AFRICA UNIVERSITY

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AN IN-DEPTH INVESTIGATION ASSESSING THE IMPACT OF HAVING A WAREHOUSE MANAGEMENT SYSTEM [WMS]. A CASE OF PULSE PHARMACEUTICALS".

BY

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A RESEARCH PROJECT SUBMITTED TO THE COLLEGE OF BUSINESS PEACE LEADERSHIP AND GOVERNANCE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER INFORMATION SYSTEMS (HONOURS)

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ABSTRACT

This study examines the impact of implementing a Warehouse Management System (WMS), A case study of Pulse Pharmaceuticals. The research will be conducted using a case study approach. Primary data will be collected through a questionnaire with the company's management, accounts department, information technology department, procurement department and warehouse department. The research is guided by several objectives which reduced order processing errors, improved inventory visibility, lower stock outages, faster-automated generation of ordering documents, reporting capability to management on order processing, labour efficiency, and warehouse capacity utilization and ensure profitability. The research's conclusions demonstrate that the firm's management of inventory accuracy will be greatly improved after the deployment of WMS, with a decrease in overstocking and stockouts, enabling the company to maintain ideal inventory levels. Additionally, the deployment of WMS will result in a decrease in the company's logistics expenses since order fulfillment will be optimized, traceability will be raised, and shelf-life management was improved, which decreased the likelihood of overstocking or losing money as a consequence of product obsolescence. The investigation also showed that the introduction of WMS has a favourable effect on the business' profitability. In this study, a qualitative approach will be used. In line with the research findings, the researcher made the following recommendations to Pulse Pharmaceuticals. Pulse Pharmaceuticals should adopt the WMS. However, lots of investment should be done to implement and operationalise the system. The researcher recommends that Pulse Pharmaceuticals Company should employ fast and better warehouse management systems such as the Standalone WMS and Cloud WMS which is a Cloud-based WMS systems that can be quickly deployed with lower up-front costs.

DECLERATION

I declare that this dissertation is my original work and has not been submitted before for any degree or examination at any other institution. All sources used or cited have been acknowledged appropriately, and no part of this work has been plagiarised. The content of this dissertation is my intellectual property, and I take full responsibility for its content and the research conducted.

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Supervisor's Signature

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DEDICATION

I dedicate this dissertation to my wonderful family, who have been a constant source of love and support throughout my academic journey. To my parents, who taught me the value of hard work and perseverance. To my friends, who encouraged me to pursue my academic goals and believed in me every step of the way. And to my sibling's, who remind me every day why I do what I do. I would like to also dedicate my dissertation to Tatenda Mawatsi, Mutsa Mwanza and Vincent Ferendende who helped me to work on my research.

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LIST OF ACRONYMS AND ABBREVIATIONS

AI Artificial Intelligence

ERP Enterprise Resource Planning

FEFO First Expire First Out

FIFO First in First Out

HR Human Resources

IoT Internet of Things

IT Information Technology

MCAZ Medical Control Authority of Zimbabwe

ML Machine Learning

SKU Stock Keeping Unit (inventory)

WMS Warehouse Management System

DEFINATION OF KEY TERMS

PFOFITABILITY- The capacity of a firm to make money or benefit financially from its activities or operations is referred to as profitability.

STOCK MANAGEMENT- Ordering, storing, and tracking inventory levels are all parts of stock management, which aims to have a sufficient amount of inventory on hand to satisfy consumer demand while avoiding the expenses of carrying around extra stock.

TRANSACTIONAL FLOW PROCESS- The term "transactional flow process" describes the order of actions or processes taken throughout a transaction's processing, from its inception to its conclusion.

RE-ORDER LEVEL POINTS- The inventory stock level at which it is appropriate to place a new order for more inventory is referred to as the re-order level point or reorder point. This is often determined using sales data and the wait time for suppliers to deliver new items.

REDUCED ORDER PROCESSING ERRORS- This is a reference to the number of errors that are made when receiving, examining, and completing client orders. This is possible by utilizing automated procedures, such as order management software, which can assist to simplify processes and lower the possibility of human mistake.

IMPROVED INVENTORY VISIBILITY- This is the capacity to measure and monitor inventory levels in real-time, allowing for improved stock visibility and facilitating more precise forecasting and ordering. This may be done by utilizing inventory management software, which keeps track of inventory levels and sends reports and notifications when it drops below certain levels.

LOWER STOCK OUTAGES- This refers to the decrease in the amount of time that a product is unavailable for purchase and out of stock, which can lead to irate consumers and lost sales.

This may be accomplished by using improved inventory management techniques, which include installing automated inventory tracking and reordering systems and setting suitable reorder levels.

CURRENT STOCK HOLDING- The amount of merchandise that is now in stock or on hand is referred to as the current stock holding. All items that a business has in its possession and that are meant for sale or usage during manufacturing are included in this.

WMS- Warehouse Management System is referred to as WMS. In order to maximize the flow of products and save costs, it refers to software and procedures used by enterprises to manage and regulate everyday warehouse operations, from inventory control through order fulfillment. A WMS often contains features like automated data collecting, order picking and shipping, receipt and put away, and inventory tracking. In order to give a comprehensive perspective of the supply chain activities, it may also interact with other corporate software systems, such as ERP and Supply Chain Management (SCM) software.

VALUE OF STOCK AT HAND- The total monetary worth of the inventory or stock that a business has on hand at a certain time is referred to as the value of stock on hand. This covers the price of purchasing the inventory as well as any associated expenses for moving, storing, and maintaining it. An essential indicator of a company's financial stability and success is the stock's valuation.

TABLE OF CONTENTS

Contents

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDECIES

Chapter 1

1.1 Introduction

This chapter present a research study to be carried out on "An in-depth investigation assessing the impact of having a Warehouse Management System [WMS]. A case of Pulse Pharmaceuticals". The research will be on bringing out problems that are being encountered by Pulse Pharmaceuticals in all their processes involved in a warehouse. It will also bring out how having a warehouse management system and stock management will ensure profitability within the organization. This research will point out all the weaknesses in the current system and the benefits of adopting warehouse management which will digitalize the complete transactional process flow from goods received all the way through to goods dispatched.

Pulse Pharmaceuticals is located at 15 Borgward road in Msasa, Harare. It was formed in November 2000. In 2004 Pulse became one of the top five pharmaceutical wholesalers in the country due to its steady growth caused by its well-organized management and focused employees. Its main lines of business are medicals, pharmaceuticals, and consumer healthcare products. It once had a retail pharmacy operating in the CBD of Harare which started in 2014 called Utano Pharmacy which was recently sold to Greenwood Wholesalers.

At the beginning of the year, 2013 Pulse Pharmaceuticals purchased part of Medix pharmacies and purchased its own premises at the mentioned address above. Before the movement to its current premises, the company was housed at 6 Cavan industrial park Msasa Harare. It is in the year 2013 when Pulse got an award for being the second in Africa for distributing Benylin cough mixture on behalf of its principal Johnson and Johnson Company located in South Africa. During the early years of its business, its market was in Harare but later extended around

towns and cities of Zimbabwe. Major suppliers of Pulse were mainly locals but later in 2008, its basket was broadened by working with international suppliers.

This introductory chapter contains the background of the study, the statement of the problem, the scope as well as the challenges (limitations).

1.2 Background of the Study

Stock management is key to the profit of Pulse Pharmaceuticals and as such, it becomes imperative to have a system that controls the complete transactional process flow from all the goods received all the way through to the goods dispatched. The process flow starts with placing an order with the supplier, receiving goods, stock control, picking goods, packing, and dispatching goods.

The manual system has seen the company encountering several problems from all the stages involved in the warehouse. Ordering stage problems that are being encountered are issues with tracking expiry dates, some orders not being processed due to printing issues, hindering stakeholders from tracking the status of their orders, and taking too much time placing an order manually. Pulse Pharmaceuticals uses a manual **RE-ORDER LEVEL CALCULATOR** and below are the processes involved.

Order Calculator Template shows

- Current stock holding
- Value of stock at hand
- Stock cover in months
- Come up with a quantitative factor in lead time to determine quantities that we order to ensure at least 3 months of order
- Historical Sales and Movement per SKU

Features of the Current Re-Order Calculator

It calculates

- Margin in Consumption Rate
- Margin of Safety
- Normal Delivery Time
- Quantity of goods in stock
- Quantity of goods in transit [en route]
- Value of goods in stock
- Value of goods in transit[enroute]
- Stock Movement
- Average Sales in 3 Months

Process Involved in Updating the Ordering Calculator

- Generates Inventory File from Pastel
- Convert it tan o Excel File Format
- Group Products
- Inventory File generated from Pastel shows stock that was sold and stock at hand.
- That Data it's the one that is updated on the order calculator which then shows if we are supposed to place an order availability that can be covered with stock availability and the value of the stock.
- The Order Calculator has got Data from 2015 which we can draw sales patterns and determine the quantity that must be ordered.

Resource Allocation

When placing an order, they allocate resources depending on the profit they will recoup for that order. They also factor in demand and sales pattern trends from previous months.

A. PRODUCTS CONTRIBUTING 80% OF VALUE

B. PRODUCTS CONTRIBUTING 15% OF VALUE

C. PRODUCTS CONTRIBUTING 5% OF VALUE

The table below shows among others the principal suppliers, products supplied, and product classes THAT are offered at Pulse Pharmaceutical.

Supplier	**Product**	**Product Group**
Allergan	Exocin Eye Drops	Over the counter
Aspen Pharmacare	Athrexin Suppositories	Prescription
Fresenius Kabi	Promethazine	Prescription
GSK Consumer	Actifed Cold Syrup	Consumer health care
GSK Consumer	Sensodyne Repair and Protect whitening	Consumer health care
Jonhson&Jonhson	Benylin 4 Flu	Over the Counter
Jonhson & Jonhson	Benylin Dry Cough	Over the Counter
Novatis	Ritalin Tablets	Prescription
Pfizer Belgium	Zithromax Tablets	Over the counter
Sanofi Aventis	Lactacyd	Over the counter
Morningside Surgicals	Surgical Blades	Dispenser

Inova	Pholtex Forte	Prescription
Glenmark	Candid Clotrimazole Cream	Over the counter
Matrix	Lamivudine Zidovudine	Anti-Retroviral Drugs
SM Pharmaceuticals	Ibuprofen	Over the counter
Eagle Agency	Igrams Foot Balm	Consumer health care

Table 1 International Principals

Local principals

These involve the following among others

Caps	Chlonicol Caps	Prescription
Reckitt Benkiser Zimbabwe	Detol Antiseptic Liquid	Consumer health care
Reckitt Benkiser Zimbabwe	Disprin Tablets	Consumer health care
Varichem	Varipan Syrup	Consumer health care
Medtech	Calamine Lotion	Over the counter
Datlabs	Cafemol	Consumer health care
Datlabs	Panado Tablets	Consumer health care
Plus Five	Enalapril	Prescription
Greenwood	Kaopectin Suspension	Prescription
Medlink	Grays Gripe Water	Consumer health care
Elecare Pharmaceuticals	Carex Condoms	Consumer health care

Jonhson&Jonhson Zimbabwe	Aqueous Cream	Consumer health care
Luster	Olive Oil Hair Lotion	Consumer health care
Omar	Examination Gloves	Consumer health care

Table 2 Local principals

Features that the current ordering system cannot meet are

- allowing to download excel files
- sorting out products per supplier to easily update the ordering calculator.
- allowing updating manually or automatically
- give notifications on products that must be re-ordered
- give an overall summary of the movement of goods
- quick order form with quantities and the total amount
- import order files that contain order details in excel format
- labels stocks products or product categories, units in stock, the value of stock in the warehouse time they will have with the stock in the warehouse before they are out of stock, expiry dates
- instantly see if the products are available, easily remove unavailable goods and notify the Sales department.

