (more than 2 times a week)?*	❑ *Yes* ❑ *No (No = 1)*		*1*
A10.	*Does staff report breakers tripping when it rains or when the air-conditioners are on full load?*	❑ *Yes* ❑ *No (No = 1)*		*1*
A11.	*Does the warehouse have a generator?*	❑ *Yes* ❑ *No*		*1*
A12.	*Can the generator handle the full site load?*	❑ *Yes* ❑ *No*		*1*
A13.	*Is there an adequate budget for the purchase of generator fuel?*	❑ *Yes* ❑ *No*		*1*
A14.	*Is there a maintenance plan on file for the generator?*	❑ *Yes* ❑ *No*		*1*
TOTAL				*___/14*
SCORE FOR THE SECTION				*____%*

Additional Notes

SECTION B: LAYOUT PLANNING AND OPERATIONS EFFICIENCY			*Score*	*Maximum Score*
B1.	*In an average week are there ever any days when orders are not processed?*	❑ *Yes* ❑ *No (No = 1)*		*1*

B2.	*In an average week are there ever any days when receipts are not processed?*	❑ *Yes* ❑ *No (No = 1)*		*1*
B3.	*Can delivery vehicles access loading/receiving bays?*	❑ *Yes* ❑ *No*		*1*
B4.	*Are receiving and dispatch areas separated?*	❑ *Yes* ❑ *No*		*1*
B5.	*In the receiving area is there sufficient secure space to arrange and sort an incoming delivery?*	❑ *Yes* ❑ *No*		*1*
B6.	*Is there a designated space for expired or damaged goods?*	❑ *Yes* ❑ *No*		*1*
B7.	*Is there sufficient secure space to assemble outgoing deliveries?*	❑ *Yes* ❑ *No*		*1*
B8.	*Is the existing floor space for pallet stacking, shelving or racking less than 75% full?*	❑ *Yes* ❑ *No*		*1*
B9.	*Are the aisles between the stacked pallets or racking clear of stored commodities?*	❑ *Yes* ❑ *No*		*1*
TOTAL				*___/9*
SCORE FOR THE SECTION				*____%*

Additional Notes

SECTION C: WAREHOUSE EQUIPMENT			*Score*	*Maximum Score*
C1.	*Are there sufficient pallets available?*	❑ *Yes* ❑ *No*		*1*
C2.	*Are there sufficient pallet jacks available?*	❑ *Yes* ❑ *No*		*1*
C3.	*If pallet racks are present, is there an operable fork truck with a maintenance schedule?*	❑ *Yes* ❑ *No*		*1*
C4.	*Is there a storage system utilized (shelving, racks or pallet stacking) and is it in good condition?*	❑ *Yes* ❑ *No*		*1*
C5.	*Is there adequate aisle space and clearance for material handling equipment?*	❑ *Yes* ❑ *No*		*1*
C6.	*Where commodities are stored on the floor are they stacked less than 2.5 meters high?*	❑ *Yes* ❑ *No*		*1*
C7.	*Are cartons in good condition, (not crushed due to mishandling or poor stacking.)?*	❑ *Yes* ❑ *No*		*1*
C8.	*Are cartons and products up off the floor and protected from water and dust?*	❑ *Yes* ❑ *No*		*1*
TOTAL				*___/8*
SCORE FOR THE SECTION				*____%*

Additional Notes

SECTION D: SPECIAL STORAGE REQUIREMENTS			Score	Maximum Score
D1.	Does the location store cold chain required product and does it have designated cold chain facilities?	❑ Yes ❑ No		1
D2.	Is there sufficient capacity for cold chain product?	❑ Yes ❑ No		1
D3.	Are all fridges and cold rooms operational?	❑ Yes ❑ No		1
D4.	Are temperatures monitored for each discreet storage unit?	❑ Yes ❑ No		1
D5.	Do the refrigerators run on solar power?	❑ Yes ❑ No		1
D6.	If the cold chain facilities run on electricity, is there a back-up source of power? (ie. generator)	❑ Yes ❑ No		1
D7.	Is there funding for the back-up source of power?	❑ Yes ❑ No		1
D8.	Is there a designated area for flammable / hazardous items?	❑ Yes ❑ No		1
D9.	Are flammable/hazardous items kept in a separate area away from the main buildings?	❑ Yes ❑ No		1
D10.	Are high-value commodities kept in a locked or caged area?	❑ Yes ❑ No		1
TOTAL				___/10
SCORE FOR THE SECTION				____%

Additional Notes

SECTION E: INVENTORY MANAGEMENT			Score	Maximum Score
E1.	Are paper or electronic inventory records updated for each receipt and issue?	❑ Yes ❑ No		1
E2.	Are ledgers maintained and are corresponding bin cards maintained in the storerooms?	❑ Yes ❑ No		1
E3.	Are ledgers legibly and accurately maintained – audit a sample and cross check the same sample on the corresponding bin card?	❑ Yes ❑ No		1
E4.	Is there a process to investigate and resolve discrepancies on records?	❑ Yes ❑ No		1
E5.	Is there a system of rolling stock checks in place?	❑ Yes ❑ No		1

E6. Are full physical inventory stock counts performed at least every 3 months?	❑ *Yes* ❑ *No*		*1*
E7. Is the write off and destruction of damaged or expired stock processed regularly?	❑ *Yes* ❑ *No*		*1*
E8. Are products organized according to FEFO?	❑ *Yes* ❑ *No*		*1*
TOTAL			*___/8*
SCORE FOR THE SECTION			*____%*

Additional Notes

SECTION F: SECURITY AND SAFETY			Score	Maximum Score
F1.	Is the building perimeter surrounded by a high wall or fence, with entry guarded?	❑ Yes ❑ No		1
F2.	Is access to the warehouse limited to only designated staff?	❑ Yes ❑ No		1
F3.	Are windows intact and burglar proofed?	❑ Yes ❑ No		1
F4.	Are the doors and windows solid and well secured?	❑ Yes ❑ No		1
F5.	Is the store secured with a lock and key but accessible during normal working hours?	❑ Yes ❑ No		1
F6.	Is firefighting equipment available and do the labels on the firefighting equipment indicate that it has been serviced within the last year?	❑ Yes ❑ No		1
F7.	Are staff trained on how to use the firefighting equipment?	❑ Yes ❑ No		1
F8.	Are there items of personal protective equipment being used? (gloves, boots, etc?)	❑ Yes ❑ No		1
TOTAL				___/8
SCORE FOR THE SECTION				____%

Additional Notes

SECTION G: HUMAN RESOURCES			Score	Maximum Score
G1.	Does the facility have personnel responsible for warehouse management (supervisor) and are there present and accountable?	❑ Yes ❑ No		1
G2.	Is there an organizational structure and chart posted showing each warehouse-related post?	❑ Yes ❑ No		1
G3.	Is there sufficient staff capacity to run the warehouse and authority to oversee warehouse management?	❑ Yes ❑ No		1
G4.	Are there records of external visits or audits?	❑ Yes ❑ No		1
G5.	Are there posted job descriptions for all positions at the warehouse?	❑ Yes ❑ No		1
G6.	Are there up to date Standard Operating Procedures (SOPs) for all functions and processes posted on site?	❑ Yes ❑ No		1
G7.	Is there active on-the-job training for staff?	❑ Yes ❑ No		1
G8.	Is there a process for new hire orientation?	❑ Yes ❑ No		1

TOTAL		*___/8*
SCORE FOR THE SECTION		*____%*

Additional Notes

Warehouse Assessment Questionnaire Scoring Sheet Results

SECTION	*KEY STRENGTHS*	*KEY WEAKNESSES*	*SECTION SCORE*
A. Warehouse Infrastructure Planning			
B. Layout Planning and Operations Efficiency			
C. Warehouse Equipment			
D. Special Storage Requirements			
E. Inventory Management			
F. Security and Safety			
G. Human Resources			

Structured Questionnaire Prepared for Qualitative Analysis

This detailed questionnaire provides a comprehensive framework for gathering in-depth information about pharmaceutical warehouse management practices among importers, covering various aspects of infrastructure, layout, equipment, special storage, inventory management, security, and human resource management

Respondents Profile

Age _____ Gender_____ Company's Location_____

Educational Background_____ Experience in Years_____

Position in the Company_____

1. Infrastructure:

- **Description of Warehouse Infrastructure:**
    - Size: Please provide dimensions (length, width, height) of your warehouse(s).

_____
_____
_____

    - Location: Describe the geographical location of your warehouse(s) and its proximity to transportation hubs.

_____
_____
_____

    - Specialized Features: Detail any specialized features such as climate control systems, segregated storage areas, or clean room facilities.

_____

_____

- **Compliance with Regulatory Requirements:**
    - How do you ensure compliance with pharmaceutical storage regulations? Describe any certifications, audits, or regulatory standards your warehouse(s) adhere to. Additionally, explain any specific measures taken to comply with regulations regarding temperature control, cleanliness, and security.

_____

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2. Layout and Operational Capacity:

- **Warehouse Layout:**
    - Description of layout and organization: Provide a detailed overview of the layout, including shelving arrangements, aisle width, and workflow design. Discuss any strategies implemented to optimize space utilization and streamline operations.

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_____

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    - Strategies to optimize operational efficiency: Describe specific measures taken to improve efficiency, such as implementing lean principles, utilizing automation technologies, or optimizing picking routes.

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_____

- **Determining Operational Capacity:**
    - How do you assess and manage operational capacity to meet demand fluctuations? Explain your process for forecasting demand, adjusting staffing levels, and allocating resources to accommodate changes in demand volume.

_____

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_____

3. Warehouse Equipment:

- **Types of Equipment:**
    - List of equipment used for storage and handling: Provide a comprehensive list of equipment, including shelving systems, forklifts, pallet jacks, and any specialized machinery or automation technologies.

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_____

    - Maintenance and calibration procedures: Describe your maintenance schedule and procedures for ensuring equipment is properly calibrated and functioning optimally. Include details on how malfunctions or defects are identified and addressed.

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4. Special Storage:

- **Specialized Storage Areas:**
    - Description of areas for temperature-sensitive or other specific requirements: Specify any areas designated for storing temperature-sensitive pharmaceuticals, hazardous materials, or high-value items. Detail the design and construction of these areas, including insulation, temperature control systems, and monitoring equipment.

_____

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    - Monitoring and control of environmental conditions: Explain how environmental conditions such as temperature, humidity, and air quality are monitored and controlled in specialized storage areas. Describe the alarm systems or automated alerts used to notify staff of deviations from desired conditions.

_____

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5. Inventory Management:

- **Inventory Tracking and Management:**
    - Methods/systems used for inventory tracking: Describe the inventory management system(s) employed, including barcode scanning, RFID technology,

or manual tracking methods. Explain how inventory data is captured, updated, and reconciled.

_____
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_____

- Measures to ensure accuracy and traceability: Discuss quality control measures in place to verify the accuracy of inventory records and ensure traceability throughout the supply chain. Include details on cycle counting procedures, stock reconciliation processes, and inventory accuracy metrics.

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_____

6. Security and Safety:

- **Security Measures:**
  - Steps taken to protect pharmaceutical products: Outline physical security measures such as perimeter fencing, access control systems, and surveillance cameras. Describe any security personnel or security protocols implemented to prevent theft, tampering, or unauthorized access.

_____
_____
_____
_____

  - Safety protocols for handling hazardous materials: Detail safety procedures for handling, storing, and disposing of hazardous materials in compliance with

regulatory requirements. Include training programs, personal protective equipment (PPE) requirements, and emergency response plans.

_____
_____
_____
_____

7. Human Resource Parameters:

- **Staff Recruitment and Training:**
    - Recruitment procedures for warehouse staff: Explain your recruitment process, including job postings, candidate screening, and interviewing. Describe any specific qualifications or experience required for warehouse positions.

_____
_____
_____

    - Training programs to ensure competence in warehouse management: Detail training programs provided to warehouse staff, covering topics such as safety protocols, equipment operation, inventory management, and regulatory compliance. Discuss ongoing training and development initiatives to enhance staff competence and performance.

_____
_____
_____
_____

- **Safety and Compliance Culture:**
    - How is a culture of safety and compliance fostered among warehouse staff? Describe efforts to promote safety awareness, encourage reporting of safety

concerns, and reinforce compliance with company policies and regulatory requirements. Provide examples of initiatives or incentives designed to promote a positive safety culture and encourage employee engagement in safety initiatives.

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