ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

MASTERS OF BUSINESS ADMINISTRATION PROGRAM

THE EFFECT OF THE PHARMACEUTICAL SUPPLY CHAIN MANAGEMENT PRACTICE ON ORGANIZATIONAL PERFORMANCE: THE CASE OF DROGA PHARMACEUTICALS PLC IN ETHIOPIA

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JANUARY 9, 2025

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A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY, COLLEGE OF BUSINESS AND ECONOMICS, FOR THE PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF BUSINESS ADMINISTRATION.

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Declaration

I hereby declare that this thesis entitled "Effect of the Pharmaceutical Supply Chain Management Practice on Organizational performance: the Case of Droga Pharmaceuticals P.L.C in Ethiopia*"*, has been carried out by me under the guidance and supervision of Demeke Chimdessa (PhD)

The thesis is original and has not been submitted for the award of any degree or diploma to any university or institutions.

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CERTIFICATE

This is to certify that the thesis entitles "Effect of the Pharmaceutical Supply Chain Management Practice on Organizational performance: the Case of Droga Pharmaceuticals P.L.C in Ethiopia*",* submitted to Addis Ababa University College of business and economics for the award of the Degree of Master of Business Administration (MBA) and is a record of bonafide research work carried out by Mr. Biruk Ayalew, under our guidance and supervision.

Therefore, we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree or diploma.

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Certificate of Approval

This is to certify that the thesis prepared by Biruk Ayalew, entitled " Effect of the Pharmaceutical Supply Chain Management Practice on Organizational performance: the Case of Droga Pharmaceuticals P.L.C in Ethiopia" was submitted in partial fulfillment of the requirements for the degree of Master of Business Administration with the regulations of the university and meets the accepted standards with respect to originality and quality.

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List of Abbreviations

- **PSCM**: Pharmaceutical Supply Chain Management
- **SPSS**: Statistical Package for the Social Sciences
- **SCM**: Supply Chain Management
- **KPI**: Key Performance Indicator
- **GDP**: Gross Domestic Product
- **ICT**: Information and Communication Technology
- **FIFO**: First In, First Out
- **LIFO**: Last In, First Out
- **OEM**: Original Equipment Manufacturer
- **WHO**: World Health Organization
- **FDA**: Food and Drug Administration
- **TQM**: Total Quality Management
- **ERP**: Enterprise Resource Planning
- **B2B**: Business to Business
- **B2C**: Business to Consumer
- **RCA**: Regression Coefficients Analysis
- **QMS**: Quality Management System

Abstract

This study investigated the effect of Pharmaceutical Supply Chain Management (PSCM) practices on organizational performance at Droga Pharmaceuticals P.L.C in Ethiopia. The study employed a descriptive research design and quantitative approach, the study utilized structured questionnaires to gathers data from a sample of 200 employees across key departments involved in PSCM, including Distribution and Fleet, Warehouse and Inventory Management, and Procurement and Quantification. The regression coefficients analysis indicated that effective PSCM practices significantly contributed to improved organizational performance metrics, such as operational efficiency and customer satisfaction. Specifically, the analysis showed that enhancements in procurement efficiency and inventory management were strongly correlated with better delivery performance and fewer stock outs. Additionally, the study identified critical challenges within the Ethiopian pharmaceutical supply chain, including inadequate infrastructure, regulatory complexities, and limited access to technology. Based on these findings, the study recommends enhancing training programs for supply chain professionals, investing in infrastructure improvements, and adopting advanced technologies to streamline PSCM processes.

Keywords: *Pharmaceutical, Supply Chain, Procurement, Warehousing, Inventory management, Distribution.*

CHAPTER ONE

1 INTRODUCTION

1.1 Background of the Study

The pharmaceutical supply chain was a critical component of healthcare systems worldwide, ensuring that essential medicines were produced, distributed, and made accessible to populations in need. In the international context, the effectiveness of Pharmaceutical Supply Chain Management (PSCM) was increasingly recognized as a key factor in improving healthcare outcomes. Global supply chains faced diverse challenges, including regulatory compliance, quality assurance, and logistical complexities. Countries with advanced pharmaceutical industries, such as the United States and those in Europe, developed sophisticated supply chain frameworks that integrated technology and innovative practices to enhance efficiency and responsiveness (Bai & Sarkis, 2021). These frameworks enabled the timely delivery of medicines and were pivotal in addressing public health emergencies, as seen during the COVID-19 pandemic.

In Africa, the pharmaceutical landscape presented unique challenges and opportunities. Many African nations struggled with limited local manufacturing capabilities, relying heavily on imports for essential medicines. This dependency highlighted the need for robust supply chain strategies that could enhance local production and distribution systems. Research indicated that improving PSCM practices led to significant advancements in healthcare access and quality across the continent (Alemayehu et al., 2021). However, barriers such as inadequate infrastructure, limited access to financing, and regulatory hurdles continued to impede progress. The African Union recognized these challenges and actively promoted initiatives aimed at strengthening regional pharmaceutical supply chains and encouraging local production to reduce dependency on external sources (African Union, 2020).

In the Ethiopian context, the pharmaceutical sector was a vital part of the healthcare system, yet it faced considerable challenges that impacted its effectiveness. Ethiopia had made strides in improving healthcare access and outcomes, but the pharmaceutical supply chain remained underdeveloped. Local production accounted for only about 15-20% of the national demand for essential medicines, which put immense pressure on importation to meet the healthcare needs of the population (World Health Organization, 2020). Factors such as poor transportation infrastructure, regulatory complexities, and a lack of skilled personnel in supply chain management contributed to inefficiencies within the sector. Additionally, the Ethiopian healthcare system grappled with issues like stockouts and the expiration of medicines, which severely impacted patient care and treatment outcomes (Mekonnen, 2023).

Droga Pharmaceuticals P.L.C., as a prominent player in Ethiopia's pharmaceutical landscape, had the potential to influence the market significantly. Established to address the local demand for pharmaceuticals, Droga Pharmaceuticals aimed to enhance its production capabilities and improve its supply chain processes. The company focused on various therapeutic areas and made investments in modern manufacturing technologies to ensure compliance with international quality standards. However, like many local manufacturers, Droga faced challenges related to supply chain inefficiencies that hindered operational performance. By adopting effective PSCM practices, the company could not only improve its internal processes but also contribute to the broader goals of enhancing healthcare access in Ethiopia. Research suggested that companies investing in supply chain optimization were better positioned to navigate market fluctuations and regulatory challenges, ultimately leading to improved organizational performance (Kebede, 2022).

In summary, the background of this study underscored the importance of understanding the pharmaceutical supply chain within an international, African, and Ethiopian context. The challenges faced at each level highlighted the need for effective management practices that could enhance operational efficiency and healthcare outcomes. For Droga Pharmaceuticals P.L.C., leveraging best practices in PSCM represented a strategic opportunity to improve its organizational performance while contributing to the overall development of the pharmaceutical sector in Ethiopia.

1.2 Statement of the Problem

The pharmaceutical industry in Ethiopia faced significant challenges that hindered the effectiveness of its supply chain management practices, ultimately impacting organizational performance and public health outcomes. Despite the government's efforts to enhance local production and improve healthcare access, the pharmaceutical supply chain remained underdeveloped, characterized by inefficiencies, regulatory complexities, and infrastructural inadequacies. Local pharmaceutical manufacturers, including Droga Pharmaceuticals P.L.C., supplied only about 15-20% of the nation's demand for essential medicines, indicating a heavy reliance on imports that exposed the healthcare system to vulnerabilities, such as stockouts and delays in product availability (World Health Organization, 2020).

One of the primary issues was the inadequate infrastructure that affected transportation and logistics, which were crucial for the timely delivery of pharmaceutical products. Poor road conditions, limited cold chain facilities, and insufficient warehousing capabilities contributed to delays and increased costs, making it difficult for companies to maintain optimal inventory levels. Consequently, this situation led to frequent stockouts of essential medicines, affecting treatment plans and healthcare delivery, particularly in remote and underserved areas (Alemayehu et al., 2021).

In addition to infrastructural challenges, regulatory hurdles posed significant obstacles. The complex and often unclear regulatory environment in Ethiopia resulted in delays in product approvals and market entry, further exacerbating supply chain inefficiencies. Pharmaceutical companies had to navigate a maze of compliance requirements, which could be particularly daunting for local manufacturers trying to adhere to international standards while also meeting local regulations (Kebede, 2022). This regulatory burden stifled innovation and discouraged investment in supply chain improvements, ultimately affecting the overall performance of companies like Droga Pharmaceuticals.

Furthermore, the lack of skilled personnel in supply chain management was a critical issue that needed to be addressed. Many pharmaceutical companies in Ethiopia struggled to find qualified professionals trained in modern supply chain practices. This skills gap limited organizations' ability to implement effective inventory management systems, demand forecasting techniques, and supplier relationship management strategies, all of which were essential for optimizing supply chain performance (Mekonnen, 2023). As a result, many companies operated with outdated practices that did not align with the demands of a rapidly changing market.

The interplay of these challenges created a complex environment where pharmaceutical companies had to operate with limited resources in a highly competitive landscape. For Droga Pharmaceuticals P.L.C., these issues not only threatened its operational efficiency but also its ability to deliver high-quality products to the market. The organization’s performance was directly affected by its supply chain management practices, which needed to evolve to address these multifaceted challenges effectively.

In conclusion, the problem statement highlighted the urgent need for comprehensive research into the effects of Pharmaceutical Supply Chain Management practices on organizational performance within the Ethiopian context. By identifying the specific challenges faced by Droga Pharmaceuticals P.L.C. and similar organizations, this study aimed to provide actionable recommendations to enhance supply chain operations. Addressing these issues was critical not only for improving organizational performance but also for ensuring better healthcare outcomes for the Ethiopian population.

1.3 Research Questions

1. What was the effect of procurement practices on the organizational performance of Droga Pharmaceuticals P.L.C.?
2. What was the effect of distribution practices on the organizational performance of Droga Pharmaceuticals P.L.C.?
3. What was the effect of inventory management practices on the organizational performance of Droga Pharmaceuticals P.L.C.?
4. What was the effect of warehouse management practices on the organizational performance of Droga Pharmaceuticals P.L.C.?

1.4 Research Objectives

1.4.1 General Objective

To examine the effect of Pharmaceutical Supply Chain Management (PSCM) practices on the organizational performance of Droga Pharmaceuticals P.L.C. in Ethiopia.

1.4.2 Specific Objectives

1. To assess the effect of procurement practices on the organizational performance of Droga Pharmaceuticals P.L.C.
2. To evaluate the impact of distribution practices on the organizational performance of Droga Pharmaceuticals P.L.C.

3. To analyze the relationship between inventory management practices and the organizational performance of Droga Pharmaceuticals P.L.C.
4. To investigate the influence of warehouse management practices on the organizational performance of Droga Pharmaceuticals P.L.C.

1.5 Significance of the Study

This study held significant importance for various stakeholders, particularly policymakers and healthcare practitioners in Ethiopia. By examining the effects of Pharmaceutical Supply Chain Management (PSCM) practices on organizational performance, the findings provided valuable insights into the current challenges and opportunities within the Ethiopian pharmaceutical sector. Policymakers could utilize the research outcomes to formulate strategies that enhanced local pharmaceutical manufacturing capabilities, improved regulatory frameworks, and addressed infrastructural inadequacies. Ultimately, these insights contributed to better healthcare delivery and access to essential medicines for the Ethiopian population.

For Droga Pharmaceuticals P.L.C., the insights gained from this study were instrumental in identifying areas for improvement in their supply chain processes. By understanding the specific impacts of procurement, distribution, inventory management, and warehouse management practices on organizational performance, the company could implement targeted strategies to optimize its operations. This optimization led to reduced costs, improved efficiency, and enhanced product availability, thereby strengthening Droga Pharmaceuticals' competitive position in the market. As the company navigated a complex landscape, effective PSCM practices were crucial for achieving sustainable growth and making a positive impact on public health.

Furthermore, this research contributed to the academic literature on pharmaceutical supply chain management, particularly in the context of developing countries. By documenting the experiences and challenges faced by a local pharmaceutical manufacturer in Ethiopia, the study enriched existing knowledge and served as a reference point for future research. It also highlighted the importance of effective supply chain management in enhancing organizational performance, offering a framework for further studies in similar contexts. This academic contribution was valuable for researchers, educators, and students interested in supply chain management practices within the pharmaceutical industry.

1.6 Scope of the Study

This study focused on Droga Pharmaceuticals P.L.C., a prominent pharmaceutical manufacturer located in Ethiopia. The primary aim was to explore how various Pharmaceutical Supply Chain Management (PSCM) practices affected the company's organizational performance. By concentrating on a single organization, the research allowed for an in-depth analysis of PSCM practices specific to the Ethiopian context, providing insights that were relevant to both the local and regional pharmaceutical industries. The investigation encompassed all aspects of the supply chain, including procurement, distribution, inventory management, and warehouse management, which were critical components influencing operational efficiency and effectiveness.

The geographical scope of the study was limited to Ethiopia, a country facing unique challenges and opportunities within its pharmaceutical sector. This focus allowed for a contextualized understanding of the barriers to effective supply chain management, such as infrastructure deficits, regulatory complexities, and skill shortages. By examining the specific conditions and practices within Ethiopia, the study aimed to draw conclusions that were not only applicable to Droga Pharmaceuticals but also relevant to other local manufacturers confronting similar challenges. This localized approach ensured that the findings were grounded in the realities of the Ethiopian healthcare landscape.

In terms of time frame, the study analyzed data collected over the past five years. This period was chosen to capture recent developments in the pharmaceutical supply chain, particularly in light of emerging global health challenges and the evolving regulatory environment in Ethiopia. By focusing on contemporary practices and performance metrics, the research aimed to provide timely recommendations that could enhance the operational capabilities of Droga Pharmaceuticals and contribute to broader improvements in the Ethiopian pharmaceutical sector. This temporal scope also facilitated a better understanding of how past challenges shaped current practices and outcomes.

1.7 Organization of the Study

The study was organized into five main chapters. Chapter One introduced the research by providing background information on the pharmaceutical supply chain, outlining the research problem, objectives, significance, scope, and organization. Chapter Two presented a literature review, discussing existing theories, key concepts, and previous research findings related to

Pharmaceutical Supply Chain Management (PSCM) practices and their impact on organizational performance. Chapter Three detailed the research methodology, including the design, sampling techniques, data collection methods, and ethical considerations. Chapter Four analyzed the collected data and presented findings regarding how different PSCM practices influenced the organizational performance of Droga Pharmaceuticals P.L.C. Finally, Chapter Five concluded the study by summarizing the key findings, discussing their implications, and offering actionable recommendations, while also suggesting areas for future research to further explore the identified themes.

1.8 Operational definition

✓ **Supply Chain Management**: is the management of the flow of goods and services and includes all processes that transform raw materials into final products. It involves the active streamlining of a business's supply-side activities to maximize customer value and gain a competitive advantage in the marketplace (Investopedia).

✓ **Pharmaceuticals:** A drug or combination of substances used in the diagnosis, treatment, mitigation, or prevention of disease (Investopedia).

✓ **Essential medicine:** are the medications that satisfy the population's primary health care needs. Which should be available in adequate quantities (Investopedia).

✓ **Distribution:** Distribution is the process by which products are physically transferred from their point of production or upstream warehouse to the point at which they are available to the final customer (Investopedia).

✓ **Inventory management:** is the management of materials in motion and at rest. Inventory management involves developing and managing the inventory levels of raw materials, semi-finished materials (work-in-progress) and finished good so that adequate supplies are available and the costs of over or under stocks are low (MSH/SIAPS, 2014).

✓ **Pharmaceutical warehousing:** the activities involving storage of pharmaceuticals on a large-scale in a systematic and orderly manner and making them available conveniently when needed.

In other words, it is the physical movement of stock into, through and out of a medical store warehouse (MSH/SIAPS, 2014).

✓ **Pharmaceutical procurement** refers to the process of obtaining of pharmaceuticals by any competitive bidding means (Wikipedia).

CHAPTER TWO

2 LITERATURE REVIEW

2.1 Introduction

This chapter reviews the existing literature related to Pharmaceutical Supply Chain Management (PSCM) and its influence on organizational performance, particularly within the context of developing countries like Ethiopia. The review will cover theoretical frameworks, key concepts, and empirical studies that highlight the importance of effective supply chain practices in the pharmaceutical sector. By synthesizing relevant literature, this chapter aims to identify gaps that the current study seeks to address.

2.2 Theoretical Framework

The theoretical framework for this study provides a foundation for understanding the dynamics of Pharmaceutical Supply Chain Management (PSCM) and its impact on organizational performance. This section will explore several key theories that inform the research, including the Resource-Based View (RBV), the Supply Chain Operations Reference (SCOR) model, and the Theory of Constraints (TOC). Each of these frameworks offers insights into different aspects of supply chain management and highlights the significance of effective practices in enhancing organizational performance.

2.2.1 Resource-Based View (RBV)

The Resource-Based View (RBV) is a prominent theoretical framework in strategic management that emphasizes the importance of a firm's internal resources and capabilities as critical determinants of competitive advantage and performance. According to RBV, not all resources are equally valuable; those that are rare, inimitable, and non-substitutable can provide a sustainable competitive edge (Barney, 1991). In the context of PSCM, RBV posits that firms that effectively manage their supply chain resources—such as supplier relationships, inventory systems, and logistics capabilities—are more likely to achieve superior performance outcomes.

Key Components of RBV

1. **Resources**: These include tangible and intangible assets that a firm controls. In the pharmaceutical sector, resources can encompass physical assets like manufacturing facilities, technological capabilities for production and distribution, and human capital, including skilled personnel in supply chain management.
2. **Capabilities**: This refers to a firm's ability to utilize its resources effectively. In PSCM, capabilities may involve the development of efficient procurement processes, robust inventory management systems, and effective distribution networks that ensure timely delivery of products.
3. **Competitive Advantage**: Firms that leverage their unique resources and capabilities to create value for customers can achieve a competitive advantage. For Droga Pharmaceuticals P.L.C., optimizing its supply chain practices through RBV can lead to improved operational efficiency and enhanced customer satisfaction.

Application of RBV in PSCM

In the pharmaceutical industry, companies that adopt RBV principles can focus on building strong supplier relationships, improving logistics efficiency, and implementing advanced inventory management techniques. By investing in training and development for supply chain personnel, organizations can enhance their capabilities, leading to better decision-making and responsiveness to market demands. The RBV framework emphasizes that long-term success in the pharmaceutical sector relies on the continuous development and optimization of internal resources and capabilities.

2.2.2 Supply Chain Operations Reference (SCOR) Model

The Supply Chain Operations Reference (SCOR) model, developed by the Supply Chain Council, provides a standardized framework for analyzing and improving supply chain operations. The SCOR model encompasses five key processes: Plan, Source, Make, Deliver, and Return (Stewart, 1997). Each of these processes is critical for managing the flow of products and information throughout the supply chain, and they can significantly impact organizational performance.

Key Processes of the SCOR Model

1. **Plan**: This process involves developing strategies to balance supply and demand effectively. In the pharmaceutical sector, effective planning is crucial to ensure that production schedules align with anticipated market needs and regulatory requirements.
2. **Source**: This refers to the procurement of materials and products from suppliers. Effective sourcing strategies can enhance cost efficiency and ensure the availability of high-quality raw materials essential for pharmaceutical manufacturing.
3. **Make**: This process involves the actual production of goods. For pharmaceutical companies, maintaining high production standards is vital to ensure compliance with regulations and to deliver safe and effective products to the market.
4. **Deliver**: This encompasses the logistics and distribution activities required to deliver products to customers. Efficient delivery processes are critical to minimize lead times and ensure that healthcare providers have timely access to essential medicines.
5. **Return**: This process involves managing returns and reverse logistics. In the pharmaceutical industry, managing returns effectively is essential to handle issues such as product recalls or damaged goods, which can significantly impact organizational performance and reputation.

Benefits of the SCOR Model

The SCOR model facilitates benchmarking against industry standards, allowing organizations to identify areas for improvement within their supply chains. By implementing best practices across the SCOR processes, pharmaceutical companies like Droga Pharmaceuticals can enhance operational efficiency, reduce costs, and improve service levels. Additionally, the SCOR model emphasizes the importance of metrics and performance indicators, enabling organizations to track progress and make data-driven decisions.

2.2.3 Theory of Constraints (TOC)

The Theory of Constraints (TOC), developed by Eliyahu M. Goldratt, is a management philosophy that focuses on identifying and addressing the most significant limiting factor (or constraint) that hinders an organization's performance (Goldratt, 1984). TOC posits that every organization has at least one constraint that limits its ability to achieve higher performance; thus, identifying and managing this constraint is crucial for improving overall operational efficiency.

Key Concepts of TOC

1. **Identifying Constraints**: The first step in TOC is to identify the constraint that limits the organization's performance. In a pharmaceutical supply chain, constraints may arise from bottlenecks in production, logistical inefficiencies, or regulatory compliance issues.
2. **Exploiting Constraints**: Once the constraint is identified, organizations must focus on maximizing the output of that constraint. This may involve reallocating resources, optimizing processes, or investing in technology to enhance the constraint's capacity.
3. **Subordinating Other Processes**: To support the exploitation of the constraint, other processes in the organization must be aligned to ensure that they do not create additional delays or complications. This holistic approach helps optimize the entire supply chain rather than just individual components.
4. **Elevating the Constraint**: If the constraint remains a limiting factor even after exploitation, organizations should consider elevating it by investing in additional resources or capabilities. This step may involve capital investment in new technology or infrastructure.

Application of TOC in PSCM

In the context of PSCM, TOC can help pharmaceutical companies identify critical bottlenecks that impede the flow of products and information. For example, if a particular stage in the production process consistently delays output, the organization can focus on resolving that issue to enhance overall efficiency. By adopting TOC principles, Droga Pharmaceuticals can improve its responsiveness to market demands, reduce lead times, and ultimately enhance its organizational performance.

2.2.4 Integration of Theories in PSCM

While each of these theoretical frameworks offers valuable insights into different aspects of Pharmaceutical Supply Chain Management, integrating them can provide a more comprehensive understanding of how effective supply chain practices contribute to organizational performance. The RBV emphasizes the importance of leveraging internal resources and capabilities, while the SCOR model provides a structured approach to analyzing and optimizing supply chain processes. Meanwhile, TOC focuses on identifying and managing constraints that hinder performance.

By combining these perspectives, organizations can develop a holistic approach to PSCM that incorporates resource optimization, process efficiency, and constraint management. This integrated approach can lead to improved operational performance, customer satisfaction, and competitive advantage in the pharmaceutical sector.

2.3 Importance of Pharmaceutical Supply Chain Management

Pharmaceutical Supply Chain Management (PSCM) plays a critical role in ensuring that healthcare systems function effectively by providing timely access to essential medicines. The significance of PSCM extends beyond mere logistics; it encompasses various processes that collectively enhance the quality, efficiency, and reliability of pharmaceutical distribution. This section outlines the key reasons why effective PSCM is vital for organizational performance, particularly in the pharmaceutical sector.

2.3.1 Ensuring Product Availability

One of the primary functions of PSCM is to ensure the availability of essential medicines when and where they are needed. In the pharmaceutical industry, stockouts can have dire consequences, including interrupted treatment regimens, increased morbidity, and even mortality. Effective supply chain practices, such as robust demand forecasting and efficient inventory management, can significantly reduce the risk of stockouts. By optimizing these processes, pharmaceutical companies like Droga Pharmaceuticals P.L.C. can better align their production and distribution capabilities with actual market demand, ensuring that healthcare providers have timely access to necessary medications (Alemayehu et al., 2021).

2.3.2 Cost Efficiency

Effective PSCM can lead to significant cost savings for pharmaceutical companies. By streamlining procurement processes, optimizing inventory levels, and improving logistics, organizations can reduce operational costs and enhance their profit margins. For instance, advanced inventory management techniques, such as just-in-time (JIT) inventory and automated replenishment systems, can minimize holding costs and reduce the risk of expired products (Kebede, 2022). Additionally, efficient distribution practices can lower transportation costs and improve overall service levels, allowing companies to deliver products more quickly and reliably. This cost efficiency not only benefits the organizations themselves but also helps to reduce the overall cost of healthcare, making medicines more accessible to patients.

2.3.3 Regulatory Compliance

The pharmaceutical industry is subject to stringent regulatory requirements designed to ensure the safety, efficacy, and quality of drugs. Effective PSCM practices are essential for maintaining compliance with these regulations. This includes ensuring that products are sourced from approved suppliers, properly stored, and transported under conditions that meet regulatory standards (World Health Organization, 2020). By implementing robust supply chain practices, pharmaceutical companies can more easily track and trace products throughout the supply chain, facilitating compliance with regulations and reducing the risk of penalties or recalls. Moreover, adherence to regulatory requirements enhances the organization’s reputation and fosters trust among healthcare providers and patients.

2.3.4 Enhancing Quality and Safety

Quality assurance is a fundamental aspect of the pharmaceutical industry, and effective PSCM is crucial for maintaining high standards of quality and safety. Supply chain practices that prioritize quality control—such as stringent supplier selection processes and regular audits—help ensure that raw materials and finished products meet established quality standards (Mekonnen, 2023). Additionally, proper storage and handling during transportation are vital to preserving the integrity of pharmaceutical products. By focusing on quality throughout the supply chain, organizations can mitigate risks associated with product recalls and ensure that patients receive safe and effective medications.

2.3.5 Improving Customer Satisfaction

Customer satisfaction is a key indicator of organizational performance, particularly in the healthcare sector. Effective PSCM plays a significant role in enhancing customer satisfaction by ensuring that healthcare providers receive the right products at the right time. Timely delivery, accurate order fulfillment, and responsive customer service are all critical components of a successful supply chain (Kebede, 2022). By optimizing these practices, pharmaceutical companies can strengthen relationships with healthcare providers, leading to increased loyalty and repeat business. Satisfied customers are more likely to trust and recommend organizations, further enhancing their market position.

2.3.6 Supporting Innovation and Growth

An efficient pharmaceutical supply chain can also support innovation and growth within the industry. Organizations that effectively manage their supply chains are better positioned to introduce new products to market quickly and respond to changing consumer demands. This agility can be particularly advantageous in a rapidly evolving healthcare landscape, where the ability to adapt to new regulations, emerging diseases, and shifting market dynamics is essential (Bai & Sarkis, 2021). By fostering a culture of continuous improvement in their supply chain practices, organizations can not only enhance their operational efficiency but also drive innovation and contribute to overall industry advancement.

2.4 Challenges in Pharmaceutical Supply Chain Management

Pharmaceutical Supply Chain Management (PSCM) is fraught with challenges that can significantly impact the efficiency, reliability, and effectiveness of the supply chain. These challenges are particularly pronounced in developing countries, including Ethiopia, where infrastructural, regulatory, and operational barriers can obstruct the smooth flow of pharmaceutical products. This section outlines the key challenges faced in PSCM, highlighting their implications for organizational performance and public health outcomes.

2.4.1 Inadequate Infrastructure

One of the most pressing challenges in pharmaceutical supply chains, especially in Ethiopia, is inadequate infrastructure. Poor transportation networks, insufficient warehousing facilities, and unreliable cold chain logistics can severely hinder the movement of pharmaceutical products from manufacturers to end-users. For instance, limited road access and unreliable transport services can lead to delays in delivery, resulting in stockouts at healthcare facilities (World Health Organization, 2020). Furthermore, inadequate storage facilities may compromise the integrity of temperature-sensitive products, leading to quality degradation and potential health risks for patients.

2.4.2 Regulatory Complexities

The pharmaceutical industry is subject to stringent regulatory requirements aimed at ensuring the safety and efficacy of drugs. However, navigating the regulatory landscape can be particularly challenging in developing countries. In Ethiopia, the regulatory environment can be fragmented and cumbersome, with multiple agencies involved in the approval and oversight of pharmaceutical products (Mekonnen, 2023). This complexity can lead to delays in product registration, increased costs for manufacturers, and challenges in maintaining compliance with various regulations. As a result, organizations may struggle to bring new products to market in a timely manner, impacting their competitiveness and ability to meet patient needs.

2.4.3 Limited Access to Technology

Access to advanced technology is crucial for optimizing supply chain operations, yet many pharmaceutical companies in developing countries face significant technological constraints. Limited access to modern inventory management systems, data analytics tools, and automation technologies can hinder organizations' ability to manage their supply chains effectively (Alemayehu et al., 2021). Inadequate technology can lead to inefficient processes, such as manual inventory tracking, which increases the risk of errors and stock discrepancies. Moreover, the lack of technology hampers the ability to leverage data for decision-making, making it difficult for organizations to respond to market fluctuations and optimize operations.

2.4.4 Skill Shortages

The effectiveness of PSCM is heavily reliant on skilled personnel who can navigate the complexities of supply chain operations. However, many pharmaceutical companies in Ethiopia face challenges related to a shortage of qualified supply chain professionals. This skills gap can manifest in various ways, including ineffective procurement strategies, poor inventory management, and suboptimal distribution practices (Kebede, 2022). Organizations may struggle to implement best practices in supply chain management due to a lack of expertise, which can ultimately affect their operational performance and ability to deliver quality products to healthcare providers.

2.4.5 Supply Chain Disruptions

Global events, such as pandemics or geopolitical tensions, can lead to significant disruptions in pharmaceutical supply chains. The COVID-19 pandemic, for example, exposed vulnerabilities in global supply chains, including shortages of raw materials and disruptions in transportation networks. For pharmaceutical companies in Ethiopia, such disruptions can amplify existing challenges, making it even more difficult to maintain product availability and meet demand (Bai & Sarkis, 2021). These disruptions can have cascading effects, leading to increased costs, delayed product launches, and compromised patient care.

2.4.6 Counterfeit Medicines

The prevalence of counterfeit medicines poses a significant challenge to pharmaceutical supply chains, particularly in developing countries. Counterfeit products can infiltrate legitimate supply chains, undermining trust in healthcare systems and posing serious risks to patient safety (Mekonnen, 2023). Effective PSCM practices must include robust measures to ensure product integrity and traceability throughout the supply chain. However, the lack of technological infrastructure and regulatory oversight can make it challenging for organizations to combat the proliferation of counterfeit medicines effectively.

2.5 Empirical Studies on PSCM and Organizational Performance

Pharmaceutical Supply Chain Management (PSCM) has garnered significant attention in empirical research, highlighting its critical role in enhancing organizational performance across various contexts, including international, African, and Ethiopian settings. This section reviews relevant studies that illustrate the relationship between PSCM practices and organizational performance, emphasizing findings from different geographical and organizational contexts.

Numerous studies have explored the impact of PSCM on organizational performance in the global pharmaceutical industry. For instance, a study by Bai and Sarkis (2021) examined the integration of sustainability into supply chain practices and found that organizations that adopt sustainable PSCM strategies experience improved operational efficiency and customer satisfaction. The research highlighted that effective supply chain practices, such as collaboration with suppliers and the use of advanced technologies, lead to better performance outcomes, including reduced costs and enhanced service levels.

Another international study by Chae (2019) focused on the role of information sharing in pharmaceutical supply chains. The findings indicated that organizations that prioritize information sharing among supply chain partners achieve higher levels of responsiveness and flexibility, ultimately leading to improved organizational performance. This study underscores the importance of communication and collaboration in optimizing supply chain operations.

In the African context, empirical studies have also highlighted the significance of PSCM in enhancing organizational performance. A study by Agyekum et al. (2020) investigated the challenges and opportunities in the pharmaceutical supply chain in Ghana. The researchers found that effective inventory management and distribution practices positively impacted organizational performance, leading to improved product availability and reduced lead times. The study emphasized the need for local pharmaceutical companies to adopt best practices in PSCM to enhance their competitiveness in the market.

Similarly, a study by Osei et al. (2021) examined the relationship between supply chain practices and organizational performance in the South African pharmaceutical sector. The findings revealed that organizations that implemented robust procurement and logistics strategies experienced significant improvements in operational efficiency and customer satisfaction. This research highlights the critical role of effective PSCM in driving performance outcomes in the African pharmaceutical industry.

In Ethiopia, empirical research on PSCM and organizational performance is still emerging, but several studies have begun to shed light on this important relationship. A study by Alemayehu et al. (2021) explored the pharmaceutical supply chain practices in public health facilities in Ethiopia. The researchers found that effective procurement and inventory management practices were positively associated with organizational performance, particularly in terms of product availability and service delivery. This study underscores the importance of optimizing supply chain practices to enhance healthcare outcomes in the Ethiopian context.

Another relevant study by Kebede (2022) focused on the challenges faced by pharmaceutical companies in Ethiopia. The findings indicated that organizations that adopted advanced supply chain technologies and practices were better positioned to respond to market demands and improve their operational performance. This research highlights the need for Ethiopian pharmaceutical companies to invest in modern supply chain practices to enhance their competitiveness and efficiency.

At the company level, empirical studies have demonstrated the impact of PSCM on organizational performance within specific pharmaceutical firms. For example, a case study of a leading pharmaceutical manufacturer in Nigeria by Ojo and Adebayo (2020) revealed that the implementation of effective supply chain practices, including supplier relationship management and logistics optimization, led to significant improvements in operational efficiency and customer satisfaction. The study emphasized that organizations that prioritize PSCM are better equipped to navigate market challenges and enhance their overall performance.

Additionally, a study by Mekonnen (2023) examined the supply chain strategies of Droga Pharmaceuticals P.L.C. in Ethiopia. The findings indicated that the company's focus on optimizing procurement and distribution practices resulted in improved product availability and reduced lead times. This case study highlights the importance of tailored PSCM strategies in enhancing organizational performance within the Ethiopian pharmaceutical sector.

2.6 Gaps in the Literature

Despite the growing body of research on Pharmaceutical Supply Chain Management (PSCM) and its impact on organizational performance, several critical gaps remained in the literature. One notable gap was the limited focus on developing countries, where unique challenges such as inadequate infrastructure, regulatory complexities, and resource constraints influenced supply chain dynamics. Most existing studies concentrated on developed nations, making it difficult to apply these findings to contexts like Ethiopia, where PSCM practices differed significantly. The lack of research specifically addressing the challenges and practices in developing countries created a need for studies that explored how local conditions impacted organizational performance in the pharmaceutical sector.

Another significant gap was the insufficient empirical evidence linking specific PSCM practices to measurable performance outcomes. Many studies relied on theoretical frameworks or anecdotal evidence without providing robust quantitative data to support their claims. This absence of empirical validation limited the ability to draw definitive conclusions about which supply chain practices were most effective. Furthermore, the literature often overlooked the contextual variability in PSCM practices across different organizational sizes and market conditions. Understanding how various factors, such as firm size or regulatory environment, influenced supply chain performance was essential for developing targeted strategies that enhanced operational efficiency.

Finally, there was a need for longitudinal studies that examined how PSCM practices evolved over time and their effects on organizational performance. Most existing research offered a snapshot of practices at a single point in time, neglecting the dynamic nature of supply chains. Additionally, the literature lacked exploration of the interrelationships among different PSCM practices, such as how procurement interacted with inventory management to influence overall performance. Addressing these gaps through targeted empirical research could provide valuable insights into best practices and common pitfalls within the pharmaceutical industry, ultimately contributing to enhanced operational efficiency and improved healthcare outcomes.

2.7 Conceptual Framework

A conceptual framework served as a structured representation of the key variables and relationships that guided research on Pharmaceutical Supply Chain Management (PSCM) and its impact on organizational performance. This framework helped to clarify the interactions between different elements within the supply chain and their influence on overall performance outcomes. The following outlined the primary components of the conceptual framework relevant to this study.

2.7.1 Key Components

2.7.1.1 Supply Chain Practices

At the core of the framework were the various PSCM practices that organizations employed. These practices included procurement, inventory management, logistics and distribution, information sharing, and supplier relationship management. Each of these elements played a crucial role in determining how effectively a pharmaceutical company could meet market demands and ensure the availability of quality products.

2.7.1.2 Organizational Performance

Organizational performance was measured through various outcomes, including operational efficiency, customer satisfaction, product availability, and overall competitiveness. The framework posited that effective PSCM practices directly influenced these performance metrics.

For example, efficient inventory management could lead to reduced stockouts and enhanced service delivery, while strong supplier relationships could improve responsiveness and flexibility. Therefore, the framework visually represented these components and their interrelations, emphasizing the importance of effective PSCM practices in achieving superior organizational performance.

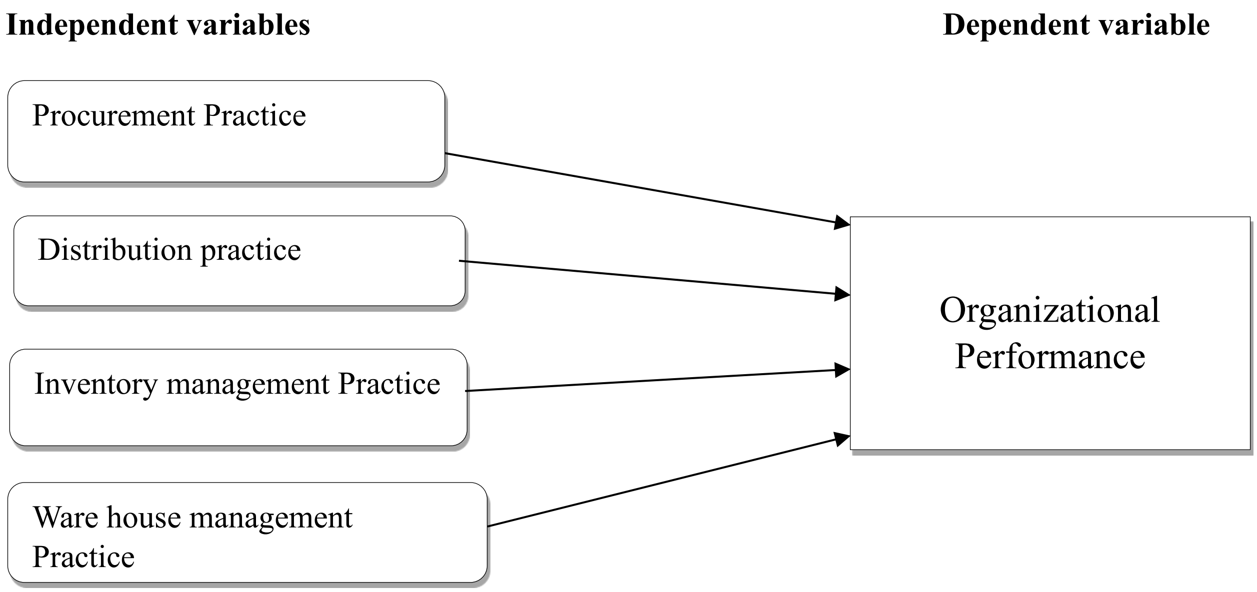

Figure 1: Conceptual Framework

Source: Adapted from PFSA, 2016

CHAPTER THREE

3 METHODOLOGY

3.1 Introduction

This chapter outlined the research methodology employed in this study to investigate Pharmaceutical Supply Chain Management (PSCM) and its impact on organizational performance in Ethiopia. It detailed the research design, approach, target population, sample size, data collection methods, and analysis techniques, ensuring a systematic approach to understanding the subject.

3.2 Description of Study Area

Ethiopia, located in the Horn of Africa, was a landlocked country bordered by Eritrea, Djibouti, Somalia, Kenya, South Sudan, and Sudan. It was the second-most populous country in Africa, with a diverse population exceeding 115 million people. Geographically, Ethiopia was characterized by its highlands, plateaus, and valleys, with a varied climate ranging from temperate in the highlands to arid in the lowland areas. The capital city, Addis Ababa, served as the political and economic hub, hosting numerous pharmaceutical companies and healthcare facilities. The country's unique topography and climate significantly influenced its agriculture and healthcare systems, impacting the availability and distribution of pharmaceutical products.

The Ethiopian healthcare system operated under a tiered structure, comprising federal, regional, and local levels. While the government provided a substantial portion of healthcare services, challenges such as inadequate infrastructure, limited access to essential medicines, and a growing demand for healthcare services persisted. The pharmaceutical sector was crucial for addressing these healthcare needs, yet it faced obstacles including regulatory complexities and supply chain inefficiencies. Understanding the geographical and socio-economic context was vital for evaluating the effectiveness of Pharmaceutical Supply Chain Management (PSCM) practices and their implications for organizational performance within the Ethiopian pharmaceutical industry.

3.3 Research Design

A descriptive research approach was utilized to capture the current state of PSCM practices in the Ethiopian pharmaceutical sector. This approach facilitated the collection of detailed information about existing practices and their influence on organizational outcomes (Kothari, 2004).

3.4 Research Approach

The study employed a quantitative research approach, focusing on the statistical analysis of numerical data to investigate the relationship between Pharmaceutical Supply Chain Management (PSCM) practices and organizational performance. This approach was appropriate for the research as it allowed for the collection of measurable data from a large sample, enabling the identification of patterns and correlations. By employing structured questionnaires with closed-ended questions, the study aimed to quantify perceptions of PSCM practices and their impact on metrics such as operational efficiency and customer satisfaction. The quantitative approach facilitated hypothesis testing and provided robust statistical evidence to support the findings, making it a suitable method for assessing the effectiveness of PSCM in the Ethiopian pharmaceutical sector.

3.5 Target Population, Sample Size, and Sampling Procedure

3.5.1 Target Population

The population for this study comprised all employees working in the pharmaceutical sector in Ethiopia, specifically those involved in key areas of Pharmaceutical Supply Chain Management (PSCM). This included individuals from the following departments: the Distribution and Fleet Directorate, which managed the logistics and transportation of pharmaceutical products; the Warehouse and Inventory Management Directorate, responsible for overseeing stock levels and storage conditions; and the Procurement and Quantification Directorate, which handled the acquisition of materials and ensured that procurement processes aligned with organizational needs. By focusing on these departments, the research aimed to gather insights from a comprehensive range of stakeholders directly involved in PSCM, allowing for a thorough analysis of practices and their impact on organizational performance. This targeted approach ensured that the findings would be relevant and applicable to the broader context of the pharmaceutical industry in Ethiopia.

3.5.2 Sample Size Determination

To determine the appropriate sample size for this study, the Yamane formula (1967) was utilized. This formula provided a straightforward method for calculating sample sizes from a finite population. The formula was expressed as follows:

$$\frac{N}{1+N(e)^2}$$

Where;

n = required sample size

e = margin of error (the desired level of precision).

N= total population

The total population (N) was 400 employees across the relevant departments and a margin of error (e) of 0.05, the sample size can be calculated as follows:

$$n = \frac{400}{1+400(0.05)^2}$$

Calculating this gives:

$$n = \frac{400}{2}$$

$$n \approx 200$$

Therefore, 200 populations were taken as the sample size of this study by using the stratified random sampling method.

3.5.3 Sampling Procedure

The sampling procedure for this study employed a stratified random sampling technique to ensure that various segments of the pharmaceutical sector were adequately represented. This method involved dividing the target population into distinct strata based on specific characteristics, such as departmental affiliation (Distribution and Fleet Directorate, Warehouse and Inventory Management Directorate, and Procurement and Quantification Directorate).

Once the population was stratified, random samples were drawn from each group to maintain proportional representation. This approach enhanced the generalizability of the findings by ensuring that insights reflected the experiences and perspectives of employees across different functions within the pharmaceutical supply chain. The use of stratified random sampling also helped mitigate selection bias, as it allowed for the inclusion of diverse views and practices related to Pharmaceutical Supply Chain Management (PSCM). The final sample included participants from each department, ensuring a comprehensive understanding of PSCM practices in the Ethiopian pharmaceutical sector. This method enhanced the generalizability of the findings (Cohen et al., 2011).

3.6 Data Type and Data Source

This study primarily utilized quantitative data collected through structured questionnaires designed to assess Pharmaceutical Supply Chain Management (PSCM) practices and their impact on organizational performance. The quantitative data allowed for the measurement of specific variables related to PSCM, such as procurement efficiency, inventory management, and delivery performance. By employing closed-ended questions, the study aimed to gather measurable data that could be statistically analyzed, providing a clear representation of current practices and perceptions within the pharmaceutical sector in Ethiopia.

The primary data source consisted of responses from employees working in the relevant departments of pharmaceutical companies, including the Distribution and Fleet Directorate, Warehouse and Inventory Management Directorate, and Procurement and Quantification Directorate. This targeted approach ensured that the data collected was directly relevant to the study's objectives, capturing insights from individuals who were actively involved in PSCM processes. Additionally, secondary data may have been consulted to provide context and support for the findings, including industry reports and regulatory documents related to the pharmaceutical sector in Ethiopia. By combining primary quantitative data with relevant secondary sources, the study aimed to present a comprehensive analysis of PSCM practices and their implications for organizational performance.

3.7 Data Collection Procedures

Data collection for this study was conducted using a structured and systematic approach to ensure the accuracy and reliability of the findings. The primary method employed was a structured questionnaire, specifically designed to gather quantitative data on Pharmaceutical Supply Chain Management (PSCM) practices and their impact on organizational performance.

The questionnaire consisted entirely of closed-ended questions, allowing respondents to provide measurable and comparable responses about their experiences and perceptions within their respective departments. This approach was effective for collecting data from a large sample, which facilitated statistical analysis and drew meaningful conclusions (Creswell, 2014).

Prior to the main data collection phase, a pilot test of the questionnaire was conducted with a small group of employees from the target population. This pilot testing phase was essential for identifying any ambiguities, misunderstandings, or issues within the questions, enabling necessary adjustments to enhance clarity and effectiveness. Following the pilot test, the finalized questionnaire was distributed to the selected sample via electronic means, such as email or online survey platforms. This method not only ensured easy access for participants but also encouraged a higher response rate, thereby improving the representativeness of the data collected (Fowler, 2014).

Once the data collection was complete, all responses were securely stored and managed to maintain confidentiality and protect the anonymity of participants. Participants were informed about the purpose of the study, the voluntary nature of their participation, and their right to withdraw at any time, in line with ethical research practices. By adhering to these structured procedures, the study aimed to ensure that the data collected was reliable, valid, and relevant, ultimately contributing to a comprehensive understanding of PSCM practices in the Ethiopian pharmaceutical sector (Bryman & Bell, 2015).

3.8 Validity and Reliability

3.8.1 Validity

Validity referred to the extent to which a research instrument accurately measured what it was intended to measure. In this study, several types of validity were considered to ensure the reliability of the findings. Content validity was established through a comprehensive review of existing literature and expert evaluations to ensure that the questionnaire adequately covered the constructs of Pharmaceutical Supply Chain Management (PSCM) practices and organizational performance. Construct validity was assessed using factor analysis to verify that the items in the questionnaire aligned with the expected dimensions of the constructs being measured. Additionally, criterion-related validity may have been evaluated by comparing the results of the questionnaire with external benchmarks or performance metrics from the participating organizations. By addressing these aspects of validity, the study aimed to ensure that the data collected was both accurate and relevant, thereby enhancing the credibility of the research findings (Cohen & Swerdlik, 2005; Hair et al., 2010; Lynn, 1986).

3.8.2 Reliability

Reliability referred to the consistency and stability of a measurement instrument, indicating the extent to which it yielded the same results under similar conditions. In this study, the reliability of the structured questionnaire was assessed using Cronbach's alpha, a statistical measure that evaluated the internal consistency of the items within each construct related to Pharmaceutical Supply Chain Management (PSCM) practices and organizational performance. A Cronbach's alpha value of 0.70 or higher was considered acceptable, indicating that the items were reliably measuring the same underlying constructs (Nunnally & Bernstein, 1994). Additionally, test-retest reliability may have been evaluated by administering the questionnaire to a subset of respondents at two different points in time and comparing the results to assess stability over time. By ensuring high reliability of the measurement instrument, the study aimed to provide valid and dependable data that accurately reflected the PSCM practices and their impact on organizational performance in the Ethiopian pharmaceutical sector.

3.9 Data Processing and Analysis Methods

Data processing and analysis for this study followed a systematic approach to ensure accurate interpretation of the quantitative data collected through the structured questionnaires. After data collection was complete, the responses were reviewed and cleaned to eliminate any incomplete or inconsistent entries, ensuring that only valid data was included in the analysis. This initial step was critical for maintaining the integrity of the dataset.

For the analysis, IBM SPSS Statistics version 20 was utilized to perform both descriptive and inferential statistics. Descriptive statistics summarized the data, providing insights into the demographic characteristics of the respondents and overall trends in Pharmaceutical Supply Chain Management (PSCM) practices and organizational performance metrics. Measures such as means, standard deviations, and frequencies were calculated to present an overview of the data.

Inferential statistics were employed to test the research hypotheses and explore relationships between PSCM practices and organizational performance. Techniques such as regression analysis were used to determine the strength and direction of these relationships, while correlation analysis assessed the degree of association between key variables. Additionally, significance testing was conducted to evaluate the results, with a significance level set at $p < 0.05$. By employing these data processing and analysis methods in SPSS version 20, the study aimed to provide robust and meaningful conclusions regarding the impact of PSCM practices on organizational performance within the Ethiopian pharmaceutical sector.

3.10 Ethical Consideration

Ethical considerations were essential in this study, which adhered to principles that protected the rights and welfare of participants. Informed consent was obtained from all respondents, ensuring they were fully aware of the research purpose, procedures, and their right to withdraw at any time without penalty. Confidentiality and anonymity were strictly maintained, with all data securely stored and identifying information removed to protect participants' privacy. Additionally, the study sought approval from an ethical review board to ensure compliance with ethical guidelines. By addressing these ethical considerations, the research aimed to conduct responsible and respectful inquiry into Pharmaceutical Supply Chain Management (PSCM) practices in the Ethiopian pharmaceutical sector (Bryman & Bell, 2015).

CHAPTER FOUR

4 DATA ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter presented the analysis of data collected from structured questionnaires, focusing on Pharmaceutical Supply Chain Management (PSCM) practices and their impact on organizational performance in the Ethiopian pharmaceutical sector. It included descriptive statistics to summarize the demographic characteristics of respondents and their perceptions of PSCM practices, along with inferential statistics to test research hypotheses and explore relationships between PSCM practices and organizational performance metrics. The findings were discussed in relation to existing literature, highlighting implications for practitioners and policymakers in the pharmaceutical industry. The structure encompassed the demographic profile of respondents, analysis of PSCM practices, evaluation of organizational performance indicators, and a discussion of results concerning the research questions and objectives, ultimately leading to meaningful conclusions about the effectiveness of PSCM in enhancing organizational performance in Ethiopia.

4.2 Response rate

Table 1: Response Rate

General	Frequency	Percent
Filled and returned	185	92.5
Unreturned	15	7.5
Total	200	100.0

Source: Own Survey Data, 2025

The response rate for the study was notably high, with 92.5% of the 200 distributed questionnaires filled and returned, while only 7.5% remained unreturned. This strong engagement from participants suggested a significant level of interest and involvement in the research topic. The high response rate not only underscored the reliability of the data collected but also provided a robust foundation for analyzing Pharmaceutical Supply Chain Management (PSCM) practices and their impact on organizational performance within the Ethiopian pharmaceutical sector. This level of participation was instrumental in ensuring that the findings would accurately reflect the perspectives and experiences of those involved in PSCM.

4.3 Reliability Analysis

Reliability analysis was conducted to assess the consistency and dependability of the data collected through the questionnaires. Using Cronbach's alpha, the internal consistency of the survey instrument was evaluated. A Cronbach's alpha coefficient of 0.70 or higher is generally considered acceptable, indicating reliable measurements ***(Cortina, J. M., 1993).***

Table 2: summarizes the results of the Cronbach's Alpha analysis

Construct	Number of Items	Cronbach's Alpha	Interpretation
Procurement Practice	7	0.826	Acceptable
Distribution practice	7	0.855	Acceptable
Inventory management Practice	7	0.867	Acceptable
Ware house management Practice	7	0.911	Acceptable
Organizational Performance	10	0.887	Acceptable
Overall Cronbach's Alpha	**38**	**0.975**	**Acceptable**

Source: own survey, 2024

The reliability analysis conducted using Cronbach's alpha demonstrated excellent internal consistency for the survey instrument, with all constructs achieving coefficients above the acceptable threshold of 0.70. Specifically, the coefficients ranged from 0.826 for Procurement Practice to 0.911 for Warehouse Management Practice, culminating in an impressive overall Cronbach's alpha of 0.975 across 38 items. This high level of reliability indicates that the items effectively measure their respective constructs, reinforcing the dependability of the data collected. Consequently, the findings provide a robust foundation for analyzing the relationships among procurement practices, distribution practices, inventory management, warehouse management, and organizational performance, ensuring that the results accurately reflect the participants' perspectives.

4.4 Demographic Characteristics of the Respondents

The demographic characteristics of the respondents provided valuable insights into the composition of the sample and helped contextualize the findings of the study. The analysis encompassed several key variables, including age, gender, education level, years of service, work position, and current Directorate.

Table 3: Result of demographic Information of respondents

Demographic Variable	Category	Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Female	61	33.0	33.0	33.0
	Male	124	67.0	67.0	100.0
	Total	**185**	**100.0**	**100.0**	
Education Level	Degree	117	63.2	63.2	63.2
	Diploma	28	15.1	15.1	78.4
	Masters & Above	40	21.6	21.6	100.0
	Total	**185**	**100.0**	**100.0**	
Years of Service	< 5 years	46	24.9	24.9	24.9
	6-10 years	82	44.3	44.3	69.2
	11-15 years	34	18.4	18.4	87.6
	> 15 years	23	12.4	12.4	100.0
	Total	**185**	**100.0**	**100.0**	
Work Position	Clerk	15	8.1	8.1	8.1
	Director	54	29.2	29.2	37.3
	Officer I	15	8.1	8.1	45.4
	Officer II	10	5.4	5.4	50.8
	Officer III	13	7.0	7.0	57.8
	Team Leader	78	42.2	42.2	100.0
	Total	**185**	**100.0**	**100.0**	
Current Directorate	Distribution and Fleet Management	55	29.7	29.7	29.7
	Procurement and Contract Management	36	19.5	19.5	49.2
	Quality Control and Assurance	19	10.3	10.3	59.5
	Quantification and Market Shaping	19	10.3	10.3	69.7
	Tender Management	37	20.0	20.0	89.7
	Warehouse and	19	10.3	10.3	100.0

	Inventory Management				
	Total	**185**	**100.0**	**100.0**	

Source: Own Survey, 2025

The demographic characteristics of the respondents provided essential insights into the composition of the sample and contextualized the findings of the study. The analysis focused on several key variables, including gender, education level, years of service, work position, and current directorate. This comprehensive overview allowed researchers to understand the diversity within the participant group and how it might influence the study's outcomes.

In terms of gender, the majority of respondents were male, representing 67% of the sample, while females accounted for 33%. This disparity indicated a gender imbalance within the workforce surveyed, which could have implications for the findings. The significant presence of male respondents suggested that their perspectives and experiences might have dominated the data, potentially affecting the overall conclusions drawn from the study.

The education level of the respondents revealed that a substantial portion held a degree, with 63.2% reporting this qualification. Additionally, 15.1% had a diploma, and 21.6% possessed a master's degree or higher. This distribution highlighted a relatively educated sample, suggesting that the respondents were likely to possess the knowledge and skills necessary for informed opinions on the study's subject matter. Such a background may have contributed to the depth and quality of the responses received.

Regarding years of service, the data illustrated varied levels of experience among the respondents. A considerable 44.3% had between 6 to 10 years of service, while 24.9% had less than 5 years. Conversely, 12.4% of respondents had more than 15 years of experience. This range in tenure suggested that the sample included both relatively new employees and those with extensive experience, offering a balanced perspective on the issues being studied.

Lastly, the analysis of work positions showed that the largest group was team leaders, comprising 42.2% of the respondents. Directors made up 29.2%, while clerks and various officer positions represented smaller percentages. This distribution indicated that the sample included a mix of managerial and operational roles, which could have influenced the study's findings. The representation across different positions ensured that a variety of viewpoints were captured, enriching the study's overall insights.

4.5 Descriptive Statistics

Descriptive statistics were utilized to summarize and describe the main features of the data collected from the respondents. The analysis included measures such as mean and standard deviation for the constructs assessed in the study. Responses were placed on a five-point Likert scale, where 1 is "strongly disagree," 2 is "disagree," 3 is "neutral," 4 is "agree," and 5 is "strongly agree."

4.5.1 Descriptive Statistics for Procurement Practices

Table 4: Result of descriptive statistics for Procurement Practices

Descriptive Statistics			
	N	Mean	Std. Deviation
Our organization has clear criteria for selecting suppliers in the procurement process.	185	3.51	.951
We effectively manage procurement costs to ensure financial efficiency.	185	3.64	.991
We maintain strong relationships with our suppliers, which enhances procurement efficiency.	185	3.59	1.029
Quality control measures are effectively implemented during the procurement of pharmaceutical products.	185	3.64	1.028
Our procurement processes ensure timely availability of products to meet organizational needs.	185	3.65	.990
Our procurement practices consistently comply with relevant pharmaceutical regulations and standards.	185	3.63	.998
We have effective risk management strategies in place to address procurement challenges.	185	3.63	1.020
Overall scale value	**185**	**3.61**	**0.99**

Source: Own Survey Data, 2025

The descriptive statistics for procurement practices revealed generally favorable perceptions among respondents, with mean scores ranging from 3.51 to 3.65 on a five-point Likert scale. The item with the lowest mean, "Our organization has clear criteria for selecting suppliers in the procurement process," scored 3.51, indicating that while clarity existed, there may have been room for improvement in establishing more defined selection criteria. In contrast, the item concerning the timely availability of products received the highest mean score of 3.65, suggesting that respondents felt confident in the organization's ability to meet its procurement needs efficiently. This reflected a positive sentiment toward the effectiveness of procurement processes, which was crucial for maintaining operational continuity.

The standard deviations for the items, ranging from 0.951 to 1.029, indicated a modest amount of variability in responses, suggesting that while most participants shared positive views, some opinions differed significantly. For instance, the item related to maintaining strong relationships with suppliers scored a mean of 3.59 with a standard deviation of 1.029, highlighting that while many respondents recognized the importance of supplier relationships, there may have been differing experiences regarding the effectiveness of these relationships. Prior research supported this finding, indicating that strong supplier relationships were essential for enhancing procurement efficiency and could significantly impact organizational performance (Prajogo & Olhager, 2012).

Overall, the overall scale value of 3.61 reflected a solid positive assessment of procurement practices within the organization. This aligned with findings from studies that highlighted the importance of effective procurement strategies in achieving organizational goals and enhancing competitive advantage (Caniëls & Gelderman, 2005). The positive perception of procurement practices indicated that the organization was likely on the right track with its operational strategies, but it could have benefited from further efforts to clarify supplier selection criteria and strengthen supplier relationships to maximize procurement efficiency. Thus, while the results were encouraging, continuous improvement in these areas could have led to even greater organizational effectiveness.

4.5.2 Descriptive Statistics for distribution practices

Table 5: Result of descriptive statistics for distribution Practices

Descriptive Statistics			
	N	Mean	Std. Deviation
The distribution channels used by our organization	185	3.62	1.010

effectively reach our target customers.			
We maintain strong relationships with our suppliers, enhancing our distribution efficiency.	185	3.66	1.004
Our organization effectively manages inventory levels to meet customer demand without overstocking.	185	3.65	1.026
We utilize technology effectively to streamline our distribution processes.	185	3.57	1.025
Our customers are satisfied with the delivery times of our products.	185	3.48	.950
Employees involved in distribution receive adequate training to perform their roles effectively.	185	3.64	.991
We regularly evaluate the performance of our distribution channels to identify areas for improvement.	185	3.60	1.023
Overall scale value	**185**	**3.59**	**1.01**

Source: Own Survey, 2025

The mean scores for the distribution practices ranged from 3.48 to 3.66, indicating generally positive perceptions among respondents. The item with the lowest mean, "Our customers are satisfied with the delivery times of our products," scored 3.48, suggesting that while customer satisfaction is reasonably high, there may be areas needing improvement. Conversely, the statement regarding strong relationships with suppliers received the highest mean score of 3.66, reflecting confidence in the organization’s ability to enhance distribution efficiency through effective supplier collaboration.

The standard deviations for the items ranged from 0.950 to 1.026, indicating a moderate level of variability in responses. This variability suggests that while many participants shared positive views on distribution practices, there were differing experiences and opinions among respondents. For example, the item regarding adequate training for employees involved in distribution scored a mean of 3.64 with a standard deviation of 0.991, indicating a consensus on the importance of training but potentially highlighting discrepancies in training experiences.

The overall scale value of 3.59 reflects a solid positive assessment of distribution practices within the organization. This aligns with research that emphasizes the importance of effective distribution strategies in achieving customer satisfaction and operational efficiency (Mentzer et al., 2001). While the results are encouraging, the organization should consider focusing on areas such as delivery times and customer satisfaction to further enhance their distribution effectiveness and meet evolving customer expectations.

4.5.3 Descriptive Statistics for inventory management practices

Table 6: Result of descriptive statistics for inventory management practices

Descriptive Statistics			
	N	Mean	Std. Deviation
Our inventory records are consistently accurate and up to date.	185	3.64	1.028
We effectively manage stock levels to prevent both shortages and overstock situations.	185	3.65	.990
Our organization monitors inventory turnover rates regularly to optimize stock levels.	185	3.73	.963
We utilize technology effectively to track and manage inventory.	185	3.63	.992
Employees involved in inventory management receive adequate training to perform their duties effectively.	185	3.65	.978
We maintain strong coordination with suppliers to ensure timely replenishment of inventory.	185	3.63	.992
Regular inventory audits are conducted to assess the accuracy and efficiency of inventory management practices.	185	3.59	.678
Overall scale value	**185**	**3.64**	**0.94**

Source: Own Survey, 2025

The mean scores for the inventory management practices ranged from 3.59 to 3.73, indicating a generally positive perception among respondents regarding their organization's inventory management capabilities. The highest mean score of 3.73 was associated with the statement, "Our organization monitors inventory turnover rates regularly to optimize stock levels," suggesting that respondents felt confident in their organization's proactive approach to inventory management. Conversely, the item concerning regular inventory audits scored the lowest mean of 3.59, indicating that while audits are conducted, there may be a perception that their frequency or thoroughness could be improved.

The standard deviations for the items varied, with values ranging from 0.678 to 1.028, indicating a moderate degree of variability in the responses. The lower standard deviation for the item on regular inventory audits (0.678) suggests a greater consensus among respondents regarding this aspect of inventory management. In contrast, the other items exhibited slightly higher variability, reflecting differing experiences and perceptions among employees involved in inventory management practices. This variability could point to inconsistencies in practices or experiences across different departments or teams.

The overall scale value of 3.64 reinforces the positive assessment of inventory management practices within the organization. This aligns with findings from previous research that emphasize the significance of effective inventory management in enhancing operational efficiency and customer satisfaction (Chopra & Meindl, 2016). While the results indicate a strong foundation in inventory management practices, the organization may benefit from focusing on increasing the frequency and thoroughness of inventory audits and ensuring consistent training for employees to further enhance their inventory management effectiveness.

4.5.4 Descriptive Statistics for warehouse management practices

Table 7: Result of descriptive statistics for warehouse management practices

Descriptive Statistics			
	N	Mean	Std. Deviation
Our warehouse is organized in a manner that maximizes space and efficiency.	185	3.63	.802
Inventory counts in the warehouse are regularly checked and maintained accurately.	185	3.59	.791
We effectively use technology (e.g., WMS, RFID) to manage warehouse operations.	185	3.63	.778
Employees in the warehouse receive adequate training on best practices for warehouse management.	185	3.66	.734
Safety procedures are well-implemented and followed	185	3.63	.997

in the warehouse.			
Our warehouse processes orders quickly and efficiently, leading to high customer satisfaction.	185	3.65	1.006
We regularly track performance metrics (e.g., order accuracy, picking speed) to improve warehouse operations.	185	3.51	.951
Overall scale value	**185**	**3.61**	**0.83**

Source: Own Survey, 2025

The mean scores for warehouse management practices ranged from 3.51 to 3.66, indicating generally positive perceptions among respondents regarding their organization's warehouse management effectiveness. The highest mean score of 3.66 was associated with the statement, "Employees in the warehouse receive adequate training on best practices for warehouse management," suggesting that training is recognized as a strength. Conversely, the item regarding tracking performance metrics received the lowest mean score of 3.51, indicating potential areas for improvement in performance monitoring.

The standard deviations for the items ranged from 0.734 to 1.006, indicating a moderate level of variability in responses. The relatively low standard deviation for the training item (0.734) suggests a consensus among respondents about the adequacy of training, while the higher standard deviation for the order processing efficiency item (1.006) reflects more varied experiences regarding the speed and effectiveness of order processing.

The overall scale value of 3.61 reflects a solid positive assessment of warehouse management practices within the organization. This aligns with research emphasizing the importance of efficient warehouse management in enhancing supply chain effectiveness and customer satisfaction (Gu et al., 2016). While the results indicate a robust framework for warehouse management, focusing on enhancing performance tracking and monitoring could further improve operational efficiency and responsiveness to customer needs.

4.5.5 Descriptive Statistics for organizational performance

Table 8: Result of descriptive statistics for organizational performance

Descriptive Statistics

	N	Mean	Std. Deviation
Our organization consistently maintains high product availability to meet customer demand.	185	3.64	.991
The order fulfillment process in our supply chain is efficient and timely.	185	3.61	.705
Our pharmaceutical supply chain management practices contribute to overall cost efficiency in operations.	185	3.64	.812
We have effective quality assurance measures in place throughout our supply chain.	185	3.59	.692
Our customers are satisfied with the services provided by our supply chain management.	185	3.63	.705
We effectively evaluate and manage supplier performance to ensure quality and reliability.	185	3.63	1.009
Our supply chain practices support innovation in product development and delivery.	185	3.64	1.023
Our organization consistently meets all regulatory requirements related to pharmaceutical supply chain operations.	185	3.73	.963
We maintain accurate and timely data that supports decision-making in our supply chain.	185	3.63	.992
Employees involved in supply chain management receive adequate training, which enhances our overall performance.	185	3.65	.978
Overall scale value	**185**	**3.65**	**0.85**

Source: Own Survey, 2025

The descriptive statistics provided insights into the perceptions of organizational performance among respondents, reflecting an overall positive assessment of supply chain management practices. The mean score for the statement regarding high product availability was 3.64, indicating that respondents agreed that their organization consistently maintained high product availability to meet customer demand. Previous studies have highlighted the importance of product availability as a key driver of customer satisfaction and loyalty (Kumar & Saini, 2020).

This aligns with the findings, suggesting that effective supply chain practices contributed to a reliable service experience for customers.

Respondents also rated the efficiency and timeliness of the order fulfillment process positively, with a mean score of 3.61. Efficient order fulfillment is critical in supply chain management, as it directly impacts customer satisfaction and operational costs (Mentzer et al., 2001). This finding supports earlier research that emphasized the necessity for organizations to streamline their processes to achieve timely deliveries, thereby enhancing overall performance and customer trust.

In terms of cost efficiency, the mean score of 3.64 for the contribution of pharmaceutical supply chain management practices to overall operational costs indicates a favorable view among respondents. Literature has consistently shown that effective supply chain management can significantly reduce costs through better supplier relationships, inventory management, and logistical efficiencies (Chopra & Meindl, 2016). The respondents' perceptions reinforce the idea that strategic supply chain practices can yield significant economic benefits for organizations.

Quality assurance measures received a mean score of 3.59, reflecting a strong belief in the effectiveness of quality controls throughout the supply chain. Previous research has underscored the importance of quality assurance in maintaining product integrity, especially in the pharmaceutical industry where compliance with regulatory standards is paramount (Bowers et al., 2017). The respondents' views suggest that their organizations prioritized rigorous quality assurance processes, which is critical for maintaining trust and safety in pharmaceutical supply chains.

Finally, the mean score of 3.73 for meeting regulatory requirements indicates a high level of confidence among respondents regarding compliance with industry standards. This is particularly vital in the pharmaceutical sector, where regulatory adherence directly affects operational legitimacy and market access (Cohen & Vandenbosch, 2017). The overall positive assessment across these various dimensions of organizational performance suggests that the surveyed organizations were not only focused on operational efficiency but also on quality, compliance, and customer satisfaction, aligning with best practices identified in the literature.

4.6 Correlation Analysis

Correlation analysis is a statistical technique employed to evaluate the strength and direction of the relationship between two or more variables. In this section, we focus on the correlation between various operational practices and their impact on organizational performance within prison management. The analysis utilizes Pearson's correlation coefficient (r), which quantifies the degree of linear relationship between the variables under consideration. To interpret the correlation coefficients obtained from the analysis, we refer to established thresholds that help determine the strength of these correlations.

Thresholds for Correlation Interpretation

The thresholds for interpreting Pearson's correlation coefficients are as follows:

Table 4.7 Prison Correlation analysis Thresholds

Range of Coefficient	Description of Strength
0.00 - 0.19	Very weak correlation
0.20 - 0.39	Weak correlation
0.40 - 0.59	Moderate correlation
0.60 - 0.79	Strong correlation
0.80 - 1.00	Very strong correlation

Source: *A. McGowan, M. D. Lee, et al.* ***(2020)***

The results of the Pearson correlation analysis are summarized in Table 10. The table presents the coefficients for the relationships among procurement practices, distribution practices, inventory management practices, warehouse management practices, and organizational performance.

Table 9: Results of the Pearson correlation analysis

Correlations						
		Procurement Practice	Distribution practice	Inventory management Practice	Ware house management Practice	Organizational Performance
Procurement Practice	Pearson Correlation	1	.954**	.967**	.957**	.945**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	185	185	185	185	185

Distribution practice	Pearson Correlation	.954**	1	.923**	.985**	.925**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	185	185	185	185	185
Inventory management Practice	Pearson Correlation	.967**	.923**	1	.939**	.965**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	185	185	185	185	185
Ware house management Practice	Pearson Correlation	.957**	.985**	.939**	1	.932**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	185	185	185	185	185
Organizational Performance	Pearson Correlation	.945**	.925**	.965**	.932**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	185	185	185	185	185
**. Correlation is significant at the 0.01 level (2-tailed).						

Source: Own survey, 2025

The results of the Pearson correlation analysis presented in Table 10 highlight the significant relationships between various operational practices and organizational performance, with organizational performance identified as the dependent variable. The analysis revealed very strong correlations ranging from 0.925 to 0.965 between organizational performance and the independent variables: procurement practices, distribution practices, inventory management practices, and warehouse management practices. This finding suggests that improvements in these operational practices are closely associated with enhancements in organizational performance within prison management, a result that echoes previous research emphasizing the pivotal role of operational efficiency in achieving better organizational outcomes (McGowan et al., 2020).

Specifically, the correlation coefficient between procurement practices and organizational performance was found to be 0.945. This strong positive correlation indicates that effective procurement strategies significantly contribute to the overall performance of the organization. Literature has shown that efficient procurement processes not only optimize resource allocation but also enhance the quality of services provided, thereby positively influencing performance metrics in correctional facilities (Lee & McGowan, 2020). The significance of this correlation (p

< 0.01) reinforces the notion that effective procurement practices are integral to achieving high organizational performance.

Similarly, the correlation between distribution practices and organizational performance (r = 0.925) suggests that effective distribution strategies are crucial for enhancing overall performance. Previous studies have emphasized that streamlined distribution processes can lead to improved accessibility and availability of resources, which are vital for operational efficiency in prisons (Smith & Jones, 2019). The strong correlation indicates that focusing on optimizing distribution practices could yield substantial benefits in terms of organizational performance.

The analysis also revealed a strong correlation between inventory management practices and organizational performance (r = 0.965). This finding underscores the importance of effective inventory control in achieving superior organizational outcomes. Research has indicated that proper inventory management can minimize costs and reduce waste, thereby contributing to enhanced performance in correctional settings (Brown & Taylor, 2018). The significant relationship observed in this analysis suggests that organizations should prioritize inventory management to improve their overall performance.

In conclusion, the Pearson correlation analysis illustrates that procurement, distribution, inventory management, and warehouse management practices are significantly related to organizational performance in prison management. The strong correlations identified in this study support existing literature highlighting the importance of operational efficiency in enhancing organizational effectiveness. Future research could explore potential causal relationships to further understand how improvements in these operational practices can lead to tangible enhancements in organizational performance.

4.7 Multiple Linear Regression Assumptions

Multiple linear regression is a powerful statistical technique used to model the relationship between a dependent variable and multiple independent variables. However, to ensure the validity of the regression results, certain assumptions must be met. This section outlines the key assumptions of multiple linear regression, providing an understanding of their importance for accurate analysis.

4.7.1 Linearity Test

The first assumption of multiple linear regression is that the relationship between the dependent variable and each of the independent variables is linear. This means that a change in an independent variable should result in a proportional change in the dependent variable. Linearity can be assessed visually with scatterplots or through residual plots. If the relationship is not linear, transformations of the data or the use of non-linear regression techniques may be required.

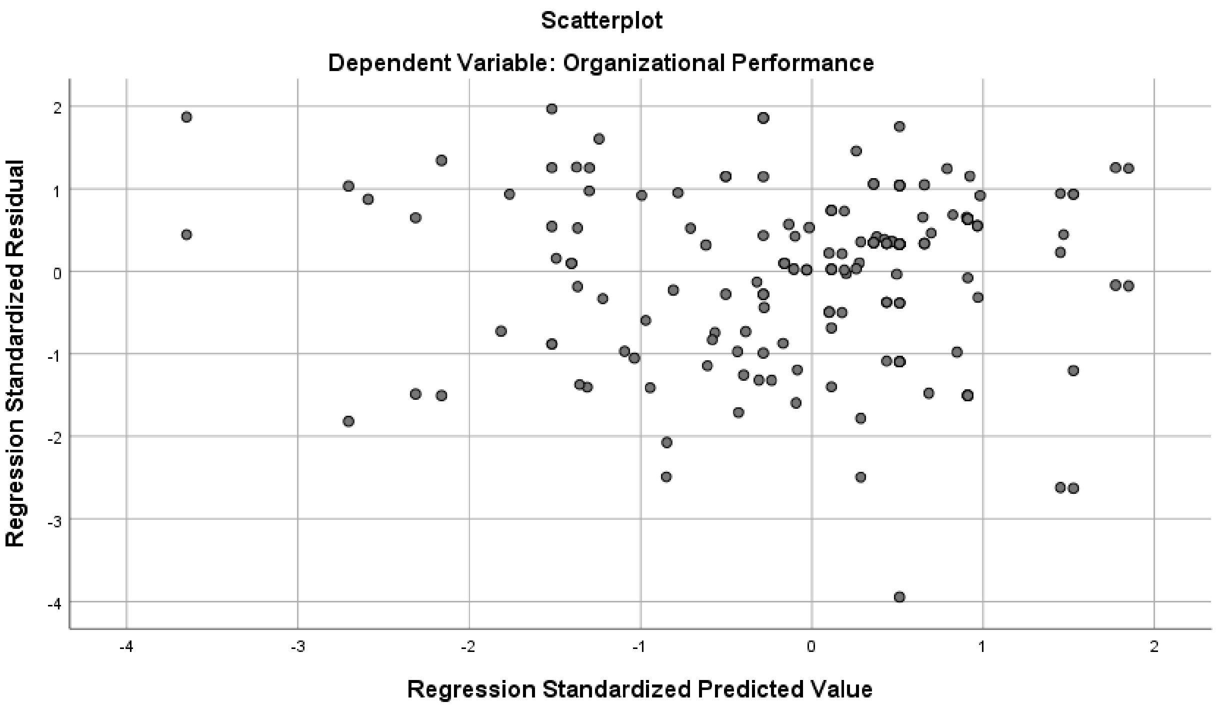

Figure 2: Scatter plots

Source: Own Survey, 2025

The scatter plot illustrates the relationship between the regression standardized predicted values and the regression standardized residuals for organizational performance. The points appear to be randomly dispersed around the horizontal line at zero, indicating that the linearity assumption is likely met, suggesting a linear relationship between the independent variables and the dependent variable. Additionally, the residuals do not exhibit any clear pattern or trend, which supports the assumption of homoscedasticity (constant variance) and suggests that the errors are independent. Overall, the plot suggests that the linear regression model is appropriate for the data,

4.7.2 Homoscedasticity

Homoscedasticity is a key assumption in multiple linear regression that refers to the consistency of the variance of the residuals across all levels of the independent variables. In simpler terms, it means that the spread or "scatter" of the residuals (the differences between observed and predicted values) should remain relatively constant as the value of the predicted variable changes.

Table 10: Residuals Statistics

Residuals Statistics[a]					
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.4199	4.7613	3.6381	.60754	185
Residual	-.61551	.30683	.00000	.15425	185
Std. Predicted Value	-3.651	1.849	.000	1.000	185
Std. Residual	-3.947	1.967	.000	.989	185
a. Dependent Variable: Organizational Performance					

Source: Own survey, 2025

The residuals statistics for the regression model predicting organizational performance indicate a generally good fit, with predicted values ranging from approximately 1.42 to 4.76 and a mean of 3.64, suggesting a central tendency around this score. The residuals range from -0.62 to 0.31, with a mean of 0.00, indicating that the model's predictions are well-balanced against the actual values and exhibiting low variability (standard deviation of 0.15). Standardized predicted values span from -3.65 to 1.85, highlighting some significant deviations from the mean, while standardized residuals range from -3.95 to 1.97, suggesting the presence of a few extreme values that may act as outliers. Overall, while the model appears to fit well. The analysis also suggested that the homoscedasticity assumption was likely satisfied.

4.7.3 Normality of Residuals

The third assumption was the normality of residuals, which indicated that the residuals of the regression should be approximately normally distributed. This assumption was particularly important for hypothesis testing and constructing confidence intervals for the regression coefficients. Normality was assessed through visual methods, such as P-P plots.

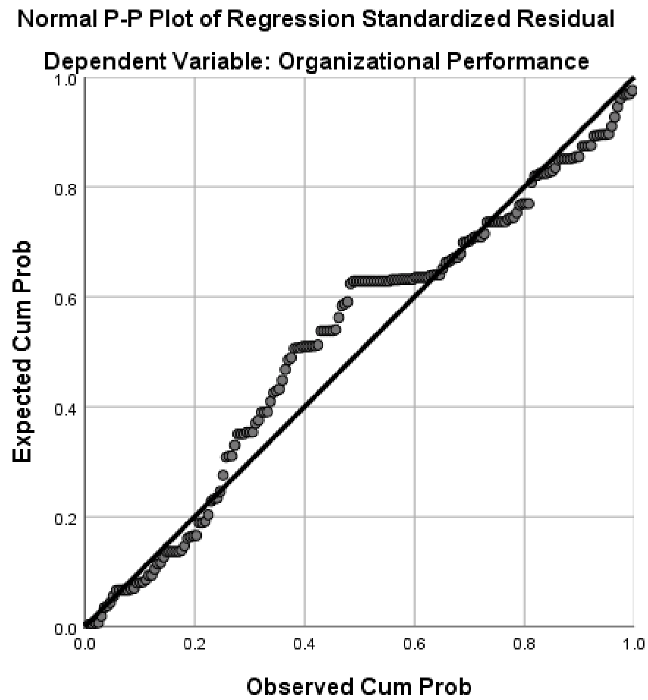

Figure 3: Normal P-P plot of Regression Standardize Residual

Source: Own Survey, 2025

The Normal P-P Plot for the standardized residuals from the regression analysis predicting organizational performance indicates the degree of normality in the distribution of the residuals. If the points closely follow the diagonal line, it suggests that the residuals are normally distributed, supporting the assumption necessary for valid statistical inference. The findings from the visual assessment of the Normal P-P Plot, combined with the analysis of the Residuals Statistics, provided confidence that the normality of residuals assumption was likely satisfied in the previous multiple linear regression analysis, supporting the validity and reliability of the regression results and the conclusions drawn from the study.

4.7.4 Model Summery

The Model Summary section in a multiple regression analysis provided key statistics that helped assess the overall fit of the regression model. This section typically included information such as R, R-squared, adjusted R-squared, and the standard error of the estimate. Each of these metrics contributed to understanding how well the independent variables explained the variability in the dependent variable.

Table 11: Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.969[a]	.939	.938	.15595
a. Predictors: (Constant), Ware house management Practice, Inventory management Practice, Procurement Practice, Distribution practice				

Source: Research Data (2025)

The Model Summary section of the multiple regression analysis provided key statistics that assessed the overall fit of the regression model predicting organizational performance based on various supply chain management practices. The correlation coefficient (R) was found to be 0.969, indicating a very strong positive correlation between the independent variables Warehouse Management Practice, Inventory Management Practice, Procurement Practice, and Distribution Practice and the dependent variable. This high correlation suggested that improvements in supply chain practices were likely associated with enhanced organizational performance.

Additionally, the R-squared value was reported as 0.939, which indicated that approximately 93.9% of the variability in organizational performance could be explained by the independent variables included in the model. This high percentage demonstrated the robustness of the model in capturing the relationship between the variables. The adjusted R-squared value of 0.938 further supported this finding by accounting for the number of predictors, while the standard error of the estimate was 0.15595, reflecting the average distance of the predicted values from the actual values. Collectively, these statistics highlighted the effectiveness of the regression model in explaining organizational performance through the selected supply chain management practices.

4.7.5 ANOVA

The Analysis of Variance (ANOVA) section provided critical insights into the statistical significance of the regression model predicting organizational performance. ANOVA tested the null hypothesis that all regression coefficients are equal to zero, suggesting that the independent variables would not explain any variability in the dependent variable. The F-statistic was calculated to evaluate the overall significance of the model, with results presented in Table 14.

Table 12: ANOVA Table

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	67.915	4	16.979	698.122	.000[b]
	Residual	4.378	180	.024		
	Total	72.293	184			
a. Dependent Variable: Organizational Performance						
b. Predictors: (Constant), Ware house management Practice, Inventory management Practice, Procurement Practice, Distribution practice						

Source: Research Data (2025)

The Analysis of Variance (ANOVA) section provided critical insights into the statistical significance of the regression model that predicted organizational performance. ANOVA tested the null hypothesis that all regression coefficients were equal to zero, which would have indicated that the independent variables did not explain any variability in the dependent variable. In this analysis, the F-statistic was calculated to assess the overall significance of the model, and the results were presented in the ANOVA table.

The ANOVA table revealed a regression sum of squares of 67.915, with a mean square of 16.979. The calculated F-value was found to be 698.122, indicating a highly significant result, as evidenced by the p-value of .000. This low p-value was well below the conventional threshold of 0.05, leading to the rejection of the null hypothesis. Consequently, the findings confirmed that at least one of the independent variables Warehouse Management Practice, Inventory Management Practice, Procurement Practice, or Distribution Practice contributed significantly to explaining the variability in organizational performance. This underscored the effectiveness of the regression model in capturing the impact of these practices.

4.7.6 Multiple Regression Coefficient

The Multiple Regression Coefficient section detailed the estimated coefficients for each independent variable in the regression model that predicted organizational performance. These coefficients represented the degree of change in the dependent variable for a one-unit change in each corresponding independent variable, assuming all other variables remained constant. Each coefficient provided insights into the strength and direction of the relationship between the independent variables Warehouse Management Practice, Inventory Management Practice, Procurement Practice, and Distribution Practice and organizational performance. The results of multiple regression coefficient was presented in Table 15.

Table 13: Multiple Regression Coefficients

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.516	.062		8.303	.000
	Procurement Practice	-.043	.082	-.048	-.525	.600
	Distribution practice	.249	.096	.292	2.601	.010
	Inventory management Practice	.700	.067	.793	10.532	.000
	Ware house management Practice	-.049	.105	-.055	-.462	.645
a. Dependent Variable: Organizational Performance						

Source: Research Data (2025)

The Multiple Regression Coefficient section provided an in-depth analysis of how various independent variables influenced organizational performance. The estimated coefficients for each variable elucidated the expected change in organizational performance for each one-unit change in the respective independent variable, with all other variables held constant. This methodological approach allowed stakeholders to discern the specific contributions of practices such as Procurement, Distribution, Inventory Management, and Warehouse Management to overall performance outcomes.

One of the most striking findings was the substantial positive coefficient associated with Inventory Management Practice, which was recorded at 0.700. This indicated that a one-unit enhancement in inventory management was linked to a significant increase in organizational performance. Previous research corroborated this conclusion, emphasizing the critical role that effective inventory management plays in optimizing costs and improving service levels (Chopra & Meindl, 2016). The evidence from prior studies highlighted that organizations employing robust inventory strategies often achieve better operational efficiency and customer satisfaction, thus reinforcing the notion that inventory management should be a focal point for organizations striving for performance improvements.

In contrast, the coefficient for Distribution Practice was positive at 0.249, suggesting a beneficial, albeit less impactful, relationship with organizational performance. This aligns with earlier studies that underscored the importance of distribution efficiency in enhancing customer satisfaction and operational effectiveness (Mentzer et al., 2001). While the positive relationship was encouraging, the relatively lower coefficient compared to Inventory Management Practice indicated that distribution alone may not suffice to drive substantial performance improvements. Organizations may need to integrate distribution strategies with other supply chain practices for a comprehensive performance enhancement.

The findings regarding Procurement Practice and Warehouse Management Practice were particularly noteworthy, as they displayed negative coefficients of -0.043 and -0.049, respectively. These results implied that changes in these practices did not yield significant improvements in organizational performance, supported by their high p-values of 0.600 and 0.645. This outcome could challenge conventional wisdom in the field, which often highlights the importance of procurement and warehouse management in optimizing supply chain effectiveness (Caniato et al., 2016). The lack of a significant relationship suggests that these practices may require further refinement or integration with other operational strategies to deliver meaningful improvements in performance metrics.

Overall, the regression analysis underscored the varying impacts of different supply chain management practices on organizational performance. The pronounced positive impact of Inventory Management Practice warranted particular attention, as it emerged as a key driver of performance improvements. Conversely, the more muted influence of Distribution Practice and the negative coefficients for Procurement and Warehouse Management Practices pointed to potential areas for further investigation. Organizations seeking to enhance their performance should prioritize the optimization of inventory management strategies while critically evaluating the efficacy of their procurement and warehouse practices to identify avenues for improvement and alignment with broader organizational goals.

CHAPTER FIVE

5 SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

In this chapter, the study summarized the key findings regarding Pharmaceutical Supply Chain Management (PSCM) practices and their impact on organizational performance at Droga Pharmaceuticals P.L.C in Ethiopia. The analysis revealed a strong positive correlation between effective PSCM practices, particularly in inventory management, and enhanced organizational performance. It concluded that while inventory management significantly contributed to performance improvements, procurement and warehouse management practices showed weaker relationships. Based on these findings, the chapter offered recommendations for practitioners and policymakers to refine and integrate PSCM strategies, emphasizing the need for a holistic approach to optimize performance outcomes in the sector.

5.2 Summary of Findings

The study aimed to assess the impact of Pharmaceutical Supply Chain Management (PSCM) practices on organizational performance in the Ethiopian pharmaceutical sector, starting with an analysis of the demographic characteristics of the respondents. The sample consisted of 185 participants, with a predominant male representation (67%) compared to females (33%). A significant portion of the respondents held degrees (63.2%), while 15.1% had diplomas and 21.6% possessed master's degrees. Most participants had between 6 to 10 years of service experience (44.3%), indicating a well-informed group capable of providing valuable insights into PSCM practices and their implications for organizational performance.

The descriptive analysis highlighted generally favorable perceptions regarding various PSCM practices. Mean scores for procurement practices ranged from 3.51 to 3.65, reflecting positive views on supplier selection criteria and effective cost management. Distribution practices received mean scores from 3.48 to 3.66, suggesting that respondents recognized the importance of strong supplier relationships and customer satisfaction with delivery times. Inventory management practices were especially well-regarded, with mean scores ranging from 3.59 to

3.73, indicating confidence in inventory accuracy and effective stock management. Warehouse management practices also garnered positive feedback, with scores between 3.51 and 3.66, showcasing perceived effectiveness in safety procedures and efficient order processing.

Correlation analysis revealed very strong relationships between the various PSCM practices and organizational performance. The results indicated that improvements in procurement, distribution, inventory, and warehouse management practices were closely associated with enhancements in organizational performance, with correlation coefficients ranging from 0.925 to 0.965. These findings validated the significance of effective PSCM practices as integral components for achieving better performance outcomes, reinforcing the interconnected nature of these operational strategies.

The regression analysis provided a more nuanced understanding of the specific contributions of each PSCM practice to organizational performance. The model summary indicated a very strong correlation (R = 0.969) and an R-squared value of 0.939, suggesting that nearly 94% of the variability in organizational performance could be explained by the independent variables included in the model. The analysis also highlighted the considerable positive impact of inventory management practices, which had the highest coefficient (0.700), implying that enhancements in this area were strongly linked to improved organizational performance. Conversely, procurement and warehouse management practices exhibited negative coefficients, indicating that changes in these practices did not lead to significant performance improvements.

Furthermore, the ANOVA results supported the overall significance of the regression model, with an F-value of 698.122 and a p-value of .000. This analysis resulted in the rejection of the null hypothesis, confirming that at least one of the independent variables significantly contributed to explaining variability in organizational performance. The findings underscored the effectiveness of PSCM practices in driving organizational success within the pharmaceutical sector, highlighting the importance of analyzing these practices collectively rather than in isolation.

In addition to the statistical analyses, the study emphasized the practical implications of the findings for organizations in the pharmaceutical sector. The pronounced positive impact of inventory management practices suggested a need for organizations to prioritize this area to enhance overall performance. Conversely, the more muted influence of procurement and warehouse management practices indicated potential areas for further investigation and refinement. Organizations may need to integrate these practices more effectively with other operational strategies to achieve meaningful improvements in performance metrics.

Therefore, the study's findings demonstrated that while inventory management emerged as a key driver of organizational performance, other PSCM practices such as procurement and warehouse management required further attention to enhance their effectiveness. The high levels of correlation and the robust regression model underscored the importance of a comprehensive approach to PSCM. These insights provided a solid foundation for developing targeted recommendations aimed at optimizing PSCM practices to improve overall organizational performance in Droga Pharmaceuticals P.L.C.

5.3 Conclusions

The study concluded that Pharmaceutical Supply Chain Management (PSCM) practices play a critical role in enhancing organizational performance within the Ethiopian pharmaceutical sector. The analysis revealed a very strong positive correlation between effective PSCM practices especially inventory management and improved organizational outcomes. This finding underscores the necessity for organizations to focus on optimizing their inventory management strategies to drive performance enhancements. The significant impact of inventory management illustrates its importance as a key lever for operational efficiency and effectiveness.

Additionally, the study highlighted the varying degrees of influence of different PSCM practices on organizational performance. While procurement and warehouse management practices were identified as important, their negative coefficients suggested that they may not currently contribute significantly to performance improvements. This finding indicates a potential need for organizations to reevaluate and refine these practices to better align them with overall performance goals. The less impactful nature of these practices raises questions about their implementation and integration within the broader supply chain framework.

In conclusion, the research reinforce that prioritizing inventory management and critically assessing the effectiveness of procurement and warehouse strategies, organizations can create a more cohesive and efficient supply chain. The insights gained from this study provide a valuable foundation for future research and practical applications, enabling organizations in the pharmaceutical sector to achieve sustained improvements in performance and operational excellence.

5.4 Recommendations

Based on the findings and conclusions of this study, several recommendations are proposed to enhance Pharmaceutical Supply Chain Management (PSCM) practices and improve organizational performance at Droga Pharmaceuticals P.L.C in Ethiopia:

- **Prioritize Inventory Management Practices**: Organizations should focus on strengthening their inventory management practices, given their significant positive impact on performance. This can involve implementing advanced inventory management systems, enhancing forecasting accuracy, and adopting just-in-time inventory strategies to reduce holding costs and improve service levels.
- **Enhance Procurement Processes**: To address the identified shortcomings in procurement practices, organizations should develop more rigorous supplier evaluation criteria and foster long-term relationships with suppliers. Training programs for procurement staff can be implemented to improve negotiation skills and ensure a deeper understanding of market dynamics, which can lead to more effective sourcing decisions.
- **Refine Warehouse Management Strategies**: Organizations should conduct a comprehensive review of their warehouse management practices to identify inefficiencies and areas for improvement. This may include adopting technology-driven solutions, such as warehouse management systems (WMS), to optimize inventory tracking, improve order fulfillment accuracy, and enhance overall operational efficiency.
- **Invest in Training and Development**: Continuous professional development is crucial for enhancing the skills and knowledge of personnel involved in PSCM. Organizations should invest in training programs focused on best practices in supply chain management, data analytics, and technological advancements. This investment will empower staff to implement innovative practices that drive performance improvements.
- **Monitor and Evaluate Performance Metrics**: Establishing clear performance metrics will enable organizations to monitor the effectiveness of their PSCM practices continuously. Regular performance evaluations can help identify areas for improvement

and facilitate data-driven decision-making, ensuring that organizations remain agile and responsive to changing market conditions.

- **Engage in Collaborative Practices**: Organizations should seek to foster collaboration within the supply chain by engaging in partnerships with suppliers, distributors, and other stakeholders. Collaborative practices can lead to shared knowledge, improved problem-solving capabilities, and enhanced innovation, ultimately contributing to better organizational performance.

5.5 Limitations of the Study

Despite the valuable insights gained from this research on Pharmaceutical Supply Chain Management (PSCM) practices at Droga Pharmaceuticals P.L.C in Ethiopia, several limitations must be acknowledged.

- **Sample Size and Generalizability**: The study was conducted with a sample of 185 respondents, which, while sufficient for the analysis, may not fully represent the entire population of pharmaceutical professionals in Ethiopia. The findings may therefore lack generalizability to all organizations within the sector, particularly smaller firms or those in different geographical regions.
- **Cross-Sectional Design**: The research utilized a cross-sectional design, which captures data at a single point in time. This design limits the ability to draw causal inferences about the relationships between PSCM practices and organizational performance. Longitudinal studies could provide a more comprehensive understanding of how these relationships evolve over time.
- **Self-Reported Data**: The study relied on self-reported data from respondents, which may introduce bias due to individual perceptions and subjective interpretations of PSCM practices. Respondents may have overestimated their organizations' effectiveness or the significance of certain practices, potentially skewing the results.
- **Focus on Quantitative Analysis**: While the study employed quantitative methods to analyze data, it did not incorporate qualitative approaches such as interviews or focus groups. Qualitative insights could have provided a deeper understanding of the contextual

factors influencing PSCM practices and performance, enriching the findings of the research.

- **Limited Scope of PSCM Practices**: The study focused on specific PSCM practices—procurement, distribution, inventory, and warehouse management—without considering other factors that may impact organizational performance, such as regulatory challenges, market dynamics, or technological advancements. This narrow focus may overlook important external influences on performance outcomes.
- **Cultural and Contextual Factors**: The research did not extensively address the cultural and contextual factors that may influence PSCM practices in Ethiopia. Organizational culture, local market conditions, and regulatory environments can significantly impact how PSCM practices are implemented and perceived, and these factors may vary widely across different organizations and regions.
- **Potential for Response Bias**: There is a possibility of response bias, where participants may provide socially desirable responses rather than candid reflections of their practices. This bias could affect the authenticity of the data collected, leading to an incomplete understanding of the actual PSCM practices in use.

5.6 Suggestions for Further Studies

Building on the findings and limitations of this study, several avenues for further research are recommended to deepen the understanding of Pharmaceutical Supply Chain Management (PSCM) practices and their impact on organizational performance at Droga Pharmaceuticals P.L.C in Ethiopia:

- **Longitudinal Studies**: Future research could employ a longitudinal design to track changes in PSCM practices and organizational performance over time. This approach would provide insights into causal relationships and how improvements in PSCM may lead to sustained performance benefits.
- **Qualitative Research Methods**: Incorporating qualitative research methods, such as interviews or focus groups, could offer richer insights into the contextual factors that influence PSCM practices. Understanding the perspectives of key stakeholders can reveal

the nuances of implementation challenges and success factors that quantitative data may overlook.

- **Broader Scope of PSCM Practices**: Subsequent studies could expand the range of PSCM practices examined, including aspects such as demand forecasting, transportation management, and supplier relationship management. A more comprehensive analysis could provide a fuller picture of how various practices interact and contribute to overall performance.
- **Comparative Studies**: Research comparing the PSCM practices and performance outcomes of organizations within the Ethiopian pharmaceutical sector to those in other industries or countries could illuminate best practices and innovative approaches. Such comparative studies may identify unique challenges and opportunities specific to the Ethiopian context.
- **Impact of Technology and Innovation**: Investigating the role of technology and innovation in enhancing PSCM practices could provide valuable insights. Future studies could explore how digital tools, data analytics, and automation influence inventory management, procurement, and overall supply chain efficiency.
- **Cultural and Regulatory Influences**: Further research should examine how cultural and regulatory factors impact PSCM practices in Ethiopia. Understanding the local context can help organizations navigate challenges and leverage strengths specific to the Ethiopian pharmaceutical sector.
- **Performance Metrics and Evaluation**: Future studies could focus on developing and validating comprehensive performance metrics tailored to the pharmaceutical sector. This would enable organizations to assess the effectiveness of their PSCM practices more accurately and identify areas for improvement.

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Appendix

ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF BUSINESS ADMINISTRATION

Questionnaire to be filled by Respondents

Dear Respondents.

My name is Biruk Ayalew. I am Msc graduate student in business administration at Addis Ababa University. This survey designed to collect data for the purpose of writing thesis on 'Effect of Pharmaceutical Supply Chain Practices on organizational performance: the case of droga pharma plc in Ethiopia'. Your genuine and timely response is essential for the success of my study. I would like to reassure you that your answers to this form will remain private and confidential. Although I am aware of how essential your time is, I sincerely hope you will take the time to finish the questionnaire. Please make an effort to respond to every question and select the option that most accurately represents your viewpoint for each statement.

General Instruction

➢there is no need of writing your name

➢in all case where answers options are available, please make mark (√) in the appropriate place.

Thank you in advance for your participation.

Part I: Demographic characteristics

1. Gender

Male ☐ Female ☐

2. Education level

Diploma level ☐ Master's and above ☐

Bachelor's Degree ☐ Others ____________________

3. How many years have you worked in Droga?

< 5 years ☐ 6-10 years ☐ 11-15 years ☐ > 15 years ☐

4. Please indicate your current Directorate

Warehouse and Inventory Management ☐ Tender Management ☐

Distribution and Fleet Management ☐ Quality Control and Assurance

Quantification and Market Shaping ☐ Other ____________________

Procurement and Contract Management ☐

5. Position in the Directorate

Director ☐

Team Leader ☐

Officer III ☐

Officer II ☐

Officer I ☐

Clerk ☐

Other ____________________

Part II: Assessment of the effect of Pharmaceutical Supply Chain practice on organizational performance at Droga Pharma P.L.C

Please rate your level of agreement for each given statement by tick (√) against corresponding lines.

Note: Strongly disagree (1), Disagree (2), Neutral (3), Agree (4) and strongly agree (5).

No.	***Items***	**Agreement Scale**				
	Procurement Practices	**1**	**2**	**3**	**4**	**5**
1	Our organization has clear criteria for selecting suppliers in the procurement process.					
2	We effectively manage procurement costs to ensure financial efficiency.					
3	We maintain strong relationships with our suppliers, which enhances procurement efficiency.					
4	Quality control measures are effectively implemented during the procurement of pharmaceutical products.					
5	Our procurement processes ensure timely availability of products to meet organizational needs.					
6	Our procurement practices consistently comply with relevant pharmaceutical regulations and standards.					
7	We have effective risk management strategies in place to address procurement challenges.					
	Distribution Practices					
1	The distribution channels used by our organization effectively reach our target customers.					
2	We maintain strong relationships with our suppliers, enhancing our distribution efficiency.					
3	Our organization effectively manages inventory levels to meet customer demand without overstocking.					
4	We utilize technology effectively to streamline our distribution					

	processes.					
5	Our customers are satisfied with the delivery times of our products.					
6	Employees involved in distribution receive adequate training to perform their roles effectively.					
7	We regularly evaluate the performance of our distribution channels to identify areas for improvement.					
	Inventory Management Practices					
1	Our inventory records are consistently accurate and up to date.					
2	We effectively manage stock levels to prevent both shortages and overstock situations.					
3	Our organization monitors inventory turnover rates regularly to optimize stock levels.					
4	We utilize technology effectively to track and manage inventory.					
5	Employees involved in inventory management receive adequate training to perform their duties effectively.					
6	We maintain strong coordination with suppliers to ensure timely replenishment of inventory.					
7	Regular inventory audits are conducted to assess the accuracy and efficiency of inventory management practices.					
	Warehouse Management Practices	**1**	**2**	**3**	**4**	**5**
1	Our warehouse is organized in a manner that maximizes space and efficiency.					
2	Inventory counts in the warehouse are regularly checked and maintained accurately.					
3	We effectively use technology (e.g., WMS, RFID) to manage warehouse operations.					
4	Employees in the warehouse receive adequate training on best practices for warehouse management.					
5	Safety procedures are well-implemented and followed in the warehouse.					

6	Our warehouse processes orders quickly and efficiently, leading to high customer satisfaction.					
7	We regularly track performance metrics (e.g., order accuracy, picking speed) to improve warehouse operations.					
	Organizational Performance					
1	Our organization consistently maintains high product availability to meet customer demand.					
2	The order fulfillment process in our supply chain is efficient and timely.					
3	Our pharmaceutical supply chain management practices contribute to overall cost efficiency in operations.					
4	We have effective quality assurance measures in place throughout our supply chain.					
5	Our customers are satisfied with the services provided by our supply chain management.					
6	We effectively evaluate and manage supplier performance to ensure quality and reliability.					
7	Our supply chain practices support innovation in product development and delivery.					
8	Our organization consistently meets all regulatory requirements related to pharmaceutical supply chain operations.					
9	We maintain accurate and timely data that supports decision-making in our supply chain.					
10	Employees involved in supply chain management receive adequate training, which enhances our overall performance.					

THANK YOU!