How best can the Re-Order level feature in a warehouse management system help in coming up with ordering decisions?

- Automatic generation of a replenishment order at the appropriate time by comparison of stock level against re-order level inventory controls.
- Positive control can easily be handled to maintain the inventory investment at the desired level only by calculating the predetermined maximum and minimum values.
- Reorder points provide businesses with greater financial flexibility by allowing them to keep a minimum amount of inventory on hand without running out of products.

When receiving goods there is a need of checking delivery documents for quantities, expiry dates, and batch numbers and enter goods into the system. Manual checks for expiry dates are prone to a lot of errors. It will also make it difficult to track products in stock, product movement, and forecast sales for a certain product.

When storing medicine, they are required to recommend conditions (temperature, humidity, and light) that must be adhered to maintain quality and standards. It's difficult to follow the First in First Out technique when storing products that came in since it's done manually.

Manual picking is prone to errors as customers sometimes receive wrong orders and quantities. Problems that have been encountered when dispatching goods are issues of duplicate orders which may result in variances, order tracking is difficult, takes time to check batch numbers, variances in batch numbers and handling returns is also prone to a lot of errors as they might credit the wrong products and wrong batch numbers.

A warehouse management system is a set of policies and processes intended to organize the work of a warehouse or distribution centre and ensure that such a facility can operate efficiently and meet its objectives.

The purpose of a WMS is to help ensure that goods and materials move through warehouses in the most efficient and cost-effective way. A WMS handles many functions that enable these movements, including inventory tracking, picking, receiving, and dispatching.

Two examples of warehouse management systems are Oracle and Microsoft Dynamic 365. Oracle Warehouse Management. Oracle WMS is a cloud-based platform that provides solutions for businesses of all sizes. It offers complex fulfillment and flexible modules to optimize inventory operations and reduce costs. It monitors operations and provides real-time analysis using warehouse intelligence. Microsoft Dynamics 365 is a cloud-based solution that provides specialized ERP integration for the supply chain management. It offers unique modules to increase productivity and meet customer demands in real-time. Businesses can gain predictive insights across inventory, warehouse, production, planning, and transportation management with AI and IoT.

The benefits of a warehouse management system are that it Boosts Productivity, Facilitate Currency Centralization, Optimize Integration, Improve Accessibility, Improves Warehouse Management, Optimize Costs and Strengthen Demand Forecasting.

The warehouse management system automates day-to-day warehousing tasks with automated functions. It also helps in adjusting accounting records and material reordering by setting up automatic reorder points. Integrates user currency preferences and assigns different currencies to vendors and customers. It also converts purchase and sales order currencies into local types. Manages multiple production facilities within the same program. Users can check for updates related to inventory across multiple warehouses.

A warehouse management system also automates multiple operations to improve efficiency and fulfillment requirements. Reduces costly errors by leveraging IoT and mixed reality. Increases procedural, tool, and personnel output with AI and ML. It leverages automation to optimize warehouse operations. Increase efficiency and productivity through flexible dashboards. Gain complete control of day-to-day operations and peak processing times.

They also can analyze actual and planned costs to provide real-time insights to improve business decisions. Improve inventory turns or days of inventory by detecting inventory trends. Machine learning predicts independent demands from sales orders or dependent demand. Determines consumer demand trends using historical data. It uses a set of forecast dimensions to detect demand trends or remove outliers.

The key features of a warehouse management system are

Barcode Scanning: Updates complete warehousing information, including inventory movement, picking, packing and shipping goods, cycle counts, and more.

Shipping Management: Manage multiple warehouses through parameters like serial numbers, revision levels, lot numbers, and more. Track inventory and view up-to-date inventory information across multiple locations. View sales trends and transfer stock between locations.

Cycle Counting: Quickly count inventory one section at a time instead of shutting down the entire operation. Serial and Lot Tracking: Track goods using serial, batch, revision, and lot numbers.

Inventory Reordering: Automatically re-orders items when supplies are low. It also complies with product manufacturing and labour costs to simplify accounting processes.

1.3 Statement of the Problem

Due to not having a warehouse management system, there has been an increase in the number of problems being encountered in the warehouse because of the number of vulnerabilities in the current system which is doing all the work and processes manually. The process that is involved in the warehouse is ordering from the supplier, receiving goods, stock control, picking goods, packing goods, and dispatching goods.

Keeping an accurate count of inventory items is one of the most challenging problems in managing warehouse systems that are manual. Initial counts, regular inventory counts, or errors in everyday order picking can create significant discrepancies in the count in your inventory management system compared to on-hand inventory. An audit of the current system is required to come up with a system that can control the complete transactional flow of processes from ordering goods as the way through to goods dispatched. This will effectively solve inherent problems in the current system as a warehouse management system will integrate and digitalize all the warehouse processes.

1.4 Research Objectives

1. The research seeks to analyse ways in which a WMS can help Pulse Pharmaceuticals achieve:

- reduced order processing errors
- improved inventory visibility
- lower stock outages
- faster-automated generation of ordering documents
- reporting capability to management on order processing, labour efficiency, and warehouse capacity utilization.
- ensure profitability

2. The research rests its foundation on seeking to identify problems being encountered from the ordering stage, receiving goods into the warehouse, storage into the warehouse, order picking, dispatch, and deliveries.

3. Outlining possible benefits and appropriate measures that must be taken by Pulse Pharmaceuticals to curb problems emanating from having a manual system.

1.5 Research Questions

The study aims to answer the following questions

- How and ways in which the current system affected the warehouse's complete transactional process from goods purchased and received to goods dispatched?
- What are the main factors calling for the increase in the number of problems being encountered in all the processes involved in the warehouse?
- Which measures can possibly and effectively be used by Pulse Pharmaceuticals to curb problems that they are encountering?
- How best can WMS help Pulse Pharmaceuticals to achieve profitability?

1.6 Assumptions/Hypothesis

- Pulse Pharmaceutical is aware of all the problems that they are encountering and possible solutions to curb all the inherent problems that they are encountering.
- Pulse Pharmaceuticals is keen to digitalize and adapt to new a warehouse management system, but they are aware of the risks [integration complexities, commitment from subordinates] and how it will disrupt their daily operations as people will go through training to be aware of how the system works.

1.7 Significance of Study

This study's findings will further reveal how having a warehouse management system will reduce all the inherent problems while improving stock management, productivity, and profitability within the organization. The findings would be of major importance in assessing how a warehouse management system can be a major tool in improving efficiency in workplace performance. Digitalizing the current system would help both management and employees resolve their problems without leading to stock outages, managing shortages, and other problems that Pulse Pharmaceuticals has been facing.

The best approach to implementing a warehouse management system will be pointing out to employees the importance and benefits of having such a system and how it will address all their problems and improve their productivity and lead to higher organizational performance.

This study's findings will redound to the company's benefit, considering that the warehouse management system will play a vital role in stock management, reordering, tracking transactions, improving customer experience, reducing stock outages, improving demand forecasting, batch management, FIFO capability, etc.

The need to adjust to efficient systems to curb problems justifies the need for an effective warehouse management system. Thus, Pulse Pharmaceuticals adopting the recommended systems derived from the results of this study will help them operate seamlessly without any predicaments.

1.8 Delimitation of the Study

The scope of this research will focus on the impact of having a warehouse management system for Pulse Pharmaceuticals and how it will ensure profitability within the organization.

1.9 Limitations of the Study

Limitations of the study are the characteristics of design or methodology that influence the interpretation of the finding from research. In simple terms, these are conditions that are out of the researcher's control that may place constraints on the conclusions of the study and their application to other situations.

Finance

The researcher might find it challenging to properly carry out a full investigation and pursue a wider range of respondents because of little funding. The researcher needed money to print out questionnaires to carry out the investigation and come up with information pointing out

problems that were currently being encountered with the organization. The researcher also needed incentives (money) to give people that will participate in this research. The incentive will lure several participants so that the information that will be gathered will be accurate.

Time

The period of the research might be limited for the researcher which may make it difficult for the researcher to exhaust all avenues in the research process. The research study should be conducted under a specific timeframe as it is an academic study to be submitted to fulfil the requirement for a bachelor's degree. The researcher will try to get time off from other school commitments and work extended hours in order to cover much ground in a limited time space.

Confidentiality

The researcher may find it difficult to collect sufficient data due to an information policy that does not allow information to be shared with third parties. Therefore, the researcher must follow a proper channel in order to obtain relevant data to carry out the study which may be successful or might as well fail. If any data is to be given to the researcher, the researcher promises not to use it for any other uses other than academic purposes.

Covid-19

The world is battling with Covid – 19 a virus that broke out in 2019 in China and following World Health Organization guidelines it may be a challenge to do research as the Covid – 19 guidelines put in place may hinder the research investigation.

Chapter 2 Literature Review

2.1 Introduction

An essential component of supply chain management, a WMS software system helps businesses manage and oversee everyday warehouse operations from the time products and supplies reach a distribution or fulfillment centre until they are sent. It enables better inventory management, resource usage, and order fulfillment by providing real-time insight over a company's full inventory, including those in warehouses and in transit. The picking and packaging procedures are further made easier by a WMS system, which also offers analytical capabilities for further optimization.

The adoption of Warehouse Management Systems (WMS) has become increasingly common among companies seeking to improve their supply chain management. Several studies have explored the benefits of implementing a WMS, including improved inventory accuracy, increased order fulfillment rates, and reduced labour costs (Bryant & Stratton, 2017; Carvalho et al., 2018; Li et al., 2019).

One of the main advantages of using a WMS is increased inventory accuracy. By providing real-time visibility of inventory levels and locations, a WMS helps companies reduce the problems associated with overstocking or stockouts. This, in turn, can lead to improved customer satisfaction and reduced inventory holding costs (Bryant & Stratton, 2017).

Another benefit of implementing a WMS is increased order fulfillment rates. By automating the order picking process and optimizing the order fulfillment process, a WMS can help

companies reduce the time it takes to process and ship orders. This can result in faster delivery times and increased customer satisfaction (Carvalho et al., 2018).

In addition to these benefits, a WMS can also help reduce labour costs by streamlining warehouse operations and reducing the need for manual data entry and physical labour (Li et al., 2019). By automating tasks such as inventory tracking, order processing, and shipping, companies can reduce the need for staff to perform these tasks manually.

However, the adoption of a WMS is not without its challenges. Some of the key challenges include the cost of implementation and maintenance, the need for staff training, and the complexity of the software (Bryant & Stratton, 2017; Carvalho et al., 2018). Companies need to carefully evaluate the costs and benefits of implementing a WMS, and ensure that they have adequate training and support in place to ensure a successful implementation.

A digital warehouse management system is essential for any business with on-hand inventory – and can help save money and gain new efficiencies in many areas. The top five benefits of a WMS system are:

1. **Improved operational efficiency:** From receiving items to distributing them, a warehouse's many procedures are automated and streamlined by a warehouse management system (WMS), which boosts productivity, ensures smooth operations, and increases a warehouse's capacity to handle large numbers. A WMS improves inventory management by decreasing mistakes in the picking and delivery of items and by getting rid of extraneous jobs. WMS software also exchanges useful data with ERP and transportation management systems, offering a thorough perspective of operations

that extends outside the warehouse walls and facilitating the easy movement of products.

2. **Reduced waste and costs:** To prevent waste and cut expenses, WMS systems may detect the products that need to be selected and sent first, especially those that are perishable or have time constraints. These technologies may also aid in understanding how to use warehouse space most effectively, from the location of merchandise to the choice of transport lanes. Some WMS systems also provide sophisticated modelling tools to design the best possible warehouse floor layouts and allocate areas for pallets, shelves, and equipment to operate at peak performance while saving time and money.

3. **Real-time inventory visibility:** Using techniques like barcoding, RFID tagging, and sensors, a warehouse management system (WMS) gives real-time insight into your inventory as it travels into and around your warehouse. The capacity to create more accurate demand projections, execute just-in-time inventory strategies, and improve traceability—all of which might be essential in recall scenarios—are made possible by this visibility.

4. **Improved labour management:** A warehouse management system (WMS) can help with labour demand forecasting, personnel scheduling, travel time optimization, and work assignment based on location, talents, and other considerations. A good WMS system may raise worker morale and increase productivity by establishing a safe, secure, and organized work environment that values employees' time and ensures their efforts are put to good use.

5. **Better customer and supplier relationships:** A warehouse management system (WMS) may improve order fulfillment, lower mistakes, and speed up delivery times to increase customer satisfaction and loyalty. A WMS may also assist suppliers by

reducing their wait times at ports and loading bays, which improves their relationship with the company. The three main types of WMS software are standalone, cloud-based, and integrated with supply chain management systems or ERP systems. Each of them has advantages and disadvantages of its own, and the optimal WMS solution depends on the particular requirements of the company.

- **Standalone WMS:** Typically, standalone WMS software is deployed on a company's premises using its own hardware. This sort of system has the benefit of supporting higher levels of customisation, even though doing so can be expensive, and giving the company more power over its data and software. Although the initial prices of these systems are often greater than those of the other choices, once they have been acquired, they become the company's property. The system must be updated and maintained by the organization, and this might cost money over time. It may become more difficult to deploy modern technology and integrate the system with other platforms as it gets older.

- **Cloud WMS:** WMS solutions that use the cloud may be set up more rapidly and for less money. They are easier to expand as businesses expand since they are delivered as software-as-a-service (SaaS), giving firms more flexibility to adapt to seasonal and irregular changes in market circumstances. Faster innovation is made possible by routine upgrades for cloud-based warehouse management. With this choice, maintenance and updating duties are given to the seller. SaaS companies offer disaster recovery capabilities and devote a significant number of resources and experience to guaranteeing the system's security. Cloud warehouse management systems also make it easier to integrate with other products.

- **Integrated ERP and SCM-based WMS:** Some warehouse management solutions are made to work as applications or modules that can be included into supply chain and

ERP platforms. The fundamental benefit of them is that they function better with concurrent frameworks, like those used in business intelligence or accounting. They give a thorough picture of all of the company's departments and the logistics network, allowing for clear visibility and facilitating the coordination and simultaneous implementation of warehouse operations and logistical procedures. All things considered, these skills can boost operational productivity and enable quick, flexible fulfillment.

- The core features of a warehouse management system support these activities in the following ways.

Receiving and put-away process

By simplifying the receiving, processing, and storage of commodities according to warehouse flow and business regulations, warehouse management systems (WMS) increase efficiency. In the past, to receive and match things against actual receipts and purchase orders, these processes were carried out manually using techniques like pen and paper. The majority of warehouses now employ WMS systems, which allow for the use of RFID technology and interaction with other software to automatically accept, validate, and reconcile products against digital purchase orders using a barcode scan. This method is still utilized in certain smaller warehouses, though. Additionally, these systems include labels for easier organization and retrieval and connectivity with invoicing applications.

Inventory management

Using automated identification and data capture techniques, warehouse management software enables real-time tracking of inventory across any location, including things in transit and in shops. Some systems offer extensive analytics and insights on the success of the products and vendors by incorporating features like cycle counting and demand forecasting. Businesses may

utilize this data to modify inventory levels and make sure there is adequate inventory to satisfy consumer demand, whether those customers are making in-person or online transactions. Warehouses may increase order rates—that is, the percentage of orders that are complete, on time, undamaged, and with accurate invoices—by precisely managing inventory and using unique processes and choosing logic.

Order picking, packing, and fulfilment

WMSs (warehouse management systems) can save costs by offering advice on the most effective ways to store, retrieve, and pack goods. Advanced picking technologies including radio frequency (RF) scanning, pick-to-light, pick-to-voice, robots, and picking route optimization algorithms are supported by these systems. Utilizing strategies such as wave picking, cross-docking, zone picking, batch picking, and put-wall systems, certain WMS solutions streamline order fulfillment. These functions simplify the fulfillment procedure and boost warehouse productivity.

Shipping

Numerous warehouse management and logistics software integrations enable a variety of ways to speed up the fulfilment process, such as the automatic generation of bills of lading, packing lists, and invoices for shipments, as well as the sending of automatic shipment notifications. Businesses can monitor whether packages arrive on schedule and at the right location using real-time tracking options.

To get this properly pays off. Most goods are off the port and on their way to their destinations on schedule thanks to best-in-class warehouse operations.

Labour management

The usage of warehouse management systems (WMS), which offer real-time visibility into labour-related expenses and productivity gaps, may help warehouses increase their efficiency and cut costs. Businesses may make better judgments and change their operations by studying this data. WMS systems may assist with planning and scheduling, either directly or through interaction with other systems, and they also facilitate task interleaving to save workers' travel time. Some WMS solutions also improve labour allocation in the warehouse and lessen "deadheading," or unnecessary time. In general, a WMS may offer significant insights that support businesses in operating leaner, more effective warehouse operations.

Warehouse metrics and analytics

A WMS may collect real-time data automatically rather than using manual techniques, which reduces keying mistakes and expedites the process. To measure crucial parameters, like on-time shipment, inventory accuracy, distribution costs, order or line fill rate, and order cycle time, this data may be combined with analytics. In general, a WMS may offer a more precise and effective method of data collection and analysis to assist warehouses in making better informed decisions.

Features of a Warehouse Management System THAT are preferable for Pulse Pharmaceuticals and how they will aid in curbing all the inherent problems that they have been encountering.

<u>Order from the Supplier</u>

- Placing an order to the supplier
- Pre-capture goods receipt information before the shipment arrives at the warehouse.
- Dashboards available to monitor and report on expected shipments.
- Streamline the receiving process once the shipment arrives, due to information already being captured into the system.

- Manage Shortages

Receiving

- Confirmation of stock received into the warehouse.
- Record batch details.
- Record multiple information associated with the shipment.
- Record notes associated with shipment [damages, shortages, etc and store accordingly]
- Generate necessary goods received documentation.
- Generate label [batch, code, who received]

Stock Control

- Batch Management – Drill down to batch numbers, manufacturers/suppliers, and expiry dates.
- Serial Number Management-Record and tracking serial numbers throughout the system.
- Stock Count – Conduct full stock counts including variance checking, re-counts, and variance acceptance.
- Stock Adjustment – Adjust and transfer stock quantities, batches, and locations. User level protected, fully audited for reporting.
- FEFO capability
- WMS connected to accounting software. For Pulse they use Pastel.
- Picking
- Pick Management

Packing

- Delivery Note – Automatically generate a delivery note to eliminate manual bills.

- Generate delivery labels for sticking to packed goods.
- Verification Mechanism

Dispatch

- Integration to third-party dispatch systems. At Pulse Pharmaceuticals they use SWIFT.
- Load Assembly - Allocate completed picks to vehicles, plan loads or routes, and print load sheets.
- Customer Delivery Confirmation-POD [sign-off on mobile devices screens]

Reverse Logistics

- Manage the return process from the collection at the customer to receipt at the warehouse.
- Stock evaluation process to determine whether goods should go back into stock, damaged or back supplier.
- Reporting to monitor and manage returns.
- Connected to a credit note.

Report

Should have a comprehensive reporting capability with the following report formats:

- On-screen view
- Printout
- Excel
- Email

Chapter 3

3.1 Introduction

This chapter gives an overall look on how the research is going to be conducted and thus research methodology. Research methodology is the methodical planning of a study by a researcher to provide accurate and trustworthy results that address the research aims and objectives. The chapter will discuss research design, research process, data analysis, data collection instruments, and research ethics amongst other factors.

3.1 Research Design

According to (Cooper & Schindler, 2011), a research design is a plan and structure of investigation so conceived as to obtain answers to research questions. (Ravi Kumar, 2000), 21 | Page views it as planning the overall design carefully. (Badger & White, 2000), indicated that the term research design covers material issues associated with the research, it includes the objectives of the research and selection of appropriate methodology, data collection techniques, and possibly how all this is linked with literature. Research design can either be classified as quantitative or qualitative (Saunders & Tosey, 2013). In this study, a qualitative approach will be used.

3.1.1 Survey research design

(Weisberg, 2005) defines a survey as a data collection device used for gathering information about groups or individuals. As a matter of fact, researchers should plan and conduct the survey in a systematic manner (Saunders & Tosey, 2013). Surveys can either be descriptive or explanatory. In this study, the researcher will employ the survey research design, which is meant to collect data from the accountants, pharmacists, Warehouse Clerks, IT Department, Procurement Officer, Sales Reps, Distribution, and Management. According to (Saunders & Tosey, 2013) such findings can therefore be generalized to the target population, and this was

one of the major reasons for the use of the survey research design. A survey design provides a quantitative or numeric description of some fraction of the population (sample) through the collection of data, a process which also involves the asking of questions, (J W Creswell, 2014).

The purpose of the proposed study is to describe and analyze the effects of a WMS on Pulse Pharmaceuticals. Using survey questionnaires and interviews, survey research techniques may collect a lot of data from both big and small groups. Despite the fact that these approaches are often accurate, careful sampling procedures must be used to guarantee a reliable interpretation of the results. Survey research can be restricted to a manageable, limited population. However, respondents might not give truthful, accurate responses, and non-responses could lead to biased and inaccurate statistics.

3.1.2 Qualitative research

In this study, the researcher will employ a qualitative research design strategy, which forgoes the use of analytical quantitative techniques. The objective is to investigate the significance of a phenomena from the viewpoints of participants, and in order to achieve this, the researcher will choose a group that has a similar culture and investigate how common behavioral patterns emerge among them through time—a method known as ethnography. According to author John W. Creswell in 2017, observing participants' behavior throughout activities is a crucial component of gathering data in this method.

According to (McMillan and Schumacher, 2002), qualitative research is an inductive procedure for categorizing data and finding patterns or links. This indicates that the study contexts organically provide meaning and data, and the methodology combines observations, interviews, and document reviews. In qualitative research, the significance of examining variables in their natural environments and taking into account their interactions are emphasized. Direct quotes are used to elicit comprehensive information from respondents in open-ended inquiries.

3.2 Target population

The population is the total of all species of the same group dwelling in one area (Hartl, 2007). (Bhattacherjee, 2012) the defined population as all people (unit of analysis) containing characteristics the researcher wishes to study. In other words, it encompasses the entire set of data from which a sample is drawn. The target population for this study is the accountants, pharmacists, Warehouse Clerks, IT Department, Procurement Officer, Sales Reps, Distribution, and Management.

Management, Sales, Procurement, Pharmacist and Accounts are the parties that are involved in the ordering committee. Sales notify the management of the products that are in demand within the market forecasting quantities needed and how they are going to sell these products. The Management together with Accounts will decide whether it wise to buy the products, do costing and see if the price will be favorable for their customers. Procurement and Pharmacist then work together in placing the order to our supplies adhering to all MCAZ guidelines. Once the order has been processes and delivered the warehouse receive the goods and so all the processes involved in the warehouse through to goods dispatched. Once dispatched Distribution do all the deliveries to all the pharmacies in Harare. Swift delivers all out of Harare goods. This is the reason that the researcher had to choose these people from such departments since they are the ones involved and the ones that are encountering the problems.

3.2.1 Sampling and sampling techniques.

A sample is a group of subjects from whom the researcher collects information, (Scott, Mannion, Davies, & Marshall, 2003). A sample is a small part of the population, which has the same characteristics as the population. There are two types of sampling methods namely probability and non-probability sampling (Saunders & Tosey, 2013).

It is important to note that individuals who work in the following departments, Accounting, Management, Procurement, Warehouse, IT, Sales, and Distribution will be chosen randomly. (Levin, 2004) defines a sample as a collection of some, but not all the elements of the population under study used to describe the population.

Sample is the process of selecting a subset of data from a defined sample frame or the full population in order to draw conclusions about the population or generalize in light of the selected sampling strategy. (Ravi **Kumar, 2000) asserts that nonprobability sampling strategies are appropriate when it is impossible or unclear how many variables there are in a population. Understanding what sampling is and why researchers choose a sample is essential before looking at the many types of sampling techniques.**

This feature made the approach suitable for the research since there are quite a several people in the Organization [Pulse Pharmaceuticals] and it would have been impossible to have them all under study at a given time e.g., Marketing, HR and IT Department. (Creswell, 2017) states that research may seek to gather a significant quantity of data from a small number of people or a little amount of data from a big number of people, as in a user study or ethnographic interview. In either situation, sampling is employed to allow researchers to ask participants more questions and get more detailed data than they could by conducting a population-wide survey. For this particular study, 40 questionnaires will be given out, one to each participant.

3.3 Types of sampling methods

Probability Sampling Methods

1.Simple random sampling

According to the search results, basic random sampling entails choosing individuals from a population at random with an equal chance of selection for each person. This approach is regarded as one of the simplest techniques to produce a random sample, and it can lessen selection bias and enable the estimation of sampling error. However, it could be difficult to set up a thorough sample frame and get in touch with everyone, particularly if they are geographically spread and several kinds of communication are necessary. Additionally, if a given attribute is scarce, employing basic random sampling could not provide enough people who have that characteristic.

2. Systematic sampling

In order to achieve an adequate sample size, systematic sampling includes picking people from a sampling frame at regular intervals based on the results of the search. Every x/nth person in the sampling frame should be chosen if the required sample size is n from a population of size x. While systematic sampling might be more practical and straightforward to carry out than straightforward random sampling, it also has drawbacks. For instance, if the sampling procedure coincides with underlying trends in the ordering of people in the sample frame, bias may arise.

3. Stratified sampling

The search results indicate that stratified sampling entails breaking the population into subgroups, or strata, that have a common trait in order to guarantee representation from all subgroups. When it is anticipated that the measurement of interest would differ amongst the subgroups, this strategy could be selected. Using stratified sampling can assist increase the

results' accuracy and representativeness while lowering sampling bias. It does, however, need knowledge of the proper sample frame features, which may not always be accessible. It might be difficult to decide which characteristic(s) to stratify by as well.

4. Clustered sampling

According to the search results, cluster sampling entails employing population subgroups as the sample unit rather than a single person. Clusters are created from the population and are chosen at random to be a part of the research. All participants in the study are included in single-stage cluster sampling, but in two-stage cluster sampling, a subset of participants from each cluster is randomly selected. When research is conducted across a large geographic area, this method may be selected since it can be more effective than simply random sampling. If the selected clusters are not representative of the population, it carries a higher risk of bias and might increase sampling error.

Non-Probability Sampling Methods

1. Convenience sampling

Convenience sampling is perhaps the easiest method of sampling because participants are selected based on availability and willingness to take part. Useful results can be obtained, but the results are prone to significant bias, because those who volunteer to take part may be different from those who choose not to (volunteer bias), and the sample may not be representative of other characteristics, such as age or sex. Note: volunteer bias is a risk of all non-probability sampling methods.

2. Quota sampling

Quota sampling is a non-random approach that is frequently used by market researchers to choose participants. With this approach, interviewers are instructed to find a certain number of respondents who fit particular criteria, preferably proportionate to the general population. This technique offers the benefits of being straightforward and representative, but because sampling is not random, it may not be representative of other traits that are not taken into account.

3. Judgement (or Purposive) Sampling

This strategy, sometimes referred to as selective or subjective sampling, depends on the researcher's judgment when deciding who to ask to participate. Thus, in order to meet their goals or take a certain approach to people who exhibit a given attribute, researchers may implicitly select a "representative" sample. The media frequently use this strategy while doing qualitative research and polling the public.

The benefit of judgment sampling is that it produces a variety of results while taking up little time and money. (Particularly useful in qualitative research). In addition to volunteer bias, it is also vulnerable to researcher mistakes of judgment, thus even while the findings may be general, they may not be representative.

4. Snowball sampling

When examining difficult-to-reach groups, this strategy is frequently utilized in social sciences. The sample grows in size like a snowball when existing participants are asked to suggest more subjects they know. For instance, participants may be requested to suggest additional users for interview when conducting a study of risk behaviors among intravenous drug users.

When it's challenging to pinpoint a sample frame, snowball sampling might be useful. Selecting friends and acquaintances of individuals who have previously been examined, however, carries a considerable risk of selection bias. (Choosing many people with similar characteristics or views to the initial individual identified).

3.4 Data collection techniques.

It is common practice to design tasks or activities that promote participant involvement around a specific subject in order to collect research data. The methodology chosen for data collection, which is covered in earlier chapters, is largely determined by the study's goals and questions. It is crucial to remember that these may alter over the course of qualitative research, though. A questionnaire and an observation plan may be used by the researcher to gather the required data for the study. Although it appears to have nothing to do with the original material given, this information was found via research.

3.4.1 Questionnaire

A questionnaire is a tool used to collect data that consists of a number of questions and other prompts to ask respondents for information. Sir Francis Galton devised the questionnaire. (Gray, 2011). It was utilized to collect responses from the individuals in a consistent way and was extremely suitable to the study. In order to obtain results that are statistically significant, especially when resources are scarce, questionnaires enable the gathering of both subjective

and objective data from a sizable sample of the study population. However, just like any other informational medium, they have benefits and drawbacks.

A questionnaire with both closed- and open-ended questions will be utilized to gather the data for this investigation. While the open-ended questions will provide the participants the ability to voice their thoughts, the closed-ended questions will primarily focus on gathering background information from the replies. Bell (2007) claims that using questionnaires to gather data is a cost-effective strategy, making it appropriate for this study. The surveys are simple to deliver to the chosen firms, saving a lot of time. This information was taken verbatim from the text that was given.

Both open-ended and closed-ended questions will be included in the questionnaire used for this study; the former will provide respondents the ability to express their thoughts completely while the latter will be utilized to obtain general background data on the participants. With open-ended questions in particular, the anonymity element of the questionnaire guarantees that responders may answer honestly with ease. Because there will be no time constraints, respondents will be free to consider the questions before responding. This technique is a cost-effective strategy that ensures there will be few mistakes due to the researcher's personality and attitude. These ideas came up during a search for pertinent sources, although they don't seem to be immediately connected to the first paragraph offered.

3.4.2 Observation Guide

According to Gray (2011), observational research can successfully accomplish its goals if it records pertinent persons and events in addition to its target components. Observation’s entail

seeing individuals in action while documenting and evaluating their behaviour. In this study, covert observations—where participants are not aware they are being watched—will be used. People may alter their behaviour when they are aware that they are being observed, altering the validity of the results, hence covert observations are helpful. Gray (2011) points out that secret observations can be thought to be immoral. These ideas were discovered through a search of pertinent sources, but they don't seem to be immediately connected to the given beginning material.

Even though it has been proven that the observational research approach is effective at capturing important events and participants, as well as constructs of interest, others contend that covert observations might be seen as immoral. However, Orton (2000) believes that it is acceptable to carry out covert observations since individuals frequently obfuscate the truth with falsehoods or misleading information. If covert observations are made, privacy must be upheld, and the identities and whereabouts of the people being watched shouldn't be shared. Observational data can add to our understanding of the subject under study. During random visits to Pulse Pharmaceuticals, the researcher will move about and make clandestine observations for this study. These ideas are closely linked to the original content that was supplied and were discovered through a search of pertinent sources.

3.5 Data presentation and analysis

Data analysis refers to the separation of elements of research data to expose some general principles that can be utilized to explain the nature of the phenomenon being investigated and can be applied in other contexts (Campbell, Gregory, Patterson, & Bybee, 2012). For purposes of this study, data will be analyzed using tables, graphs, and a summary of each of the information for each question. The open-ended questions in the questionnaire as well as the observation findings will be analyzed and reported verbatim and in other cases, their comments will be integrated into a summary gathered from closely related responses.

For the data gathered to be useful, the findings will be organized to establish patterns and logical and coherent conclusions. The importance of analyzing data is to bring out some emerging themes from the data collected and thus conclusions can be made on whether research objectives were achieved or not. Data will be analyzed and presented using frequency tables, bar and line graphs, and pie charts. Tables bars and line graphs were used to present both qualitative and quantitative data.

3.6 Ethical considerations

Ethics is acquired from the Greek word "ethos" which refers to character or customs or acceptable behaviour. (Churchill, 2005) defined ethics as moral principles and values that govern the way in which an individual or group conducts their activities (Creswell, 2014), says that there is always tension between doing research for the good of others, while also ensuring that the rights of participants are protected. Therefore, the implication for ethics for this study is to encourage full disclosure of information by maintaining a balanced relationship of mutual trust between the researcher and the participants. The study will take into consideration the following ethical principles; The researcher only involved participants with their consent or knowledge.

The researcher will make the respondents truthfully aware of the research before they answer any questions. None of the respondents will be manipulated and based on their judgment they will be retained the right to support or withdraw from the study. The researcher will shed light by first introducing himself, the research, its purpose, and the importance of the study. There will be no use of force or coercion upon the participants. The respondents will have to reserve their self-will, and solely share their decision whether to be subjects of the study or not since the choice will theirs. In other words, respondents will participate voluntarily and not of obligation (Campbell et al., 2012).

There must be an ethical stance from the researcher concerning the professional treatment of the information provided by the respondents. The anonymity and confidentiality of the respondents and their responses will be upheld and guaranteed throughout the duration of the study. This is because there will be referencing to any specific respondent whether by use of name or code or any means of identification. The respondents won't be followed up for the answers they will give even on questions that sounded sensitive.

The ethical principle of justice will be observed, and all respondents will be treated with equal respect and dignity throughout the conduct of the study. The researcher will also respect the stakeholders concerned and those who would find the study useful. Gratitude was also sincerely expressed to all the respondents who will take their time to willingly participate in the study.

3.7 Chapter Summary

The chapter discussed the research methodology. The study will be descriptive research, researching on how a Warehouse Management System will help Pulse Pharmaceuticals with stock management. It will employ qualitative and quantitative research techniques and make use of inductive thinking to add to the existing body of knowledge.

Chapter 4

4.1 Introduction

This chapter provides a detailed analysis of the information gathered by the researcher Pulse Pharmaceuticals. The fact that the data was mostly gathered from primary data sources is made very evident. The information (data) that was gathered has been meticulously documented with special attention to detail. It has also undergone critical analysis and is provided in this chapter. I employed both qualitative and quantitative data sources to generate the data, which I then critically analysed, reviewed, and synthesized to produce a tangible body of knowledge that enables me to produce good and pertinent suggestions.

The research employed both quantitative and qualitative study since it involved the creation of numerical data that can be transformed into usable statistics and the construction of quantifiable formulae. In this case quantitative approaches are used to build relationships in a numerical manner because they serve as the best means to prove research hypotheses and a better way to produce reliable outcomes. The researcher noted that the respondents were quite aware of the subject matter.

4.2 Presentation and Analysis of Data

4.2.1 Primary Data

Questionnaires Response rate.

I grouped my questionnaires and distributed them to the respective 4 departments of the Pulse Pharmaceuticals company. I distributed 25 questionnaires and the respondents were the

working personnel in the accounting department, procurement, warehouse and the management department. the respondents clearly outlined their responses in the questionnaires given. The questionnaire response rate was 24 out of 25 which is 96%. Below tabulated is the questionnaire response rate.

Department	**Targeted respondents**	**Successfully conducted**	**Percentage%**
Accounting	10	10	40%
Warehouse	10	10	40%
Management	3	2	8%
Procurement	2	2	8%
Total	**25**	**24**	**96 %**

Table 3 Questionnaire response rate

Data source; Primary Data

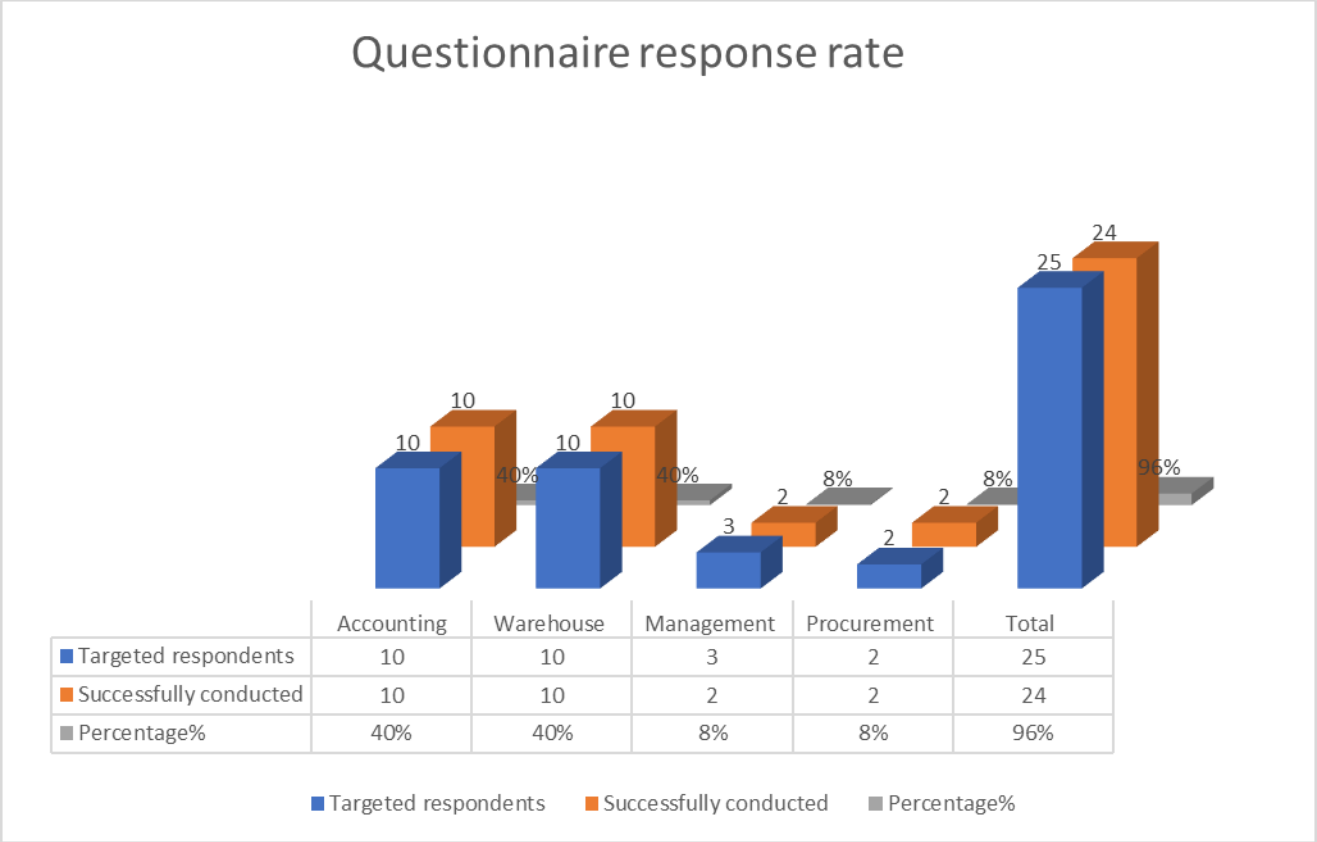

Figure 1 Graphical presentation of the questionnaire response rate

The information tabulated above shows that the questionnaire response rate was 96 percent (96%). Out of the 25 targeted respondents 24 of them manage to attend the questionnaires with only one person not being able to attend to the questionnaires due to work logistics. Moreover, the respondent filed his apology and communicated earlier on his inability to attend to the questionnaire. Yousuf, M (2020) commented on 50% and above response rate as being fit for the research to be taken ahead as there are lower chances of having bias. Thus, being it, the questionnaire response rate was 96% and there was no obstacle that would hinder the research from being done hence the 96% qualifies the data to be significantly sufficient with regard to information validity and reliability.

4.2.2Primary data emerging from the questionnaires

Background information; number of years served on the firm.

Number of years	0<5years	5<10years	10<15years	15years <	Total
Respondents	5	4	6	9	24
Percentage	**20.8%**	**16.6%**	**25%**	**37.5%**	**100%**

Table 4 Duration on Pulse Pharmaceutical company.

The table above shows the information about the length of service the respondents have been in the company. Shown above is that, a higher percentage of the respondents have served in the company for more than 15 years. This is denoted by 37,5% and also 25% is of people who have served for 10-15 years in the company while 16.7% is of people who have served for 5-10 years. Lastly 20,8% of people have been in the company for 0-5 years. The company was established in 2004 and it has 19 years of successful operation and henceforth 79.2% of the respondents have been in the company for five years and above. Therefore, the greater the proportion of the company workers with more than five years of experience, the more reliable and impartial the information the researcher will receive because these workers have seen a lot in their time of service in the company.

4.2.3 Problems associated with the current system.

Below discussed and tabulated are results from the questionnaires and interviews conducted by the researcher with regards to the problems currently facing the manual warehouse system that is currently in use.

Whole Warehouse Workstation	Strongly NO	NO	Uncertain	Yes	Strongly yes	Total

Have you ever encountered any problems with tracking expiry dates	0%	0%	12.5%	52.5%	35%	100%
Have u encountered errors with tracking variances	0%	8.3%	0%	33.3%	58.4%	100%
Difficulties in solving cases that have to do with delivering wrong products to customers.	0%	0%	4.2%	41.7	54.1%	100%
Untimely processing and delivery of goods	4.2%	12.5 %	0%	16,7%	66.6%	100

Table 5 Problems associated with the current system

Indicated above are problems associated with the current manual warehouse system. Of the total respondents, 87% of the respondents agreed to the notion that they have encountered problems with tracking expiry dates; (52.5%) was s YES while strongly YES was (35%) respectively. 91.7% of the respondents also agreed that they encountered errors with tracking variances using the current system. More to that, 95.8% of the respondents articulated that this current manual warehouse management system is characterised by many flaws such as delivering wrong products to the customer. In addition to that 83.3% of the research respondents claimed and strongly agreed that there was untimely processing and delivering of goods due to this manual system. There was a very small percentage of the people who were uncertain, who strongly disagreed and disagreed with various notions discussed above.

4.2.4 Do you have any experience on use of the WMS?

Attitude	**Strongly no**	**No**	**Not sure**	**Yes**	**Strongly yes**	**Total**
Frequency	9	8	1	4	2	24

Percentage	37,5%	33.3%	4.2%	16.7%	8.33%	100%

Table 6 Respondents' experience on the use of WMS

Above tabulated are the results of the conducted research with the need to know whether the respondents had any experience with use of the Warehouse Management System.

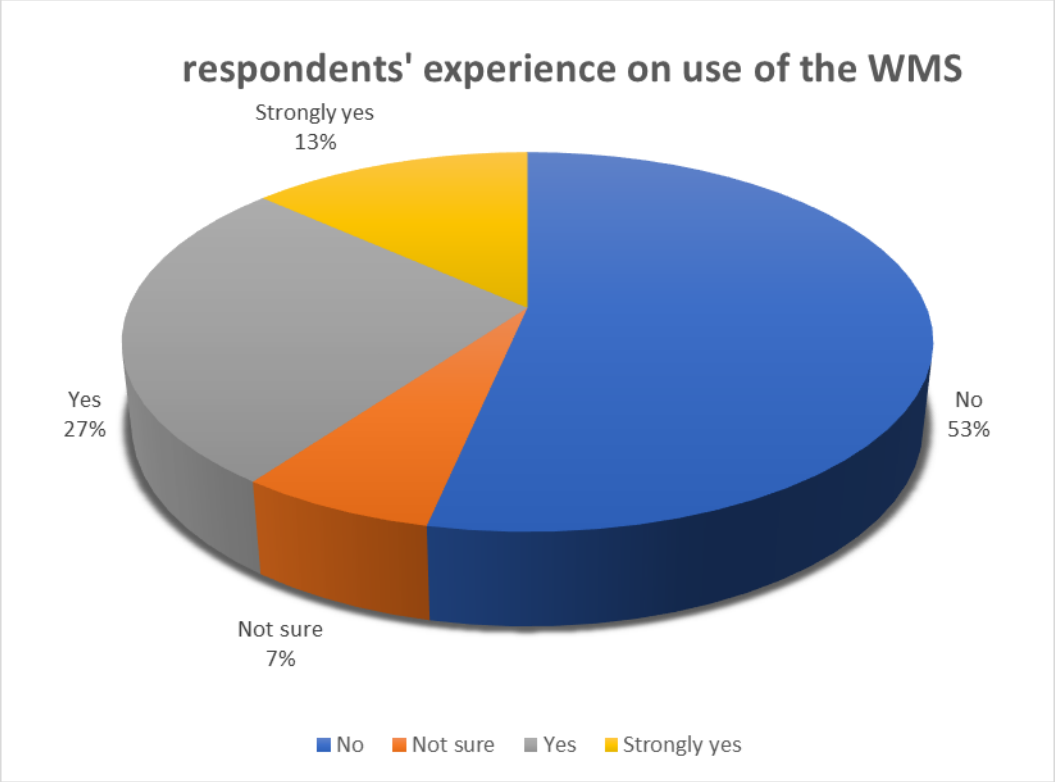

Figure 2 Respondents' experience on use of the WMS

The graph clearly shows that a bigger percentage (53%) of the respondents had no experience on the usage of the WMS and had never used it before while 7% of the people were not sure if

they had experience on the WMS. 27% percent of the people had experience and 13% had a strong experience on the functionality and usage of the WMS.

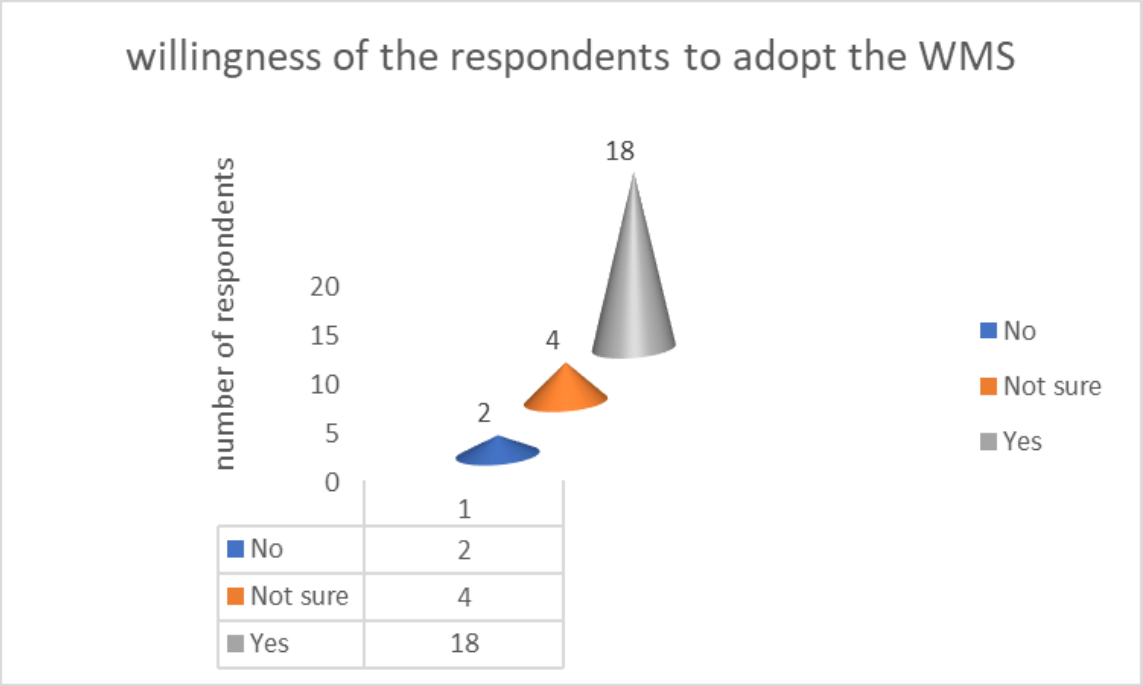

Figure 3 Willingness of the respondents to adopt to the WMS

Source - Primary data

From the research conducted more than half of the respondents 18 of 24 (75%) were willing to adopt a new warehouse management system regardless of some few individuals (4/24) who are not sure if they are to adopt it and only two respondents were not willing to adopt the system. "We *are used to a manual system which is highly flawed and we encounter difficulties on day-to-day operations*" said one of the respondents. There is a greater chance of adopting this WMS since above 50% of the respondents are willing to adopt the system. This will allow the smooth implementation of the WMS as it is greatly embraced. "*The operations of this company will be pushed albeit and be easier to do carry out since they will be digitalized and optimized if a WMS is implemented,"* another respondent exclaimed during the research.

4.2.6 Motives for establishing a Warehouse Management system

Table

Attitude	Strongly agree	Agree	uncertain	disagree	Strongly disagree	Total
Optimizing and digitalizing processes	16	6	2	0	0	**24**
	66,7%	25%	8.3%	0%	0%	**100%**
To process and deliver orders in time	20	3	0	1	0	**24**
	83.3%	12.5%	0%	4.2%	0%	**100%**
To deliver rightful products to customer	14	6	4	0	0	**24**
	58.4%	25%	16,6%	0%	0%	**100%**
To help in product decisions	15	9	0	4	0	**24**
	62.5%	37.5%	0 %	0%	0%	**100%**
To reduce costs from human error.	14	8	2	0	0	**24**
	58.3%	33.4%	8.3%	0%	0%	**100%**

Table 7 Motives for establishing a Warehouse Management system

Source type; primary data; The respondents gave motives for implementation of the Warehouse Management System.

4.2.6.1 Optimizing and digitalizing the process.

The study presumed that due to the work in the company being manually done, the use of the Warehouse Management System will enhance the optimization and the digitalization of the process. And this, does not only make work easier for the workers but also increase the efficiency and the operational capacity of the business. The results obtained entails that in total

91,7% of the respondents agree that the installation of the warehouse Management System will optimize and digitalize the processes. The remaining 8.3% is uncertain if this optimized or digitalized the processes. The usage of the WMS allows the inventory management even at unprecedented levels and by so doing, the current needs are always met and customer service is optimized.

4.2.6.2 To process and deliver orders in time.

Pulse pharmaceutical company uses a manual system of entering sells data into the books and this is very laborious and exhaustive. In the research conducted, 83.3% and 12.5% of the respondents strongly agreed and agreed respectively with only 4.2% in disagreement to the notion. The use of the Warehouse Management system leads to improved operational efficiency since the system automate and streamline warehouse processes from inbound to outbound deliveries timeously.

4.2.6.3 To deliver rightful products to customer

The research conducted shows that 58.4% and 25% strongly agreed and agreed to the notion that the usage of a WMS is to deliver and rightful products to the customers while only 16 % was not certain (uncertain) with the notion. By using a WMS this allows the rightful goods to be delivered to customers since there is inventory tracking, picking, receiving and put-away features that allows timely delivery of customer orders and to the right customers and as well notifies them about the same.

4.2.6.4 To help in product decisions

100 % of the respondents agree with the notion that the WMS helps in product decisions. This is seconded by 62,5 and 37,5% strongly agreeing and agreeing respectively to the WMS being

able to help in product decision making. Nikunj Gundaniva (2016, May 06) postulated that with data as current as the most recent order, shipment, or receipt and any movement in between, a company may manage inventory in real-time using a warehouse management solution or an enterprise resource or product planning system for warehouses. This means that the utilization of a warehouse management system aids in product decisions.

4.2.6.5 To reduce costs from human error.

The current system is characterised by many flaws and has higher cases of human errors which are costly to the business. The implementation and the installation of the WMS will help in reducing costs from human error. The conducted research shows that the 91.7% of the people are in agreement with the notion denoted by 58.7% and 33.4% strongly agreeing and agreeing respectively. The WMS systems can help lower these costs by guiding the most efficient way to store, retrieve, and pack products. Roh, T., et al., (2022). The system also supports picking technologies that streamline the process, such as radio frequency (RF) with and without scanning verification, pick-to-light and pick-to-voice technology, robotics, and algorithms that can help optimize picking paths that all help to streamline order fulfilment hence minimizing cost incurred through human errors.

4.3 Discussions and interpretation.

Based on the results obtained from the research conducted, it is assumed that the company is not using an automated warehouse Management System however it is basing its operations on the manual warehouse management system. The research conducted was mainly based on investigating into the effects of having a WMS warehouse management system at Pulse Pharmaceutical company and to this stage it has been tested and tried that there is a greater

advantage that comes with the implementation of the WMS on the area of study as discussed below.

Questionnaires were administered to the respondents and interviews were conducted to gather information on what actually is the effect of having a WMS. The study began by presenting the respondents' views in relation to their understanding on the subject matter, the problems that are currently affecting the business and the ills of the current manual system. From the analysis of the problems associated with the current manual system, it is apparent that the Warehouse Management System (WMS) is a worthwhile decision as the benefits from it outweighs the costs.

All interviewees noted that the WMS is a growth strategy for the business as well as a way to reduce problems that occur inter-departmental as well as between supplier and company and between customer and the company. These findings have led this study to conclude that the WMS is the best way to go to optimize and to digitalize the operating systems thus reducing unnecessary costs incurred by the company hence creating a less labour-intensive work environment that is supported by automation and robotics in work place Roh, T.et al, (2022). From all the views discussed in this section, the majority seem to believe that the motives discussed include optimizing and digitalizing processes, process and deliver orders in time, delivering rightful products to customer to make product decisions and lastly to reduce costs from human error.

The manual warehouse management system that currently prevails in the company is labour intensive, it is highly flawed thus being characterised by many problems arising not only from the shop floor but also from the manual handling of the work load that results in problematic situations arising between the company and customer as well as across operating departments.

As the objective of the company as from 2 Decades ago, is to expand the company operations and to operate at a very high capacity, the company has reached a point where it is very necessary to adopt the WMS as it makes operations easier and be quick to be performed.

It is of greater importance to note that the respondents are facing difficulties with the manual warehouse system that is quite vulnerable to human error. Nikunj Gundaniva (2016, May 06) This manual system is characterised by problems such as accidental redundancy, bad/ improper warehouse management. This manual warehouse management system has been proved to be problematic in setting buffers stock of the quick/fast moving products as well as it reduces the preparedness of seasonal demands and hence pronounced is unsatisfactory order management. (Campbell et al., 2012), Due to prevalence of errors, the manual warehouse system causes costly inventory shortages or stockouts that affect business's bottom line.

The researcher noted that the greater proportion of the respondents 75% was ready to embrace

Findings from the research carried out shows that a bigger percentage (53%) of the respondents had no experience on the functionality and usage of the WMS. This indicates that this was a new system that was about to be implemented. In addition to that the respondents at Pulse Pharmaceutical company were more than eager to adapt to change and to adopt a new warehouse management system despite the lack of experience on the subject matter. The respondents were very much enthusiastic to wanting to implement a new system. Lanjing, w, et al. (2022) pushed forward the necessity of having a Warehouse Management System and with the current situation in the Pulse pharmaceutical company, it is high time the WMS is in cooperated.

4.4 Chapter summary

The Chapter was meant to present, analyse, discuss and analyse the data that was obtained from research. Both primary and secondary data were used in this chapter. Data presentation tools of bar graphs, pie charts and tables were used to aid responses that were obtained from the research. Close analysis has been done to both quantitative and qualitative data and a number of findings were obtained as explained below.

- The majority of the targeted respondents exclaimed that the company was having problems with the usage of manual warehouse management system since the operations were problematic and at times results in costs and losses being incurred.
- Both the interviews and the questionnaires conducted showed that a greater percentage of the respondents had no experience with the operations of the WMS but were eager to embrace it and to adapt to it on point of implementation
- The motives that necessitate the implementation of the WMS to Pulse Pharmaceutical company have a positive result towards addressing the problems associated with the current manual warehouse system.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter will mainly focus on giving a summary of the major research findings from the study on the effects of having a WMS (Warehouse Management System) at Pulse Pharmaceutical company. Other aspects that are to be discussed in this chapter include conclusions, implications, recommendations and suggestions for further study.

5.2 Discussion

This research was concerned with the effects of having a Warehouse Management System at Pulse Pharmaceutical company. The objectives of this study were to analyse and identify the problems being encountered from the ordering stage, receiving goods into the warehouse, storage into the warehouse, order picking, dispatch, and deliveries. Another objective is to outline possible benefits and appropriate measures that must be taken by Pulse Pharmaceuticals to curb problems emanating from having a manual system.

To achieve the aims and objectives of this research project, the researcher conducted the study utilizing significant thoughts, ideas, and concepts from various academics examined using electrical journals, prior thesis, and primary data from respondents. The researcher employed research tools to complete this study, including questionnaires and interviews, and Microsoft Excel was used to analyse quantitative data through the creation of graphs and charts.

5.2.1 Addressing the Research Questions

5.2.1.1 How and ways in which the current system affected the warehouse's complete transactional process from goods purchased and received to goods dispatched?

The research study results from questionnaires, observations and interviews shows that the company uses a manual warehouse management system which has been projected to have a significant impact on the warehouse's complete transactional process from goods purchased and received to goods dispatched. This process is prone to errors, delays, and miscommunications, leading to delays in receiving and stocking the goods. Thus 87% of the respondents agreed that the current system is characterised by problems that arise on daily basis.

When the goods finally arrive at the warehouse, they need to be checked, labelled, and entered into the system manually. This process can be time-consuming, and there is a higher risk of human error, leading to discrepancies in the inventory levels. In addition to that, with a manual system, inventory management can be challenging as it requires manually updating the stock levels, tracking the goods' movements, and monitoring the expiry dates. This process can be overwhelming for the warehouse personnel, leading to inaccuracies in the inventory levels and inefficient use of storage space.

More so, when customer orders come in, the warehouse personnel need to locate the goods manually, leading to longer processing times, and potentially incorrect product shipments if the wrong item is picked in error. Finally, goods are dispatched through manual processes, which could take longer to process as all documents need to be processed manually. Summing up to this, the manual warehouse management system leads to inefficiencies in the warehouse management system, longer processing times, inaccuracies in tracking inventory levels, and higher operating costs due to the manual labour required to manage the warehouse

5.2.1.2. What are the main factors calling for the increase in the number of problems being encountered in all the processes involved in the warehouse?

Factors that contribute to the increase in problems encountered in all the processes involved in the warehouse include Inefficient processes for the warehouse management system is manual hence its more prone to errors and inefficiencies due to their reliance on human labour. This is supported by the research conducted which showed that the manual data entry, paper-based documentation, and lack of automation has led to increased errors and costed on productivity.

The researcher noted that the system is characterised by problems with tracking expiry dates, tracking variances, difficulties in solving cases that have to do with delivering wrong products to customers and untimely processing and delivery of goods. In this study the researcher noted that 80-95% respondents articulated the existence of these problem due to the manual system that is currently in place. Another factor is poor inventory management. As without accurate tracking and control of inventory, products can be misplaced, lost, or expire. This can lead to supply chain disruptions, customer dissatisfaction, and financial losses.

Another factor is lack of visibility. Without real-time data and visibility into inventory levels, order status, and fulfilment processes, managers may struggle to make informed decisions and respond to changes in demand or supply. In addition to that, rising customer expectations is a factor of concern. Consumers demand faster, more accurate, and more flexible order fulfilment options, manual systems may struggle to keep up, leading to delays, errors, and lost sales and thus 95,6% of the respondents confirmed that they had problems with delivering wrong goods to the customer.

Lastly, one of the main factors calling for the increase in the number of problems being encountered in all the processes involved in the warehouse is increased competition. As the e-commerce market continues to grow and more businesses switch to online sales, warehouses must keep pace with increasing demand while maintaining high levels of accuracy, speed, and customer satisfaction. However, the manual systems as that one used by Pulse Pharmaceuticals

may struggle to compete against more modern, automated alternatives. More so, there is continued existence of errors and problems that occur at Pulse Pharmaceuticals due to the workers trying to meet consumers needs and demand. Also, the company needs to be competitive and hence manual systems may struggle to keep up, leading to delays, errors, and lost sales.

5.2.1.3 Which measures can possibly and effectively be used by Pulse Pharmaceuticals to curb problems that they are encountering?

Pulse Pharmaceuticals can in cooperate several measures to curb problems of the manual warehouse management system in general these strategies or measures are as follows:

1. Implementing a computerized warehouse management system which is the WMS: This would involve automating manual processes and using software to manage inventory. This will reduce the risk of errors, improve accuracy, and save time.

2. Barcode and RFID technology: By using these technologies, a company can easily track inventory in real-time, which can minimize loss and theft of products.

3. Training employees: Employees should be trained on how to use the warehouse management system effectively. This includes proper data entry, scanning, and tracking procedures.

4. Utilizing mobile devices: Equipping warehouse personnel with mobile devices such as tablets and smartphones can enable them to access real-time data on inventory, order statuses, and dispatch notifications while on the move.

5. Improved safety measures: There should be safety measures in place to prevent accidents such as proper lighting, clear signage, and designated safety zones.

6. Effective communication: A proper communication system should be put in place to ensure effective communication between the warehouse team, suppliers, and customers. This can help streamline processes and reduce delays.

5.2.1.4 How best can WMS help Pulse Pharmaceuticals to achieve profitability?

Improved inventory accuracy is one advantage of deploying a WMS in the pharmaceutical sector. WMS will help Pulse Pharmaceutical offers real-time inventory visibility, which may assist decrease overstocking or stockouts, improving customer happiness while lowering the cost of keeping product on hand and boosting profitability. (Bryant & Stratton, 2017).

A simplified warehouse operation that lowers labour expenses by improving order fulfillment and delivery is another advantage of a WMS. (Li et al., 2019). WMS may also assist with lot and expiry date management, enhancing traceability and lowering the chance of product obsolescence, which can boost profitability. (Carvalho et al., 2018).

The implementation of a WMS had a beneficial effect on profitability, according to research by Lacerda et al. (2021) that examined the effects on a Brazilian pharmaceutical firm. The study indicated that the WMS increased the accuracy of inventory management and decreased transportation expenses. However, putting a WMS into place at Pulse Pharmaceuticals may also be difficult and expensive. Companies must weigh the costs and advantages, make sure the implementation project is well planned and carried out, and give warehouse personnel with enough training and support. (Bryant & Stratton, 2017). In summary, a WMS deployment may help pharmaceutical organizations by enhancing inventory accuracy, lowering labour costs, and maintaining product traceability, ultimately resulting in higher profitability.

5.3 Conclusions

The results that were obtained show that the WMS has a positive effect on firms' overall performance as well as profitability. Based on the research findings, the researcher concludes that the Warehouse Management System has a greater impact on the company's ability to achieve the following as part of the research objectivity

- reduction in operational and order fulfilment costs
- reduced order processing errors
- improved inventory visibility
- improved customer experience (reduction in complaints)
- lower stock outages
- faster-automated generation of ordering documents
- reporting capability to management on order processing, labour efficiency, and warehouse capacity utilization.
- reduce order cycle.
- temperature monitoring system
- ensure profitability
- reduced lead time between ordering and receiving goods

From the respondent's view, they highlighted that implementation and the in-cooperation of the WMS is a beneficial strategy to their organisation. Responses from interviews highlighted the same view and they described it as a reactive approach. In addition, they also pointed out a number of benefits including optimization and digitalization of the operating systems thus reducing unnecessary costs incurred by the company hence creating a less labour-intensive work environment that is supported by automation and robotics in work place thus allowing

the business to be very competitive. It was revealed also that, Pulse Pharmaceuticals is operating as one of the biggest and leading full-line pharmaceutical distributor serving more than 900 community pharmacies in Zimbabwe's health sector despite the manual warehouse operation system. In analysing the benefits of having the WMS in this study, it has been concluded that the benefits outweigh possible incurred costs.

These benefits include increase in inventory management even at unprecedented levels and by so doing, the current needs are always met and customer service is optimized and this also helps in product decisions. Improved operational efficiency since the system automate and streamline warehouse processes from inbound to outbound deliveries timeously. By using a WMS this allows the rightful goods to be delivered to customers since there is inventory tracking, picking, receiving and put-away features that allows timely delivery of customer orders and to the right customers and as well notifies them about the same. The system also supports picking technologies that streamline the process, such as radio frequency (RF) with and without scanning verification, pick-to-light and pick-to-voice technology, robotics, and algorithms that can help optimize picking paths that all help to streamline order fulfilment hence minimizing cost incurred through human errors.

This study concludes that having or implementation of the Warehouse Management System, to a greater extent, is beneficial to the company since it minimizes the company's risk of failure as well as enhancing growth and profitability.

5.4 Implications

According to the findings based on the research questions, the adoption or having in place a WMS on Pulse Pharmaceuticals helps to improve operational efficiency. This is evident in that with the introduction of WMS this will usher several benefits to the company and thus making Pulse Pharmaceuticals more competitive in this global economic environment. . In addition to

this, the WMS is instrumental in addressing the inventory management, product decision as well as tacking expiry dates challenges.

5.5 Recommendations

In line with the research findings, the researcher made the following recommendations to Pulse Pharmaceuticals

- Pulse Pharmaceuticals should adopt the WMS. However, lots of investment should be done to implement and operationalise the system.
- It is the researcher's recommendation that the company should select related WMSs that are suitable and match perfectly to the operations of Pulse Pharmaceuticals.
- The researcher recommends that Pulse Pharmaceuticals Company should employ fast and better warehouse management systems such as the Standalone WMS and Cloud WMS which is a Cloud-based WMS systems that can be quickly deployed with lower up-front costs.
- The researcher recommends the company to continuously maintain, update as well as integrating the WMS with other platforms and implement new technologies to keep it advanced and modest.
- Pulse Pharmaceuticals to use technology and innovation as a survival strategy as it lowers risk percentage, helps company to attain growth, reduce costs from human errors thus improving revenue and profitability.

5.6 Suggestions for Further Research

Since this study has focused on the effects of having a WMS on Pulse Pharmaceuticals on profitability and stock management within the organization, the researcher suggests that further study should be carried out development of best suiting warehouse management systems. The

researcher suggests that further studies should be carried out on the factors to be considered before operationalization and implementation of the WMS.

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Appendix 1 QUESTIONNAIRE

AFRICA UNIVERSITY

(A United Methodist-Related Institution)

AN IN-DEPTH INVESTIGATION ASSESSING THE IMPACT OF HAVING A WAREHOUSE MANAGEMENT SYSTEM [WMS]. A CASE OF PULSE PHARMACEUTICALS".

BY

PANASHE MATIZA

190215

YEAR 2023

My name is Panashe Matiza an Africa university student doing Computer Science degree in my final year. I am conducting a research study into finding the effects of adopting a Warehouse Management System on Pulse Pharmaceutical company. A case study of Pulse

Pharmaceutical company based in Harare will be used. With all due respect, I am kindly asking your participation in completing the questionnaire which is necessary to my project. Please make your answers brief and fill in the blank spaces provided as well as ticking where appropriate in the Likert and scale charts. Confidentiality would be highly exercised henceforth I take this opportunity to have you rest assured that the information you are going to provide will only be used for only academic writing purposes.

Section A

1a). Tick where appropriate. What is your department of work within the organization?

☐ accounts department

☐ Procurement department

☐ Management department

☐ warehouse department

b). Duration in the company

☐ 0 -5years

☐ 5-10 years

☐ 10-15 years

☐ more than 15 years

Section B

a) What do you understand by the term Warehouse Management System?

……
……
……

… …… b)
Do you encounter problems with the current systems? **Yes or No**

b(i) If yes then name a couple of them

……
……
……
……
……

Section C

1 Tick where appropriate. How do you rate the current system?

1
2
3
4
5

2 Have you ever encountered any problem whilst using the current system?

Strongly Agree.
Agree neutral
Disagree
Strongly Disagree

3 Given that there is a system that can help to optimize all the processes involved in the warehouse, are you willing to adapt to such a system?

Yes
No

4 Do you have any experience using a warehouse management system?

Yes
No

5 How often do you encounter problems using the current system? Tick where appropriate.

a) Always
b) Sometimes
c) Seldom
d) Never
e) Not sure

6) Choose whether you agree or disagree with the following statements

Variable	Agree	Disagree
A WMS will ease and optimize processes involved in the warehouse and this will reduce problems that will be encountered within all inter related departments		
Bringing in a new WMS will face resistance as people will not be aware of the changes that will be brought about by the new system		
Problems being encountered should be brought up and then enlighten people on how the WMS will curb all the problems being encountered		

Optimizing and digitalizing or processes should be considered to ensure profitability as automation reduces costs incurred from human errors		

Decision making on products to order from which suppliers can be done using WMS as it is based on computerized accurate forecasts unlike biased decisions from the management and procurement departments.		

Section C

1) What are departmental problems you encounter when using the current system? Answer with a YES or NO on the relevant section with regards to your work station.

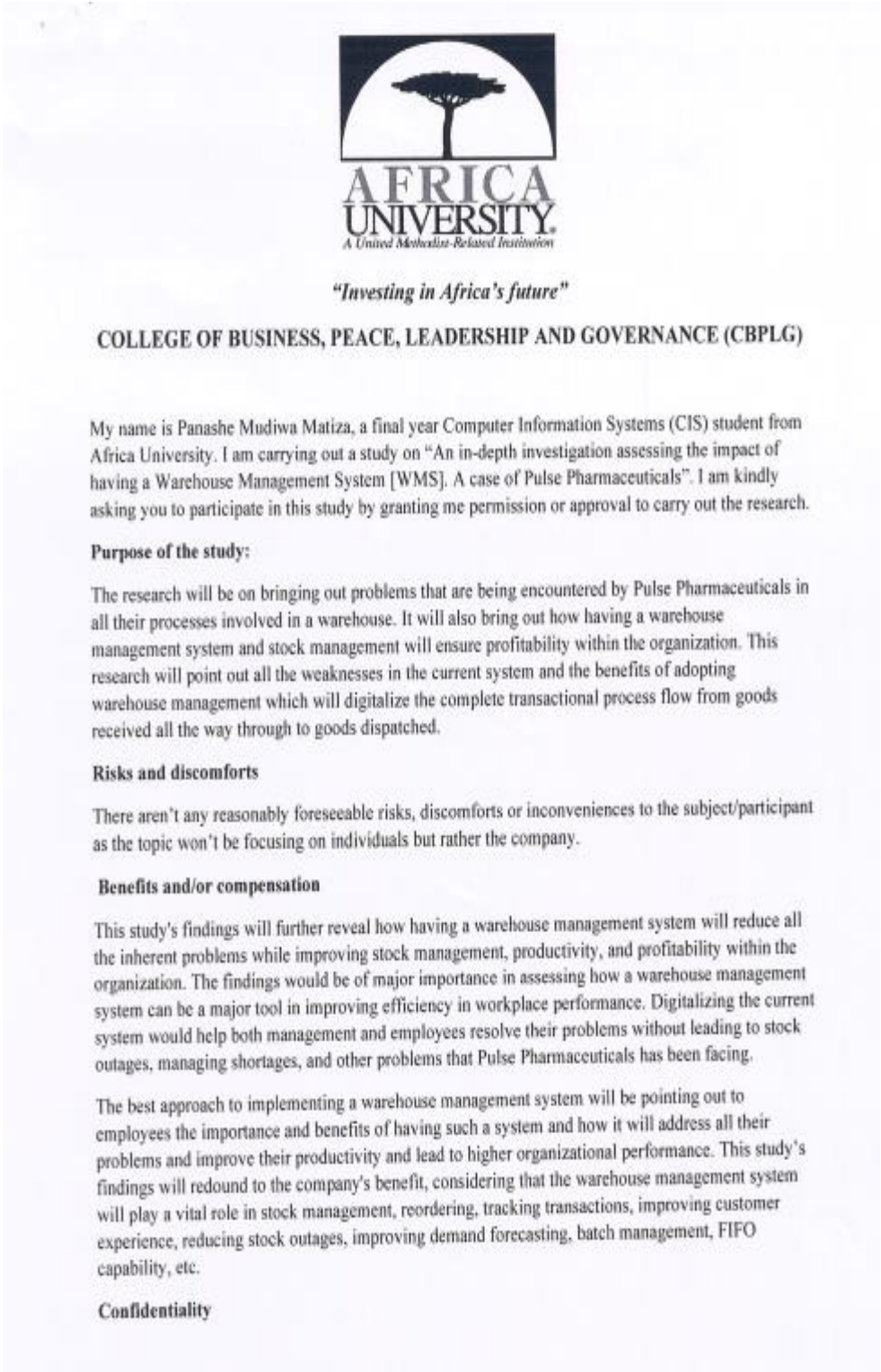
Warehouse department	**Yes**	**No**
1) Have you ever encountered any problems with tracking expiry dates		
2) Orders not being processed and delivered in time		
3) Errors in tracking variances		
4) Difficulties in solving cases that have to do with delivering the wrong products to the customer.		
Procurement department		
1) Taking time placing orders manually		
2) Finding it difficult to track status of goods in routes		
3) Have problems with maintaining the buffer stock for all fast-moving products.		
Accounts department		
1) Having difficulties to forecast demand for certain products		

2) Find it difficult to come up with a competitive price even after factoring all costs incurred.		
Management		
1) Finding it difficult to make a decision on which product to purchase that can recoup capital spent within a short period		
2) Finding it difficult to order, maintain buffer stock, reduce stock outs, etc.		

Appendix 2 GANT CHART

Preparation of Proposal	September -October 2022	November 2022	December 2022	January 2023	February 2023	March 2023	April 2023
Presentation of Proposal							
Preparation and Submission of proposal application to ethics committee							
Data Collection							
Data Analysis							
Report Writing							
Submission of Dissertation							
Presentation of Dissertation							

Appendix 3 CONSENT FORM



AFRICA UNIVERSITY
A United Methodist-Related Institution

"Investing in Africa's future"

COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND GOVERNANCE (CBPLG)

My name is Panashe Mudiwa Matiza, a final year Computer Information Systems (CIS) student from Africa University. I am carrying out a study on "An in-depth investigation assessing the impact of having a Warehouse Management System [WMS]. A case of Pulse Pharmaceuticals". I am kindly asking you to participate in this study by granting me permission or approval to carry out the research.

Purpose of the study:

The research will be on bringing out problems that are being encountered by Pulse Pharmaceuticals in all their processes involved in a warehouse. It will also bring out how having a warehouse management system and stock management will ensure profitability within the organization. This research will point out all the weaknesses in the current system and the benefits of adopting warehouse management which will digitalize the complete transactional process flow from goods received all the way through to goods dispatched.

Risks and discomforts

There aren't any reasonably foreseeable risks, discomforts or inconveniences to the subject/participant as the topic won't be focusing on individuals but rather the company.

Benefits and/or compensation

This study's findings will further reveal how having a warehouse management system will reduce all the inherent problems while improving stock management, productivity, and profitability within the organization. The findings would be of major importance in assessing how a warehouse management system can be a major tool in improving efficiency in workplace performance. Digitalizing the current system would help both management and employees resolve their problems without leading to stock outages, managing shortages, and other problems that Pulse Pharmaceuticals has been facing.

The best approach to implementing a warehouse management system will be pointing out to employees the importance and benefits of having such a system and how it will address all their problems and improve their productivity and lead to higher organizational performance. This study's findings will redound to the company's benefit, considering that the warehouse management system will play a vital role in stock management, reordering, tracking transactions, improving customer experience, reducing stock outages, improving demand forecasting, batch management, FIFO capability, etc.

Confidentiality

Information obtained in the study that can be identified with the participant will not be disclosed without their permission. Names and any other identification will not be asked for in the questionnaires and interviews.

Authorisation

If you have decided to approve this study, please sign this form in the space provide below as an indication that you have read and understood the information provided above and have agreed to grant to Panashe Mudiwa Matiza 190215 to carry out his research.

Masiwa Dauba

Name

(Please print) Date 06/02/2023

Signature of Research Matiza L Panashe Matiza 190215

Participant or legally authorised representative If you have any questions concerning this study or consent form beyond those answered by the researcher including questions about the research, your rights as a research participant, or if you feel that you have been treated unfairly and would like to talk to someone other than the researcher, please feel free to contact the Africa University Research Ethics Committee on telephone (020) 60075 or 60026 extension 1156 email aurec@africau.edu

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06 FEB 2023
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Zimbabwe
Tel: +263 242 487091 Fax +263 242 487047
www.pulse.pharmaceuticals.com

Appendix 4 BUDGET

Transport	**40**
Bond Paper	**10**
Printing	**5**
Food Cost	**20**
Total	**75**

Appendix 5 AUREC APPROVAL

Investing in Africa's future

AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE (AUREC)

P.O. Box 1320 Mutare, Zimbabwe, Off Nyanga Road, Old Mutare-Tel (+263-20) 60075/60026/61611 Fax: (+263 20) 61785 website: www.africau.edu

Ref: AU2796/23 17 April, 2023

PANASHE MUDIWA MATIZA
C/O Africa University
Box 1320
MUTARE

RE: AN IN-DEPTH INVESTIGATION ASSESSING THE IMPACT OF HAVING A WAREHOUSE MANAGEMENT SYSTEM [WMS]. A CASE OF PULSE PHARMACEUTICALS",

Thank you for the above-titled proposal that you submitted to the Africa University Research Ethics Committee for review. Please he advised that AUREC has reviewed and approved your application to conduct the above research.

The approval is based on the following.

a) Research proposal

- **APPROVAL NUMBER** AUREC 2796/23
  This number should he used on all correspondences, consent forms, and appropriate documents.
- **AUREC MEETING DATE** NA
- **APPROVAL DATE** April 17, 2023
- **EXPIRATION DATE** April 17, 2024
- **TYPE OF MEETING** Expedited
  After the expiration date, this research may only continue upon renewal. For purposes of renewal, a progress report on a standard AUREC form should be submitted a month before the expiration date.
- **SERIOUS ADVERSE EVENTS** All serious problems having to do with subject safety must he reported to AUREC within 3 working days on standard AUREC form.
- **MODIFICATIONS** Prior AUREC approval is required before implementing any changes in the proposal (including changes in the consent documents)
- **TERMINATION OF STUDY** Upon termination of the study a report has to be submitted to AUREC.

AFRICA UNIVERSITY
RESEARCH ETHICS COMMITTEE (AUREC)
APPROVED
P.O. BOX 1320, MUTARE, ZIMBABWE

Yours Faithfully

MARY CHINZOU
ASSISTANT RESEARCH OFFICER: FOR CHAIRPERSON
AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE