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AN INVESTIGATION INTO INVENTORY MANAGEMENT PRACTICES IN RETAIL PHARMACIES IN MUTARE

BY

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Abstract

The main objective of the study was to investigate the current inventory management practices employed by retail pharmacies in Mutare. The study also sought to investigate the barriers that prohibit inventory management strategies from being successful in retail pharmacies in Mutare. The literature reviewed highlighted key theories including the Economic Order Quantity (EOQ) Model, the Resource-Based View (RBV) Theory, and the Supply Chain Maturity Assessment Test. Using interviews, qualitative data was collected from 20 respondents drawn from 5 retail pharmacies in Mutare. The findings revealed that retail pharmacies in Mutare use three main types of inventory management systems; manual, hybrid and fully digital. The findings showed that supply chain effectiveness improved with the level of digitization, with fully digital systems supporting faster decision-making, better stock visibility and improved demand forecasting, while manual systems struggled with stockouts and inefficiencies. The study found that retail pharmacies in Mutare faced several barriers that hindered effective inventory management including limited technology adoption, financial constraints, inadequate staff training, poor supplier reliability, communication gaps and lack of real-time data visibility. The study concluded that full digital systems adopted by larger pharmacies offered high inventory management efficiency through real-time tracking and automation while hybrid or manual systems adopted by smaller pharmacies were prone to errors, delays, and limited responsiveness. The study also concluded that optimizing inventory management in Mutare's retail pharmacies requires a multi-pronged strategy such as adopting digital inventory technologies, building stronger supplier relationships, investing in staff training, enhancing stock control practices such as regular audits and the consistent application of the First-Expiry-First-Out (FEFO) method to reduce wastage and improve operational efficiency. The study recommended that retail pharmacies should prioritize migrating from manual or hybrid systems to fully automated inventory management platforms. For small to medium pharmacies, the study suggested phased adoption or cost-sharing strategies such as cooperative investments or leasing models to overcome financial and infrastructure limitations. The study recommended that future research should consider expanding the sample size to include a broader range of pharmacies across different cities or provinces to capture more diverse experiences and practices. Additionally, future studies could explore the impact of emerging technologies such as artificial intelligence, automation and blockchain on inventory and supply chain optimization in the pharmaceutical sector.

Key Words: Inventory Management, Pharmaceutical Supply, Retail Pharmacies

Declaration

I declare that this dissertation is my original work except where sources have been cited and acknowledged. The work has never been submitted, nor will it ever be submitted to another university for the award of a degree.

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Dedication

This work is dedicated to my family, for their unwavering support and encouragement throughout this journey.

List of Acronyms and Abbreviations

EOQ	Economic Order Quantity
RBV	Resource-Based View
SCMAT	Supply Chain Maturity Assessment Test
SCOR	Supply Chain Operations Reference
USAID	United States Agency for International Development
WHO	World Health Organisation

Definition of Key Terms

Inventory Management- is the process of ordering, storing, tracking, and controlling a company's inventory. It ensures the right amount of stock is available at the right time to meet customer demand without overstocking or understocking.

Inventory control- is the systematic regulation and supervision of the procurement, storage, and utilization of materials and products to maintain an optimal balance between inventory investment and customer service levels.

Retail Pharmacy- is a store where prescription medications, over-the-counter drugs, and other health-related products are sold directly to consumers. It also provides services like medication counselling and health advice.

Table of Contents

List of Tables

List of Figures

List of Appendices

CHAPTER 1 INTRODUCTION

1.1 Introduction

This chapter outlines the key elements of the study, including its background, problem statement, research objectives, and questions. It also highlights the significance of the study, define its scope, and address any limitations.

1.2 Background to the Study

The health sector is a vital arm of every society, one of the essential basic duties of any government is to keep its citizens safe and healthy (Ghabak & Seetharaman, 2023). The availability of quality healthcare that has easy accessibility and affordability for all members of a society is important because of the substantial health care costs that ill-health is often associated with (WHO, 2022). The pharmacy sector is an integral part of the health sector which comprises of various branches such as industrial pharmacy, hospital pharmacy, pharmacy education, and community/retail pharmacy practices. Retail pharmacies are an important part of health systems that dispense a large proportion of all health products and related services in many countries. They play an important role in any society, by serving as the connecting point through which consumers can get their medications (Okoh, 2019). With convenient opening hours, geographic accessibility, and personal familiarity with their clients, retail pharmacies are often a patient's first "port of-call" with the health system. As such, they can expand access to medicines (USAID, 2022).

Therefore, an ideal scenario for a pharmaceutical facility would be to have enough inventory to satisfy customer demand while preventing clientele loss due

to stock-outs (Nsanzimana & Akumuntu, 2024). Inventory management systems in retail pharmacies are responsible for the efficient movement of pharmaceutical products from manufacturers to distributors, wholesalers, and ultimately, to the retail pharmacy where they are dispensed to customers (Nsanzimana & Akumuntu, 2024). Inventory management, on the other hand, is focused on managing the upstream (supplier) and downstream (customer) relationship in other to achieve profitable outcomes for the overall good of all parties involved in the chain (Okoh, 2019). The flow of inventory retail pharmacy in the pharmacy sector focuses heavily on the final consumers' needs because it operates in its downstream sector and the income is generated mainly from direct sales to customers.

The management of inventory is therefore a critical aspect of business operations, especially in sectors where product availability and timely distribution are paramount to customer satisfaction and organizational success (Elzarka, 2019). An efficient inventory management system is integral to organizational success, particularly in healthcare, consumer goods, and agriculture, where shortages can have costly consequences (Ghabak & Seetharaman, 2023). A well-managed inventory management systems ensures the timely delivery of pharmaceutical products to pharmacies, optimizes inventory levels to minimize stockouts and excess inventory, and enhances overall operational efficiency (Islam, 2024). In retail pharmacies, effective inventory management plays a crucial role in ensuring that medicines and healthcare products are consistently available to meet the needs of patients. A key objective in WHO's essential medicines strategy is "to expand access to essential medicines by improving financial and supply systems (Anyona, Karimi & Maru, 2021).

However, despite the critical nature of inventory management in this sector, many retail pharmacies, especially those in emerging markets, face significant challenges in maintaining effective inventory. Bilal, Bititci and Fenta (2024) mentions that many nations, particularly in Africa and Asia, struggle with access due to unaffordability and inventory management inefficiencies. According to Takawira and Pooe (2024), the pharmaceutical industry in Zimbabwe faces challenges, partly due to low technology adoption, which affects service delivery. To this, retail pharmacies in Mutare, a city in Zimbabwe, are no exception. As one of the major urban centers, Mutare's retail pharmacies cater to a large population, serving both urban and rural communities in the surrounding areas. These pharmacies face unique challenges in managing inventory systems due to issues such as inadequate infrastructure, fluctuating demand, and supply chain disruptions, which are often exacerbated by external factors such as economic instability, inflation, and global supply chain bottlenecks.

One of the primary challenges for retail pharmacies is the difficulty in maintaining a balanced inventory. Pharmacies often experience stock outs of essential medicines or, conversely, an overstock of products that are not in high demand, leading to waste and financial losses (Nugraha & Basri, 2024). These challenges are particularly severe in the case of life-saving medicines, where shortages can result in the denial of essential treatments. Additionally, the pharmaceutical industry is highly regulated, with stringent requirements for the storage, handling, and distribution of medicines, adding complexity to inventory management practices (Ghabak & Seetharaman, 2023).

The retail pharmacy sector is also influenced by the rapid changes in the healthcare environment. New medicines and medical technologies are constantly

being introduced, and the demand for specific drugs can shift unexpectedly (Elzarka, 2019). This dynamic environment requires pharmacy managers to be highly responsive to fluctuations in demand while ensuring that their inventory systems remain robust and capable of managing these changes (Takawira & Pooe, 2024). As a result, supply chain systems must be agile, able to adapt to both market demands and regulatory requirements while minimizing costs and avoiding stock outs or excess stock.

In response to these challenges, many retail pharmacies have begun revisiting their inventory management systems, seeking innovative solutions to improve inventory management (Takawira & Pooe, 2024). For some, this includes the adoption of technology such as inventory management software, automated stock tracking systems, and integration with suppliers' systems to provide real-time data on stock levels and product availability (Islam, 2024). However, the implementation of these systems is often met with obstacles such as high initial costs, lack of technical expertise, and insufficient training for staff.

In this context, it is essential to understand the specific issues and challenges faced by retail pharmacies when it comes to supply chain systems and inventory management. Recent disruptions, including material cost increases, demand variations due to the COVID-19 pandemic and supply chain interruptions, have exposed the vulnerability of supply chains (Rashid, 2020). These challenges necessitate a reevaluation of inventory management strategies to enhance resilience and adaptability. While global literature offers insights into best practices for inventory management in retail, there is limited research that specifically addresses the unique inventory management challenges of retail pharmacies in Mutare. This study therefore seeks to address this gap.

1.3 Statement of the Problem

In the past five years, retail pharmacies in Mutare have been experiencing a significant increase in stock-outs of essential drugs, which has led to widespread issues within the pharmaceutical inventory management. These stock-outs are often exacerbated by unreliable supplies, causing disruptions in the availability of medications required for treating various health conditions. Consequently, patients are frequently subjected to prescription changes by their doctors, as alternative drugs are sought to replace unavailable ones. This situation not only impacts the health and well-being of patients but also undermines the trust in healthcare providers and the overall effectiveness of the healthcare system in the region. If this issue is not addressed, the effects could be severe: compromised patient outcomes, increased medication errors, the deterioration of the patient-pharmacist relationship, and a potential rise in healthcare costs due to the need for emergency care or prolonged treatment cycles. The lack of a reliable inventory management systems in retail pharmacies could result in even more frequent and disruptive stock-outs, further diminishing the quality of care. The proposed research aims to investigate the effectiveness of current inventory management practices in retail pharmacies in Mutare, with a focus on identifying the causes and consequences of stock-outs and unreliable drug supplies. By examining current inventory management practices, the research seeks to pinpoint critical weaknesses and propose tailored solutions that can mitigate stock-outs, improve supply chain reliability, and ultimately enhance patient care. The study aims to provide actionable recommendations for retail pharmacies to optimize their inventory management practices, reduce prescription changes, and

ensure a consistent and reliable flow of essential medications to meet patient needs.

1.4 Research Objectives

The objectives of this study were to:

1.4.1 Investigate the current inventory management practices employed by retail pharmacies in Mutare.

1.4.2 Investigate the barriers that prohibit inventory management strategies from being successful in retail pharmacies in Mutare.

1.4.3 Recommend strategies for optimizing inventory management practices to improve efficiency in retail pharmacies in Mutare.

1.5 Research Questions

1.5.1 What are the current inventory management practices utilized by retail pharmacies in Mutare?

1.5.2 What are the barriers that prohibit inventory management strategies from being successful in retail pharmacies in Mutare?

1.5.3 What strategies can be implemented to optimize inventory management practices to improve efficiency in retail pharmacies in Mutare?

1.6 Research Proposition

The proposition of the study is that the use of technology, better demand forecasting and improved supplier collaboration could enhance inventory management and overall efficiency in retail pharmacies.

1.7 Significance of the Study

The significance of this study lies in its potential to contribute to the optimization of inventory management in retail pharmacies, with the ultimate goal of improving the availability of essential medicines and reducing waste. The findings of this study are of interest to pharmacy managers, policymakers, and supply chain professionals, as they provide practical guidance on how to enhance the effectiveness of supply chain systems and inventory management strategies.

1.7.1 To the Academia

This study, in terms of knowledge expansion, this study would contribute to the existing body of knowledge as it fills the following gaps:

a) Literature Gap

The literature on pharmaceutical inventory management, particularly in Zimbabwe, remains limited. While there is an abundance of studies focused on supply chain management in general or in larger pharmaceutical markets, research specific to retail pharmacies in smaller cities like Mutare is scarce. Current literature often overlooks the challenges faced by retail pharmacies in cities outside the capital, especially the effects of stock-outs on patient care. Furthermore, the connection between unreliable drug supplies and frequent prescription changes, as well as the downstream consequences for patient health, has not been deeply explored in the context of Mutare. This study aims to fill this

gap by specifically examining these issues and their effects on healthcare outcomes in a smaller regional context.

b) Methodological Gap

Most existing studies on pharmaceutical inventory management employ generalized surveys or focus on large-scale retailers or hospitals. There is a methodological gap when it comes to using detailed qualitative and quantitative methods to assess supply chain issues at the retail pharmacy level in smaller cities. This study applied the mixed-methods research, combining interviews with pharmacy managers, suppliers, and healthcare providers with documentary analysis of stock-out records, prescription change data, and patient health outcomes.

c) Theoretical/Conceptual Gap

The theoretical framework for inventory management in retail pharmacies is often built on general SCM principles that do not fully consider the specificities of the pharmaceutical sector in developing economies. There is a conceptual gap in understanding how retail pharmacies in Mutare can apply supply chain strategies effectively taking into account factors such as pharmacy size and whether large or small retail pharmacies experience similar supply chain challenges, as well as the supply chain technology use. This research contributes to supply chain theory by developing a context-specific model for retail pharmacy supply chain management that incorporates factors such as pharmacy size and supply chain technology use and other supply chain dynamics of smaller cities.

d) Innovation

This study introduces innovation by focusing on practical, actionable strategies that can be implemented by retail pharmacies in Mutare to mitigate stock-outs and improve inventory management. Through this study, retail pharmacies in Mutare can adopt innovative technologies like AI, machine learning, and blockchain to optimize their supply chain. For example, predictive analytics could be used to forecast demand trends more accurately, reducing waste and ensuring that pharmacies have the right stock at the right time. Such technological innovations in the supply chain could then be extended to other areas of pharmacy operations. Thus, in terms of Education 5.0, this study generates new ideas and knowledge on a topical issue of supply chain in the health sector, one of the most important sectors.

1.7.2 Stakeholder Benefits

This study is expected to benefit several stakeholders as follows:

Retail Pharmacy Managers: For pharmacy owners and managers, the findings provide a deeper understanding of current supply chain systems and offer actionable recommendations for enhancing inventory control practices. Improved supply chain management can lead to more consistent drug availability, improving both business outcomes and patient care.

For healthcare professionals and pharmacists, better inventory management will directly impact their ability to deliver quality care by ensuring that medications are available when needed, improving customer satisfaction, and potentially reducing the likelihood of errors due to stock inconsistencies.

Suppliers and distributors stand to benefit from the study by gaining insight into the specific needs and challenges faced by retail pharmacies in Mutare. This will enable them to tailor their supply chain practices to better meet the demands of the local pharmacy market, ensuring timely deliveries and minimizing disruptions.

Lastly, policymakers and regulators will find the research useful in understanding how the retail pharmacy sector is currently managing inventory and the broader implications for healthcare delivery. The study can inform future regulations or support the development of policies aimed at improving supply chain practices in the sector, contributing to a more robust healthcare system overall.

1.8 Delimitations of the study

This study was confined to the following delimitations:

Geographical Scope: The research focused specifically on retail pharmacies within the city of Mutare, Zimbabwe, rather than expanding to other cities or countries.

Time Scope: The study focused on the past 3–5 years (from 2022 to 2025) to account for recent trends in supply chain issues.

Conceptual Delimitation: The research primarily examined inventory management practices and challenges that were present in Mutare's retail pharmacies.

Population Delimitation: The research involved data collection from individuals involved in the pharmaceutical supply chain, including pharmacy managers, owners, and internal pharmacy staff. These participants were considered better suited to respond to questions relating to the supply chain, as they were directly involved.

1.9 Limitations of the study

The following limitations were encountered:

Lack of Cooperation from Respondents: Some selected respondents were reluctant to participate in the study due to concerns about breaching company confidentiality rules. This limitation was addressed by clearly explaining the purpose of the study, assuring participants that all responses would remain confidential, and emphasizing that the data would be used solely for academic purposes. Additionally, participants were reassured of the anonymity of their responses, which helped to increase cooperation and encourage more timely feedback.

Bureaucracy in Accessing Information: The researcher faced delays and challenges in obtaining the necessary permissions, which impeded certain aspects of the research process. To navigate this, the researcher remained patient and flexible, working within the existing organizational structures to manage bureaucratic procedures effectively.

Possibility of Bias: There was a possibility of bias in the data collected, as some participants provided responses that were favourable to their companies or aligned with their roles within the organization. To minimize the impact of this

bias, methodological triangulation was employed combining primary data (interviews) with secondary data (such as company reports and industry publications). This allowed for cross-verification of findings and provided a more comprehensive understanding of the supply chain processes within the selected pharmacies.

Despite these limitations, efforts were made to mitigate their impact. A diverse range of departments and roles were represented in the interviews to capture varied perspectives across the organizations. The study also emphasized the depth and richness of qualitative data, and triangulation from multiple sources was used to enhance the validity of the findings.

CHAPTER 2 REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter provides a comprehensive literature review on inventory management, with a specific focus on the retail pharmacy sector. It synthesizes existing research on the challenges and best practices in inventory control, procurement strategies, and supply chain integration in pharmacies. The review highlights key theoretical frameworks and models that have been applied in similar contexts, and it explores the evolving role of technology and data analytics in enhancing supply chain efficiency. A conceptual framework for the study is also provided, showing the variables of the study.

2.2 Theoretical Framework

The theoretical framework for this study is based on the Economic Order Quantity (EOQ) Model, the Resource-Based View (RBV) Theory, Supply Chain Maturity Assessment Test. Also discussed is the Supply Chain Operations Reference (SCOR) Model.

2.2.1 The Economic Order Quantity (EOQ) Model

The Economic Order Quantity (EOQ) model is a fundamental theory in inventory management that aims to determine the optimal order quantity for inventory, which minimizes the total costs associated with inventory management (Obi & Agarana, 2023). These costs typically include ordering costs (such as shipping, handling, and procurement) and holding costs (such as storage, insurance, and spoilage).

In the context of retail pharmacies, the EOQ model can be applied to determine the most cost-effective amount of pharmaceutical stock to order at a time (Nugraha & Basri, 2024). Given the fluctuating demand for medications and the need for timely restocking, this model helps pharmacy managers make informed decisions about how much inventory to order without overstocking or running out of stock. Through optimizing order quantities, pharmacies can reduce wastage, avoid stock outs, and ensure that they can meet customer demand efficiently (Obi & Agarana, 2023).

2.2.2 Resource-Based View (RBV) Theory

The Resource-Based View (RBV) suggests that firms can gain a sustainable competitive advantage by utilizing valuable, rare, inimitable, and non-substitutable resources (Johnson, Peter & Shital, 2021). These resources could include physical assets (such as warehouses or technology systems), human capital (skilled employees and suppliers), and intangible assets (brand reputation, relationships, or proprietary processes). In the context of retail pharmacies, applying the RBV theory means recognizing the critical resources that can drive effective inventory management. For example:

Technology and Information Systems: Pharmacies that invest in advanced inventory management systems or technologies (such as RFID tracking, real-time stock monitoring, or automated reorder systems) have a significant advantage. These resources enable better tracking of stock levels, timely restocking, and better visibility across the supply chain, which can help optimize inventory and reduce costs.

Supplier Relationships and Collaboration: Strong relationships with suppliers and wholesalers are a critical resource for pharmacies. Establishing long-term partnerships with reliable pharmaceutical suppliers ensures timely deliveries and the availability of essential medications. These relationships can help mitigate stock outs and allow pharmacies to have more flexibility when adjusting to demand changes. A pharmacy with good relationships with local suppliers could leverage these connections to ensure more efficient stock replenishment and potentially better prices.

Human Resources: The skills and experience of pharmacy managers and staff play a significant role in effectively managing inventory. Knowledgeable employees can better forecast demand, manage stock efficiently, and deal with inventory challenges as they arise. This human capital resource can lead to more accurate ordering decisions and better stock control.

Brand Reputation and Customer Loyalty: For pharmacies, having a trusted reputation for consistently providing the right medications and services can be a powerful resource. Customers are more likely to return and trust a pharmacy with good service, and this steady demand allows the pharmacy to optimize its inventory levels more effectively.

2.2.3 Supply Chain Operations Reference (SCOR) Model

Using the Supply Chain Operations Reference model (SCOR), Lockamy and McCormack (2004) developed a 'supply chain management process maturity model' which describes a supply chain's business process maturity i.e. the degree of process integration in the supply chain. Srai and Gregory (2005), further designed the 'supply chain capability map' which assesses the maturity of supply chain capabilities based on the resource-based view. The SCOR model is a widely recognized framework used to evaluate and improve supply chain performance. It provides a structured approach for understanding the key processes in a supply chain namely Plan, Source, Make, Deliver, and Return. In the context of retail pharmacies, this model can be applied to streamline and improve inventory management practices, from procurement through to product delivery.

Plan: Pharmacies must forecast demand accurately for medications, plan inventory levels, and establish policies that guide purchasing decisions.

Source: The model emphasizes establishing reliable relationships with suppliers of pharmaceutical products to ensure that orders are placed in a timely and cost-effective manner.

Make: In retail pharmacies, this process involves the availability of stock for sale and ensuring the efficient arrangement of medication on shelves, including managing expiration dates.

Deliver: This focuses on logistics, ensuring timely deliveries of medicines to meet demand and avoiding stock outs or excess inventory.

Return: Pharmacies need to manage returns of expired or defective drugs and handle waste efficiently.

2.2.4 Supply Chain Maturity Assessment Test (SCMAT)

The most widely used maturity model in supply chain management is the supply chain maturity assessment test (SCMAT) which was developed by Netland et al. (2007). This model addresses 48 best practices classified into seven categories in which organizations should evaluate their maturity level: strategy, control, processes, resources, materials, information and organization. SCMAT helps in assessing the different performance areas in a company's supply chain to initiate improvement and sustain business competitiveness. The SCMAT is an easy qualitative assessment tool that uses a 5-point maturity scale where organizations can evaluate their operations by asking the question 'to which extent does our firm use best practice?' and select the appropriate answer as follows: '1' never or does not exist, '2' sometimes or to some extent, '3' frequently or partly exist, '4' mostly or often exist and '5' always or definitely exist. Consequently, this assessment would show the degree of the supply chain activities maturity at the strategic and operational level and would define the areas that need improvement in the organization's supply chain (Elzarka, 2019). The review of literature showed that the SCMAT was not previously used in the pharmaceutical supply chain nevertheless in the retail-consumer interface. Therefore, this study would use the SCMAT to assess the maturity of a retail pharmacy chain in Mutare with the aim of highlighting its current status in supply chain practices and emphasizing the areas for possible improvements (Elzarka, 2019).

2.3 The Relevance of the theoretical framework to the study

The EOQ model is crucial in inventory management as it helps businesses determine the optimal order quantity that minimizes the total cost of inventory, including holding, ordering, and stock out costs. By applying this model, companies can maintain a balance between inventory costs and order frequency, ensuring efficient inventory management. Its strengths include its simplicity and ability to provide clear guidelines for minimizing inventory-related costs. However, weaknesses lie in its assumptions, such as constant demand and ordering costs, which often don't hold true in real-world dynamic environments, reducing its practical applicability in fluctuating markets.

The RBV theory emphasizes leveraging a firm's internal resources and capabilities to gain a competitive advantage, making it highly relevant in supply chain management, where unique resources (e.g., technology, expertise, supplier relationships) can enhance operational performance. Strengths of RBV include its focus on strategic internal capabilities and long-term value creation. However, weaknesses include its tendency to overlook external factors, such as market conditions or competitor actions, which can also significantly impact a company's supply chain performance, making it less comprehensive in addressing external dynamics.

Supply Chain Operations Reference (SCOR) Model: The SCOR model offers a comprehensive framework for evaluating and improving inventory management performance through key processes, metrics, and best practices, making it highly relevant for organizations aiming to streamline their operations. Strengths include its standardized approach and extensive use in benchmarking and process improvement. However, weaknesses include its complexity and the potential difficulty in adapting it to unique or highly specialized supply chains,

as well as the reliance on accurate and consistent data for effective implementation.

The Supply Chain Maturity Assessment Test is relevant as it assesses the maturity of a supply chain in terms of process effectiveness, integration, and alignment with business goals. It is vital for identifying areas of improvement and implementing strategies to advance supply chain capabilities. The theory provides a structured framework for evaluating and improving inventory management practices. However, weaknesses include its potential to oversimplify complex supply chain dynamics and may not fully account for the need for continual adaptation in response to external market changes or disruptions.

This theory is therefore utilized in this study for the explanation of inventory management in retail pharmacies. Prior studies have used this theory as a base for measuring inventory management performance in retail pharmacies (Johnson et al, 2021).

2.4 The Pharmaceutical Industry

The pharmaceutical industry is big business which contributes considerably to the world's economy and has a rising global presence. It is estimated that the global pharmaceutical industry is worth about $1 trillion (Statista, 2020). The industry comprises four main segments, namely: (1) the innovative pharmaceutical industry, (2) the biopharmaceutical industry, (3) biologics and (4) the generic pharmaceutical industry. The pharmaceutical industry is one of the most innovative industries in the world (Takawira & Pooe, 2023) and has been one of the world's most prosperous and lucrative sectors for the past few decades.

According to Nedelcheva (2019), the industry's main activities start with the research phase, then the development phase, and finally the delivery of pharmaceutical drugs. By the 1990s, the South African pharmaceutical industry was already well established and had become the most rapidly growing and mature pharmaceutical industry in Africa, supplying both primary and secondary medicines through local and multinational firms (Takawira & Pooe, 2023). The South African pharmaceutical industry is the largest market for medicines in sub-Saharan Africa. According to Global Africa Network (2020), there are over 200 pharmaceutical firms in South Africa, valued at about R20 billion. The local manufacturing supplies about 70% of the pharmaceutical industry's demand with generic medicines accounting for 50% of the total market (Investsa, 2020). The private sector accounts for approximately 84% of the market with the public sector accounting for the rest (Maphumulo & Bhengu, 2019).

2.4.1 Retail Pharmacy

There are many terms used interchangeably and refer to stores where medicinal products are dispensed and sold, e.g., retail pharmacy, medicine store, licensed chemical seller, chemist, patent vendor, proprietary drug vendor, and accredited drug dispensing outlet (Bilal et al, 2024). In this study, "retail pharmacies" which are distinguished from other entities are those pharmacies which are overseen and/or owned by licensed pharmacists or other licensed professionals who sell registered prescription-based medicines. Retail pharmacies can be divided into chain and independent pharmacies. Chain pharmacies are defined as organizations where two or more pharmacies were operating under the same name and the business used distinctive branding across all pharmacies (High

Impact Practices in Family Planning, 2021). Independent pharmacies, on the other hand, are those that operate only one pharmacy under the same name.

Retail pharmacies are an important part of health systems that dispense a large proportion of all health products and related services in many countries. With convenient opening hours, geographic accessibility, and personal familiarity with their clients, retail pharmacies are often a patient's first "port of-call" with the health system. As such, they can expand access to medicines (WHO, 2022).

2.4.2 Retail pharmacy practices

Retail pharmacies offer both products and services to their customers. Typically, patients walk into the pharmacy with a prescription to purchase their medication and they would need to speak with a qualified pharmacist who provides counselling on how the medication should be used. These products include prescription drugs (such as antibiotics), Over the Counter (OTC) medications, herbal and other some other medical consumables and devices (Bilal et al, 2024).

Retail pharmacies typically purchase stock from wholesalers or distributors who serve as a bridge between manufacturing companies and retail pharmacies because manufacturing companies prefer to sell in large volumes at a time and the capacity that they offer per sale cannot be met by individual retail pharmacy outlet (Chakma, 2020). Distributors (Wholesalers) on the other hand have the capacity to buy bulk volumes from different manufacturing companies at a good rate and then they resell to pharmacy shops (Nsanzimana & Akumuntu, 2024). Wholesalers who provide a wide portfolio can attempt to win over their pharmacy customers by offering discount deals on bulk purchases and other arrangements. In more advanced societies, one common form of tie-in that is

offered is to provide the pharmacist with sophisticated software that will manage their dispensing process, inventory replenishment and submissions for reimbursement (Nugraha & Basri, 2024).

Supply chain design and delivery for the pharmacy is more effective when the usefulness of a product is understood, and this enhances patient's compliance in other for them to fully benefit from treatment (pharmaceutical care) (Obi & Agarana, 2023). To achieve this, the pharmacy must ensure that the dugs required for the patients' needs are always available (on the shelves or in store) and never out of stock.

2.4.3 The notion of Supply Chain Management

Several definitions have been used to define supply chain. Basically, a supply chain is a network of flows that link manufacturers, retailers and customers (Islam, 2024). A supply chain management (SCM) has also been defined as a set of approaches and practices to effectively integrate suppliers, manufactures, wholesalers, distributors, and customers for improving the long-term performance of the individual firms as well as supply chain as a whole in a cohesive and high-performing business model (Elzarka, 2019). SCM involves collaboration with suppliers, distributors, and other stakeholders to streamline processes and mitigate risks throughout the supply chain network. On the other hand, procurement involves the process of sourcing and acquiring goods or services needed for the operation of a business. In the context of retail pharmacy, procurement specifically refers to the acquisition of pharmaceutical products, medical supplies, and other inventory required for dispensing to customers. This process encompasses activities such as supplier selection, negotiation,

purchasing, and contract management. Effective procurement practices ensure that pharmacies obtain high-quality products at competitive prices, thereby contributing to cost efficiency and customer satisfaction (Islam, 2024).

Basic supply chain management practices include distribution strategies, logistics and transport management, technology usage, collaboration with suppliers, demand forecasting and planning and regulatory compliance.

One prevalent supply chain practice in retail pharmacy involves centralized purchasing and distribution. Many retail chain shops opt for a central procurement model where products are acquired centrally and subsequently distributed to their various outlets (Nsanzimana & Akumuntu, 2024). Additionally, some suppliers may choose to supply products directly to individual pharmacy outlets. This dual approach provides flexibility and caters to the specific needs and preferences of different pharmacies.

Efficient logistics and transportation management are integral components of successful supply chain operations in retail pharmacy (Islam, 2024). Chain shops typically maintain dedicated transportation fleets and employ a specialized supply chain team or transport officers to oversee logistics (Chopra, 2020). This approach ensures timely and secure delivery of pharmaceutical products to each outlet, minimizing disruptions and optimizing overall distribution.

The adoption of technology, particularly Enterprise Resource Planning (ERP) software, is a common practice in supply chain. ERP systems facilitate comprehensive management of operational tasks, including inventory control, order processing, and demand forecasting (Ghabak & Seetharaman, 2023). The

integration of technology increases the accuracy and reduces the manual errors made by employees, and provides real-time visibility into supply chain activities.

Establishing collaborative and supportive relationships with suppliers and stakeholders is a key supply chain management practice (Bilal et al, 2024). Retail pharmacies recognize the importance of transparent communication and partnership with pharmaceutical manufacturers, distributors, and other stakeholders (Ivanov, 2020). Collaborative efforts contribute to better inventory management, streamlined procurement processes, and mutual success within the supply chain.

Forecasting demand accurately and planning are critical for maintaining optimal inventory levels and meeting customer needs. Retail pharmacies invest in forecasting tools and methodologies to predict demand trends accurately (Johnson et al, 2021). This proactive approach minimizes stock outs, reduces excess inventory, and enhances overall supply chain responsiveness.

Adherence to regulatory standards is a fundamental aspect of supply chain management in the retail pharmacy sector. Retailers prioritize compliance with Good Distribution Practice (GDP) and other relevant regulations to ensure the safety, quality, and authenticity of pharmaceutical products. Compliance measures extend to the procurement, storage, and distribution phases of the supply chain (Nsanzimana & Akumuntu, 2024).

2.4.4 Pharmaceutical supply chains

Supply chain management is the management of all activities that are targeted at satisfying the end consumer (Chopra, 2020). It involves managing supply chain

assets and products, information and fund flow to maximize total supply chain surplus (Chopra, 2020). It also involves managing upstream and downstream relationships with suppliers and customers to deliver superior customer value at low cost to the supply chain (Christopher, 2022). PSCs are very complex, combining processes, organisations and operations involved in developing, designing and manufacturing useful pharmaceutical drugs. A typical PSC process includes importation, registration, procurement and distribution of drugs and medical products, forming a significant component of the healthcare system (Takawira & Pooe, 2023).

According to Nsanzimana and Akumuntu (2024), the key stakeholders in this supply chain include multiple government agencies, hospitals, clinics, drug manufacturers, drug distributors, pharmacy chains, retailers, research organisations and regulatory boards such as the Medicines Control Authority of Zimbabwe (MCAZ), the Pharmacists Council of Zimbabwe (PCZ) and the Health Professions Authority (HPA). In the pharmaceutical industry, supply chain breakdowns can have a direct impact on the company's bottom line, but they can also have a direct impact on the health and well-being of patients (Yaroson et al., 2019).

The primary focus of SCM is mainly with the coordination of both upstream (supplier) and downstream (Customer) relationship in other to achieve profitable outcomes for the overall good of all parties involved in the chain. (Obi & Agarana, 2023). A retail supply chain comprises many vendors that supply various types of products. These products are delivered to distribution centers. After that, products are consolidated with other products and shipped from distribution centers to retail outlets. A distinguishing component of retail supply

chains is that retailers have store outlets through which consumers purchase products (Gereffi, Pananond & Pedersen, 2022). This is somewhat different from business-to-business supply chains, where products are delivered to the customers without using any intermediaries. A general framework of retail supply chain is given below:

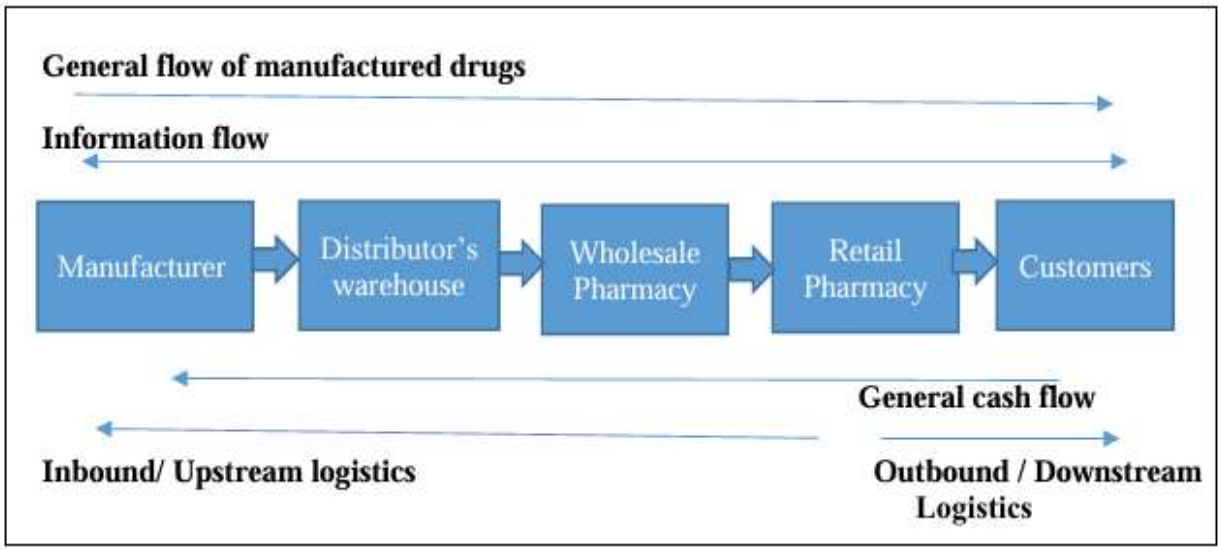

Figure 2.1: Retail Supply Chain structure

Source: Onkoh (2019).

As shown in Figure 2.1 above, the pharmaceutical supply chain commences with the manufacturer or supplier of raw materials, who supplies the necessary components for medication synthesis in accordance with the specific product requirements. Subsequently, the finalized products are conveyed to a distribution platform that oversees the storage and extensive dissemination to wholesalers and distributors. These intermediaries subsequently distribute the products to regional distributors, pharmacies and hospitals. During this procedure, financial transactions take place, and crucial demand and inventory data are exchanged. Medications are distributed to end users, usually patients through pharmacies or

hospitals. The bidirectional exchange of information frequently occurs, and financial transactions can encompass intricate arrangements such as credit agreements, insurance policies and compensation measures, particularly inside healthcare establishments. A supply chain contains information on everything from facilities to inventory to transportation to costs and prices (Chopra, 2020).

2.4.5 Inventory Management

Inventory management is one of the pivotal tasks of retail supply chain management. Retailers are always busy with lessening the risk of stock outs by carrying buffer inventory for items with high demand. Retailers are now realizing the cost of losing sales along with the costs of holding idle inventory (Rana, Osman & Halim, 2024). A diverse set of inventory management approaches is employed by retail pharmacies and these are discussed below.

2.4.5.1 Just in Time Technique

The "Just in Time" technique involves ordering inventory items precisely when there is a customer demand, minimizing excess inventory storage. This approach suggests that inventories are only ordered when there is customer demand. Pharmacies that prioritize efficient inventory turnover and reducing the costs associated with excess inventory adopt this technique (Nsanzimana & Akumuntu, 2021).

2.4.5.2 Economic Order Quantity (EOQ)

This refers to the ability to order quantities of inventory that meet demand while minimizing the total costs related to ordering. EOQ aims to find the optimal

order quantity that balances inventory holding costs and ordering costs (Nsanzimana & Akumuntu, 2021).

2.4.5.3 ABC/ VEN Analysis

An inventory management technique that determines the value of inventory items based on their importance to the business and how essential is the inventory. ABC analysis categorizes inventory items into different classes based on their value to the business, allowing pharmacies to prioritize their focus on high-value items.

2.4.5.4 Vendor Managed Inventory

This refers to engaging outsourced suppliers to manage inventory monitoring and replenishment. VMI involves outsourcing inventory management to suppliers who are responsible for monitoring and replenishing stock (Nsanzimana & Akumuntu, 2021).

2.4.6 Inventory Management Effectiveness

Inventory management is attributed to how a firm meets its operational and financial goals. It requires keeping a perfect balance between demand and supply and mitigating stockouts or overstocking. This helps businesses ensure better utilization of resources and save costs from storing goods that are not necessary (Ali, Fayad, Alomair & Naim, 2024). This includes demand forecasting, setting reorder levels and regularly tracking inventory. Additionally, companies leverage tools including Enterprise Resource Planning (ERP) systems and automatic identification technologies like RFID for these processes. Demand forecasting is (very) important because it informs how much of each SKU should

be in inventory. By analyzing historical information and utilizing analytics tools, companies can better predict future demand requirements, which in turn helps them reduce wastage while still keeping up their customer responsiveness (Fayad, Khatib, Abbas, Ghaleb & Mousa, 2024). However, demand forecasting by itself is not enough, as "accurate demand forecasts are a pre-requisite for lower inventory cost and improved service levels" (Ali, Sharabati, Allahham & Nasereddin, 2024). Efficient supply chain management also facilitates superior inventory control with a continuous flow of inputs and products from suppliers to customers.

In addition, effective inventory management allows businesses to reduce storage and transportation costs and increase their stock turnover ratio by quickly delivering new products at the right time. Inventory management also greatly benefits operational efficiency by reducing waste and refining production processes. Pankowska (2019) conducted research into the fact that efficient inventory management can lead to significant cost savings and improved customer service.

Efficient inventory management is one of the crucial factors for gaining a competitive advantage in the industry. Companies can maintain the right balance between supply and demand at an optimal level, minimize costs, and improve operational efficiency through more advanced strategies and technologies to create a better-performing company (Ali et al, 2024).

2.4.7 The Importance of an efficient inventory management

Effective inventory management is essential, as retailers look to increase their output and revenue while keeping their operating costs to a minimum (Singh et

al, 2021). Not only does a well-managed supply chain result in higher profits, an agile and responsive strategy also helps retailers consistently predict and meet customer demand. The importance of supply chain management (SCM) in the retail pharmacy sector cannot be overstated, as it directly impacts the availability of pharmaceutical products to customers and the overall efficiency of operations (Islam, 2024).

In the face of shifting consumer behavior, retailers must build a resilient supply chain, one that can both adapt to pandemics, economic shifts and other disruptions and evolve as new supply chain processes and management methodologies emerge. According to McKinsey (2023), building long-term resilience into the supply chain can help businesses boost their sales by 3% to 7% and improve cash flow by 15%. Specifically, supply chain management can help retailers improve their operations, drive revenue and position their businesses for long-term success. Efficient supply chain management is critically important in the pharmacy industry for several reasons, given the unique characteristics and demands of this sector (Sridharan & Goldstein, 2020). The relevance of efficient supply chain management in the pharmacy industry can be understood through the following key factors:

2.4.7.1 Determining Ideal Inventory Levels

Controlling inventory represents one of the highest costs for retailers. Businesses must be able to forecast market demand and maintain an optimal volume of inventory to meet that demand (Islam, 2024). Inventory analytics software can help retailers strike an ideal balance between production volumes and customer demand to avoid manufacturing an excess of products and subsequently

overspending on storage (Okoh, 2019). With visibility into inventory at every stage of the supply chain, retailers can understand any limitations that may occur, so they can prevent their supply chains from failing to meet customer expectations.

2.4.7.2 Product Availability

SCM ensures the timely availability of pharmaceutical products on the shelves of retail pharmacies (Sridharan & Goldstein, 2020). By managing the flow of goods from suppliers to pharmacies and optimizing inventory levels, SCM minimizes stock outs and ensures that customers have access to the medications they need when they need them.

2.4.7.3 Cost Efficiency

Pharmacies are always under a constant pressure to manage costs while maintaining product quality. An efficient supply chain helps in optimizing inventory levels, reducing waste, and minimizing overall operational costs (Johnson et al, 2021). Effective SCM practices help retail pharmacies minimize costs associated with inventory management, transportation, and warehousing. Through streamlining processes, reducing waste, and optimizing inventory levels, pharmacies can lower operating expenses and improve profitability (Islam, 2024).

2.4.7.4 Regulatory Compliance

The pharmacy industry is highly regulated, with stringent requirements for product safety, traceability, and documentation (Takawira & Pooe, 2024). An efficient supply chain helps pharmacies to comply with regulations, ensuring that products meet quality standards and are tracked from manufacturing to

distribution. SCM plays a critical role in ensuring that retail pharmacies comply with regulatory requirements governing the procurement, storage, and distribution of pharmaceutical products (Sridharan & Goldstein, 2020). By implementing robust SCM processes, pharmacies can track product origins, manage expiration dates, and maintain proper storage conditions to meet regulatory standards and ensure product safety and efficacy.

2.4.7.5 Customer Satisfaction

A well-managed supply chain contributes to enhanced customer satisfaction by ensuring product availability, timely delivery, and accurate order fulfillment (Sridharan, & Goldstein, 2020). By minimizing stock outs, reducing wait times, and providing reliable service, pharmacies can build customer loyalty and maintain a competitive edge in the market. Timely and reliable delivery of medicine is crucial for maintaining customer satisfaction (Islam, 2024). Efficient supply chain management ensures that pharmacies and healthcare providers have the necessary medicines when needed, contributing to overall healthcare service quality (Johnson et al, 2021).

2.4.7.6 Risk Management

SCM helps retail pharmacies identify, assess, and mitigate risks associated with supply chain disruptions, such as supplier shortages, transportation delays, or regulatory changes (Valashiya & Luke, 2023). By proactively managing risks and implementing contingency plans, pharmacies can minimize the impact of disruptions on operations and maintain business continuity.

2.4.7.7 Competitive Advantage

An efficient and responsive supply chain can serve as a source of competitive advantage for retail pharmacies (Islam, 2024). By differentiating themselves through superior product availability, faster delivery times, and lower costs, pharmacies can attract and retain customers, increase market share, and outperform competitors (Islam, 2024).

2.4.7.8 Patient Safety

Patient safety is paramount in the pharmacy Sector. An effective supply chain reduces the risk of counterfeit drugs, ensures the authenticity of products, and minimizes the chances of distributing substandard or unsafe medications to consumers (Valashiya & Luke, 2023).

2.4.7.9 Product Sensitivity, Shelf Life and Demand Variability and Seasonality

Pharmaceuticals often have a limited shelf life, and some products may require specific storage conditions. Efficient supply chain management ensures that drugs are delivered promptly and maintained under the appropriate conditions to prevent spoilage or degradation (Johnson et al, 2021).

The demand for medicine items can vary due to factors such as disease outbreaks, seasonal illnesses, or unexpected health crises. Efficient supply chain management enables pharmacies to respond to fluctuations in demand, preventing stock outs and excess inventory (Islam, 2024). Challenges such as natural disasters, geopolitical issues, or global health crises can disrupt supply chains. An efficient and resilient supply chain in the pharmacy can help them navigate unforeseen challenges and ensures a continuous supply of essential

medications in order to meet customer demand (Yaroson, Breen, Hou & Sowter, 2019).

2.5 Retail inventory management challenges

The retail supply chain environment is continuously evolving that creates new challenges for retailers. Major challenges in the retail supply chain include ensuring the right products to the right places at affordable price and available for purchase (Yaroson et al, 2019). Aside from external challenges, there are also internal challenges to companies wishing to improve their supply chains. According to Leigh Sparks (2020), the key challenges for retailers are to make end-to-end customer-centric supply chains visible, to aid efficiency and flexibility, to rethink existing and new activities, and to provide as sustainable a solution as possible based on sound practices and efficient operations. The retail pharmacy sector faces distinctive challenges within the market environment that directly impact procurement and supply chain management practices. These are explained below.

2.5.1 Fragmented Supply Chain

The retail supply chain is often fragmented, involving multiple stakeholders such as manufacturers, wholesalers, distributors, and individual pharmacies. This fragmentation can result in coordination challenges, lack of transparency, and difficulties in traceability of pharmaceutical products (Yaroson et al, 2019). Lack of coordination may lead to inefficiencies, delays, and difficulties in tracking the movement of products throughout the supply chain. It can also contribute to inventory imbalances, with some pharmacies facing shortages while others have excess stock (Islam, 2024).

2.5.2 Limited Technological Adoption

Some pharmacies may face barriers to adopting advanced technologies for procurement and supply chain management. This includes the implementation of Enterprise Resource Planning (ERP) systems, digital inventory management tools, and other technology-driven solutions (Ivanov, 2020). Limited technological adoption can result in manual and less efficient procurement processes, slower response to market dynamics, and challenges in maintaining accurate and real time inventory data (Hofstra et al, 2024). This, in turn, affects the overall agility and competitiveness of pharmacies in the market.

2.5.3 Counterfeit drugs

A significant challenge in the retail pharmacy sector is the availability of counterfeit products and compromised product integrity (Johnson et al, 2021). Procuring pharmaceuticals from informal markets may expose pharmacies to substandard or fake medications, compromising patient safety. Additionally, the lack of authenticity and traceability in the informal sector poses challenges in ensuring the quality and legitimacy of pharmaceutical products (Hofstra et al, 2024).

2.5.4 Lack of Skills

The lack of formal education among pharmacy owners and managers is a significant challenge (Pavela et al., 2021). Without a solid understanding of business management and supply chain dynamics, pharmacy owners may struggle to implement optimal procurement practices (Hofstra et al, 2024). Educational gaps may lead to suboptimal decision making in procurement,

inadequate inventory management, and a limited ability to adapt to evolving supply chain best practices. It also hinders the adoption of innovative solutions that could enhance efficiency. These challenges often stem from inadequate training (Johnson et al, 2021).

2.5.5 Lack of Proper Storage

The lack of proper storage in retail pharmacies presents significant risks to the supply chain, as many pharmaceutical products are sensitive to temperature, humidity, and light. Improper storage conditions can lead to the degradation of drugs, particularly biologics and vaccines, reducing their efficacy and potentially compromising patient safety (Schneider, 2018). For instance, temperature fluctuations can cause vaccines to lose their potency, rendering them ineffective (Pavela et al., 2021). Inadequate storage also complicates inventory management, leading to inefficiencies such as overstocking, stockouts, and product wastage (Hobbs et al., 2022). Implementing climate-controlled environments and real-time monitoring systems can mitigate these risks and improve inventory accuracy, ensuring that medicines remain viable throughout their shelf life (Pavela et al., 2021).

2.5.6 Unreliable Supply of Medicines

Unreliable supply of medicines is a persistent challenge in retail pharmacy supply chains, often caused by disruptions in manufacturing, logistical issues, and regulatory delays. Pharmaceutical companies may face production delays due to supply shortages, labor disruptions, or equipment malfunctions, which can create gaps in supply (Schneider, 2018). Furthermore, fluctuations in demand, such as during flu season or public health emergencies, can lead to stock outs,

leaving pharmacies unable to meet patient needs. Strengthening supplier relationships and utilizing demand forecasting tools can help pharmacies anticipate shortages and mitigate the impact of supply chain disruptions (Sridharan & Goldstein, 2020).

2.5.7 Short Life Cycles of Medicines

The short life cycles of many pharmaceutical products create challenges in retail pharmacy supply chains, as medications can be discontinued or replaced by newer alternatives before existing stock is sold. As new drugs are introduced, older medications may lose their market share or be phased out due to safety concerns or the emergence of more effective treatments (Pavela et al., 2021). This can lead to inventory obsolescence and financial loss, as pharmacies are left with unsold stock (Islam, 2024). To manage this challenge, pharmacies must implement agile inventory management practices and stay informed about market trends, regulatory changes, and emerging therapies to ensure they are not overstocking soon-to-be obsolete medications (Schneider, 2018).

2.6 Strategies for optimizing inventory management practices in retail pharmacies

2.6.1 Integration of Technology

Globally, successful retail pharmacies are increasingly adopting and upgrading technology to increase efficiency. Automated inventory management systems, electronic order processing, and data analytics tools are becoming standard (Pavela et al., 2021). Implementing such technologies can streamline

procurement processes, reduce errors, and provide real-time insights into inventory levels.

Embracing digital transformation entails the integration of robust Enterprise Resource Planning (ERP) systems, data analytics, and online platforms within the retail pharmacy sector (Dolgui & Ivanov, 2022). This digitalization can enhance visibility, streamline supply chain processes, and improve overall operational efficiency. Implementing ERP systems can provide most recent insights into inventory levels of the warehouse, next seasons or next order's demand forecasting, and order processing. Online platforms can facilitate direct communication between pharmacies and suppliers, reducing lead times and enhancing the accuracy of orders.

Successful pharmacies leverage advanced technology solutions, such as Enterprise Resource Planning (ERP) systems and supply chain management software. These tools facilitate real-time monitoring of inventory levels, streamline order processing and enhance overall visibility across the supply chain. Digital technologies, including blockchain, artificial intelligence (AI), and the IoT, are being leveraged to optimize operations, enhance supply chain visibility, and improve communication between partners (Chen et al., 2023). For instance, real-time visibility offered by blockchain technology does not only facilitate tracking the movement of goods but also aids in the identification of potential disruptions (Dolgui & Ivanov, 2022). Furthermore, access to real-time data and analytics significantly improves decision-making (Min, 2019).

Digitalizing supply chains provide engineering businesses with regular stock status, demand, future, and supplier performance data, therefore making decision

making better informed. In return, this streamlines levels so that there will be less wastage, lower stock-outs, or surpluses as well, and in the process, make processes more efficient (Ali et al, 2024). In South Africa, for example, the government utilized digital systems for efficient procurement and distribution of COVID-19 vaccines, resulting in an effective allocation nationwide (Dzinamarira et al., 2021). Digitalisation has also ensured rapid distribution of medicines and medical supplies to hospitals and clinics across the country (Antwi et al., 2021). Nonetheless, there exist implementation challenges such as the need for more digital infrastructure and resources, especially in rural areas, and concerns over data security and privacy that may hinder the adoption of digital technologies (Fouche & Andrews, 2022).

2.6.2 Collaborative Models

Collaborative efforts among stakeholders is pivotal in maintaining the flow of goods and services, especially during crisis periods (Singh et al., 2021). This collaboration, encompassing elements such as information sharing, joint planning, and decision-making, has been crucial in ensuring the availability and distribution of essential medicines and medical supplies (Ivanov et al., 2021). For instance, the swift collaboration between pharmaceutical manufacturers, distributors, and retailers facilitates the nationwide distribution of medical necessities to hospitals and clinics (Omar et al., 2022). However, effective collaboration encounters challenges such as the need for heightened trust and the management of conflicts of interest among supply chain partners, potentially impeding the implementation of collaborative measures (Basso et al., 2019).

2.6.3 Quality assurance and Regulatory Compliance

Leading pharmacies prioritize regulatory compliance and often implement track-and-trace systems (Fouche & Andrews, 2022). These systems ensure the authenticity of pharmaceutical products, providing end-to-end visibility into the supply chain. Adhering to strict quality assurance and regulatory compliance standards is a hallmark of successful pharmacies. This involves ensuring that all pharmaceutical products meet regulatory requirements, are sourced from reputable manufacturers, and are stored and distributed under controlled conditions (Nsanzimana & Akumuntu, 2024).

2.6.4 Demand-Driven Procurement

A shift towards demand-driven procurement is observed in advanced retail pharmacies such as Cardinal Health Inc, Walgreens Boots Alliance, McKesson Corporation, CVS Health Corporation and Wal-Mart Stores Inc. This involves adjusting procurement strategies based on real-time demand data (Nsanzimana & Akumuntu, 2024). Data-driven decision-making ensures that pharmacies maintain optimal inventory levels, minimizing waste and improving customer satisfaction.

2.6.5 Investment in Training and Talent Development

Investing in training and talent development is a key strategy for enhancing the inventory management of retail pharmacies by improving supplier relationships, and regulatory compliance. Well-trained staff can optimize inventory tracking, reduce errors, and improve customer service, while also leveraging technology and automation to streamline operations (Omar et al., 2022). Additionally, training in logistics, crisis management, and continuous improvement fosters a proactive and efficient workforce that can adapt to disruptions, reduce waste, and

ensure smooth supply chain operations (Islam, 2024). Ultimately, these investments contribute to cost savings, better customer experiences, and a more resilient supply chain. Successful pharmacies invest in training and talent development programs to ensure that their staff, including procurement and supply chain teams, stay abreast of industry trends, regulations, and best practices (Ivanov, 2020).

Investing in training and capacity-building programs also empowers pharmacy owners and staff with the knowledge and skills needed for effective supply chain management. Training initiatives can cover areas such as procurement best practices, inventory management, and the use of technology (Johnson et al, 2021). Targeted training programs can bridge these gaps. These programs can be tailored to the specific needs of pharmacy owners, improving their decision-making capabilities and overall supply chain competence.

2.6.6 Continuous Improvement and Lean Practices

Best-in-class retail pharmacies adopt continuous improvement and lean practices (Kapoor et al, 2018). Continuous improvement and lean practices are key methodologies for enhancing operational efficiency and eliminating waste in business processes, including supply chains (Morris & Sweeney, 2019). Continuous improvement focuses on consistently refining processes over time, encouraging a culture of small, incremental changes that collectively lead to significant improvements. It relies on feedback, data-driven decisions, and employee involvement to drive enhancements in quality, speed, and cost-effectiveness (Nugraha & Basri, 2024).

Lean practices, derived from the Toyota Production System, aim to optimize value by minimizing waste (such as excess inventory, unnecessary motion, or waiting time) without sacrificing quality. Key principles of lean include streamlining workflows, reducing cycle times, and improving communication (Morris & Sweeney, 2019). Lean emphasizes the importance of understanding customer value and aligning all processes to deliver that value more efficiently.

When applied to retail pharmacies, continuous improvement and lean practices can help improve supply chain management by reducing stockouts, minimizing inventory holding costs, enhancing customer service, and increasing responsiveness to demand changes (Ivanov, 2020). These practices foster a more agile and efficient supply chain, ultimately leading to better resource utilization, improved profitability, and enhanced customer satisfaction (Sridharan & Goldstein, 2020).

2.6.7 Centralized procurement and distribution and efficient storage

Centralized procurement and distribution, combined with efficient storage practices, can significantly enhance the inventory management of retail pharmacies (Nugraha & Basri, 2024). By consolidating procurement processes, pharmacies can leverage economies of scale, negotiate better prices, and streamline inventory management across multiple locations. This centralization allows for more consistent and reliable purchasing, reducing the risks of stockouts or overstocking (Ivanov, 2020). Efficient storage practices, such as optimized shelving, climate-controlled environments, and systematic inventory tracking, ensure that products are stored in optimal conditions, reducing waste and spoilage. Together, these strategies improve operational efficiency, reduce

costs, and ensure that pharmacies can provide timely and reliable service to customers while maintaining regulatory compliance. Leading pharmacies have a centralized procurement model, allowing them to purchase products in bulk centrally (Pavela et al, 2021). This strategy enables them to negotiate better deals with suppliers, achieve cost advantages and maintaining better control over inventory. Pharmacies dealing with specialty drugs often implement dedicated cold chain management strategies. This ensures the safe storage and transportation of temperature-sensitive medications, maintaining their efficacy and quality (Obi & Agarana, 2023).

2.6.8 Diversification of Suppliers

Supplier diversification is a key strategy for improving the resilience and efficiency of a retail pharmacy's inventory management. By sourcing from multiple suppliers, pharmacies can reduce risks from disruptions such as delays, price hikes, or shortages. This approach offers flexibility in pricing and delivery, allowing better negotiation terms and consistent inventory levels (Sridharan & Goldstein, 2020). It also minimizes dependence on a single supplier, ensuring supply continuity during disruptions like natural disasters or regulatory changes. Ultimately, supplier diversification enhances cost-effectiveness, stability, and operational resilience, helping pharmacies avoid risks from market fluctuations and regulatory changes (Morris & Sweeney, 2019).

2.7 Conceptual Framework

The conceptual framework shows the relationship between the dependent variables and the independent variables. The conceptual framework for this study is shown below;

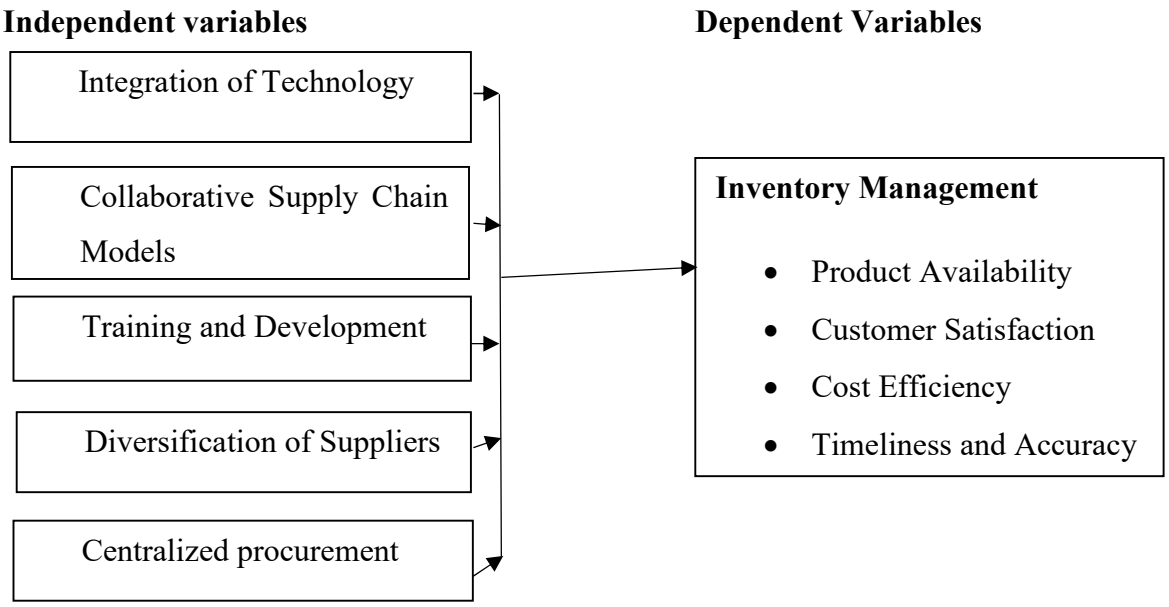

Figure 2.2: Conceptual Framework Source: Author (2025)

2.8 Empirical Studies

Several studies have been conducted across the globe on inventory management in retail pharmacies and found mixed results. Nsanzimana and Joseph Akumuntu (2024) conducted a study on the effects of healthcare inventory management practices on the performance of pharmaceutical companies in Rwanda with special focus on selected retail pharmacies located in Gasabo District. The majority of respondents strongly agreed that inventory control techniques were effective in reducing stock outs, maintaining appropriate inventory quantities, minimizing wastage and losses. Inventory shrinkages, such as expiration, damages, theft, and stock outs, significantly impact pharmacy performance, so emphasizing on addressing these issues through good inventory management would improve the performance effectively. The use of various stock management software systems was also examined, with Ishyiga being the most widely adopted system. The study however did not investigate the barriers that

prohibit supply chain management strategies from becoming successful, which this present study seeks to achieve.

Ali, Fayad, Alomair, and Al Naim (2024) conducted a study on the critical dynamics of characteristics within digital supply chains and their collective impact on inventory management efficiency. Using an exhaustive survey of 350 engineering company representatives, the study explored the complex interactions between supply chain system qualities, on-time data, and inventory management effectiveness. Through advanced regression analysis, the authors tested three hypotheses to assess the impact of digital adaptivity, dynamism, and flexibility on information visibility and inventory management. The study found strong positive relationships between digital adaptability and flexibility in the supply chain, enhancing both information visibility and inventory management effectiveness. However, digital agility in the supply chain did not show significant relationships with these variables, though it may still play a role. While the study provided valuable insights into digital supply chain dynamics, it focused on engineering companies, where supply chain characteristics may differ from those in the retail pharmacy industry. The present study aims to fill this gap by exploring how these digital dynamics affect inventory management in the retail pharmacy sector.

Bilal, Bititci, and Fenta (2024) conducted a study on effective inventory management strategies to address demand and supply uncertainty, using Ethiopian pharmaceutical supply services as a case study. The study highlighted the systemic challenges faced by Ethiopian public health facilities, such as frequent stock-outs of essential medicines, inadequate forecasting, prolonged procurement processes, a fragmented distribution system, poor data quality, and

a shortage of trained professionals. The study emphasized the importance of proactive measures like communication, stock assessment, supervision, and streamlined procurement to mitigate disruptions, while reactive strategies such as safety stock were found to be less effective in the long term. It also stressed the need to align supply chain strategies with product uncertainties, foster collaboration, and use flexible designs for resilience. However, the study focused on the Ethiopian Pharmaceutical Supply Services (EPSS), which faces a highly unstable and volatile supply chain. The dynamics of the Ethiopian system differ significantly from those in Mutare, Zimbabwe, where the supply chain context and challenges may be distinct. The present study aims to fill this gap by exploring the unique supply chain challenges and strategies in Mutare's retail pharmacy sector.

Takawira and Mutambara (2023) conducted a study on COVID-19 and emerging markets as a strategic framework for pharmaceutical supply chains, aiming to develop a framework to address COVID-19-induced disruptions within the South African pharmaceutical industry. The study explored the perceptions of 25 pharmaceutical supply chain professionals in South Africa through semi-structured interviews, highlighting strategies such as research and development (R&D), marketing strategies, collaborative disruption management, and local production as key to overcoming supply chain disruptions. The findings emphasized the importance of local R&D initiatives, digital technologies, effective communication, local manufacturing, and strong supplier and customer relationships for enhancing resilience. However, the study focused on the broader pharmaceutical industry and did not investigate the specific barriers affecting supply chains in retail pharmacies. This is the gap that the present study

seeks to address by focusing on the retail pharmacy sector and the unique challenges it faces in supply chain management.

Elzarka (2019) conducted a study that assessed the supply chain maturity of a retail pharmacy chain in Egypt using the Supply Chain Maturity Assessment Test (SCMAT). This qualitative case study provided an in-depth analysis of supply chain activities through a focus group of eleven top and middle managers from various functions, including supply chain, logistics, quality management, operations, information technology, customer service, procurement, and human resources. The focus group assessed the company's supply chain maturity, revealing several areas for improvement that could help expand the chain's operations to more cities in Egypt. However, the study did not explore the barriers to supply chain efficiency, and this present study seeks to close that gap by investigating these barriers in the context of Mutare's retail pharmacy sector.

Johnson et al (2021) conducted a study on inventory management practices and supply chain performance of antiretroviral (ARV) medicines in public hospitals in Nyamira County, Kenya. The study highlighted that unreliable supply systems had hindered the uninterrupted supply of life-saving medicines in many developing countries, with ARVs being particularly affected. The study found that, except for order lead time, all supply chain performance metrics were unsatisfactory due to high stock-out rates, poor reporting, and high stock wastage from expired medicines. Strategies such as adopting an electronic inventory system, using data for decision-making, dedicated storage of ARVs, and including buffer stock were suggested to improve inventory management. However, the study focused solely on ARVs and did not address broader supply

chain inefficiencies or inventory management practices for other types of medicines or in different healthcare settings.

Okoh (2019) conducted a study on retail pharmacy supply chain performance as a comparison of typical configurations of England and Nigeria. The study noted that the use of software to synchronize the inventory activities of retailers with that of wholesalers, contributed to better efficiency in the operations in retail outlets in England. Technology plays a very important role in ensuring the resilience and reliability of the retail pharmacy supply chain. Incorporating this to the practice in Nigeria will go a long way to enhance supply chain operations thereby reducing cases of stock outs of antibiotics at the retail level. While this study primarily focuses on broader geographic regions, and while it highlights the role of technology in improving supply chain operations, it does not address how these practices may apply specifically to the unique challenges and conditions within Zimbabwe or Mutare.

Takawira and Pooe (2024) conducted a study on supply chain management system for retail pharmacies in Zimbabwe. The study noted that pharmaceutical industry in Zimbabwe has been facing many challenges, which could partly be explained by the low uptake of new technology by the sector. For example, most of the existing retail pharmacies still conduct their day-to-day transactions manually. A basic inventory management system is used to maintain and monitor the inventory and a manual stock take is done at the end of each month to balance sales and purchases. This poses an unnecessary burden for the employers as well as challenges for effective service delivery. The study mentioned that a supply chain management system for automatic order processing, e-procurement, and collaboration in the supply chain is an innovative

solution to the above-mentioned challenges. If well adopted, this system could ensure that critical orders for health medication are anticipated and procured by key health delivery institutions while also ensuring that pharmacies achieve their commercial targets. The study however was based on the whole pharmaceutical industry while the present study focuses on a single location, Mutare, where geographical location may play a role in affecting supply chain or product delivery. Therefore, the current study seeks to address this gap by examining how these broader supply chain challenges manifest in Mutare, offering a more localized view of the situation.

Nugraha and Basri (2024) studied inventory management at XYZ Hospital Pharmacy in Bandung, focusing on medicines and medical devices. With rising health costs, effective supply chain management is essential to reduce unnecessary expenses. Using monthly stock and daily sales data from October 2023 to February 2024, the research applied quantitative methods to determine optimal inventory levels, including Economic Order Quantity (EOQ), safety stock, and reorder point (ROP). It also uses ABC analysis and cycle counting for inventory prioritization. The study found out that a continuous review strategy can lead to significant cost savings: IDR 302,697,429 (48.17%) for pharmaceutical products and IDR 70,602,064 (48.77%) for medical devices. Total savings across all products were IDR 373,299,493. The research emphasized the need for better inventory controls, especially for single-use medical devices, to improve cost efficiency and inventory optimization. However, their study concentrated on inventory management rather than broader supply chain efficiency, which is the focus of the present research in Mutare.

This study aims to broaden the scope to include not only inventory control but also supply chain efficiency and resilience in Mutare's retail pharmacies.

Islam (2024) conducted a study on Procurement and Supply Chain Management Practices in the Retail Pharmacy Business in Bangladesh. The industry had experienced significant expansion, with numerous new pharmacies opening during the pandemic and continuing to grow afterward. Recognizing the promising future, major companies began investing in the sector. Despite its potential, there was a notable lack of a formalized supply chain structure in the industry. While the study highlighted the sector's expansion, the findings cannot be generalized to Zimbabwe due to differing supply chain dynamics between the two countries. The present study seeks to fill this gap by examining the specific challenges faced by retail pharmacies in Mutare, taking into account the local context and supply chain structure.

While there are a number of studies conducted, there is a dearth in literature on supply chain inefficiencies. Most studies have focused on supply chain optimization, inventory management, and technology adoption, but few have specifically addressed the root causes and impacts of inefficiencies within supply chains, particularly in the retail pharmacy sector. This study seeks to close this gap by exploring the underlying factors contributing to supply chain inefficiencies in the context of Mutare's retail pharmacies, with a focus on improving operational performance and resilience.

2.9 Chapter Summary

This chapter reviewed various studies on supply chain dynamics, highlighting gaps in literature related to supply chain inefficiencies, particularly within the

context of the retail pharmacy sector. Several studies were examined, each focusing on different aspects of supply chain management, from inventory control and technology adoption to supply chain resilience in the face of disruptions. The following chapter presents the methodology that will be adopted in conducting the study.

CHAPTER 3 METHODOLOGY

3.1 Introduction

This chapter outlines the research methodology that was employed in conducting the study. It detailed the research design, the population and sampling methods,

the data collection instruments and the approach to data analysis and organization. Additionally, the chapter addressed the ethical considerations that guided the research process.

3.2 The Research design

This study adopted an exploratory research design, which was used to investigate the topic in-depth and gain a comprehensive understanding of the inventory management practices in retail pharmacies in Mutare. Exploratory research design is a type of research approach used to investigate a problem or explore a phenomenon in-depth (Yin, 2015). It is characterised by its flexibility in terms of methods and approaches, as it does not follow a strict set of procedures or predetermined hypotheses but instead encourages an open-ended investigation into the subject matter. Exploratory research is predominantly qualitative and typically uses techniques such as interviews, focus groups, observations, and case studies to collect data (Creswell, 2023). This study was purely qualitative and used interviews as the main data collection tool, hence the suitability of this research design.

This design also enabled the researcher to gather preliminary insights, explore emerging patterns, and generate a deeper understanding of the factors affecting inventory management in the sector. The flexible nature of the exploratory approach allowed the study to adapt as new information became available, facilitating a comprehensive exploration of the topic.

3.3. Population and Sampling

The population was defined as the entire group of elements that shared common observable characteristics or patterns, which the researcher aimed to make inferences about (Saunders et al., 2016). The population for this study was drawn from five retail pharmacies in Mutare and included pharmacy owners and managers, pharmacists, and pharmacy staff involved in inventory management and supply chain operations. These individuals are responsible for overseeing the daily operations of the pharmacy, including inventory management, procurement, and overall supply chain coordination. Their insights into the challenges and practices related to inventory control will be critical to understanding the current system. On average, each pharmacy employed approximately five people. The target population for the study is presented in Table 3.1 below.

Table 3.1 Population

Respondents Class	**Population**
Pharmacy Staff (owners, managers and general staff)	25
Total	**25**

3.3.1 Sampling Technique

In this study, purposive sampling was adopted to select participants who were directly involved in the supply chain and inventory management processes in retail pharmacies in Mutare. This included pharmacy owners, managers, pharmacists, staff, and suppliers, all of whom were likely to have valuable insights into the challenges and practices related to inventory management. Purposive sampling is a non-probability sampling technique where participants are selected based on specific characteristics or qualities that align with the research objectives (Yin, 2015). In this method, the researcher deliberately chose

individuals who had relevant experience, knowledge, or insights into the study's focus, ensuring that the sample directly contributed to the research aims.

The adoption of purposive sampling was particularly suitable for this study because it allowed the researcher to focus on individuals with in-depth knowledge and experience, ensuring that the data collected was relevant and rich in detail. Since the study aimed to explore specific aspects of inventory management and supply chain systems in the pharmacy sector, purposive sampling helped target the most knowledgeable and informed individuals, thus enhancing the quality and relevance of the findings.

3.3.2 Sample Size

In calculating the sample size, the study adopted the Yamane (1973) statistical formula and the sample size was calculated as below;

n=	N
	(1 + Ne2)

Where; n = required sample size

N = size of the population

e = alpha level, that is, allowable error e = 0.10 at 90% confidence interval

n=	25
	(1 + 25(0.10*0.10)

n= 20

A sample size of 20 respondents was selected from the population of 25, as this was a qualitative study. This sample size was appropriate for qualitative research, where the focus was on obtaining in-depth insights and rich data from a select group of participants rather than generalizing to a larger population. This sample size allowed for detailed exploration of the perspectives of key stakeholders involved in inventory management and supply chain systems in retail pharmacies in Mutare.

3.4 Data Collection Instruments

Data for the study were collected through interviews and documentary analysis.

3.4.1 Interviews

Interviews were used as the primary data collection method, providing an opportunity for the researcher to engage directly with participants through two-way conversations. During the interviews, the researcher asked questions related to the study topic, allowing for a deeper understanding of the respondents' experiences and perspectives (Barry & Zikmund, 2015). A semi-structured interview guide with open-ended questions was employed, which was pre-tested to ensure its effectiveness before use. All interviews were conducted face-to-face, enabling a more interactive and personal exchange of information.

The main participants in these interviews were senior pharmacists, as they were directly involved in implementing inventory management strategies and could provide valuable insights into supply chain systems in retail pharmacies. Non-verbal responses were also noted to help interpret immediate reactions and gain a

full understanding of participants' answers. The face-to-face format allowed the researcher to clarify any ambiguities in real time, ensuring more accurate and nuanced data.

Interviews proved particularly useful, allowing the researcher to probe complex issues, clarify unclear answers, and explore deeper insights. Unlike questionnaires, interviews offered flexibility to ask follow-up questions and obtain detailed responses, facilitating a comprehensive understanding of inventory management practices and challenges.

However, interviews also had limitations. They were time-consuming due to preparation, conducting, and analyzing responses. Potential interviewer bias could influence participants' answers, and the face-to-face interaction might have limited the range of participants or affected confidentiality, potentially reducing candidness. Despite these challenges, interviews allowed for deeper, more personal exploration of the subject matter.

3.4.2 Documentary Analysis

Documentary analysis was used as a secondary data collection method, focusing on the examination of relevant documents related to supply chain systems and inventory management practices in retail pharmacies in Mutare. This involved reviewing existing written materials such as company inventory reports, financial records, supply chain strategy documents, policy guidelines, and industry publications.

Documentary analysis provided valuable background information, helped verify interview findings, and offered a broader understanding of the current state of

inventory management in the sector. By examining these documents, the researcher identified trends, discrepancies, and gaps in inventory management systems, cross-referencing this with data from interviews.

This method enhanced the study by providing deeper contextual understanding and complemented the qualitative data from interviews. It also allowed the researcher to capture data that may not have emerged from participant responses, enriching the overall findings of the study.

3.5 Pilot Study

Pilot testing was an essential step in the research process, involving a preliminary trial of the research instruments to identify any issues and ensure their effectiveness before the main study. In this study, pilot testing was conducted to assess the usability of the interview guide, which was a key data collection instrument. The interview guide, containing semi-structured and open-ended questions, was pre-tested with a small sample of participants who were similar to the actual study respondents but were not included in the final sample.

The primary aim of the pilot test was to identify potential problems with the interview guide, such as ambiguous questions, unclear instructions, or any aspects that could cause confusion during the interviews. Feedback was sought from the pilot test participants regarding the clarity, relevance, and comprehensibility of the questions, as well as the logical flow of the interview format and its ability to elicit in-depth information. The length of the interviews was also assessed to ensure they were neither too short nor excessively long, thereby maintaining respondent engagement while gathering sufficient data.

Furthermore, the pilot test provided an opportunity for the researcher to practice the interview process and refine interview techniques. It allowed familiarization with the interview flow, management of non-verbal cues, and effective use of probing questions when necessary. Logistical issues were also identified, including determining the optimal setting for conducting face-to-face interviews to ensure a comfortable and focused environment for participants. Based on feedback from the pilot test, necessary adjustments were made to improve the interview guide and ensure it effectively captured the data needed to answer the research questions.

3.6 Data Collection Procedure

The procedure for conducting interviews in this study involved several systematic steps to ensure the collection of relevant, in-depth, and reliable data from a purposive sample of 20 respondents at retail pharmacies in Mutare. The steps undertaken were as follows:

Selection of Participants: The sample of 20 respondents was purposively selected based on their roles and involvement in decision-making related to inventory management and supply chain systems. These individuals were chosen because of their knowledge and expertise in critical areas such as pharmacy operations management and supply chain coordination.

Pre-Interview Preparation (Development of Interview Guide): A semi-structured interview guide with open-ended questions was developed, focusing on key topics including current inventory management practices, the role of senior management in overseeing supply chain systems, challenges faced in inventory control, and strategies for improving efficiency.

Pre-testing of Interview Guide: Prior to the main interviews, the interview guide was pre-tested with a smaller group to assess the clarity and relevance of the questions. Based on feedback from the pre-test participants, necessary adjustments were made to refine the guide for the main study.

Communicating with Participants: The researcher contacted the selected senior management members through formal channels such as email or phone to request their participation. The purpose of the study, as well as the estimated duration and format of the interviews, was clearly communicated.

Scheduling: Interview appointments were arranged at times convenient for each participant, considering their professional commitments. The interviews were conducted face-to-face to facilitate deeper engagement, observation of non-verbal cues, and immediate clarification of responses.

Conducting the Interviews: Interviews were held in quiet, private settings within the pharmacies to ensure confidentiality and minimize distractions. A comfortable environment was established to help participants feel at ease and encourage open, honest responses.

Interview Process: At the start of each interview, the researcher introduced themselves, explained the purpose of the study, and ensured participants understood their rights, including voluntary participation and confidentiality. The semi-structured interview guide served as a framework, with open-ended questions encouraging participants to elaborate on their responses. The researcher maintained flexibility to probe deeper into specific areas and clarify responses as needed, ensuring comprehensive coverage of relevant topics.

Recording Responses: With participant consent, interviews were audio-recorded to ensure accurate data capture. The researcher also took notes to document important non-verbal cues and observations that could provide additional context.

3.7 Analysis and Organisation of Data

3.7.1 Data analysis

Data processing and analysis were critical steps in this study, as they transformed raw data into meaningful insights. For this study, which focused on strategies for enhancing inventory management and supply chain systems in retail pharmacies in Mutare, data was primarily collected through semi-structured interviews with senior management.

After the interviews were conducted and audio-recorded, the first step in data processing involved transcribing the recordings. The transcription process converted spoken responses into written form, ensuring that all verbal data was accurately captured. The researcher also took detailed notes during the interviews, including non-verbal cues, to enrich the understanding of participants' responses.

Thematic analysis was employed to analyse the data—a method that involved identifying, analysing, and reporting patterns (themes) within the dataset. Themes related to inventory management practices and supply chain systems in the retail pharmacy sector were identified from the initial codes. Once the key themes were finalized, the researcher interpreted the findings in the context of the research questions. This step involved examining how each theme

contributed to understanding the challenges and opportunities within inventory management and supply chain systems in retail pharmacies, identifying areas for improvement, and proposing strategies to enhance operational efficiency.

The researcher also compared the emerging themes and patterns from the interviews with existing literature on inventory management and supply chain best practices. This comparison enabled the validation of the study's findings and helped contextualize the results within broader theoretical frameworks, ensuring that the conclusions drawn were grounded in established knowledge.

3.7.2 Data presentation

In this study, data presentation involved organizing and displaying the findings from the qualitative analysis of interviews and documentary materials in a clear and meaningful manner. Since qualitative research emphasizes depth and context, the data presentation aimed to highlight key themes, patterns, and insights that emerged from participants' responses and the document analysis.

Thematic Presentation: The primary method of presenting the data was through the themes identified during thematic analysis. Each theme was clearly outlined and discussed, with findings illustrated using direct quotes from interview participants to provide a deeper understanding of their perspectives.

Narrative Format: The data was presented in a narrative format, where themes were organized into sections corresponding to the research questions. This approach provided a coherent flow of information that linked the data back to the study’s objectives.

Use of Tables and Charts: Although the study was qualitative, relevant quantitative data such as demographic information or the frequency of certain responses were presented using simple tables and charts, for instance, summarizing key characteristics of the respondents.

Cross-referencing with Documentary Data: Documentary analysis was integrated into the data presentation by comparing interview findings with key documents such as supply chain reports, inventory logs, and industry publications. Significant discrepancies or alignments between interview data and documents were discussed to offer a more comprehensive view of the supply chain systems in retail pharmacies in Mutare.

3.7.3 Validity and Reliability of Findings

Validity referred to the extent to which the research accurately measured what it intended to measure, ensuring that the findings genuinely reflected the inventory management practices and supply chain systems in retail pharmacies in Mutare. To ensure validity, the researcher employed multiple data collection methods, including semi-structured interviews and documentary analysis, allowing for triangulation and cross-validation of data. The interview questions were carefully designed and pre-tested to ensure clarity, relevance, and alignment with the research objectives. Additionally, the researcher engaged in member checking by sharing preliminary findings with selected participants to confirm that the data accurately represented their views, further enhancing the validity of the results.

Reliability referred to the consistency and dependability of the research findings over time and across different contexts. In this study, reliability was enhanced through a systematic and structured approach to data collection and analysis. The

researcher followed a consistent process for conducting interviews, transcribing responses, coding data, and identifying themes. A semi-structured interview guide was used to ensure that all participants were asked similar questions, enabling consistent comparison of responses. To further improve reliability, the interview guide was pilot-tested with a small group to identify any inconsistencies or ambiguities. This consistent approach throughout the interview and analysis process helped strengthen the reliability of the study's findings.

3.8 Ethical Consideration

It was essential for the researcher to adhere to ethical norms throughout the study (Yin, 2014). To ensure the protection of participants and the integrity of the research process, several ethical considerations were followed:

Permission: All ethical protocols were observed, including obtaining ethical clearance from the Africa University Research Ethics Committee (AUREC). Before commencing the study, the researcher secured formal permission from the relevant authorities at the selected retail pharmacies in Mutare. This ensured that the research was conducted in alignment with organizational policies and with full respect for institutional guidelines.

Informed Consent: Prior to participation, all respondents were fully informed about the purpose, scope, and nature of the study. They were made aware that their participation was voluntary, and that they had the right to withdraw at any stage without any negative consequences. Written informed consent was obtained from each participant before any data collection began.

Confidentiality and Anonymity: The researcher ensured that all data collected remained confidential. Personal identifiers were removed to maintain respondent anonymity. Participants were assured that their responses would not be linked to their identities, and that the data would be used solely for academic purposes.

Data Protection: All collected data, including audio recordings, interview transcripts, and documents, were securely stored. Access to the data was restricted to the researcher only, safeguarding it from unauthorized access.

Non-Coercion: Participation in the study was entirely voluntary. No participant was coerced or pressured to provide information. The researcher clearly communicated that participation would not affect their position within the organization, and that there would be no negative consequences for choosing not to participate or for withdrawing.

Transparency: The researcher maintained full transparency throughout the research process, clearly communicating how the study would be conducted, how the data would be used, and what the potential outcomes could be. Where applicable, participants were given the opportunity to review the findings to verify that their views had been accurately captured and represented.

3.9 Summary

This chapter provided a detailed discussion of the research methodology adopted for the study. It outlined the exploratory research design used to gain a deeper understanding of supply chain and inventory management practices in retail pharmacies in Mutare. The population for the study comprised staff members from five selected retail pharmacies, including pharmacy owners, managers,

pharmacists, and inventory personnel. A purposive sampling technique was used to select 20 participants. Data were collected using semi-structured interviews and documentary analysis. The chapter also addressed ethical considerations such as informed consent, confidentiality, data protection, non-coercion, and the necessary permissions obtained from relevant authorities. The next chapter presents and discusses the findings of the study.

CHAPTER 4 DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter presents and analyses the primary data collected through interviews. The data findings are visually represented using thematic tables, with explanations accompanying each table to clarify the insights. In this chapter, the key questions posed in the study are directly addressed. Furthermore, the findings are compared to the literature review, and in-depth discussions are provided for each research objective to draw meaningful connections and insights.

4.2 Data Presentation and Analysis

4.2.1 Interviews Response rate

The researcher managed to interview 15 of the targeted 20 participants thereby obtaining a 75% response rate which showed a high level of engagement and commitment from the selected participants. This indicated that respondents took this matter as an important subject and were willing to contribute to the study through participation.

4.2.2 Demographic Data

The demographic profile of all the 15 interviewees who took part in the study is presented in Table 4.1 overleaf.

Table 4.1: Demographic Profile of Respondents

Participant	Gender	Position	Age	Period in Employment

1	Female	Pharmacist	36	10
2	Female	Pharmacy Manager	39	15
3	Male	Owner	48	8
4	Male	Technician	28	3
5	Female	Technician	35	12
6	Male	Technician	37	12
7	Male	Pharmacist	26	3
8	Female	Pharmacist	24	1
9	Male	Pharmacist	52	28
10	Male	Pharmacy Manager	42	18
11	Female	Pharmacist	25	1
12	Female	Pharmacy Manager	38	14
13	Male	Owner	42	16
14	Female	Technician	36	10
15	Male	Pharmacy Supervisor	28	4

Source: Field Data (2025)

The analysis of the respondents' profiles revealed a fairly balanced gender distribution among participants, with males representing a slight majority (53%) compared to females (47%). This near-equal gender representation is beneficial for understanding how inventory management practices and supply chain decisions are influenced by diverse perspectives across retail pharmacies in Mutare. While male participants were more likely to hold senior positions such as Owner or Pharmacy Supervisor, female participants also featured prominently in both operational and managerial roles, including Pharmacy Manager and Pharmacist. This suggests that both genders are actively involved in the strategic and day-to-day aspects of inventory management.

Participants' positions covered a broad spectrum of roles within the pharmacy sector, offering a holistic view of the supply chain system. The sample included frontline personnel such as Technicians, who are directly involved in stock handling and inventory recording, as well as Pharmacists, who are critical in monitoring stock levels and placing replenishment orders. Additionally, the inclusion of Pharmacy Managers, Supervisors, and Owners added strategic and

administrative insights into inventory control, supplier relations, procurement policies, and overall supply chain decision-making. This wide representation across functional roles is particularly valuable for a study focused on inventory management. Technicians and Pharmacists provide grounded insights into operational challenges such as stockouts, expiries, and ordering inefficiencies, while Managers and Owners contribute knowledge of supplier negotiations, procurement planning, and system-level inventory controls.

In terms of age distribution, participants ranged from 24 to 52 years old, with an average age of approximately 36.3 years. The largest age group (47%) fell within the 30–39-year bracket, indicating professionals likely to be deeply engaged in both operational and managerial functions. Participants aged 40 and above (33%) often held senior roles, bringing with them years of experience in pharmacy operations and long-term engagement with suppliers and inventory systems. Younger participants (20–29 years), representing 20% of the sample, were mostly in entry to mid-level positions and are likely to bring fresh insights into digital tools and modern inventory practices, including the use of stock management software and mobile-based ordering systems.

The combination of younger, tech-savvy professionals and seasoned pharmacy personnel creates a comprehensive respondent pool capable of providing varied insights into inventory management processes from manual stock control to more advanced systems integration. This diversity ensures that the investigation captures both legacy practices and emerging trends in pharmacy supply chain systems.

The employment period data from retail pharmacies in Mutare indicates a mix of experienced and relatively new staff, with an average tenure of around 10 years. Longer service periods among pharmacy managers and owners suggest leadership stability, which can support more effective inventory management and supply chain coordination. However, shorter tenures among pharmacists and technicians may lead to gaps in operational consistency. These findings highlight the importance of strong supply chain systems and standardized processes to maintain effective inventory management across varying levels of staff experience.

In general, the participant profile reflected a well-rounded mix of genders, ages, and functional roles, which was essential for examining the effectiveness of inventory management practices in retail pharmacies. Such diversity enhanced the validity of the study by ensuring that the findings accounted for multiple layers of the supply chain process; strategic, operational, and technological, within the context of retail pharmacies in Mutare.

4.2.3 Current inventory management systems employed by retail pharmacies in Mutare

Respondents were asked several questions regarding the main inventory management systems used by retail pharmacies in Mutare. The main question was ***"What invnetory management systems or strategies do your pharmacy currently use to manage inventory and orders?"*** Responses to the research question revealed a mix of manual and digital approaches tailored to each pharmacy's operational capacity.

The responses from the 15 respondents interviewed yielded the following:

Table 4.2: Current Inventory Management Systems

Respondent ID	Pharmacy Size	Inventory Management Method(s) Used	System Type
R1	Small	Manual (stock cards, physical counts)	Manual Systems
R2	Medium	Hybrid (manual + POS-based digital system)	Hybrid Systems
R3	Large	Fully automated system with real-time updates	Digital Systems
R4	Medium	Manual only	Manual Systems
R5	Large	Digital system integrated with supplier database	Digital Systems
R6	Small	Manual (reorder level tracking and monthly counts)	Hybrid Systems
R7	Medium	Hybrid system with POS integration	Hybrid Systems
R8	Large	Fully digital with automated reordering alerts	Digital Systems
R9	Small	Fully automated system with real-time updates (updated)	Digital Systems
R10	Medium	POS-based inventory system with manual verification	Hybrid Systems
R11	Large	Fully automated, cloud-based system	Digital Systems
R12	Small	Manual with occasional digital spreadsheet updates	Hybrid Systems
R13	Medium	POS-based system with reorder level notifications	Hybrid Systems
R14	Large	Advanced digital system with inventory forecasting	Digital Systems
R15	Medium	Hybrid (manual stock checks with POS integration)	Hybrid Systems

Nearly 47% of pharmacies are using fully digital systems, indicating a significant shift towards automation. However, 40% still rely on hybrid systems, and 13.3% remain fully manual, suggesting room for further digitization. 2 respondents (R1, R4) primarily use manual inventory management methods, including stock cards, physical counts, and reorder level tracking. 6 respondents (R2, R6, R7, R10, R12, R15) utilize a hybrid system, combining manual methods with digital tools such as point-of-sale (POS) systems or spreadsheets. 7 respondents (R3, R5, R8, R9, R11, R13, R14) use fully digital inventory systems,

featuring real-time tracking, automated reordering alerts, supplier integration, and cloud-based solutions.

The findings also showed that all large pharmacies (100%) use digital systems, showing complete adoption of automation at scale, while small and medium pharmacies still use manual or hybrid systems, possibly due to cost, infrastructure, or technical skill limitations. Medium pharmacies show the most diverse adoption, using all three types. The complete shift to digital systems among larger pharmacies reflects the need to manage more complex and high-volume inventory operations efficiently.

4.2.4 Effectiveness of Current Inventory Management Systems

In response to the question, *"How effective do you think your current inventory system is in meeting demand and ensuring product availability?"*, participants shared a range of experiences that reflected both strengths and challenges in the current inventory management practices. Through thematic analysis of their responses, several key themes emerged, each illustrating different dimensions of supply chain effectiveness in retail pharmacies in Mutare. Table 4.3 overleaf shows the results.

Table 4.3: Effectiveness of Current Inventory Management Systems

System Type	Pharmacies	Effectiveness
Manual Systems	R1, R4	**Low** – Slow, error-prone, and less responsive to demand fluctuations.
Hybrid Systems	R2, R6, R7, R10, R12, R13, R15	**Moderate** – Better tracking, but still vulnerable to manual errors and delays.
Digital Systems	R3, R5, R8, R9, R11, R14	**High** – Fast, data-driven decisions, improves real time inventory monitoring, reduces stockouts, improves demand forecasting.

The findings showed that the effectiveness of a pharmacy's inventory management system is closely tied to the type of inventory management approach it uses. In the analysis, respondents alluded that pharmacies that rely entirely on manual systems, which include stock cards, physical counts, and manual reorder tracking face significant challenges such as delayed detection of stock shortages, human error, and poor real-time visibility of stock levels. As a result, their supply chain systems are considered low in effectiveness, with a high risk of stockouts, overstocking, and missed sales opportunities.

In contrast, pharmacies that have adopted hybrid systems that combine manual tracking methods with digital tools such as POS (Point of Sale) platforms, spreadsheets, or basic alert systems. These hybrid setups offer a moderate level of effectiveness in supply chain operations. While not fully automated, they provide better control and faster response times than manual systems. However, they still depend partially on human intervention, which can lead to occasional inaccuracies or delays in stock replenishment. This group mainly includes

medium-sized pharmacies that are in the process of transitioning toward more fully digital solutions.

A significant portion of the pharmacies that have implemented fully automated or digital inventory systems, generally larger or more established businesses, use advanced systems capable of real-time stock tracking, automated reorder alerts, cloud-based data access, and even supplier integration or demand forecasting.

One participant shared:

"Since we introduced an inventory system, we've had fewer stockouts because the system alerts us before we run out." (Participant 8).

The effectiveness of their supply chain systems is considered high, as they are able to respond quickly to demand fluctuations, maintain optimal stock levels, and streamline supplier coordination. This reduces waste, prevents stockouts, and supports overall operational efficiency.

4.2.5 Barriers prohibiting the successful inventory management strategies

The second objective of the study investigated the factors that hinder the achievement of successful inventory management strategies in retail pharmacies in Mutare. Identifying these factors would provide a base for crafting strategies to alleviate them and design appropriate strategies for optimising the efficiency of retail pharmacies' inventory management systems. The responses are presented in Table 4.4 overleaf.

Table 4.4: Barriers to successful inventory management

Respondent	Response
1	*"We face challenges with manual record-keeping that sometimes leads to stock discrepancies and delays in ordering."*
2	*"Limited access to reliable technology makes it difficult to implement automated inventory systems effectively."*
3	*"Financial constraints often prevent us from investing in advanced supply chain software or maintaining large stock levels."*
4	*"Lack of proper training on inventory management means errors can happen when processing stock."*
5	*"Supplier delays and inconsistent deliveries are a big barrier to keeping inventory levels stable."*
6	*"Communication gaps between staff and suppliers often lead to order inaccuracies."*
7	*"High staff turnover sometimes disrupts inventory processes and creates inconsistency in supply management."*
8	*"Our pharmacy struggles with limited financial resources, making it hard to adopt new technologies for stock management."*
9	*"Poor transport infrastructure causes delays in stock deliveries, impacting availability."*
10	*"There is insufficient training for staff on supply chain best practices, which hinders smooth inventory operations."*
11	*"We lack real-time data tracking tools, which makes it difficult to monitor stock levels effectively."*
12	*"Limited financial capital restricts our ability to keep optimal stock and invest in technology."*
13	*"Manual systems dominate our supply chain management, and without digital tools, errors and delays are common."*

From the responses captured above, several common themes were noted. These are explained below:

Theme 1: Limited Technology Adoption

Many retail pharmacies rely heavily on manual record-keeping due to lack of access to or familiarity with digital inventory management systems, leading to errors and inefficiencies. This reliance on manual processes results in errors, slow response times to stock changes, and an inability to access real-time data. Consequently, pharmacies struggle to adjust quickly to market demands or prevent stockouts, reducing their competitiveness and operational efficiency.

Theme 2: Inadequate Staff Training

Insufficient training on supply chain and inventory management practices results in inconsistent implementation of strategies and poor handling of orders and stock.

Theme 3: Financial Constraints

Limited financial resources restrict pharmacies from investing in advanced inventory systems or maintaining optimal stock levels, causing stockouts or overstocking.

Theme 4: Poor Supplier Reliability

Unreliable or inconsistent deliveries from suppliers disrupt stock availability, making it difficult to maintain steady inventory levels.

Theme 5: Communication Gaps

Lack of effective communication between pharmacy staff and suppliers can lead to delays, order inaccuracies, and difficulties in forecasting demand.

Theme 6: Limited Data Visibility

Without proper tracking and reporting tools, pharmacies struggle to monitor inventory in real time, hindering timely decision-making and replenishment.

The analysis of secondary data from regional healthcare and pharmaceutical industry reports highlighted several operational challenges that align with the barriers identified in retail pharmacies in Mutare. Studies from the Zimbabwe Pharmaceutical Sector Assessment (2024) and the Medicines Control Authority of Zimbabwe (MCAZ) indicate that many community pharmacies face chronic

shortages of qualified staff, high staff turnover, and limited access to continuous professional development factors that hinder consistent application of supply chain best practices. In addition, digitalisation rates in small to medium-sized pharmacies remain low, with less than 35% adopting electronic inventory systems, according to the Retail Health Systems Report (2023). Limited integration between pharmacies and upstream suppliers also results in fragmented communication and poor demand forecasting, contributing to stock management inefficiencies. Furthermore, regulatory delays in medicine approvals and import licensing processes often slow down the supply chain, making it harder for pharmacies to maintain optimal stock levels. These systemic issues reflect and reinforce the key themes from the primary data particularly inadequate staff training, limited technology adoption, and poor supplier reliability highlighting the need for sector-wide reforms to strengthen pharmacy supply chain operations.

4.2.6 Strategies for optimizing retail pharmacies' inventory management

Having identified the factors that hinder the achievement of successful supply chain management strategies in retail pharmacies, it was imperative to ascertain the respective strategies that could be adopted to optimize inventory management and improve efficiency in retail pharmacies in Mutare. Respondents were asked on what strategies could be adopted to optimize the inventory management in retail pharmacies in Mutare to improve efficiency and their responses are presented in Table 4.5 overleaf.

Table 4.5: Strategies for optimizing inventory management

Respondent	Response
1	*"Introducing inventory management software would help us monitor stock levels more accurately and reduce human error."*
2	*"We need stronger partnerships with reliable suppliers to ensure consistent stock availability and timely deliveries."*
3	*"Implementing real-time stock monitoring tools can help us avoid both overstocking and stockouts."*
4	*"A centralized supply ordering system across multiple pharmacies could reduce duplication and improve efficiency."*
5	*"Using the First-Expiry-First-Out method consistently would reduce expired stock and save costs."*
6	*"We should conduct regular stock audits to identify discrepancies early and adjust procurement accordingly."*
7	*"Forecasting tools that help predict demand trends during peak seasons would allow us to stock up appropriately in advance."*
8	*"Government support in regulating and monitoring suppliers can help reduce the circulation of counterfeit medicines."*
9	*"Improving communication between the pharmacy team and suppliers can help prevent delays and order errors."*
10	*"Regular staff training on inventory handling and ordering systems will help improve accuracy and reduce wastage."*

Based on the participants' responses, the following four common themes emerged as key strategies to optimize and improve inventory management efficiency in retail pharmacies in Mutare:

Theme 1: Adoption of Technology

This includes implementation of inventory management software, use of real-time stock monitoring tools and introduction of forecasting tools. This addresses issues of accuracy, efficiency and responsiveness in inventory tracking and ordering.

Theme 2: Supplier Relationship Management

This includes building stronger partnerships with reliable suppliers, improving communication with suppliers and seeking government support to regulate and

monitor supplier practices. This aims to ensure consistent stock availability, reduce delays, and eliminate counterfeit medicines.

Theme 3: Staff Training and Capacity Building

This includes training pharmacy staff on inventory handling and procurement systems, encouraging knowledge-sharing and best practices within teams. This helps reduce human error, improve order accuracy, and enhance the overall efficiency of inventory management.

Theme 4: Stock Control and Inventory Practices

This includes regular stock audits to detect discrepancies early, consistent use of First-Expiry-First-Out (FEFO) method and avoiding overstocking and stockouts through better stock monitoring. This improves product quality, reduces wastage, and ensures optimal stock levels.

These themes collectively highlight the need for systemic improvements in technology, staff training, supplier coordination, and stock control to strengthen supply chain performance in Mutare's retail pharmacies.

4.3 Discussion and Interpretation

The findings from the study on the current inventory management practices employed by retail pharmacies in Mutare revealed that most retail pharmacies utilize a combination of manual stock control methods such as stock cards, physical counts, and reorder level tracking as well as digital inventory management systems that are often integrated with point-of-sale (POS) platforms. Larger or more established pharmacies tend to adopt automated systems that

allow real-time stock updates, generate reorder alerts, and assist in supplier coordination. While manual inventory methods remain common, particularly among smaller pharmacies, there is a clear trend toward hybrid and fully automated systems in more established or larger operations. Thus, manual practices are still common, especially among small and some medium pharmacies; hybrid systems (manual + digital) dominate in medium-sized pharmacies while fully automated systems are mostly used by larger pharmacies, offering real-time data and automated reorder features.

Pharmacies with some level of digital inventory tracking reported better stock management and fewer shortages, highlighting the role of technology in enhancing visibility and control. Several participants acknowledged the benefits of technology and automation in improving supply chain efficiency. Pharmacies that had adopted inventory management software or point-of-sale systems reported better performance in tracking stock levels and identifying reorder points. However, cost, lack of technical skills, and unreliable electricity or internet access were cited as barriers to widespread adoption of such tools.

The findings also reflected that many retail pharmacies in Mutare operate without advanced technological systems such as ERP or digital inventory management tools. This reliance on manual processes results in errors, slow response times to stock changes, and an inability to access real-time data. Consequently, pharmacies struggle to adjust quickly to market demands or prevent stockouts, reducing their competitiveness and operational efficiency.

Findings also revealed that many pharmacy owners or managers lack formal training in supply chain and business management. This skills gap affects their

ability to implement efficient inventory strategies, manage suppliers effectively, and make data-driven decisions. As a result, procurement processes may be poorly planned, leading to overstocking, stockouts, and financial losses.

Pharmacies often face delays in medicine deliveries due to manufacturing issues, transport disruptions, or regulatory bottlenecks. This unpredictability in supply makes it difficult to maintain consistent stock levels, especially during periods of high demand, such as outbreaks or seasonal illness spikes. The inability to fulfil customer needs on time weakens the pharmacy's position in the market and undermines trust.

The findings of this study on limited technology adoption align with the findings of Fouche and Andrews (2022), which stated that limited digital infrastructure and concerns around data security and privacy hinder the adoption of digital technologies, especially in less developed or rural areas. In this study, many retail pharmacies continue to rely on manual record-keeping due to limited access to digital systems and insufficient familiarity, resulting in operational inefficiencies and errors.

However, on the contrary, these findings of this study differ from the findings of Pavela et al. (2021) and Dolgui and Ivanov (2022), which highlighted the increasing global adoption of automated inventory management systems and ERP tools in retail pharmacy supply chains to improve real-time visibility and reduce errors. Unlike in developed markets, Mutare's pharmacies face barriers such as cost and capacity that prevent them from adopting these technological advancements.

The findings of this study on inadequate staff training on inventory practices as a barrier to effective inventory management in retail pharmacies are consistent with the findings of Johnson et al. (2021), which stated that a lack of targeted training in inventory and procurement systems hinders the ability of pharmacy staff to manage stock efficiently. In this study, insufficient training has led to poor handling of orders and inconsistent implementation of inventory strategies. These findings also align with Omar et al. (2022), who emphasized that well-trained staff can optimize inventory tracking, reduce errors, and improve overall supply chain performance. The gap in training observed in Mutare pharmacies is a critical factor in their operational challenges, particularly with regard to ordering accuracy and stock monitoring.

The findings of this study on financial constraints as a barrier to effective inventory management practices align with the findings of Nsanzimana and Akumuntu (2024), which stated that resource limitations in smaller pharmacy operations restrict their ability to invest in advanced inventory systems or adopt demand-driven procurement models. Financial constraints in Mutare's pharmacies limit their capacity to maintain optimal stock levels, often resulting in stockouts or overstocking. These findings also concur with Ali et al. (2024), who acknowledged that digital transformation is often hindered by lack of financial resources, especially in developing regions. The inability to procure adequate technologies and systems due to cost restrictions remains a significant barrier for pharmacies in this context.

The findings of this study which mentioned supplier reliability as a challenge in pharmaceutical inventory management are consistent with the findings of Sridharan and Goldstein (2020), who stated that overreliance on limited or

unreliable suppliers exposes pharmacies to delays, disruptions, and inconsistent stock availability. Pharmacies in Mutare reported challenges in maintaining steady inventory due to inconsistent deliveries and lack of accountability among suppliers. These findings also align with Morris and Sweeney (2019), who highlighted that supplier diversification enhances resilience and helps mitigate risks arising from supplier unreliability. In contrast, the pharmacies in this study experience difficulties partly because of a lack of supplier options and regulation.

The findings of this study on communication gaps as a barrier align with the findings of Basso et al. (2019), which stated that poor communication and low trust levels between supply chain partners can impede collaboration and affect performance. In Mutare, communication gaps between pharmacies and suppliers lead to delayed orders, inaccurate deliveries, and difficulties in demand forecasting. This finding also supports the argument by Ivanov et al. (2021), who emphasized the importance of information sharing and joint planning in maintaining a stable pharmaceutical supply chain. The lack of effective communication mechanisms in Mutare hinders pharmacies from responding quickly to changes in demand or resolving stock discrepancies.

The findings of this study are consistent with the findings of Min (2019) and Chen et al. (2023), which stated that access to real-time data and analytics significantly improves supply chain decision-making. In Mutare, the absence of digital tools for real-time inventory tracking limits visibility, which delays replenishment and leads to poor stock management. The findings however differ from the situation described in Antwi et al. (2021) and Dzinamarira et al. (2021), who documented the effective use of digital systems in South Africa for real-time tracking during the COVID-19 vaccine rollout. Unlike South Africa's

national systems, Mutare's pharmacies operate in a fragmented environment with minimal access to centralized digital tracking, showing a significant gap in system maturity.

In improving inventory management practices, participants emphasized the need for modern inventory management software, real-time stock monitoring, and forecasting tools to improve inventory accuracy and responsiveness. These findings align with current literature that underscores the role of digital tools in strengthening pharmaceutical supply chains. Ma, Shi and Kang (2023) found that digital transformation significantly improves supply chain performance through enhanced traceability and real-time information sharing. Similarly, Soliveres et al. (2024) observed that pharmacies in Cavite, Philippines that implemented computerized inventory systems experienced fewer stockouts and better ordering accuracy. The findings also concur with the findings of Pavela et al. (2021), which stated that automated inventory management systems and electronic order processing tools streamline procurement processes, reduce errors, and provide real-time insights into inventory levels.

The findings of this study are also consistent with the study by Dolgui & Ivanov (2022), which stated that the integration of ERP systems and digital platforms within pharmacy operations enhances visibility, streamlines operations, and improves decision-making. Similarly, the pharmacies studied in Mutare have begun adopting real-time stock monitoring tools to improve inventory tracking. This also aligns with the findings of Chen et al. (2023), who stated that digital technologies such as AI, blockchain, and IoT improve communication and supply chain transparency. While Mutare's pharmacies have not fully adopted

these advanced technologies, their move toward basic digital tools marks an important step in the same direction.

However, while the benefits of technology are evident, implementation challenges persist, and studies, for example by Ma et al (2023) cautions that the success of digital tools is highly dependent on supporting infrastructure including stable electricity, internet access, and digital literacy among pharmacy staff. These systemic barriers were not fully captured in participants' responses but must be considered in assessing the feasibility of technology adoption. Moreover, while participants highlighted operational benefits, recent studies suggest that sustainability and traceability key aspects of global supply chain discourse are also important technology outcomes (Li & Thurasamy, 2025). These elements were notably absent from local narratives, suggesting a narrow focus on efficiency over broader strategic gains.

Supplier relationship management also emerged as a theme for optimising inventory management practices in retail pharmaceutical companies. Pharmacies in Mutare emphasized the importance of building strong relationships with reliable suppliers and improving communication. These findings are consistent with the findings of Singh et al. (2021), which stated that collaborative supply chain models involving joint planning and improved communication are pivotal in ensuring the availability of essential medicines. The findings also align with the study by Ivanov et al. (2021), which stated that collaboration between manufacturers, distributors, and retailers ensures timely distribution and stock availability. This is consistent with the emphasis in Mutare on reducing delays and counterfeit medicines through supplier partnerships and improved monitoring.

However, the findings of this study differ slightly from the study by Basso et al. (2019), which stated that collaboration is often hindered by mistrust and conflict of interest. In Mutare, while challenges exist, pharmacies are actively seeking government support to regulate supplier practices, suggesting a more proactive approach to mitigating those issues.

Moreover, participants consistently identified staff training in inventory handling and procurement systems as a key driver of inventory accuracy and operational efficiency. This finding is strongly supported by existing literature, such as a study by Soliveres et al. (2024) who found a direct link between staff training and improved application of inventory control techniques, such as Economic Order Quantity (EOQ) models and reorder level calculations. These findings are also consistent with the findings of Omar et al. (2022), which stated that investing in staff training improves inventory management and customer service. The findings also align with the study by Islam (2024), which emphasized training in logistics and crisis management as key to creating a proactive and adaptable workforce. Moreover, the findings align with Johnson et al. (2021), which stated that tailored training programs help pharmacy staff improve procurement practices and inventory handling. This reflects the approach in Mutare to provide relevant training that empowers staff at all levels.

Despite its acknowledged importance, training alone is often insufficient. A study by Mafanele et al. (2025) emphasized that for training to be effective, it must be ongoing, practical, and supported by broader organizational systems, including standard operating procedures (SOPs) and supervisory structures. While participants in Mutare proposed knowledge-sharing and best practices within teams, there was little mention of structured mentoring, external

professional development, or engagement with industry networks all of which are highlighted in the literature as key to sustaining improvements in human capital.

Interviews responses also revealed the need for stock control and inventory practices, which concurs with the findings of Kapoor et al. (2018) and Morris and Sweeney (2019), which stated that continuous improvement and lean practices can eliminate waste and improve inventory accuracy. These findings also align with Nugraha and Basri (2024), who emphasized that continuous refinement of inventory practices enhances customer service and reduces costs. Furthermore, the findings are consistent with Ivanov (2020), which stated that lean practices in pharmacy operations can reduce stockouts and improve responsiveness to demand.

The final theme focused on basic but essential stock control practices such as regular audits, the use of the First-Expiry-First-Out (FEFO) method, and maintaining optimal stock levels to avoid stockouts and overstocking. These practices are consistent with global standards and widely recommended in the literature. For instance, a study of the Ethiopian public pharmaceutical distribution system (BMC Health Services Research, 2025) confirmed the widespread use of FEFO and stock audits as effective methods for minimizing waste and ensuring medicine quality.

4.4 Summary

This chapter presented and discussed the key findings from the investigation into supply chain systems for effective inventory management in retail pharmacies in Mutare. The study revealed a prevalent reliance on manual and hybrid inventory

management methods, particularly among smaller and medium-sized pharmacies, while larger pharmacies showed a greater adoption of automated systems. Despite the recognized benefits of digital tools such as improved stock visibility, real-time tracking, and better reorder accuracy widespread implementation is hindered by financial constraints, limited technical skills, and unreliable infrastructure. The findings also highlighted challenges such as poor supplier reliability, communication gaps, and a lack of formal training in supply chain management, all of which contribute to inefficiencies and stockouts. However, strategies such as investing in technology, strengthening supplier relationships, improving internal communication, and implementing ongoing staff training were identified as key to enhancing inventory accuracy and overall supply chain performance. The following chapter (Chapter 5) presents the study's summary, conclusions and recommendations.

CHAPTER 5 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The previous chapter presented and analysed the key findings of the study. This chapter provides a summary of those findings, draws relevant conclusions, offers practical recommendations, discusses the broader implications and proposes areas for future research. The conclusions and recommendations are grounded in the evidence outlined in Chapter 4 and are aligned with the research objectives established in Chapter 1.

5.2 Discussion

The first chapter (Chapter one) of this study presented and highlighted the introduction, the background of the study, the statement of the problem, the objectives of the study, the research questions, significance of the study and the scope of the study. The main objective of the study was to investigate inventory management practices with a specific focus on retail pharmacies in Mutare. This was further broken down into three specific objectives: to investigate the current inventory management practices employed by retail pharmacies in Mutare, to examine barriers affecting the success of inventory management strategies and to recommend strategies for optimizing inventory management practices. Chapter Two reviewed relevant literature and established the theoretical, conceptual and empirical underpinnings of the study. The theoretical framework drew on four

key models: the Economic Order Quantity (EOQ) Model, the Resource-Based View (RBV) Theory, the Supply Chain Operations Reference (SCOR) Model, and the Supply Chain Maturity Assessment Test (SCMAT). The chapter also critiqued existing literature, highlighted scholarly gaps, and contextualized the need for this study within the pharmaceutical retail space in Mutare. Chapter Three detailed the methodology adopted for the research. The study employed an exploratory research design, to investigate the topic in-depth and gain a comprehensive understanding of the supply chain systems and inventory management practices in retail pharmacies in Mutare. Data was collected using interviews and documentary analysis from a target population drawn from five retail pharmacies in Mutare. Participants included pharmacy owners, managers, pharmacists, and staff involved in supply chain and inventory management. Ethical considerations, including informed consent, confidentiality, and permission from participants were carefully observed. Chapter Four presented and analysed the findings obtained through the research instruments. The data was analysed using content and thematic analysis and was presented in tables and narrative notes.

The major findings were as follows:

5.2.1 Current inventory management systems employed by retail pharmacies in Mutare

The study found that retail pharmacies in Mutare use three main types of inventory management systems: manual, hybrid, and fully digital. Approximately 47% of respondents reported using fully digital systems featuring real-time tracking, automated reordering, and cloud-based access, mostly in large

pharmacies where demand and volume require efficient operations. About 40% use hybrid systems that combine manual processes with digital tools like POS and spreadsheets, offering moderate effectiveness but still vulnerable to errors and delays. The remaining 13.3% rely solely on manual systems, which are slow, error-prone, and ineffective in responding to stock fluctuations. The findings showed that supply chain effectiveness improves with the level of digitization, with fully digital systems supporting faster decision-making, better stock visibility, and improved demand forecasting, while manual systems struggled with stockouts and inefficiencies.

5.2.2 Barriers that prohibit the successful inventory management strategies in retail pharmacies in Mutare

The study found that retail pharmacies in Mutare face several barriers that hinder effective inventory management, including limited technology adoption, financial constraints, inadequate staff training, poor supplier reliability, communication gaps and lack of real-time data visibility. Many pharmacies still rely on manual inventory systems due to lack of access to or familiarity with digital tools, which leads to errors, slow responses, and stock discrepancies. Financial limitations were frequently cited, preventing investment in automated systems or maintaining optimal stock levels. Respondents also highlighted insufficient training, especially in supply chain best practices, resulting in errors during inventory processing. Supplier delays and inconsistent deliveries were reported to disrupt stock availability, while poor communication between staff and suppliers led to order inaccuracies. Additionally, the absence of real-time

tracking tools further limited visibility into stock levels, delaying decision-making and replenishment.

5.2.3 Strategies for optimizing inventory management in retail pharmacies in Mutare

The study found that optimizing inventory management in Mutare's retail pharmacies requires adopting inventory technology, such as real-time monitoring and forecasting tools, to improve accuracy and responsiveness. Strengthening supplier relationships through better communication and regulation was also highlighted to ensure consistent stock availability. Staff training on inventory handling and ordering systems was recommended to reduce errors and improve efficiency. Finally, implementing better stock control practices, including regular audits and the First-Expiry-First-Out (FEFO) method, can help reduce wastage and maintain optimal stock levels.

5.3 Conclusions

From the findings obtained, the following conclusions were drawn:

5.3.1 Current inventory management systems employed by retail pharmacies in Mutare

The study concluded that retail pharmacies in Mutare employ three main inventory management systems manuals, hybrid and fully digital with varying levels of effectiveness. Larger pharmacies have adopted fully digital systems that offer high supply chain efficiency through real-time tracking and automation, while smaller and medium-sized pharmacies often rely on hybrid or manual systems that are prone to errors, delays, and limited responsiveness.

5.3.2 Barriers to successful inventory management strategies in retail pharmacies in Mutare

The study concluded that several key barriers hinder effective supply chain management in Mutare's retail pharmacies. These include limited adoption of digital tools, financial constraints, inadequate staff training, unreliable supplier performance, poor communication, and lack of real-time inventory visibility. These challenges collectively compromise stock accuracy, lead to delays, and hinder timely decision-making.

5.3.3 Strategies for optimizing inventory management in retail pharmacies in Mutare

The study concluded that optimizing supply chain performance in Mutare's retail pharmacies requires a multi-pronged strategy. This includes adopting digital inventory technologies, building stronger supplier relationships, investing in staff training, and enhancing stock control practices such as regular audits and the consistent application of the First-Expiry-First-Out (FEFO) method to reduce wastage and improve operational efficiency.

5.4 Implications

The study has provided critical insights into the specific supply chain challenges faced by retail pharmacies in Mutare, highlighting the impact of technology gaps, financial constraints, inadequate training, and poor supplier coordination on inventory management effectiveness. These findings serve as a wake-up call to pharmacy owners and managers, emphasizing the urgent need to modernize inventory systems and invest in staff capacity. Understanding these challenges

enables pharmacy stakeholders to make informed decisions that can improve stock visibility, reduce stockouts, and enhance service delivery. The study also carries broader implications for the pharmaceutical sector in Zimbabwe, encouraging policymakers, industry regulators, and support organizations to develop frameworks and incentives that promote digital adoption, supplier reliability, and staff development. Additionally, the findings offer valuable guidance for other pharmacies facing similar operational environments, and can inform future research focused on strengthening pharmaceutical supply chains in resource-constrained settings.

5.5 Recommendations

From the findings and conclusions made, the following recommendations were made:

5.5.1 Current inventory management systems employed by retail pharmacies in Mutare

Given that fully digital systems were found to be the most effective in supporting real-time inventory tracking and accurate demand forecasting, the study recommends that retail pharmacies should prioritize migrating from manual or hybrid systems to fully automated inventory management platforms. This transition should include the adoption of cloud-based solutions and integrations and automated reorder alerts to enhance operational efficiency. For small to medium pharmacies, the study suggests phased adoption or cost-sharing strategies such as cooperative investments or leasing models to overcome financial and infrastructure limitations.

5.5.2 Barriers Hindering Successful Inventory Management Strategies

To address the major barriers identified such as limited technology adoption, financial constraints, staff training gaps, and poor supplier reliability the study recommends that retail pharmacies in Mutare should invest in low-cost digital tools that offer inventory visibility and reduce reliance on manual methods. Improving communication channels within pharmacy teams and with suppliers should also be prioritized to reduce order inaccuracies and improve responsiveness.

5.5.3 Strategies for Optimizing Inventory Management

Based on the findings, the study recommends a multifaceted approach to inventory management optimization:

Technology Adoption: Pharmacies should implement real-time stock monitoring and demand forecasting tools to improve decision-making, reduce stockouts, and prevent overstocking.

Supplier Relationship Management: Establishing long-term, transparent, and accountable supplier relationships is essential. Pharmacies should work with regulatory bodies to monitor supplier practices and avoid counterfeit products.

Staff Training: Pharmacies must ensure that staff are well-trained in inventory software usage, demand forecasting, and procurement planning to minimize errors and inefficiencies.

Inventory Control Practices: The study also recommends routine stock audits and implementation of centralized ordering systems (where feasible) to reduce waste and enhance cost efficiency.

5.6 Suggestions for Further Research

One limitation of this study is the relatively small sample size, as it focused on five retail pharmacies within Mutare. While this provided valuable insights into localized supply chain challenges and practices, the limited scope may affect the generalizability of the findings to other regions or larger pharmacy chains. Future research should consider expanding the sample size to include a broader range of pharmacies across different cities or provinces to capture more diverse experiences and practices. Comparative studies involving both urban and rural settings could also uncover regional variations in supply chain effectiveness. Additionally, future studies could explore the impact of emerging technologies such as artificial intelligence, automation, and blockchain on inventory and supply chain optimization in the pharmaceutical sector. Further research could also examine how continuous improvements in supply chain practices influence operational performance, cost efficiency and customer satisfaction over time.

REFERENCES

Ali, A.A.A., Fayad, A.A.S., Alomair, A.& Al Naim, A.S. (2024). The Role of Digital Supply Chain on Inventory Management Effectiveness within Engineering Companies in Jordan. *Sustainability 2024*, 16, 1-25.

Antwi, H. A., Paixao, T. L. A., & Antwi, M. O. (2021). Digitisation of healthcare products and the democratization continuum of the healthcare system in China: A systematic review. *International Journal of Scientific Research in Science Engineering and Technology*, 8(4), 266–283.

Aslam, H., Khan, A. Q., Rashid, K., & Rehman, S.-U. (2020). Achieving supply chain resilience: The role of supply chain ambidexterity and supply chain agility. *Journal of Manufacturing Technology Management*, 31(6), 1185–1204.

Atieh Ali, A.A.; Sharabati, A.A.A.; Allahham, M.; Nasereddin, A.Y. The Relationship between Supply Chain Resilience and Digital Supply Chain and the Impact on Sustainability: Supply Chain Dynamism as a Moderator. *Sustainability 2024*, 16, 3082.

Bilal, A.I., Bititci, U.S., Fenta, T.G. (2024). Effective Supply Chain Strategies in Addressing Demand and Supply Uncertainty: A Case Study of Ethiopian Pharmaceutical Supply Services. *Pharmacy 2024*, 12 (1), 1-18.

Burinskiene, A (2018). Pharma Supply Chain: Efficiency Modelling Approach. *Journal of System and Management Sciences*, 8 (2), 65-73.

Chakma, J. (2020, Nov 16). *Bangladesh on track to becoming a $6b pharma market by 2025*. Retrieved from www.thedailystar.net: https://www.thedailystar.net/business/news/bangladesh-track-becoming-6b-pharma market-2025-1995741.

Chopra, S. (2020). *Supply chain management: Strategy, planning and operation*. (13th ed., Seventh Global Edition). Pearson Education.

Christopher, M. (2022). *Logistics and supply chain management.* (6th ed.). Pearson Education, Limited.

Creswell, J. W., & Creswell, J. D. (2023). *Research design: Qualitative, quantitative, and mixed methods approaches*. SAGE Publications.

Dzinamarira, T., Nachipo, B., Phiri, B., & Musuka, G. (2021). COVID-19 vaccine roll-out in South Africa and Zimbabwe: Urgent need to address community preparedness, fears and hesitancy. *Vaccines*, 9(3), Article 250.

Elzarka, S (2019). Assessing Supply Chain Maturity for Retail Pharmacy Chain. International Conference on Operations and Supply Chain Management, *Vietnam, 2019*, 1-11.

Fayad, A.A.S.; Khatib, S.F.A.; Abbas, A.F.; Ghaleb, B.A.A.; Mousa, A.K.A. The determinants and consequences of board multiple directorships. Corp. Gov. *Int. J. Bus. Soc*. 2024.

Fouche, I., & Andrews, G. (2022). "Working from home is one major disaster": An analysis of student feedback at a South African university during the COVID-19 lockdown. *Education and Information Technologies*, 27, 133–155.

Gereffi, G., Pananond, P., & Pedersen, T. (2022). Resilience decoded: The role of firms, global value chains, and the state in COVID-19 medical supplies. *California Management Review*, 64(2), 46–70.

Ghabak, V & Seetharaman, A. (2023). *Integration of Machine Learning in Agile Supply Chain Management.* In Proceedings of the 2023 15th International Conference on Computer and Automation Engineering (ICCAE), Sydney, Australia, 3–5 March 2023.

Global Africa Network. (2020). *Changes and growth in the Gauteng pharmaceutical industry*. Retrieved April 05, 2025, from https://www.globalafricanetwork.com/ company-news/changes-and-growth-in-the gauteng-pharmaceutical-industry/ (https:// www.globalafricanetwork.com/company-news/changes and-growth-in-the-gauteng-pharmaceutical-industry/)

Hobbs, J., Zhang, S., & Keeling, M. (2022). Pharmaceutical supply chain management: An empirical study of storage and inventory challenges. *Pharmaceutical Logistics Journal*, 15(4), 58-65.

Hofstra, N., Spiliotopoulou, E., & de Leeuw, S. (2024). Ordering decisions under supply uncertainty and inventory record inaccuracy: An experimental investigation. *Decis. Sci*. 2024, 55, 303–318.

Investa. (2020). Pharmaceuticals. Retrieved May 13, 2025, from http://www.investsa.gov.za/key sectors/healthcare-life-sciences/ (http:// www.investsa.gov.za/key-sectors/healthcare-life sciences/).

Islam, A (2024). *Report On Procurement & Supply Chain Management Practice in Retail Pharmacy Business: A Comprehensive Study in context of Wellbeing Pharmacy.* BRAC Institute of Governance and Development (BIGD) BRAC University.

Ivanov, D. (2020). Predicting the impacts of epidemic outbreaks on global supply chains: A simulation-based analysis on the coronavirus outbreak (COVID-19/SARS CoV-2) case. Transportation Research Part E: Logistics and *Transportation Review*, 136, 101922.

Ivanov, D., & Dolgui, A. (2021). OR-methods for coping with the ripple effect in supply chains during COVID-19 pandemic: Managerial insights and research implications. *International Journal of Production Economics*, 232(1), 107921.

Johnson, A., Peter, K., Shital, M (2021). Inventory Management Practices and Supply Chain Performance of Antiretroviral Medicines in Public Hospitals in Nyamira County, Kenya. *Rwanda Journal of Medicine and Health Sciences*, 4(2),1-12.

Kapoor, D., Vyas, R., & Dadarwal, D. (2018). An overview on pharmaceutical supply chain: A next step towards good manufacturing practice. *Drug Designing & Intellectual Properties International Journal*, 1(2), 49–54.

Lockamy, A. and McCormack, K. (2004). Linking SCOR planning practices to supply chain performance: An exploratory study. *International Journal of Operations & Production Management* 24 (11/12) 1192-1213.

Maphumulo, W.T., & Bhengu, B.R. (2019). Challenges of quality improvement in the healthcare of South Africa post-apartheid: A critical review. *Curationis*, 42(1), 1901.

McKinsey and Company. (2023). Taking the pulse of shifting supply chains. Retrieved March 12, 2025, from https://www.mckinsey.com/capabilities/ operations/our-insights/taking-the-pulse-of shifting-supply-chains (https://www.mckinsey.com/ capabilities/operations/our-insights/taking-the-pulse-of shifting-supply-chains).

Morris, P., & Sweeney, E. (2019). Responding to disruptions in the pharmaceutical supply chain. *The Pharmaceutical Journal*. Advance online publication. https://pharmaceutical-journal.com/article/research/responding-to-disruptions in-the-pharmaceutical-supply-chain.

Nedelcheva, Y. (2019). Competitiveness in the pharmaceutical industry: A historical overview. Entrepreneurship, 7(1), 36–47.

Netland, T. H., Alfnes, E., Fauske, H. (2007). *How mature is your supply chain?* A supply chain maturity assessment test, Proceedings of the 14th International EurOMA Conference Managing Operations in an Expanding Europe (EurOMA 2007), Ankara, Turkey.

Nsanzimana R. & Akumuntu J. (2024). Effect of Healthcare Inventory Management Practices on the Performance of Pharmaceutical Companies in Rwanda; A Case of Selected Retail Pharmacies in Gasabo District. *Journal of Procurement & Supply Chain*, 8(1) 107-129.

Nugraha, R.F & Basri, M.H (2024). Analysis of Inventory Management System at Pharmacy of XYZ Hospital. *International Journal of Current Science Research and Review*, 07 (07), 1-19.

Obi, L., & Agarana, M. C. (2023). *EOQ and QD modelling techniques and analysis of inventory control of some selected pharmaceutical settings in Lagos.*

Okoh, U.I (2019). *Retail Pharmacy Supply Chain Performance* - A Comparison of Typical Configurations of England and Nigeria. Master's thesis. School of Business and Governance Department of Business Administration. Tallinn University of Technology.

Omar, I. A., Debe, M., Jayaraman, R., Salah, K., Omar, M., & Arshad, J. (2022). Blockchain-based Supply Chain Traceability for COVID-19 personal protective equipment. *Computers & Industrial Engineering*, 167, Article 107995.

Pankowska, M (2019). Information technology outsourcing chain: Literature review and implications for development of distributed coordination. *Sustainability 2019*, 11, 1460.

Pavela, G., Cunningham, S., & Green, M. (2021). The importance of cold chain management in the pharmaceutical industry. *Pharmaceutical Technology*, 45(2), 30-34.

Saunders, M. N. K., & Bezzina, F. (2016). Reflections On Conceptions of Research Methodology Among Management Academics. *European Management Journal*, 33 (5), 297.

Schneider, M. (2018). Inventory management in retail pharmacies: The challenge of short product life cycles. *Journal of Pharmaceutical Retailing*, 11(1), 45-52.

Singh, S., Kumar, R., Panchal, R., & Tiwari, M. K. (2021). Impact of COVID-19 on logistics systems and disruptions in food supply chain. *International Journal of Production Research*, 59(7), 1993–2008.

Sridharan, V., & Goldstein, B. (2020). Outsourcing in pharmaceutical supply chains: *Risks and rewards. Global Supply Chain Review*, 9(3), 102-110.

Statista. (2020). *Top 10 pharmaceutical companies based on R&D spending as revenue share in 2019 and 202*6. Retrieved March 17, 2025, from https://

www.statista.com/statistics/407969/projected sales-of-top-pharmaceutical-companies-worldwide/
(https://www.statista.com/statistics/407969/projected sales-of-top-pharmaceutical-companies-worldwide/).

Takawira, B., & Mutambara, E. (2023). COVID-19 and emerging markets: A strategic framework for pharmaceutical supply chains [Special issue]. *Corporate & Business Strategy Review*, 4(4), 346–358.

Takawira, B., & Pooe, R.I.D. (2024). Supply chain disruptions during COVID-19 pandemic: Key lessons from the pharmaceutical industry. *South African Journal of Business Management*, 55(1), a4048.

USAID (2022). *Use of Retail Pharmacies as a Source of Essential Medicines, including Family Planning Products, for Public Sector Clients in Low- and Middle-Income Countries: A Thought Leadership Paper*. February 22, 2022.

Valashiya, M.C.; Luke, R. Enhancing supply chain information sharing with third-party logistics service providers. *Int. J. Logist. Manag*. 2023, 34, 1523–1542.

World Health Organization. WHO Medicines Strategy. 2022.

Yamane, T. (1973). *Statistics: Analysis introductory*. New York: Harper & Row.

Yaroson, E.V., Breen, L., Hou, J., & Sowter, J. (2019*). Resilience strategies and the pharmaceutical supply chain: The role of agility in mitigating drug shortages*. In A.P. Barbosa-Povoa, H. Jenzer, & J.L. De Miranda (Eds.), Pharmaceutical supply chains- Medicines shortages (pp. 249–256). Springer International Publishing.

Yin, R.K. (2015). *Case Study Research: Design and Methods*. London: Penguin Books.

Zhang, Y., Luo, S., & Chen, L. (2020). The impact of technological advancements on pharmaceutical supply chain efficiency. *Journal of Business Logistics*, 41(2), 80-92.

APPENDICES

APPENDIX 1: INFORMED CONSENT

Dear Sir/Madam

My name is Wimbai Makuyana, a final year EMBA student from Africa University (AU). I am carrying out a study titled "**AN INVESTIGATION INTO INVENTORY MANAGEMENT PRACTICES IN RETAIL PHARMACIES IN MUTARE.**" I am kindly asking you to participate in this study.

The purpose of the study is to evaluate the inventory management systems employed by retail pharmacies in Mutare. If you decide to participate, the interview will take approximately 30 minutes of your time.

You may have discomfort in giving out information perceived confidential with fear of victimisation, or inconveniences in own time allocation-these are normal feelings. However, the researcher guarantees confidentiality and to add on to that, no mention of own name will be requested and will remain anonymous.

The information requested for is expected to be given on a willing basis without expectation of payment in return. However, should the participant want to know the results of the survey the researcher is willing, after completion, to share the results with the participants.

Participation in this study is voluntary. If, as a participant you decide not to participate in this study, this will not affect the future relationship with the researcher. If you chose to participate, you are free to withdraw your consent and to discontinue participation without any harm or penalty.

Before you sign this form, please feel free to ask any questions on any aspect of this study that may seem not clear to you.

If you have decided to participate in 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 participate.

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Name of Research Participant (please print) Date

Signature of Research Participant or legally authorised representative

Should 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.

Name of Researcher –Wimbai Makuyana

APPENDIX 2: RESEARCH INSTRUMENT- INTERVIEW GUIDE

SECTION A: DEMOGRAPHIC INFORMATION

i. Gender?

ii What is your position?

iii May you provide your age?

iv. For how long have you been working for your current organisation?

SECTION B: INTERVIEW QUESTIONS

1. What inventory management systems or strategies do your pharmacy currently use to manage inventory and orders?
2. How effective do you think your current inventory management system is in meeting demand and ensuring product availability?
3. What challenges do you face in managing the inventory that may contribute to inefficiencies, such as delays or stock outs?
4. How do factors like supplier reliability, logistics, or inventory management impact the efficiency of your pharmacy's inventory management?
5. What do you think are the biggest barriers preventing inventory management strategies from being successfully implemented in your pharmacy?
6. Are there any external factors, like regulatory changes or market volatility, that hinder the effectiveness of inventory strategies in your pharmacy?
7. How do inventory management inefficiencies, such as stock outs or delays, affect your pharmacy's operations and customer satisfaction?
8. In what ways do inefficiencies in the inventory management impact your pharmacy's financial performance?

9. What changes or improvements would you suggest to enhance your pharmacy's inventory management practices?
10. Do you think implementing new technologies or better supplier relationships could help improve your inventory management efficiency? In what ways?

Thank you for your co-operation

APPENDIX 3: 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: AU 3973/25

13 June, 2025

WIMBAI MAKUYANA
C/O Africa University
Box 1320
MUTARE

RE: **INVESTIGATING THE SUPPLY CHAIN SYSTEMS FOR EFFECTIVE INVENTORY MANAGEMENT: CASE OF RETAIL PHARMACIES IN MUTARE.**

Thank you for submitting the above-titled proposal to the Africa University Research Ethics Committee for review. Please be 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 3973/25
  This number should be used on all correspondence, consent forms, and appropriate documents
- **AUREC MEETING DATE** NA
- **APPROVAL DATE** June 13, 2025
- **EXPIRATION DATE** June 13, 2026
- **TYPE OF MEETING**: Expedited
  After the expiration date, this research may only continue upon renewal. A progress report on a standard AUREC form should be submitted a month before the expiration date for renewal purposes.
- **SERIOUS ADVERSE EVENTS** All serious problems concerning subject safety must be reported to AUREC within 3 working days on the 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
FOR CHAIRPERSON
AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE