

ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

Department of Logistics and Supply Chain Management

EFFECTS OF INVENTORY MANAGEMENT PRACTICES ON OPERATIONAL PERFORMANCE: EVIDENCE FROM PRIVATE PHARMACEUTICAL IMPORTERS IN ADDIS ABABA

BY

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JUNE 2026

ADDIS ABABA, ETHIOPIA

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APPROVAL SHEET

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DECLARATION

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of Tariku J. (Ph.D.). All sources of materials used for the thesis have been duly acknowledged. I further confirm that the paper has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

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ENDORSEMENT

This thesis has been submitted to Addis Ababa University, School of Commerce for examination with my approval as a university advisor.

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_____

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June 2026

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ACRONYMS & ABBREVIATIONS

EFDA - Ethiopian Food and Drug Authority

ERP - Enterprise Resource Planning

GDP - Gross Domestic Product

ICT - Information and Communication Technology

JIT - Just-in-Time

KPI - Key Performance Indicator

RBV - Resource-Based View

SPSS - Statistical Package for Social Sciences

VIF - Variance Inflation Factor

WHO - World Health Organization

ABSTRACT

This study aimed at investigating the relationship between inventory management practices and operational performance by conducting an analysis on selected private pharmaceutical importers in Addis Ababa, Ethiopia. An explanatory research design with quantitative research approach was employed. The population of the study comprised of staffs working in 20 private pharmaceutical importers in Addis Ababa, Ethiopia. A sample of 296 respondents was randomly chosen from the population of study. Primary data was obtained from 253 valid and usable respondents with the help of standardized and self-administered questionnaires through a 5-point Likert scale method. Both descriptive and inferential analyses were performed using SPSS version 26.0. From the findings, it is evident that inventory management practices such as record accuracy, inventory security, inventory turnover, supply responsiveness, storage compliance and demand forecasting have positively and significantly impacted operational performance. Among the identified variables, storage compliance and supply responsiveness showed highest effects while demand forecasting and record accuracy showed moderately significant impacts on operational performance. Inventory security and supply responsiveness showed the lowest effects on operational performance. Therefore, inventory management practices are effective predictors of operational performance. With the strategic use of storage compliance, inventory turnover, demand forecasting and record accuracy, professionals working in pharmaceutical industry can increase efficiency and effectively serve customers, especially when it comes to essential medicines.

Keywords: Demand Forecasting, Inventory Management, Inventory Turnover, Operational Performance, Pharmaceutical Importers, Record Accuracy, Supply Responsiveness, Storage Compliance,

CHAPTER ONE

1. INTRODUCTION

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

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

1.1. Background of the Study

Efficient inventory systems have been acknowledged as vital to success in the pharmaceutical sector. Across global supply chain studies, effective inventory systems have invariably been noted as key contributors to improved service delivery, minimization of wastage, and competitive advantage (Christopher, 2016; Chopra & Meindl, 2021). In emerging nations, pharmaceutical importers experience various problems, including disruptions in their supply chain operations, stringent regulatory compliance requirements, and the need to stock adequate quantities of essential pharmaceuticals. Therefore, the success of pharmaceutical importing firms depends upon their use of strong inventory management frameworks. They have to ensure stock availability, minimize wastage from expiry and theft of products, and comply with international regulations.

Operational performance, as discussed in operations management studies, refers to an organization's capability to fulfill its objectives and customer expectations simultaneously (Krajewski et al., 2019). Performance measures differ among organizations due to varying sizes, complexities, technology capability, and regulatory issues (Stevenson, 2018). Notwithstanding the variation in performance measures, inventory management is critical in influencing operational success by enabling better decision-making and implementation capabilities. Thus, the success of pharmaceutical importing firms relies on their ability to record stocks correctly, prevent loss through expiration of

pharmaceuticals and theft, sustain stock availability and supply responsiveness, minimize expiry of medications and avoid disruption in service delivery, observe regulatory compliance regarding storing conditions, and forecasting future demand (Christopher, 2016; Mentzer, 2018).

Pharmaceutical inventory management involves a number of activities, such as predicting, ordering, receiving, storing, and distribution of pharmaceuticals from procurement to delivery. Therefore, the process of inventory management entails consideration of constraints such as cost, quality, time, and regulatory issues as well as management of various risks related to safety of products and coordination of various stakeholders (Christopher, 2016; Mentzer, 2018). Previous studies have established a consistent correlation between inventory management and operational performance in relation to product availability, cost, and quality management (Gunasekaran & Kobu, 2020; Lambert & Stock, 2021). Anticipation of possible scenarios as well as the formulation of contingencies to manage uncertain situations in pharmaceutical inventory management has also been emphasized (Simchi-Levi, 2019).

Nevertheless, the manner of inventory management varies among firms in terms of complexity. Some pharmaceutical importers, especially multinationals, allocate full-time inventory management personnel while SMEs have fewer capabilities as they rely partly on inventory management (Jorge & Mário, 2019). Hence, inventory management techniques are not identical for different organizations, especially multinationals and SMEs. Compared to large firms, smaller companies are likely to suffer operational failure because of lack of necessary resources, inadequate records, ineffective forecasting methods, and non-compliance with WHO storage guidelines.

Ethiopia's pharmaceutical industry has experienced growth over the last few years in the development of its national health care system. As estimated by the Ethiopia Food and Drugs Authority (EFDA), about 65 percent of the medicines used in the nation are supplied by private importers (EFDA, 2023). Additionally, the pharmaceutical industry accounts for almost 85 percent of Ethiopia's pharmaceutical needs (MoH, 2022). Importantly, the contribution of pharmaceutical importers is significant as far as ensuring that medicines are available to both urban and rural residents is concerned (Tadesse, 2022). Many of these firms have, however, faced operational difficulties characterized by inadequate inventory control skills, lack of demand forecasting skills, and inefficient record maintenance, thus reducing their effectiveness in service delivery. It is therefore important to improve the practices of pharmaceutical importers in the country since their role in the nation's health is very crucial.

1.2. Statement of the problem

Across the world, pharmaceutical importers should be able to implement inventory management practices with a level of accuracy, responsiveness, and compliance. When accuracy of recording reaches 95 percent or higher, security of stock is very strong, turnover of products is optimized, there is rapid response in service delivery, and there is effective demand forecasting and proper storage according to WHO criteria, high fill rate, high turnover rate, and reduced expiration of pharmaceuticals are inevitable (Christopher, 2016; Chopra & Meindl, 2021). The aforementioned figures indicate the ideal situation in which practices can be compared with those practiced in Ethiopia.

In Ethiopia, however, previous studies have shown inadequate accuracy of inventory records (below 80 percent), huge wastages of medicines due to expiry of stock above 10 percent, and recurrent shortages lasting for weeks (Tadesse Jobira et al., 2021; Boche et al., 2020). Furthermore, forecasting errors among public institutions, including EPSA, are as high as 50 percent (Bilal et al., 2025). Although the foregoing data shows inefficiency among institutions, they were conducted on public institutions. No studies have been conducted on pharmaceutical firms in Addis Ababa in order to provide a comprehensive assessment of the inventory determinants in the pharmaceutical industry in Ethiopia. This represents a gap in the current body of knowledge.

There are numerous consequences as a result of lack of documentation of information about inventories of pharmaceutical firms. Without record accuracy, firms are unable to identify causes of stockouts or overstocking. Poor inventory security increases risk of diversion and theft which reduces profitability (Emiru, 2021). Poor management of turnover leads to increased numbers of expiry of medications. Low responsiveness of inventories to orders delays supply while inconsistency in compliance to storage regulations makes products to become unsafe. In addition, lack of good forecasting leads to mismatch between supply and demand and prevents investments in advanced inventory systems. All the identified weaknesses affect operational performance. This study attempts to address the deficiency in knowledge by analyzing the impact of five determinants of inventory management practices on operational performance among selected private pharmaceutical importers in Addis Ababa.

1.3. Research Objectives

1.3.1. General Objective

The general objective of the study is to evaluate the effect of inventory management practices on operational performance of selected private pharmaceutical importers in Addis Ababa, Ethiopia.

1.3.2. Specific Objectives

The specific objectives of the study are:

1. To examine the effect of record accuracy on the operational performance of selected private pharmaceutical importers in Addis Ababa.
2. To analyze the influence of inventory security on the operational performance of selected private pharmaceutical importers in Addis Ababa.
3. To examine the impact of inventory turnover on the operational performance of selected private pharmaceutical importers in Addis Ababa.
4. To analyze the effect of supply responsiveness on the operational performance of selected private pharmaceutical importers in Addis Ababa.
5. To investigate the effect of storage compliance on the operational performance of selected private pharmaceutical importers in Addis Ababa.
6. To examine the influence of demand forecasting on the operational performance of selected private pharmaceutical importers in Addis Ababa.

1.4. Research Hypothesis

The following hypotheses are tested

1. H1: Record accuracy has a positive and significant effect on operational performance.
2. H2: Inventory security has a positive and significant effect on operational performance.
3. H3: Inventory turnover has a positive and significant effect on operational performance.
4. H4: Supply responsiveness has a positive and significant effect on operational performance
5. H5: Storage compliance has a positive and significant effect on operational performance.
6. H6: Demand forecasting has a positive and significant effect on operational performance.

1.5. Significance of the Study

The significance of this study is that it offers pragmatic information on how the inventory management practice influences operational performance in private pharmaceutical importing companies in Ethiopia. This study helps organizations determine which inventory management practices have an impact on operational efficiency in terms of cost-effectiveness, dependability, and expiry. As a result, companies can use the data obtained from this research and implement practices to optimize inventory tracking, reduce waste, and even shorten lead times in order to benefit operations at hand. This study is significant in its contribution both to academic research as well as to the operational issues faced by firms that provide the majority of medicines used in Ethiopia.

Furthermore, the significance of the study is evident in the possibility that it creates to address the issue of regulatory and administrative practices among firms and agencies in question. For instance, the Ethiopian Food and Drug Authority would be able to take into account the results of the research in their planning and organization of inspections and programs that need to be carried out by private pharmaceutical firms. Additionally, inventory and logistics managers may find this study useful for improving monitoring, education, and compliance with the standard procedures of inventory management. This study would be valuable for further research by student practitioners.

1.6. Scope of the Study

Like other scholarly work, the scope of this study has been specified geographically, contextually, and methodologically. Geographically, this study has been confined to Addis Ababa, Ethiopia. Addis Ababa is the capital of the country where nearly 85% of all pharmaceutical importing companies and their key operations are found. Hence, other regions were purposely left out.

Operational performance was defined by such indicators as accuracy of records, inventory security, inventory turnover, responsiveness of supplies, storage compliance, and forecast of demands. There were additional factors such as management of relations with suppliers, transportations, customs clearance process, and information technology but they too were deliberately excluded as they fell outside the scope of the study.

In terms of methodology, an explanatory quantitative research design, along with an approach based on the use of quantitative techniques, was employed because the study sought to test some hypotheses related to the relationship between the practice of inventory management and operational

performance. The target population of the study included the active members of staff of the private pharmaceutical importing companies in the selected region. Management and non-management staff alike were included in the sample group because they have more information about the practice and process of managing pharmaceutical inventories than anyone else.

The scope, thus, includes only the private pharmaceutical importing firms of Addis Ababa. Data was collected from December 2025 to April 2026. The study did not consider such factors as public sectors agencies such as EPSS as well as regional importers outside the capital city. It also focused only on those determinants of inventory management practices that were related to operational performance.

1.7. Operational Definition

- **Inventory Management** – It is a planned organization, controlling and monitoring of all facets of the stock and motivating all parties involved to accomplish the inventory goals safely and within the parameters of cost, time, and quality (CSCMP, 2016).
- **Record Accuracy** – This is to have updated information to minimize mistakes in managing the inventory, in ensuring that the physical stocks match those in the records (IMI, 2018).
- **Inventory Security** – Inventory security entails minimizing wastage due to expiration and theft through proper storage, controlling access and rotating stocks (Alexander, 2015).
- **Inventory Turnover** – This entails keeping a constant flow of stocks and inventory available through the efficient turnover of stocks to ensure that there is no overstocking or shortages (Dortok, 2016).
- **Supply Responsiveness** – This refers to the responsiveness to any changes in the supply chain that help to avoid lead-time service disruptions (Construction Law, 2019).
- **Storage Compliance** – This is adherence to storage requirements such as temperature control and humidity management, and WHO guidelines on proper shelving (PMI, 2018).
- **Demand Forecasting** – This means forecasting of demand accurately to avoid over or understocking through statistical and judgemental forecasts (Alexander, 2015).
- **Operational Performance** – Operational performance is refereed to the involvement of cost efficiency, service quality, reliability in deliveries and customer satisfaction (Alexander, 2015).

1.8. Organization of the Study

This paper is structured in five chapters. In the first chapter, the introductory materials including background to the study, statement of the problem, the objective of the study, the research question, importance of the study, scope and limitations of the study. Chapter two is on the literature reviewed during the desk review phase of this study. Chapter three deals with various methodologies applied in carrying out this study. The fourth chapter will highlight results, discussion, and data analysis.

CHAPTER TWO

2. LITERATURE REVIEW

This chapter provides a structured review of related literature that establishes the foundation for evaluating inventory management practices and their influence on operational performance. The discussion begins with a theoretical and conceptual review, where established frameworks such as the Resource-Based View and Just-in-Time, Agency Theory. This is followed by an empirical review that synthesizes prior studies on pharmaceutical supply chains and operational efficiency, highlighting methodological approaches, key findings, and gaps in the literature. Finally, it develops a conceptual framework that integrates theoretical insights and empirical evidence into a unified model, illustrating how inventory practices namely forecasting, procurement, warehousing, and distribution interact with contextual determinants to influence operational performance. Together, these three sections provide the intellectual and analytical lens through which the study is situated.

2.1. Theoretical and Conceptual Review

Research in pharmaceutical importation and operational performance in resource-constrained and volatile environment settings like Ethiopia's private sector needs a theoretical lens that is simultaneously strategic and action-oriented. Several theories are likely candidates - Resource-Based View (RBV), Just-in-Time (JIT), Agency Theory, Materials Management Theory, and Contingency Theory - to name a few. However, after careful analysis, it becomes clear that the former two offer the best explanation, while the other three are largely irrelevant.

2.1.1. Theoretical Foundation

Resource-Based View (RBV) - According to the Resource-Based View (RBV), proposed by Wernerfelt (1984) and Barney (1991), competitive advantage is built through developing and nurturing resources within a firm. Such resources are valuable, rare, inimitable, and non-substitutable (VRIN). It may be tangible (warehouse space, capital, and refrigerators); intangible (trust, reputation, knowledge, forecasting capacity); and organizational capabilities (coordination routines, IT system).

The RBV is highly relevant in the case of pharmaceutical importers operating in Addis Ababa where companies operate in an uncertain and volatile environment. Competitive advantage here comes from developing capabilities and skills unique to each importer rather than generic procurement strategies. For example, a firm that can effectively monitor inventory, nurture long-term relationships with suppliers, and predict demand would perform better in terms of order fulfillment and expiration reduction than its competitors. Such performance differences stem from heterogeneity and immobility of resources (Barney & Wright, 2023).

The dynamic capabilities view developed by Teece, Pisano, and Shuen (1997) increases RBV's applicability through describing how organizations adapt in a constantly changing environment by sensing opportunities, seizing them, and responding. Several recent studies confirmed that dynamic capabilities contribute to the flexibility and agility of supply chains (Kabra, 2024; Baharmand et al., 2023). Thus, RBV can be viewed as both a static and dynamic theory.

Just-in-Time (JIT) Theory - The principle of Just-in-Time (JIT), first described in the context of Toyota's Production System (Ohno, 1988), includes elimination of waste, push-to-pull operations, and tight integration with suppliers. The main principles of this theory are producing only needed products and keeping minimum stocks, both of which relate directly to the goals of efficient and timely delivery, especially relevant for pharmaceutical supply chains.

JIT can complement RBV in explaining inventory practices because while the latter describes the resources necessary for successful operations, the former offers guidance on how to manage them for optimal efficiency. In the context of Addis Ababa, JIT needs to be modified because of the lack of reliable logistics, customs delays, and infrastructure gaps. By interpreting it as lean, flexible, and resilient inventory management, JIT remains relevant.

This view is supported by research demonstrating the effectiveness of JIT application in resource-constrained contexts. According to Mwangi and Were (2018), Kenyan distributors applying JIT principles demonstrated improved inventory performance and significantly fewer stock-out situations than their counterparts. Furthermore, Tadesse and Worku (2024) found that Ethiopian importers practicing vendor-managed inventories were more productive and experienced lower holding costs than those relying on review methods.

Combining RBV and JIT theories into one allows us to look at inventory management from a strategic-operational perspective. RBV highlights unique resources that determine competitiveness, while JIT helps to develop strategies on how to manage them to ensure efficiency and minimize wastage. This dual approach overcomes weaknesses inherent to single theories - firms may have good warehouses but not apply JIT practices, thus accumulating outdated supplies, or vice versa.

Such a combination of RBV and JIT is especially helpful in the context of pharmaceutical importation in Addis Ababa because of scarcity, volatility, and fragmentation of supply chains that affect health outcomes. The former will identify resource-based competitive advantages, while the latter will show how to leverage them into efficiency and performance improvements.

In conclusion, it is important to stress that this research will utilize the integrated framework where RBV will explain antecedents of effective inventory management through resource advantages, and JIT will operationalize them. Leadership will be identified as a key enabler impacting both resource-based and JIT-driven factors. The resulting approach is strategically sound and operationally effective, providing a strong basis for the proposed conceptual model.

2.1.2. Concepts of Inventory Management

According to CSCMP (2016), inventory management refers to the practice of planning, organizing, monitoring, and controlling inventory processes in order to satisfy demand at the lowest possible cost. This definition distinguishes inventory management from ordinary business operations. Whereas many functional areas of a firm might not necessarily focus on inventories, inventory management is a field with specific objectives (service level achievement and cost reduction) and requiring effective resource allocation and utilization (Kerzner, 2019). Considering the complexity involved in inventory management, the approach to the issue should be associated with the creation of an appropriate framework that allows achieving objective targets under conditions dictated by cost, service level, and quality (Turner, 2016).

In terms of process theory, the classical inventory concepts suggest that inventory systems transform the input elements of the process (order placing, receiving, and storing) into the output elements (stock possession and delivery accomplishment) (Lepak, 2010). Some of the classical concepts involve economic order quantity and reorder point calculation and contribute greatly to inventory management in the context of planning, monitoring, and control activities (Lock, 2020). They prove to be useful in situations with high predictability.

As far as the neo-classical inventory management theories are concerned, they highlight the dynamic and ambiguous character of the current logistics environment and its susceptibility to external influences. Neo-classical models indicate that inventory management takes place in sociotechnical context when it becomes necessary to take into account the factors mentioned above to cope with ambiguity, conflictual goals, and changing circumstances (Morris, 2013). In contrast to the classical order of events, neo-classical inventory management implies flexibility and adaptation to change and involvement of stakeholders (Winter & Szczepanek, 2017).

2.1.3. Inventory Management Practices

Record accuracy - Record accuracy stands for the congruency between inventory records and physical inventory. It allows making timely reorders, avoiding stock-outs and overstock (Chopra & Meindl, 2016). Errors occur because of data recording mistakes, theft, deterioration, inaccurate inventory counting, and system restrictions. To ensure accuracy, one may apply regular cycle counting, bar coding, RFID technology, and audits (Waters, 2020).

Inventory Security - Inventory security involves securing items against theft, damage, and expiration. In order to secure goods properly, one should limit warehouse access, install security cameras and other monitoring devices, follow FIFO/FEFO principles, and control the environment (Christopher, 2016). Pharmaceutical products require special attention in terms of security owing to their valuable nature and containing controlled substances. Effective inventory security helps prevent loss.

Inventory Turnover - Inventory turnover is defined as the frequency of selling of inventory during a certain period of time. High turnover signifies successful inventory management, while low turnover signals overstocking and poor sales performance. Ideally, the turnover rate depends on the type of products: it is higher in case of fast-moving consumer goods than pharmaceuticals (Stevenson, 2018). The turnover rate can be computed as the ratio of cost of goods sold to average inventory balance. To

achieve optimal inventory turnover, one may implement demand forecasting, supplier collaboration, and ABC analysis (Krajewski et al., 2019).

Supply Responsiveness- Supply responsiveness refers to the capacity to adjust inventory rapidly depending on changes in supply and demand conditions. Responsible organizations apply buffer inventory, use multi sources, and rely on fast transportation means when there occur any supply chain problems (Gunasekaran & Kobu, 2020). In the context of importing pharmaceutical products, supply responsiveness is important owing to the length of lead time and other uncertainties. Key supply responsiveness indicators include lead time, fill rate, and order cycle time (Lambert & Stock, 2021).

Storage Compliance - Storage compliance implies compliance with regulations concerning inventory storage, including appropriate temperature and humidity, illumination, shelves, and product segregation (WHO, 2011). Storage non-compliance leads to drug degradation and violations of laws. Among the compliance practices, one may mention constant temperature measurement, calibration of equipment, employees' training, and data collection (EFDA, 2019).

Demand Forecasting - Demand forecasting means predicting demand on the basis of historical data, awareness of market dynamics, and mathematical methods (Simchi-Levi, 2019). Forecasting contributes to the prevention of overstocking and stock-outs. There are numerous methods of forecasting, including simple moving average and machine learning algorithms. Proper practices in the sphere of demand forecasting comprise data cleansing, forecasting collaboration, and forecast error evaluation (Chopra & Meindl, 2016).

2.1.4. Operational Performance

Operational performance can be described as the ability to turn inputs into outputs efficiently for satisfying the needs of customers. In inventory management, operational performance is usually measured in terms of cost efficiency, service quality, reliability, and customer satisfaction (Neely, Gregory, and Platts, 2005). Whereas operational performance was once considered exclusively from a financial perspective, it is now evaluated using time-based, quality-based, and flexibility-based measures (Slack, Chambers, and Johnston, 2010).

Cost Efficiency - The concept of cost efficiency in inventory management includes holding costs, ordering costs, and stock-out costs. Holding costs include warehousing, insuring, and obsolescence

while ordering costs include purchasing and transportation costs whereas stock-out costs include lost revenues and costs of emergency purchases (Waters, 2020).

Service Quality - In relation to imports of pharmaceutical products, service quality refers to supplying the right quantity of the correct product, at the right time and in the right conditions. Indicators that can be used to measure service quality include order fill rate and product integrity (Christopher, 2016).

Delivery Reliability - Delivery reliability involves the delivery of products or services on time as promised. It leads to increased trust from customers and lower amounts of safety stocks required by customers. Some of the measures used for measuring delivery reliability are percentage on-time deliveries and order cycle time (Mentzer, 2018).

Customer Satisfaction - Customer satisfaction entails how well the inventory management process meets the needs and expectations of the customers. High levels of customer satisfaction are known to result in repeat business and large order quantities (Lambert and Stock, 2021).

2.2. Empirical Literature Review

Effect of Record Accuracy and Operational Performance

Zulch (2019) investigated factors affecting operational performance in the pharmaceutical distribution industry in Indonesia. The study sought to determine whether record accuracy practices affect the overall operational performance of selected distribution companies. Fifteen pharmaceutical distribution companies in Jakarta were targeted as the study population. The survey was conducted on a total of 322 active staff members. The results revealed that record accuracy and data integrity had the highest effect on the effectiveness of operational performance.

Hwang (2013) carried out research on the link between inventory record accuracy and operational performance as a new dimension for achieving supply chain success. A quantitative research approach was applied through gathering primary data from a sample of 158 inventory managers. The findings conclude that record accuracy plays a vital role in choosing the right replenishment decisions and delivering the necessary service levels.

Uneb and Raza (2018) conducted a study dedicated to finding out the perceptions regarding factors related to inventory management failures in the pharmaceutical industry of Pakistan. The study focused on a sample of 45 pharmaceutical companies. The study found that by implementing electronic record-keeping systems and training staff on data entry procedures, the accuracy of

inventory records, the quality of order fulfillment, and customer satisfaction dramatically increase. Thus, the following hypothesis is proposed:

H1: Record accuracy has a positive and significant effect on operational performance.

Inventory Security and Operational Performance

Zou (2014) conducted a study on the determinants of operational performance in the pharmaceutical manufacturing industry in Pakistan. The survey was conducted on 2,127 employees of 8 pharmaceutical companies. The findings revealed that operational performance highly depends on inventory security practices. It also suggested that it is vital to implement appropriate security measures for pharmaceutical products, considering their value and sensitivity.

Yong and Nur (2017) surveyed the impact of inventory security on the operational performance of pharmaceutical distribution companies in Lagos, Nigeria. A descriptive research design with a quantitative research approach was applied. A total of 25 distribution companies were taken as the study population. Primary data were collected from 250 professionals through standard questionnaires. The result found that inventory security practices, including access controls and surveillance, highly contribute to the success of distribution operations. They posit that security measures, loss prevention systems, and staff training are considered to be critical factors of success that positively affect inventory accuracy, customer confidence, and operational efficiency.

Nugroho (2018) conducted a survey related to determinants of pharmaceutical supply chain performance. The study focused on a sample of 315 staff from 10 pharmaceutical importers in Amsterdam. Explanatory research was adopted to investigate the relationship between the factors, namely inventory security, stock rotation, facility management, and technology adoption, and their influence on operational performance. Based on multiple regression analysis, the results revealed that inventory security underlined the importance of loss prevention on operational performance. Thus, the following hypothesis is proposed:

H2: Inventory security has a positive and significant effect on operational performance.

Inventory Turnover and Operational Performance

Benita (2014) studied the impacts of inventory turnover on pharmaceutical supply chain performance. The survey was conducted on 30 pharmaceutical distributors in Indonesia. A standard questionnaire was used to collect primary data from 384 targeted respondents. Multiple linear regression analysis

was applied to examine the effect of inventory turnover on operational performance. The findings illustrate that turnover rates have a significant impact on the efficiency of pharmaceutical operations. Moreover, the study concluded that inventory turnover is associated with operational performance in each type of pharmaceutical product. The author posits that it is paramount for inventory managers to optimize turnover rates based on product characteristics and demand patterns.

A study by Raziq (2018) that investigated the effect of inventory turnover on operational performance of pharmaceutical companies in India found that efficient turnover reduces holding costs, minimizes obsolescence, and improves cash flow. The findings illustrate the importance of ABC classification and cycle counting because inventory managers should prioritize turnover optimization for high-value, fast-moving products.

Ahmed and Ismael (2013) stated that essential inventory management knowledge, skills, competencies, and characteristics ensure successful operational performance through right decisions at the right time and by employing right practices at the right places. They acknowledged the complex nature of pharmaceutical supply chains and divided the success factors into four major categories: accuracy, security, turnover, and forecasting. They concluded that the factors ranked higher by professionals were all inventory-related. They also claimed that the results of their study can be applied to pharmaceutical sectors of other developing countries. Thus, the following hypothesis is proposed:

H3: Inventory turnover has a positive and significant effect on operational performance.

Supply Responsiveness and Operational Performance

Baker (2018) at The George Washington University aimed to evaluate the impact of supply chain integration, supplier responsiveness, and information sharing on operational performance in large-scale pharmaceutical supply chains in the USA. A total of 330 sample respondents from 54 pharmaceutical companies participated in the survey. The study found that supply responsiveness and supplier collaboration positively influence operational performance.

Another study conducted in Pakistan by Taherdoost (2015) analyzed whether a relationship exists between supply responsiveness practices and operational performance in the pharmaceutical industry. A descriptive research design and mixed research approach were applied. The survey targeted 290 professionals including supply chain managers, procurement officers, warehouse supervisors, and

logistics coordinators. Both standard questionnaires and interviews were conducted to collect primary data. The findings conclude that supply responsiveness plays a significant role in pharmaceutical operations, meaning that operational performance can significantly depend on chosen lead time reduction strategies and their cost effectiveness. The study suggested that an effective responsiveness system comprises a four-step process which includes lead time measurement, bottleneck identification, improvement implementation, and performance monitoring.

Baker (2018) emphasized the impact of inventory managers and their responsiveness practices as major determinants of operational performance. A quantitative non-experimental correlational study examined whether supply chain responsiveness is correlated with operational performance in pharmaceutical supply chains. The study highlights the importance of effective responsiveness in ensuring operational success in the pharmaceutical industry. Thus, the following hypothesis is proposed:

H4: Supply responsiveness has a positive and significant effect on operational performance.

Storage Compliance and Operational Performance

Osedo (2017), in a study on the determinants of effective implementation of pharmaceutical warehousing in Kenya, concluded that storage compliance is a monitoring and evaluation tool that promotes operational performance by ensuring that relevant and significant product-related information is communicated to all stakeholders. In addition, it promotes operational performance by ensuring the setting of storage standards as well as identification of indicators for tracking storage conditions.

Selam (2017) sought to identify and assess the success factors for the implementation of storage compliance in pharmaceutical supply chains. Using descriptive research design, the finding of the result revealed that effective temperature monitoring, proper shelving, and clear storage procedures were considered to be the factors that contribute to the success of pharmaceutical operations.

Hyvari (2007) aimed to evaluate the critical success/failure factors in inventory management and to examine the relationships between storage compliance and organizational performance. This study also aimed to gain an understanding of how warehouse managers present their storage requirements to ensure operational success. Based on the survey responses received, it is possible to identify critical success factors in storage management that are significantly related to company size, warehouse size,

organization type, and inventory managers' compliance monitoring practices. The warehouse implementation was also analyzed, and the results indicated the importance of storage condition monitoring and continuous compliance verification, followed by temperature control, ranked highest in most warehouse operations. Thus, the following hypothesis is proposed:

H5: Storage compliance has a positive and significant effect on operational performance.

Demand Forecasting and Operational Performance

According to Barassa (2014), demand forecasting is required to promote operational performance and timely inventory decisions due to harmonization and coordination between forecasters and inventory managers. He conducted a research study on the influence of forecasting tools on inventory performance in Kenya. From the findings, it was clear that demand forecasting promotes inventory optimization because inventory management is mainly aimed at meeting customer demand. It would be of paramount importance if forecasters were involved in making their demand projections known, as this would influence the timely availability of stock. In addition, he concluded that forecasting involvement in inventory planning promoted inventory optimization as the forecasters can track demand patterns and ensure that inventory levels are in line with meeting customer needs, as well as aiding in replenishment decision-making.

Wangeci (2013) conducted a research study on the determinants influencing the performance of pharmaceutical supply chains and concluded that demand forecasting, particularly using quantitative methods, is highly significant in ensuring that inventory levels are optimized. According to the study, forecasters need to be involved in identifying demand patterns, monitoring forecast accuracy, and evaluating forecast methods. However, forecasters need to be trained to ensure their participation is effective in promoting performance.

Njeri & Were (2017) concluded that demand forecasting promotes operational performance, and lack thereof critically affects the timely availability of products. According to Migwi (2015), demand forecasting promotes operational performance by ensuring that inventory levels receive the required optimization due to the accuracy portrayed. On the contrary, Osedo (2017) conducted a study on the determinants of effective implementation of pharmaceutical warehousing in Kenya and was able to conclude that demand forecasting is highly significant in the effective implementation of pharmaceutical warehousing in Kenya. Thus, the following hypothesis is proposed:

H6: Demand forecasting has a positive and significant effect on operational performance.

2.3. Research Gap

The vital importance of pharmaceutical supply chains in ensuring health benefits for nations has been recognized by various researchers who nevertheless identified several limitations in theoretical and practical applications of inventory management for this particular domain. Such fundamental theories as the Resource-Based View (RBV), Just-In-Time (JIT), and Agency Theory can help to analyze operational performance but need to be more customized when used for pharmaceutical importing operations considering various external environmental factors like difficulties with customs clearance and regulatory requirements. There is a lack of comprehensive empirical studies of the pharmaceutical industry in Ethiopia related to inventory management with regard to stock-out incidences, expiry waste, and obstacles connected with regulation of imports. Additionally, compliance issues in relation to pharmaceutical storage are addressed with the help of non-specific frameworks not taking into consideration the peculiarities of Ethiopian infrastructure and climate. Finally, the issue of stakeholder relationships has not been extensively explored yet, especially with regard to interactions between regulators, importers, and hospitals or clinics, and the criteria of performance measurements were too narrow, being focused only on cost, availability, and turnover.

Several studies examined inefficiency problems in the pharmaceutical supply chains in Ethiopia but did not pay much attention to the private importers responsible for supplying most of the medications to the country. The previous research mostly employed a descriptive methodology and lacked statistical analysis with regard to using supply chain management theories like RBV and JIT. This study tries to fill the existing gaps through investigating privately owned pharmaceutical import companies located in Addis Ababa by employing an explanatory quantitative approach with correlation and regression analysis.

2.4. Conceptual Framework

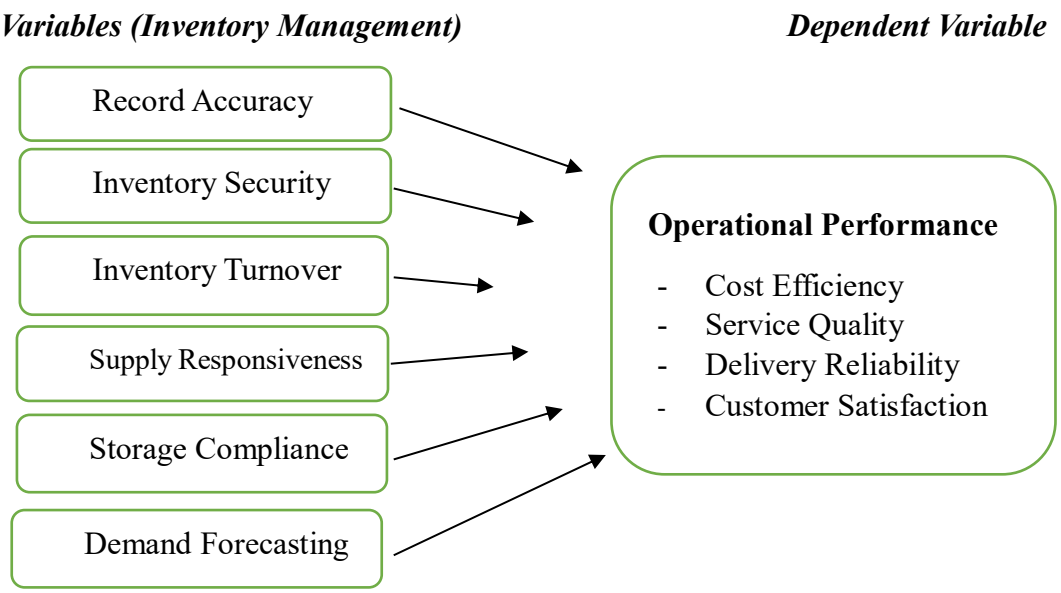
The conceptual framework presents the association of inventory management practices and operational performance of firms engaged in importing pharmaceuticals. The role played by inventory management practices in shaping operational efficiency cannot be overlooked as they determine the cost-efficiency, effectiveness, and consistency of operations (Christopher, 2016; Chopra & Meindl, 2021). In the present research, there are six independent variables of inventory management including

record accuracy, inventory security, inventory turnover, supply responsiveness, storage compliance, and demand forecasting.

Record accuracy leads to effective replenishing decisions, eliminating stock-outs and overstocking issues (Tadesse Jobira et al., 2021). Security ensures reduction in the loss of products due to theft or expiration, which helps in minimizing write-offs and saving money (Emiru, 2021). Turnover makes sure that the supply and stock of products are consistent and do not end up with the expired medication (Lambert & Stock, 2021). Responsiveness ensures quick lead times, preventing disruption in the supply of medicines (Bilal et al., 2024). Storage compliance keeps the medicine fresh and safe according to the international standards of WHO and EFDA (EFDA, 2023). Lastly, demand forecasting prevents over- or under-supply of products (Simchi-Levi, 2019).

All these practices have an effect on the performance of a firm through operational indicators such as cost efficiency, effectiveness, reliability, and level of satisfaction among others (Gunasekaran & Kobu, 2020; Waters, 2020). For this reason, the proposed conceptual framework shows the practices of inventory management as determinants of the performance of pharmaceutical importers in Ethiopia. Figure 1 demonstrates the association between the independent and dependent variables.

Figure 1. Conceptual Framework of the Study



(Source: Christopher (2016) and Chopra & Meindl (2021)

CHAPTER THREE:

3. RESEARCH METHODOLOGY

This study used a research methodology intended to look into how inventory management practices impact the operational performance of privately owned pharmaceutical importing organizations operating in Addis Ababa. This methodology covers the process employed to undertake research on the main research problem, including research design, population of interest, sample size, methods of data collection, and analytical procedures used. This methodology ensures the application of the scientific approach in order to meet the objectives set.

3.1. Research Approach

A quantitative research approach was applied in the current study owing to the fact that the key purpose of this study was to develop numerical data that could be subjected to further statistical analysis. With regard to the current subject matter, the adoption of the aforementioned research approach was very appropriate since the construct investigated – inventory management – involves various measurable practices. The measures developed from those practices include record accuracy, turnover ratio, average lead time, inventory compliance rate, and forecasting error.

The reason for choosing such an approach in this particular case was associated with the need to achieve objectivity and replicability. Indeed, a qualitative research approach would allow exploring the perceptions of inventory practices among the study subjects; however, such an approach would be ineffective in demonstrating the relationships between inventory determinants and performance outcomes through statistical means. Therefore, the choice of a quantitative approach was the most appropriate strategy for establishing evidence-based conclusions about the way in which inventory practices affect operational performance among the studied population.

3.2. Research Design

An explanatory research design was applied in this study owing to the fact that the latter required testing causal relationships between the constructs involved. The explanatory approach allowed investigating the impact of the following inventory practices on performance metrics: record accuracy, inventory security, inventory turnover, supply responsiveness, storage compliance, and demand forecasting. Such an approach was chosen for several reasons. First of all, the study focused not only on exploring inventory practices but also on explaining their influence on performance

outcomes. In turn, the explanatory design provided a proper framework for conducting hypothesis testing and thus obtaining action-oriented conclusions.

Through applying an explanatory research design, the researcher will be able to make predictions on the basis of independent and dependent variables and their interaction. For instance, regression analysis may help find out whether forecasting accuracy has any significant impact on fill rate and turnover efficiency or not, whereas correlation analysis can demonstrate the degree of association between inventory security and expiration losses. Overall, thanks to this research design, it will become possible to obtain the necessary data concerning best inventory practices. From this perspective, such a design can be justified by the potential to generate evidence-based recommendations. Namely, businesses will be able to know what specific inventory function should be improved to enhance operational performance.

3.3. Target Population

The target population of this study includes management and operational employees working in the 20 best large-scale private pharmaceutical importers based in Addis Ababa, Ethiopia. There are about 360 pharmaceutical importing firms licensed in the country and 215 of which operate from Addis Ababa. However, the study purposely sampled the top 10% of these companies for the reason that these companies make up the highest share of the pharmaceutical import market regarding the quantity imported, complex supply chain operations, and diversification of the workforce. The operations of the sampled companies are thus much more representative of those carried out within the industry, and hence their impact is stronger for the performance of the entire industry. This study therefore makes more sense in practical terms as far as its contribution in improving the inventory management practices within Ethiopia's pharmaceutical industry is concerned. Etikan, Musa, and Alkassim (2016) hold that purposive sampling is suitable in cases where it is intended to sample the most influential subgroups within a population.

This study purposively sampled 20 leading pharmaceutical importers in Ethiopia, which accounted for 10% of the total number of pharmaceutical import licenses granted within the country. In line with the recommendations by Hair, Black, Babin, and Anderson (2010), a sample of between 100 and 1,000 requires that the population be about 10% of the number of respondents. It means that in this case, the accessible population would be equal to 630 employees. Selection of the enterprises mentioned above was justified by the fact that these are the largest players in the pharmaceutical

import market in Ethiopia with respect to volume, capacity and complexity. These enterprises have been responsible for more than half of all medicines imported into Ethiopia. They have well developed inventory systems and employ professionals in various departments. The importance of conducting the study among such organizations increases generalizability because industry leaders are supposed to set the benchmarks for smaller firms (Patton, 2015).

Table 1: Total population of the study (n= 630) in each import according to department.

Import	Total Employees	Procurement	Warehouse/ Inventory	Logistics	Quality Control	Finance	Customer Service
Baker General Business PLC	54	10	16	9	6	5	7
Helix Pharmaceutical and Medical Equipment Import and Distribution PLC	30	5	8	5	3	3	6
Perfit life Trading PLC	42	7	10	7	5	4	9
Fam Medicine and Medical Import	23	4	5	4	3	3	4
Date Trading S.C Import	37	7	9	6	4	4	7
Melat Pharmaceutical Import	18	3	2	3	2	2	6
Anmaw Alemu Pharmaceutical Import	29	5	5	5	3	3	8
Nared Pharmaceutical Import	31	5	5	5	4	3	9
Droga Pharma pvt.Lyd.com	83	15	22	14	9	8	15

Mount Trading PLC	27	5	4	5	3	2	8
Y.H.Y Trading PLC	31	5	9	5	4	3	5
Herdot Trading PLC	23	4	5	4	3	2	5
Merim Jemal Seid Import	15	3	3	2	2	1	4
Biniam Merhazion Import	31	5	8	5	4	3	6
Waliif Health care Share Company	30	5	10	5	3	3	4
The peak Trading PLC	22	4	6	4	2	2	4
Nabas Pharmaceutical Import	17	3	5	3	2	1	3
Reshid Yesuf Ali Medicine and Medical Device Importer	24	4	5	4	3	2	6
Yousira pharma PLC	32	6	10	5	4	3	4
Bora Drugs and medical supplies Import PLC	31	5	9	5	4	3	5
Total	630	111	156	105	73	60	125

As a result of the described method, an accessible population of 630 employees was achieved. It is sufficiently numerous to enable inferential statistics. This is confirmed by Creswell & Creswell (2018).

3.4. Sample Size Determination

Choosing a proper sample size was another important stage of the methodology. Too large samples were inefficient and impracticable, and too small ones could yield unreliable results. Given the available population consisting of about 630 employees in the 20 most active and top pharmaceutical

importers of Addis Ababa, it was not possible to include all of them in the study. Thus, the number of respondents was defined according to the popular Yamane's (1967) equation for known populations, frequently used by researchers in the social sciences. The equation takes the following form:

$$n = \frac{N}{1 + Ne^2}$$

Where:

n = required sample size;

N = known population;

e = margin of error.

The choice of Yamane's (1967 as cited by Adam, 2020) formula was justified by the simplicity of application and reliability of obtained results in terms of calculating the required sample size in the case of a finite population. The use of a 95% confidence level and 5% margin of error is acceptable practice in research in management and social sciences since it balances costs and accuracy. When substituting the values of N = 630 and e = 0.05 (margin of error representing a 95% confidence level), the following equation emerges:

$$\frac{(630)}{1+(630*0.05^2)} = 245 \text{ respondents.}$$

Consequently, a recommended sample size for the research was 245 respondents. Such a sample size allows one to find statistically accurate results without increasing resource requirements and logistical difficulties. Recognizing that organizational surveys often face non-response challenges, the calculated sample size was inflated by 20%, resulting in a final target of 294 (= 245 + (245 * 20%)) respondents. This adjustment ensured that even if some participants declined or were unavailable, the achieved sample would remain statistically adequate for analysis.

3.5. Sampling Technique

The research conducted involved the application of sampling technique combining probability and non-probability sampling. First of all, the stratified random sampling technique was used in order to identify participants. As mentioned above, the target population included both employees from the managerial positions and those without them. Moreover, the level of experience as well as involvement of a person in inventory operations was considered as well in order to provide maximum

representativeness of the sample. Therefore, participants were identified using stratified random sampling.

However, purposive sampling was also used in the course of identifying participants as it helped select participants that could provide additional expertise in the area under consideration. Participants selected using the method mentioned were experts working in the field of inventory management and those who had experience of dealing with inventory operations. The rationale for using these sampling techniques in combination was related to the necessity to balance the two approaches and ensure that both general and specific features would be taken into account.

3.6. Type and Source of Data

Primary data was the only source of information collected in order to perform data analysis. Primary data was chosen as it reflects current issues and trends related to inventory operations within an organization and allows to assess the problem properly. Using secondary data in order to evaluate inventory operations would not be correct as such data might be obsolete and would not represent the situation in Ethiopian private pharmaceutical importing firms. Therefore, use of primary data would be much better in this case.

Moreover, primary data would help measure particular aspects associated with inventory management practice. Structured questionnaires would be used to collect quantitative data necessary for analysis, whereas some documents (related to inventory management operations) would be analyzed to evaluate qualitative aspects (including record accuracy, inventory security, inventory turnover, inventory responsiveness, inventory storage, and inventory forecasting).

3.7. Data Collection Instrument

A regular questionnaire was adopted for collecting the required primary data. It involved a structured questionnaire made up of concrete and predetermined questions. All questions in the questionnaire were framed using the same language and placed in the same order.

Based on different types of literature, a questionnaire was developed to measure the influence of determinants of operational performance on inventory management effectiveness. It was divided into two parts namely; general information and study variables. General information includes respondent's gender, age, education, experience, role, and department. Study variables include independent and

dependent variables. The questionnaire contains a total of 36 questions of which 31 questions represent inventory management practice and five items reflect operational performance.

- Independent Variables – Independent variables include inventory management practices such as inventory record accuracy, inventory safety, inventory turns, supply responsiveness, storage compliance, and demand forecasting.
- Dependent Variable – Operational performance was considered the dependent variable which comprises cost efficiency, service quality, delivery reliability, and customer satisfaction.

The questionnaire was adopted from different sources including Chopra and Meindl (2016); Christopher (2016); and Gunasekaran & Kobu (2020). 5-point Likert scale-based questionnaires were used in data collection. The Likert scale ranges from 1 ("Strongly disagreed") to 5 ("Strongly agreed").

3.8. Validity Test

The validity of the research instrument became one of the key concerns while considering whether the instrument would measure the constructs reliably (Kothari, 2004). The validity of the instrument guarantees that the data collected with it is representative of the phenomenon investigated and will improve the validity of the results obtained during the research. In order to validate the effectiveness of the research instrument, it was piloted among workers at Pharmacon House PLC, the biggest pharmaceutical importer in Ethiopia. Piloting is commonly regarded as the basic component of the process of instrument validation (Creswell & Creswell, 2018).

As part of the research instrument validation procedure, 30 employees were recruited to participate in its piloting. Afterward, they were asked to provide comments about the meaning of each question and whether they considered it clear and appropriate. The participants' response proved the items to be clear and relevant; consequently, face validity of the instrument was achieved. Face validity is related to the appropriateness of the items presented to the participants as well as to their perceived relevance; therefore, participant feedback plays an important role in evaluating it (Polit & Beck, 2017).

Since the purpose of conducting the pilot test was validation, all participants did not become part of the main research sample. Moreover, consultations with research advisor and inventory management experts were held as part of the same validation process. The consultations were needed in order to

ensure content validity because reviewing by experts becomes a common practice when validating the content of questions (Boateng et al., 2018).

Thus, face validity and content validity were achieved by consulting experts and conducting a pilot test. As a result, the instrument can be regarded as credible in relation to its use in the context of Ethiopian pharmaceutical importation.

3.9. Reliability Test

Reliability calculates the consistency of the measurements, or more simply, the degree of regularity of the data acquired from repeated measurements (Hair, 2010). The reliability or internal consistency of a group of scale or test items is evaluated using Cronbach's alpha statistic (Bryman and Bell, 2013). In this regard, the data collected from the distributed questionnaire were analyzed for internal validity by Pearson Correlation Coefficient.

Table 2: Results of Reliability Test

Variables	No. of Items	Cronbach's Alpha Coefficients
Record Accuracy	5	.706
Inventory Security	5	.747
Inventory Turnover	5	.905
Supply Responsiveness	5	.730
Storage Compliance	5	.882
Demand Forecasting	6	.863
Operational Performance	5	.891

The results in Table 2 illustrate the Cronbach's alpha coefficients of each variable stated in the questionnaire. The values of Cronbach's Alpha for each field of the questionnaire and the entire questionnaire of this study were in the range of 0.706 and 0.905, significant at $p < .05$. Thus, the measuring instrument of this study can be taken as a reliable instrument, as the overall reliability was found to be .905 at $p < .05$.

3.10. Data Collection Procedure

The next activity after development of the instrument was distribution of the questionnaires as per the sampling technique explained in the above section. This was done to make data collection easier for all the participants by contacting them directly.

Having identified their offices and warehouses where they operate, they were requested for permission to conduct the survey in their premises. After getting their permission, questionnaires were then distributed to participants, who responded only if they were willing to do so. Data collection process did not interrupt their daily activities as it took place during tea times and other suitable times of the day.

Apart from distributing the questionnaires through the direct approach, participants were also contacted via emails so that they could respond to the questionnaire in their own time. Follow-ups were made frequently in order to get a response from all participants.

3.11. Method of Data Analysis

In the analysis of data collected, both descriptive and inferential statistical tests were carried out. For interpretation purposes of the data collected in the study, descriptive statistics was used for hypothesis testing and the investigation of the research questions. The inferential test was also carried out using SPSS version 26 software. The descriptive statistic is used to interpret the personal characteristics of the respondents as well as calculate mean and standard deviation for each study variable while inferential statistics would be utilized in testing of hypotheses, correlation and multi-regression analysis. Tables and graphs were used to present the results of analysis visually.

Model Specification: The study model in question would be formulated through the identification of independent and dependent variables for analysis of the research. Their relationship will be investigated using the multiple linear regression approach. The latter allows defining the relationship as well as examining the significant effect of independent variables on the dependent one. As it is already discussed, inventory management practices include record accuracy (RACC), inventory security (ISEC), inventory turnover (ITRN), supply responsiveness (SRES), storage compliance (SCOM), and demand forecasting (DFOR). On the other hand, operational performance (PERF) serves as the dependent variable. The following multi-regression analysis model formulation is used for the investigation of the relationship between the above-mentioned variables:

$$PERF = \beta_0 + \beta_1 RACC + \beta_2 ISEC + \beta_3 ITRN + \beta_4 SRES + \beta_5 SCOM + \beta_6 DFOR + e$$

Where:

- PERF = Operational Performance
- RACC = Record Accuracy
- ISEC = Inventory Security
- ITRN = Inventory Turnover
- SRES = Supply Responsiveness
- SCOM = Storage Compliance
- DFOR = Demand Forecasting
- β_0 = Constant; $\beta_{1,2,3,4,5,6}$ = Coefficients of Predictors

3.12. Ethical Considerations

Adherence to ethical principles is crucial when undertaking business research. The respondents were not obliged to write their names and were given the assurance that their answers would be processed with utmost confidentiality to maintain the anonymity of the data they provided. In the questionnaire's introduction, the study's objective was already made clear. In the questionnaire, the researcher also made an effort to avoid making any false or deceptive claims. Finally, only willing participants were given the questionnaires after receiving their full consent; those who declined were not contacted.

CHAPTER FOUR:

4. RESULT AND DISCUSSION

This chapter presents the results of the data analyses and their interpretations. The analyses were summarized under descriptive and inferential analysis. The descriptive statistics describes the demographic profile of respondents, analysis of responses in each attribute. Whereas inferential

statistics, includes scale correlation test, assumption for the linear regression model, and simple linear regression analysis

4.1. Response Rate

Table 3: Response Rate

Questionnaire	Frequency	Percentage (%)
Total distributed	294	100.0
Unreturned questionnaire	33	11.2
Returned questionnaire	261	88.8
Response errors	8	2.7
Total valid and usable returned questionnaires	253	86.1

Table 3 shows the response rate for the questionnaires issued. The questionnaire received good response with a total number of 294 questionnaires distributed to the targeted group. Out of the 294 questionnaires distributed, 261 were filled and submitted to us giving a response rate of 88.2%. This good response rate shows that the participants had an interest in the research, hence minimizing non-response bias. While the response rate is impressive, there were 33 questionnaires (11.2%) that did not get back to us. Apart from that, 8 (2.7%) questionnaires were rejected because they had incomplete information. In analyzing the missing data, less than 2% of the values were missing for each variable. After screening, the total usable questionnaires were 253, resulting in 86.1% response rate.

The high response rate (86.1%) implies that the findings are likely representative of the target population and that the risk of non-response bias is minimal. For pharmaceutical importers, this level of engagement suggests that employees perceive inventory management as a relevant and pressing organizational issue, warranting further investment in data-driven improvements. This confirms that the achieved sample size was sufficient to detect medium effects in the planned analyses, thereby ensuring methodological robustness.

Table 4: Total number of employees (n= 253) in each import according to department.

Import	Total Employees	Procurement	Warehouse/ Inventory	Logistics	Quality Control	Finance	Customer Service
Baker General Business PLC	22	4	8	4	2	2	2

Helix Pharmaceutical and Medical Equipment Import and Distribution plc	12	2	5	2	1	1	1
Perfit life Trading PLC	17	3	7	3	2	1	1
Fam Medicine and Medical Import	9	2	3	1	1	1	1
Date Trading S.C Import	15	3	6	2	2	1	1
Melat Pharmaceutical Import	7	1	3	1	1	1	0
Anmaw Alemu Pharmaceutical Import	12	2	5	2	1	1	1
Nared Pharmaceutical Import	13	2	5	2	2	1	1
Droga Pharma pvt.Lyd.com	33	6	13	5	4	3	2
Mount Trading PLC	11	2	4	2	1	1	1
Y.H.Y Trading PLC	12	2	5	2	1	1	1
Herdot Trading PLC	9	2	3	1	1	1	1
Merim Jemal Seid Import	6	1	2	1	1	1	0
Biniam Merhazion Medicine and Medical Import	12	2	5	2	1	1	1

Waliif Health care Share Company	12	2	5	2	1	1	1
The peak Trading PLC	8	2	3	1	1	1	0
Nabas Pharmaceutical Import	7	1	3	1	1	1	0
Reshid Yesuf Ali Medicine and Medical Device Importer	11	2	4	2	1	1	1
Yousira pharma PLC	13	2	5	2	2	1	1
Bora Drugs and medical supplies Import PLC	12	2	5	2	1	1	1
Total	253	45	98	42	28	22	18

4.2. General Information about the Respondents

Table 5: Demographic Characteristics of Respondents (n = 253)

Character	Category	N	(%)
Sex	Male	138	54.5
	Female	115	45.5
Age	21 – 30 years	112	44.3
	31 – 40 years	92	36.4
	41 – 50 years	41	16.2
	Above 50	8	3.2
Education	High School	0	0.0
	Diploma	0	0.0
	First Degree	201	79.4
	Master's & above	52	20.6
Department	Procurement	45	17.8
	Warehouse/Inventory	98	38.7

	Logistics	42	16.6
	Quality Control	28	11.1
	Finance	22	8.7
	Customer Service	18	7.1
Position	Manager	14	5.5
	Coordinator	18	7.1
	Supervisor	25	9.9
	Senior Officer	78	30.8
	Junior Officer	118	46.6
Service Year	1 – 5 years	142	56.1
	6 – 10 Years	85	33.6
	Above 10 Years	26	10.3

The demographic distribution in Table 4 highlights a balanced gender composition, with males (138; 54.5%) slightly outnumbering females (115; 45.5%).

Age distribution shows a predominantly young workforce, as 204 respondents (80.7%) are below 40 years: 112 (44.3%) aged 21–30 and 92 (36.4%) aged 31–40, while only 8 (3.2%) are aged above 50, reflecting limited late-career representation.

The youthful workforce implies that pharmaceutical importers have an opportunity to invest in long-term capacity building and technology adoption, as younger employees are generally more adaptable to digital tools and process innovations. However, the scarcity of experienced senior staff (only 10.3% with >10 years of service) suggests a risk of knowledge loss and may indicate retention challenges.

Educational attainment is notably high: the majority hold first degrees (201; 79.4%). Master's and above account for 52 (20.6%). This indicates a workforce that is overwhelmingly educated, aligning with the professional demands of pharmaceutical importing operations. The high educational level of respondents enhances the reliability of the survey data, as participants possess the cognitive skills to accurately interpret questionnaire items. From a managerial perspective, this educated workforce represents a valuable resource that can be leveraged for continuous improvement initiatives, provided that leadership creates an enabling environment for knowledge application.

The distribution of respondents across departments shows that the majority were drawn from Warehouse/Inventory (98; 38.7%), reflecting the central role of this unit in inventory management. The second largest group came from Procurement (45; 17.8%), underscoring its importance in sourcing and supplier management. Together, Warehouse/Inventory, Procurement, and Logistics (42; 16.6%) account for more than two-thirds of the sample, highlighting the operational intensity of the organization. Smaller proportions were represented by Quality Control (28; 11.1%), Finance (22; 8.7%), and Customer Service (18; 7.1%). This representation of core operational departments ensures that the study captures frontline perspectives on inventory practices, which are most relevant for diagnosing performance gaps. However, the under-representation of finance and customer service suggests that the study's findings may be less reflective of cross-functional integration issues, which could be explored in future research.

Position analysis reveals that junior officers (118; 46.6%) form the largest group, followed by senior officers (78; 30.8%) and supervisors (25; 9.9%). Managers account for only 14 (5.5%), indicating a broad base of early-career employees supported by a smaller leadership tier. Service years reinforce this pattern: more than half of respondents (142; 56.1%) have 1–5 years of experience, while 85 (33.6%) have 6–10 years. Only 26 (10.3%) have more than 10 years of service.

The predominance of junior and mid-level staff means that the perceptions captured in this study primarily reflect the views of operational personnel rather than strategic decision-makers. This is both a strength (ground-level reality) and a limitation (limited visibility into strategic trade-offs). Organizations should consider mentorship programs that pair junior officers with experienced staff to accelerate learning and improve retention.

4.3. Inventory Management Practices Affecting Operational Performance

This section provides a descriptive analysis of the study variables, focusing on inventory management practice and operational performance. The respondents' perspective of a vehicle is measured using statistical measures: mean and standard deviation. Based on the interpretation scale based (Best, 2005), mean scores between 1.01-1.80 indicate no influence very low influence; 1.81–2.60 low influence; 2.61–3.40 moderate influences; 3.41–4.20 high influence and from 4.21 to 5,00veryhighinfluence). Standard-deviation values emphasize the extent of discordancy in opinions, since scores > 1.000 reflect substantial difference of opinion among respondents.

4.3.1. Record Accuracy

Table 6: Description of Record Accuracy (n = 253)

Statement	Mean	STD.
Inventory records are updated in real-time	4.34	1.277
Physical stock counts match system records regularly	4.41	1.393
Data entry errors are quickly identified and corrected	3.89	1.690
Barcode scanning/RFID technology is used for tracking	4.39	1.403
Regular cycle counting is conducted to verify records	4.16	1.545
Grand Mean	**4.24**	**1.038**

The practices that promote record accuracy were generally rated positively by pharmaceutical importers. As can be seen from table 4, the grand mean was M = 4.24 (SD = 1.038). Physical count reconciliation with computerization was ranked at the top (M = 4.41, SD = 1.393). As shown by the rating, the practice was highly valued by importers since it guarantees consistency between the actual stock levels and documentation. Barcode scanning and radio frequency identification were rated almost equally high (M = 4.39, SD = 1.403) due to the significant role played by technologies in minimizing potential errors associated with manual documentation. In turn, real-time inventory updates received quite a positive rating (M = 4.34, SD = 1.277).

In terms of the least preferred practice, error identification and correction emerged at the lowest rank (M = 3.89, SD = 1.690), whereas cycle counting was the next lowest (M = 4.16, SD = 1.545). It can be concluded that importers prioritize proactive practices and technological means in favor of corrections and regular counts, although the last two are also essential for the enhancement of accuracy. On the whole, record accuracy emerged as the second most valuable aspect in inventory management practiced by Ethiopian pharmaceutical importers.

On an organizational level, the concept of record accuracy proves useful for the implementation of other effective practices, such as demand forecasting and supply responsiveness. To be accurate, reliable record keeping provides the informational basis required for successful forecasts and helps

avoid any problems that could emerge due to stock-outs or excess. Record accuracy makes it possible for organizations to follow all regulatory requirements.

4.3.2. Inventory Security

Table 7: Description of Inventory Security (n = 253)

Statement	Mean	STD.
Warehouse access is restricted to authorized personnel	3.95	1.731
Security cameras and surveillance systems are in place	2.81	1.986
FIFO/FEFO rotation is strictly followed to prevent expiry	3.38	1.922
Theft prevention measures are effective	4.14	1.554
Expiry date monitoring prevents product wastage	4.34	1.404
Grand Mean	**3.72**	**1.201**

Table 7 shows the positive perception of inventory security practices by pharmaceutical importers, with the grand mean of 3.72 (SD = 1.201). Out of all these dimensions, the most reliable security measure was expiry date monitoring (mean = 4.34, SD = 1.404) due to regulatory nature of the industry and the necessity of ensuring product integrity. Theft prevention also proved to be an important practice for protecting valuable goods (mean = 4.14, SD = 1.554), as pharmaceuticals represent an expensive commodity, which can be easily stolen from a company for personal gains. Finally, restricted warehouse access showed medium significance (mean = 3.95, SD = 1.731), indicating the importance of physical protection measures in safeguarding warehouses' integrity.

In comparison to other inventory security practices, FIFO/FEFO rotation demonstrated moderate significance (mean = 3.38, SD = 1.922), indicating the fact that although this dimension was recognized as important by organizations, implementation difficulties prevented companies from applying this approach consistently enough. On the contrary, the least reliable security measure according to the research is surveillance systems (mean = 2.81, SD = 1.986), demonstrating another potential vulnerability of firms, which rely on physical security practices instead of using technology. In accordance with agency theory, as formulated by Jensen and Meckling (1976), the lack of technology like CCTV significantly increases informational asymmetry in warehouses, making it more challenging for managers to exercise control over their employees' activities.

Overall, the results demonstrate that expiry date monitoring and theft prevention are the two main pillars of inventory security practices. At the same time, surveillance system proves to be insufficiently developed among firms.

4.3.3. Inventory Turnover

Table 8: Description of Inventory Turnover (n = 253)

Statement	Mean	STD.
Fast-moving items are identified and prioritized	3.21	1.597
Stock levels are optimized to prevent both overstocking and stock-outs	4.30	1.217
Slow-moving inventory is reviewed regularly	3.57	1.480
ABC classification is used for inventory management	3.67	1.642
Inventory turnover rate meets industry benchmarks	3.38	1.571
Grand Mean	**3.63**	**1.130**

The results shown in Table 8 above prove that inventory turnover management among pharmaceutical importers contributes to business operations at a moderate level with a grand mean score of 3.63 (SD = 1.130). Out of the individual constructs, stock level optimization had the highest value (mean = 4.30, SD = 1.217). It shows that businesses consider stock level optimization to be very important as it ensures that there is no excess or shortage of stocks in their stores. Review of slow-moving items was moderately valued (mean = 3.57, SD = 1.480) showing that the aspect is considered vital by firms. On the other hand, ABC classification received positive ratings (mean = 3.67, SD = 1.642) implying that organizations recognize the importance of categorizing stocks according to the Pareto Principle. Turnover rate benchmarking had moderately positive results (mean = 3.38, SD = 1.571) proving partial conformity to the standard. In addition, identification of fast-moving items was rated poorly (mean = 3.21, SD = 1.597).

The overall findings show that pharmaceutical importers are strong in stock level optimization and ABC classification while they perform poorly in identification of fast-moving items and review of slow-moving products. This means that they have adopted lean inventory management only partially. Poor identification of fast-moving products leads to poor customer service and increased costs while excessive slow-moving products lead to inefficiencies and losses due to expiry of the products. To mitigate the problem, managers should conduct regular reviews of slow-moving items, for example, on a quarterly basis. Disposition of excess stocks should be done using various methods such as

returning to suppliers, selling the stocks at discounted prices, donating or disposing of the products appropriately.

4.3.4. Supply Responsiveness

Table 9: Description of Supply Responsiveness (n = 253)

Statement	Mean	STD.
Lead times from international suppliers are consistently short	4.02	1.650
Customs clearance processes are efficient	4.17	1.581
Alternative suppliers are available when primary suppliers face delays	4.37	1.295
Emergency orders can be processed quickly	3.99	1.697
Supply chain disruptions are responded to promptly	4.23	1.431
Grand Mean	**4.15**	**1.173**

From the findings contained in Table 9 above, it is clear that the practices relating to supply responsiveness in the importation of pharmaceutical products have been rated highly, with a grand mean of 4.15 (SD = 1.173). The dimension that has received the highest mean score has been related to alternative suppliers, which has a mean of 4.37 (SD = 1.295). This means that the majority of firms have adopted multiple sourcing as a way of managing risk in a highly dependent import setting. Furthermore, disruption response also received a good rating (4.23, SD = 1.431). Customs clearance has been rated fairly well (mean = 4.17, SD = 1.581), while lead-time management and emergency order handling received moderately good ratings of 4.02 (SD = 1.650) and 3.99 (SD = 1.697), respectively.

It may be worth noting that the above scores are higher than the ones we had assumed that would be achieved from the firms' perspective. We had estimated that responsiveness had only been moderate and thus, had a grand mean of 3.37. From the new findings, it is now evident that the firms consider their responsiveness practices quite significant in the area of risk management and dealing with disruptions, among others.

Contingency theory is used to explain the findings above. While certain managerial practices, such as multiple sourcing, enhance supply responsiveness, the role played by other factors cannot be overlooked. These other factors mainly relate to customs procedures and port operations, which still play a key role in determining responsiveness. Firms may consider various practical approaches to

improving responsiveness including working with professional brokers, preparing the required documents beforehand, and developing good relations with customs officials.

4.3.5. Storage Compliance

Table 10: Description of Storage Compliance (n = 253)

Statement	Mean	STD.
Temperature and humidity are monitored continuously	4.18	1.471
Storage conditions meet World Health Organizations guidelines	3.05	1.938
Products are stored on proper shelving and pallets	3.97	1.600
Storage areas are clean and well-organized	3.59	1.763
Temperature monitoring equipment is calibrated regularly	4.43	1.276
Grand Mean	**3.85**	**1.133**

The scores provided in Table 10 indicate that the storage compliance practices carried out by pharmaceutical importers are significantly impactful. The grand mean of 3.85 (SD = 1.133) indicates that the dimension is essential for organizations within the industry. When considering the various dimensions, the regular calibration of temperature monitoring equipment is given the most significant value, with a mean of 4.43 (SD = 1.276). It indicates that the respondents recognize the importance of having accurate equipment to ensure effective storage conditions. Continuous temperature and humidity monitoring received high scores, as well, with a mean of 4.18 (SD = 1.471). It reflects the significance of keeping the drugs safe during the storage process. Likewise, the appropriate use of shelving and pallets (mean = 3.97, SD = 1.600) and the cleanliness and organization of storage areas (mean = 3.59, SD = 1.763) have also been valued positively. On the other hand, the compliance with WHO guidelines has received the lowest scores (mean = 3.05, SD = 1.938).

All the aforementioned scores prove that storage compliance is one of the most important aspects studied in this research. In addition, it is vital for pharmaceutical importers because of the high level of responsibility related to providing patients with medications of proper quality. From the perspective of institutional theory, the EFDA has played a critical role in shaping the behavior of organizations. Consequently, the latter complies with WHO guidelines on Good Storage Practices. Yet, the relatively low score in terms of compliance proves that firms prefer to focus on easier-to-track activities, such as maintaining accurate environmental conditions and organizing shelves.

4.3.6. Demand Forecasting

Table 11: Description of Demand Forecasting (n = 253)

Statement	Mean	STD.
Historical sales data is used for forecasting	4.23	1.393
Forecast accuracy is measured regularly	4.38	1.431
Customer demand patterns are well understood	2.59	1.953
Forecasts are updated regularly based on new information	4.30	1.485
Collaboration with customers improves forecast accuracy	3.85	1.705
Forecast errors are analyzed to improve future predictions	3.90	1.675
Grand Mean	**3.88**	**1.154**

As seen in table 11, the overall influence of the practice is high with a grand mean of 3.88 (SD = 1.154). The highest scores within the practice were awarded to forecast accuracy measure which had a mean value of 4.38 (SD = 1.431). This shows that the respondents have high levels of confidence that their organizations do a lot of monitoring and accuracy improvement. Other dimensions that scored high included forecast update process with a mean of 4.30 (SD = 1.485) and the use of historical sales data with a mean value of 4.23 (SD = 1.393). It seems that pharmaceutical importers in Ethiopia make use of evidence-based approaches to forecast demand accurately. Forecast error analysis had a mean value of 3.90 (SD = 1.675) while customer involvement had an average score of 3.85 (SD = 1.705). These moderate practices suggest that the pharmaceutical companies attempt to avoid future forecasting errors and collaborate with other parties to come up with better projections. The least scoring aspect was understanding customer demand patterns which had an average of 2.59 (SD = 1.953).

In summary, it can be noted that pharmaceutical importers in Ethiopia have adopted advanced approaches for forecasting. They have made good use of statistical techniques and have relied a lot on historical sales information to improve forecasting efficiency. Nonetheless, the poor score for demand pattern understanding demonstrates a significant sensing gap according to dynamic capabilities theory (Teece, 2007). It can therefore be concluded that the pharmaceutical firms need to strengthen their statistical skills for effective detection and analysis of demand drivers such as seasonality, outbreaks, and competition.

4.3.7. Operational Performance

Table 12: Description of Operational Performance (n = 253)

Statement	Mean	STD.
Inventory holding costs are well-managed	2.81	1.872
Stock-out frequency is low	3.92	1.519
Customer orders are fulfilled accurately	4.47	1.187
Order delivery is consistently on time	4.37	1.295
Customer satisfaction with product availability is high	3.58	1.083
Grand Mean	**3.83**	**.992**

Table 12 depicts results obtained concerning the perception of the respondents regarding operational performance due to the described inventory management practice. The overall mean of 3.81 (SD = 0.988) implies that the mentioned practice had a significant effect on respondents' business activities. Accuracy of order fulfillment is one of the most influential dimensions among those of the described construct. It was estimated at a mean score of 4.45 (SD = 1.182), which implies that the sector has reliable operational procedures. The next most important dimension, namely on-time delivery, received a mean score of 4.33 (SD = 1.289). Thus, the mentioned practice affects order delivery time. Stock-out frequency, which received a mean score of 3.95 (SD = 1.514), is another dimension of the discussed practice. Customer satisfaction received a moderate mean score of 3.56 (SD = 1.081). Finally, inventory holding costs were assessed the lowest with a mean score of 2.78 (SD = 1.868).

In particular, it appears that pharmaceutical importers demonstrate higher performance when it comes to customer-related variables such as order accuracy, timeliness, and availability of the goods. These factors play an important role in establishing a positive reputation and trust since consumers can observe whether or not they are met. In other words, operations have been built with an aim to achieve the highest level of service. Nevertheless, the relatively low mean score for the inventory holding costs management factor implies that high service levels can be sustained due to having sufficient stocks. Safety stocks represent wastage under lean manufacturing. Therefore, pharmaceutical importers can carry out an ABC analysis in order to find high value and low-frequency items. Vendor -managed inventory (VMI) with key customers can help reduce safety stocks.

4.3.8. Summary of Descriptive Analyses

Table 13: Summary of Descriptive Analyses

Domain	Mean (M)	Standard Deviation (SD)
Record Accuracy	4.24	1.038
Inventory Security	3.72	1.201
Inventory Turnover	3.63	1.130
Supply Responsiveness	4.15	1.173
Storage Compliance	3.85	1.133
Demand Forecasting	3.88	1.154
Operational Performance	3.83	0.992

The descriptive results revealed notable differences across the seven domains (table 13). Firstly, some of the strengths identified include record accuracy, which had the highest mean score (M = 4.24, SD = 1.038). This is an indication of great focus on reliability of records and avoiding errors between physical count and records. Secondly, supply responsiveness had high rating (M = 4.15, SD = 1.173). This implies a greater flexibility in sourcing products from alternative suppliers in case of difficulties. The positive aspect in terms of demand forecasting (M = 3.88, SD = 1.154) indicates the use of demand forecasting using data while storage compliance also had relatively good ratings (M = 3.85, SD = 1.133). This implies following the guidelines on storage of pharmaceuticals and conducting demand forecast, although there are weaknesses regarding demand analysis and WHO guidelines.

Operation performance was quite consistent (M = 3.83, SD = 0.992) and recorded the least variance. This means that the effects or the service delivery outcomes of such operations like order accuracy and timeliness have more uniform experience than inventory practices. The last two practices included inventory security (M = 3.72, SD = 1.201) and inventory turnover (M = 3.63, SD = 1.130). These moderate scores suggest that surveillance technology is yet to be used and also, there are problems of handling slow moving items and identification of fast movers.

In sum, it can be noted that the difference in variation in inventory practices (SD > 1.1) compared to the least variability in operational performance (SD = 0.992) indicates the fact that employees try to make things work in their own way. Hence, there is the need to improve efficiency by reducing variability in operational performance using standardized procedures and training. After

consolidation of descriptive results, the next phase is the testing of hypothesized relationships using inferential statistics.

4.4. Inferential Analysis

Inferential statistics enable the researcher to move beyond descriptive summaries and make generalizations about the broader population from the sample of 253 respondents. This section includes correlation testing, assumption diagnostics, and multiple regression analysis. While the descriptive analysis provided insights into patterns of record accuracy, inventory security, inventory turnover, supply responsiveness, storage compliance, demand forecasting and operational performance, inferential statistics allow for testing the strength, direction, and significance of relationships among these variables. It ensures that conclusions are not limited to observed tendencies but are grounded in statistically validated evidence.

4.4.1. Correlation Test

In order to test whether there exists a relationship between inventory management practices and organizational performance, the Pearson product–moment correlation coefficient technique was used. The interpretation of correlation coefficients includes that values between 0.10-0.29 show a weak relationship; values from 0.30-0.49 show a moderate relationship; and those above 0.50 show a strong relationship (Field, 2005).

Table 14: Correlation Test Results

	DFOR	ISEC	ITRN	SRES	SCOM	RACC	PERF
Demand Forecasting (DFOR)	1						
Inventory Security (ISEC)	.674**	1					
Inventory Turnover (ITRN)	.306**	.220**	1				
Supply Responsiveness (SRES)	.554**	.554**	.351**	1			
Storage Compliance (SCOM)	.493**	.501**	.454**	.696**	1		
Record Accuracy (RACC)	.865**	.575**	.239**	.522**	.490**	1	
Operational Performance (PERF)	.715**	.647**	.455**	.719**	.720**	.680**	1

**Correlation Significant at P<.05%*

The correlation analysis in table 14 further shows an especially high association between RACC and DFOR ($r = .865$, $p < .05$). It is evident that firms that are able to maintain accurate inventory records

are also able to produce accurate forecasts about the expected demand. Statistically, there is about 75% of variance in the demand forecasted that can be attributed to the record accuracy. Conceptually, it means that not only record accuracy contributes positively to organizational performance independently, but it is necessary for forecasting. Thus, it is impossible to distinguish their contribution.

Additionally, both of these practices demonstrate a significant positive correlation with the level of organizational performance (r = .680 for RACC and r = .715 for DFOR). It means that any improvement in either of these practices can be linked to improvements in organizational performance. Nevertheless, since the two practices have been identified as highly correlated, their influence on performance most likely overlaps and thus needs to be interpreted carefully. For a manager, this overlap represents a real situation: forecasting can only be done based on accurate records, which, in turn, have become strategically important.

The remaining practices of inventory management were positively correlated with organizational performance, but with different intensities. Specifically, ISEC (r = .647), SRES (r = .719), and SCOM (r = .720) show high correlation and contribute to higher organizational performance, which, again, demonstrates the importance of such practices for the operation. ITRN demonstrated a much lower positive correlation with performance (r = .306) and can be considered secondary in importance for Ethiopian pharmaceutical importers.

Overall, the obtained data demonstrate mutual reinforcement among all of the practices under analysis and their collective impact on organizational performance. At the same time, high correlation between record accuracy and forecasting can represent a specific emphasis for Ethiopian pharmaceutical importers, namely, development of record keeping is also needed in order to increase organizational performance.

4.4.2. Assumption for Regression Model Test

Prior to conducting regression analysis, the four main assumptions of ordinary least squares (OLS) regression – multicollinearity, homoscedasticity, linearity, and normality of residuals – were tested. Their results are shown below.

- **Multicollinearity Test**

Table 15: Collinearity Diagnostics

Model	Collinearity Statistics	
	Tolerance	VIF
Record Accuracy	.241	4.147
Inventory Security	.484	2.065
Inventory Turnover	.766	1.306
Supply Responsiveness	.441	2.270
Storage Compliance	.437	2.289
Demand Forecasting	.196	5.095

a. Dependent Variable: Operational Performance

The Variance Inflation Factor (VIF) values, in table 15, range from 1.306 to 5.095, while tolerance values range from 0.196 to 0.766. Although the standard cutoff for multicollinearity is VIF > 10 (or Tolerance < 0.1), some authors suggest a stricter criterion of VIF > 5 indicating moderate collinearity (O'Brien, 2007). Demand Forecasting exhibited a VIF of 5.095, indicating that approximately 80% of its variance is shared with other predictors, most notably Record Accuracy (VIF = 4.147). This moderate collinearity suggests that firms with stronger record-keeping practices also tend to implement more robust forecasting systems, making their individual contributions to operational performance statistically intertwined. While not exceeding the conventional threshold of severe multicollinearity (VIF > 10), this overlap underscores the conceptual interdependence of inventory accuracy and forecasting reliability. Other variables demonstrate VIFs < 5.

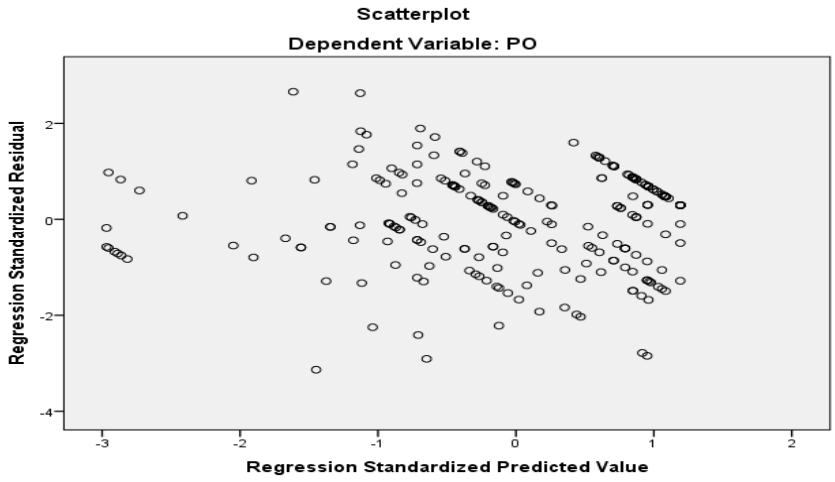
Multicollinearity is not serious enough to violate regression assumptions. Still, the moderate correlation between record accuracy and demand forecasting needs to be taken into account since coefficient estimates for these predictors would have increased standard errors, which complicates the evaluation of their statistical significance. Practically speaking, the effects of record accuracy and demand forecasting on operational performance need to be considered together. None of the variables should be eliminated, but the regression results should be interpreted considering this limitation.

- **Linearity and Homoscedasticity Test**

Linearity and homoscedasticity were tested utilizing both visualization techniques and statistical tests. It was examined employing added-variable partial regression plots for all independent variables and the RESET test. The analysis indicated that the linear regression model correctly reflects relationships between six inventory management practices and organizational performance. There is no indication

of nonlinearity, hence, estimated coefficients can be interpreted as valid indicators of linear associations between variables under study.

Figure 2. Scattered plot for Linearity and Homoscedasticity Test



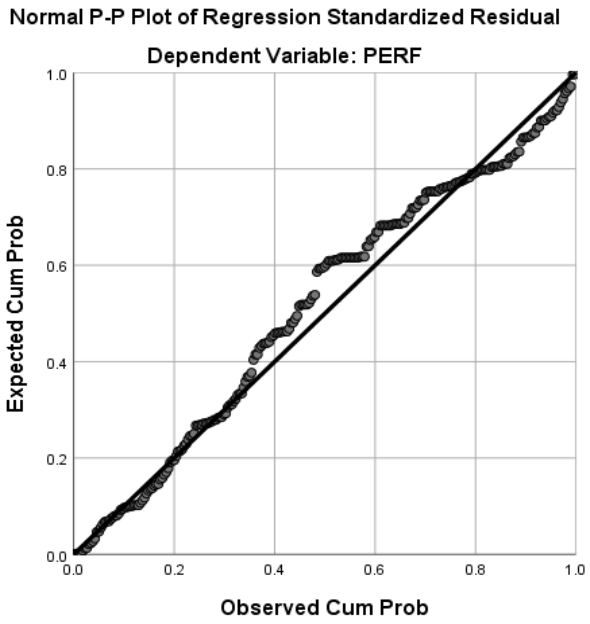


Figure 2 presents the scatter plot of standardized residuals on fitted values. Residuals are quite uniformly distributed across the horizontal axis; there is no appearance of any kind of funnel shape. Thus, visual inspection suggests that variance does not change depending on predicted values. As supplementary evidence, the Breusch-Pagan test was carried out, yielding the following result: χ^2 (6) = 8.42 with the probability level equal to 0.208 (>0.05). Therefore, the null hypothesis of constant variance cannot be rejected, thus indicating no heteroscedasticity.

In general, there are numerous implications that should be considered. Methodologically speaking, linearity and homoscedasticity ensure the validity and efficiency of OLS estimators; standard errors are accurate and, consequently, t-tests and F-tests yield reliable outcomes. Moreover, the satisfaction of assumptions increases the likelihood that the established relationship between inventory practices and performance will hold regardless of performance levels. In managerial terms, results obtained allow the use of regression outputs for policy formulation and intervention planning purposes.

(a) Visualization of residuals: The scatterplot showing the relationship between standardized residuals and fitted values revealed the presence of fairly evenly scattered dots along the horizontal line. It is important to note that the funnel pattern was not found, which would indicate increasing/decreasing variance depending on the level of predictions.

(b) Breusch-Pagan test for heteroscedasticity: The results of applying the Breusch-Pagan test showed that χ^2 (6) = 8.42; p-value = 0.208 (>0.05). Thus, the null hypothesis about constant variance was retained due to the fact that the calculated p-value did not exceed 0.05 threshold.

The fulfillment of homoscedasticity assumption implies several implications that should be considered further. Firstly, this assumption provides grounds for the effectiveness and unbiasedness of OLS regression estimators. Secondly, the lack of heteroscedasticity allows stating that standard errors are accurate, thus, hypothesis testing through t-tests/F-tests can be considered reliable. Thirdly, it contributes to making research results more generalizable because the absence of heteroscedasticity indicates the constancy of relationships between dependent/independent variables at different levels of performance. For a business, such an outcome confirms the validity of the regression results, which gives grounds for making decisions aimed at improving the performance of employees managing inventories.

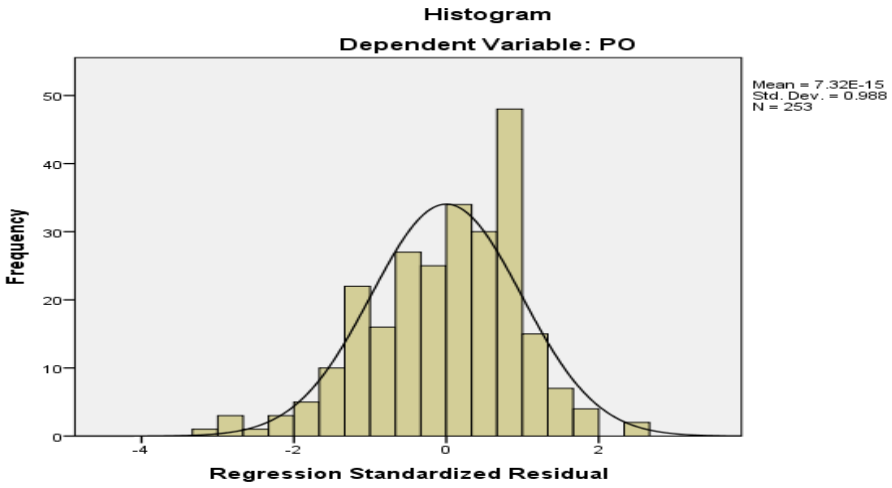
- **Normality Test**

Scores on each variable should be normally distributed. This can be checked by inspecting the histograms of scores on each variable. The residuals should be normally distributed about the predicted dependent variables scores (Pallant, 2005). One of the ways that these assumptions can be checked is by inspecting the residuals scatter plot and the Normal Probability Plot of the regression standardized residuals that were requested as part of the analysis. The most obvious way to tell if a distribution is approximately normal is to look at the histogram itself. If the graph is approximately bell-shaped and symmetric about the mean, it can usually be assumed normality.

Table 16: Histogram for Normality Test

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Record Accuracy	253	-1.468	.153	1.439	.305
Inventory Security	253	-.642	.153	-.588	.305
Inventory Turnover	253	-.528	.153	-.682	.305
Supply Responsiveness	253	-.668	.153	-.265	.305
Storage Compliance	253	-1.173	.153	.342	.305
Demand Forecasting	253	-.861	.153	-.369	.305
Operational Performance	253	-.839	.153	.478	.305
Valid N (listwise)	253				

Figure 3. Histogram graph for normality Test



Referring table 16, the analysis of normality via a histogram shows that there exists a gap in the data. The dataset is not normally distributed as a bell-shaped curve cannot be formed when plotted in a graph. The frequency distribution of the dependent variable (operational performance) is symmetrical instead of either positively or negatively skewed. Thus, the observed data of the operational performance are normally distributed.

4.4.3. Regression Analysis

Multiple regression analysis was employed to examine the extent to which inventory management practices explain variance in operational performance and to determine the relative importance of each practice. This statistical technique not only quantifies the predictive power of the overall model but also establishes the significance of each independent variable in relation to the dependent variable (Pallant, 2005).

In this study, a multiple linear regression was conducted with operational performance as the dependent variable and six inventory management practices - record accuracy, inventory security, inventory turnover, supply responsiveness, storage compliance, and demand forecasting as the independent variables. The regression output included the model summary, the ANOVA test, and the regression coefficients, each providing complementary insights into the strength and validity of the hypothesized relationships.

Table 17: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.863[a]	.744	.738	.50780

a. Predictors: (constant), RACC, ISEC, ITRN, SRES, SCOM, DFOR

Table 17 illustrates the model summary. The results show that the multiple correlation coefficient (R) is 0.863, indicating that overall inventory management practices have a positive and strong relationship with operational performance. R Squared ($R^2 = .744$) shows that inventory management practices explain 74.4% of the variance in operational performance, implying that operational performance can be predicted from the combination of record accuracy, inventory security, inventory turnover, supply responsiveness, storage compliance, and demand forecasting. The remaining 25.6% of the variance is explained by other factors not included in this study.

Compared to variance of the model (R-squared), adjusted R-square is more reliable in measuring a regression models goodness of fit. It is a modified version of R-squared that accounts for predictors that are not significant. I.e., it shows whether adding additional predictors improve a regression model or not. Whereas, the R-square value only indicates the variance in overall operational performance of pharmaceutical importers in Addis Ababa.

Table 18: ANOVA Test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	184.447	6	30.741	119.218	.000[b]
	Residual	63.433	246	.258		
	Total	247.880	252			

a. Dependent Variable: Operational Performance

From Table 18 the results of the ANOVA show that the regression model is statistically significant. This is evident from the high F-statistic value of 119.218 at $p < .05$. It shows that the variation in operational performance attributed to six inventory management practices cannot be due to luck. As such, the regression sum of squares (184.447) constitutes a large portion of the total sum of squares (247.880), while the residual sum of squares (63.433) is relatively lower. Consequently, the predictors account for most of the variation in operational performance.

The statistical significance of the ANOVA test means that the model is reliable and valid. Therefore, the inventory management practices, such as record accuracy, inventory security, inventory turnover, supply responsiveness, storage compliance, and demand forecasting, jointly influence operational performance. In this case, the study's hypothesis posits that operational performance is influenced by effective inventory practices. From a methodological point of view, the implication is that it is appropriate to conduct an analysis of the regression coefficients.

Table 19: Coefficients (Inventory Management on Operational Performance)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.030	.162		.185	.854
Record Accuracy	.160	.063	.186	2.554	.011
Inventory Security	.120	.038	.146	3.148	.002
Inventory Turnover	.114	.032	.130	3.534	.000
Supply Responsiveness	.196	.043	.223	4.600	.000
Storage Compliance	.222	.041	.262	5.378	.000
Demand Forecasting	.152	.063	.159	2.419	.016

a. Dependent Variable: Operational Performance

As can be seen from Table 17 below, the regression analysis conducted illustrates the contribution of different inventory management practices to operational performance. Overall, it should be stated that all six of the selected predictors have a statistically significant influence on operational performance ($p < 0.05$).

In particular, it was found that storage compliance has proven to be the strongest predictor in the set ($\beta = .262$, $p < .001$). This finding is especially valuable for the study because of the importance of maintaining optimal storage conditions as a means to ensure product quality and compliance. Supply responsiveness comes second ($\beta = .223$, $p < .001$). In fact, it is this practice which allows companies to respond appropriately to disruptions in the supply chain. Moreover, it also serves as an indicator of operational performance. Record accuracy has proved to contribute significantly ($\beta = .186$, $p = .011$) to operational performance and supports other practices like forecasting.

The practice of forecasting itself also has proven to make a statistically significant difference ($\beta = .159$, $p = .016$). Inventory security ($\beta = .146$, $p = .002$) and inventory turnover ($\beta = .130$, $p < .001$) have shown themselves to be comparatively weak predictors. Nevertheless, they do affect operational performance. This suggests that although measures to prevent theft, surveillance, and turnover management have some effect, they are not as important in improving operational performance as compliance and supply responsiveness in the pharmaceutical sector of Ethiopia. Thus, in terms of the unstandardized coefficients, the model expression is represented as:

PERF = .030 + .160 RACC + .120 ISEC + .114 ITRN + .196 SRES + .222 SCOM + .152 DFOR

Based on the regression analyses, all six objectives of the study were addressed. The test results of the proposed hypotheses are summarized as follows:

Table 20: Summary of the Proposed Hypotheses

Code - Alternate Hypothesis	Significance	Decision
H1 - Record accuracy has a positive and significant effect on operational performance.	$\beta = .186$, $p = .011$	Supported
H2 - Inventory security has a positive and significant effect on operational performance.	$\beta = .146$, $p = .002$	Supported
H3 - Inventory turnover has a positive and significant effect on operational performance.	$\beta = .130$, $p < .001$	Supported
H4 - Supply responsiveness has a positive and significant effect on operational performance.	$\beta = .223$, $p < .001$	Supported
H5 - Storage compliance has a positive and significant effect on operational performance.	$\beta = .262$, $p < .001$	Supported
H6 - Demand forecasting has a positive and significant effect on operational performance.	$\beta = .159$, $p = .016$	Supported

In sum, according to the findings, operational performance depends mostly on two practices, namely storage compliance and supply responsiveness. However, record accuracy and forecasting are also important for this purpose. Security and turnover have shown themselves to be relevant but secondary factors. From a manager's standpoint, it should be stated that such a hierarchy of influences will guide future actions towards improvement of the discussed processes.

4.5. Discussion of the Findings

The result indicating a moderate effect (B = .160) of the accuracy of records on performance can be explained using the RBV framework. Record accuracy is viewed as a resource since accurate records provide valuable information that allows managers to make efficient decisions regarding inventory

replenishment. As Barney (1991) puts it, competitive advantage is reached when organizations manage to develop rare and inimitable resources. In this case, inventory records are considered an intangible asset that increases coordination and performance, which corroborates with the ideas expressed by Chen (2017).

The relatively lower impact of security (B = .120) can be discussed under the Institutional Theory. Even though protection of the inventory from theft and wastage is significant for the success of the organization, it may be due to coercive pressures that force companies to implement certain practices. Indeed, Mohammad (2017) states that just security measures do not guarantee success without strategic planning. Such views are shared by Scott (2014) who argues that coercive pressures should be supported by organizational readiness.

The relatively weak effect of turnover on performance (B = .114) can be explored through the Dynamic Capabilities Theory. According to Teece et al. (1997), companies should reconfigure their resources to adjust to environmental dynamics. The efficiency of turnover depends on several factors, including demands variability, nature of goods, and organizational culture (Low, 2014). In other words, although inventory turnover represents a metric that measures the company's efficiency, the low significance in this case implies a lack of dynamic capabilities among the studied companies.

The greater effect of responsiveness (B = .196) is in line with the Supply Chain Management and Dynamic Capabilities. Responsiveness stands for a firm's capability to respond promptly to any unexpected changes. Perumal and Bakar (2011) found out that responsiveness was one of the determinants of operational success of the firms. The current results confirm that agility helps organizations achieve better performance. From the perspective of dynamic capabilities, it means that organizations can sense and seize opportunities.

Storage compliance (B = .222) shows the highest effect and thus directly supports Institutional Theory. Compliance with requirements set by WHO and other regulations is associated with coercive pressures forcing organizations to conform to standards and adopt best practices. Linda (2017) emphasized that monitoring and proactive compliance were critical for pharmaceuticals companies. In other words, the results imply that institutions serve as drivers for operational performance, which corroborates DiMaggio and Powell's ideas (1983).

Lastly, the moderate impact of forecasting (B = .152) can be justified using the RBV approach and Dynamic Capabilities. Forecasting accuracy is viewed as an organizational capability as it allows

optimizing inventory and reducing costs. Perumal and Bakar (2011) as well as Mohammad (2017) stated that successful performance could be achieved through accurate forecasting. From the perspective of RBV, forecasting represents an intangible resource whereas from the perspective of dynamic capabilities, it is viewed as forecasting abilities.

To sum up, the results expand the existing body of knowledge on the Supply Chain Management theory. They illustrate interactions of various forces that determine operational performance such as institutions (compliance), resources (forecasting, record accuracy), and dynamic capabilities

(turnover, responsiveness). Consequently, the study demonstrates that for a company to achieve high efficiency and competitiveness in the country under discussion, it should be based on three key aspects.

CHAPTER FIVE:

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter synthesizes the findings derived from the descriptive analysis and the inferential analysis. Based on the findings and insights gained from the evidence presented above, it emphasizes the importance and relative impact of inventory management on performance. In addition to discussing the managerial and theoretical implications of such findings, this chapter also provides recommendations on how to enhance inventory management performance in order to achieve optimal performance. The structure of the chapter entails an outline of the major findings, followed by conclusion, and then recommendations.

5.1. Summary of Major Findings

The synthesis of the findings in this research covers descriptive and inferential statistics for the purpose of understanding the impact of inventory management practices in determining the level of operational performance among pharmaceutical product importers based in Addis Ababa. Below are the major findings of this study.

Specific Objective 1 – The Effect of Record Accuracy on Operational Performance

- The importance of record accuracy was perceived as highly important among respondents with a grand mean score of 4.24. Real-time updates and technological tools such as Barcode/RFID

showed strong importance ratings compared to other record-related practices, with relatively less emphasis on error corrections.

- Record accuracy was positively and significantly correlated with operational performance ($r = .680$, $p < .05$) with significant regression effect ($\beta = .160$, $p = .011$). The accuracy of records is an important foundational aspect in determining operational performance as these are closely related to forecast accuracies.

Specific Objective 2 – The Effect of Inventory Security on Operational Performance

- Security practices received relatively high importance ratings (grand mean score of 3.72). Practices on theft prevention and expiry monitoring were the most preferred while surveillance technologies received the least preference.
- Inventory security had a significantly positive correlation with performance ($r = .647$, $p < .05$) with significant regression effect ($\beta = .120$, $p = .002$). Inventory security practices are important but the lack of technological monitoring causes information asymmetries leading to potential shrinkages among firms.

Specific Objective 3 – The Effect of Inventory Turnover on Operational Performance

- The practices associated with inventory turnovers had relatively lower scores with a grand mean of 3.63 with stock level optimization receiving the highest rating whereas fast-moving items had the lowest rating.
- Inventory turnovers had significant positive correlation with performance ($r = .455$, $p < .05$) with the weakest regression effect ($\beta = .114$, $p < .001$). There are effective strategies for managing the inventory levels of companies; however, there are some problems with identifying fast-moving items and slow-moving stocks.

Specific Objective 4 – The Effect of Supply Responsiveness on Operational Performance

- Supply responsiveness was viewed as having high importance with a grand mean of 4.15. Disruption response and alternative suppliers were the strongest aspects whereas lead times and emergency orders had moderate importance.
- Supply responsiveness showed strong and significant positive correlations with performance ($r = .719$, $p < .05$) with the second strongest regression effect ($\beta = .196$, $p < .001$). The firms have been

successful at adopting various supply chain responses, which can be considered as the main determinants of operational performance.

Specific Objective 5 – The Effect of Storage Compliance on Operational Performance

- Storage compliance received high importance from the respondents with a grand mean of 3.85. Practices such as calibration and temperature controls had stronger ratings than WHO compliance.
- The importance of storage compliance to performance was seen through its strong positive correlation ($r = .720$, $p < .05$) with the strongest regression effect ($\beta = .222$, $p < .001$). The compliance with regulations in the pharmaceutical business is crucial for determining operational performance; however, this does not necessarily translate to broader regulatory compliance.

Specific Objective 6 – The Effect of Demand Forecasting on Operational Performance

- Forecasting had strong importance ratings with a grand mean of 3.88. Measurement of forecast accuracy, update, and history were relatively more important than sensing customer demand trends.
- There was a strong positive correlation between forecasting practices and performance ($r = .715$, $p < .05$) with significant regression effect ($\beta = .152$, $p = .016$).
- There is an increasing trend in the adoption of forecasting practices; however, there is no sufficient analysis regarding seasonal and competitive dynamics in demand.

Overall, the six inventory management practices contributed collectively to explaining 74.4% of the variances in the operational performance ($R^2 = .744$, adjusted $R^2 = .738$, $F(6,252) = 119.218$, $p < .001$). The two most important practices included storage compliance and supply responsiveness, while the rest such as inventory turnover and security were significantly less important. The findings show that operational performance in the pharmaceutical industry is most influenced by compliance and supply responsiveness practices.

5.2. Conclusion

Inventory management is not only a practical task, but a strategic factor for organization survival and success in pharmaceutical importing operations. In developing countries, like Ethiopia, where businesses must adhere to strict regulations and rely heavily on external supply chain partners, performance in inventory management is vital not only for business efficiency, but for regulatory

compliance and patient protection. The results of this research reveal that operational performance does not emerge from single practices, but is a function of multiple mechanisms, which combined represent nearly seventy-five percent of all performance variance: storage compliance, supply responsiveness, record accuracy, demand forecasting, inventory security, and inventory turnover.

Storage compliance was found to be the most important among all investigated mechanisms, as an effect of high regulatory environment. Supply responsiveness became the second most important mechanism due to external dependency. Thus, it could be said that external adaptability and regulatory compliance outweigh internal optimization in terms of influencing performance outcomes. Record accuracy and demand forecasting had moderate impact on performance, their close connection indicating that information integrity is a necessary precursor of successful prediction. On the contrary, inventory security and inventory turnover had weak but still significant impact, indicating prioritizing compliance and responsiveness by businesses over systematic inventory turnover.

Theoretical implications are relevant in the sense of validating the use of contingency and dynamic capabilities perspectives in the case of low-income countries, proving that performance is contingent on the regulatory and environmental factors. Practical implications are related to diagnostic purposes of the conducted research, allowing managers to recognize areas where attention needs to be given first and foremost to boost performance.

In conclusion, the results clearly indicate that performance of pharmaceutical importers in terms of operational performance is positively affected by compliance, responsiveness, and information integrity, among other things. By conducting such research in the Ethiopian pharmaceutical import industry, the paper contributes to supply chain management literature significantly and serves as a good base for further studies of inventory practices in developing economies.

5.3. Recommendations

Based on the results obtained during this study, the following recommendations regarding improving inventory management practices in pharmaceutical companies are given, which can positively impact operational performance in such organizations. In particular, each of the identified practices proved to have an influence on operational performance; however, the degree of this influence varied. Therefore, the recommendations related to improving specific inventory management practices in pharmaceutical companies are outlined below.

- The improvement of record accuracy requires certain steps. As noted, record accuracy proved to be strongly correlated with the use of real-time inventory updating tools and technologies (like barcode/RIFD) along with relatively weak record correction and reconciliation practices. Therefore, firms should introduce automated record verification within ERP systems and conduct structured cycle counting. This is important as it prevents making inappropriate replenishment and demand forecasting decisions. Warehouse managers and IT departments, with procurement staff's support, should take the responsibility for ensuring accurate inventory records.
- As for inventory security, this inventory management practice was shown to be a considerable but rather weak indicator, which was related to the lack of electronic surveillance at firms. Despite effective theft prevention and expiration date control mechanisms being implemented by firms, there still remain gaps related to the lack of information about security problems due to relying only on physical means. To improve this situation, firms should install surveillance cameras in critical areas, as well as develop reporting systems. Senior management and compliance officers are responsible for installing this equipment, while warehouse supervisors are responsible for developing and enforcing a reporting system.
- Inventory turnover practices showed a moderately positive impact on firms' operational performance, although firms excel at optimizing stock levels while struggling with identifying fast-moving items and regularly checking slow-moving items. These issues may negatively affect cash flow and cause products to expire due to not selling timely. Therefore, the introduction of the review process for slow-moving products along with updating of the ABC classifications on a quarterly basis is necessary. Teams comprised of procurement, sales, and finance managers should be involved in managing this practice.
- Concerning the practices related to supply responsiveness, this practice turned out to be the second highest predictor of performance. Firms utilize several methods aimed at addressing disruptions, as well as employ multiple suppliers; however, the inconsistency of lead time and emergency order management practices still exists. To make improvements in this area, firms should develop formal strategies of supplier diversification and introduce lead time prediction tools. Procurement managers are responsible for negotiating supplier relationships, while logistics managers should implement predictive tools and handle emergency orders.

- Regarding storage compliance practices, this inventory management practice turned out to be the best predictor of performance, which is determined by the nature of pharmaceutical industry regulations. Firms focus on equipment calibration and temperature control; however, there still remain issues related to adhering to WHO guidelines on storage. Thus, automated storage monitoring systems with real-time alerts, as well as internal audits based on WHO Good Storage Practices, should be developed. QA units and compliance officers are responsible for doing so, while warehouse managers perform this task.
- Lastly, the demand forecasting practice showed strong correlations with performance. Yet, despite being a good forecasting practice, firms lack proper sensing capabilities as regards understanding demand triggers (e.g., seasonal factors, competitive environment). Therefore, investment in market intelligence systems, collaboration in demand forecasting with major clients, and development of error measurement practices are required. Demand planning teams and commercial management staff should handle these practices.

Limitations of the Study

The current research faces some limitations that affect the extent of its validity and depth of insights provided. Firstly, the research focused on Addis Ababa alone, a location known as one of the key cities for pharmaceutical product importing companies. However, there might be certain differences between Addis Ababa and other parts of Ethiopia in terms of their practices. Secondly, the factors such as cooperation with suppliers, efficient transportation, customs, and technology were not considered. This made it impossible to have a comprehensive overview of the problem under discussion. Thirdly, the use of one source and cross-sectional design increased the risk of common method bias. However, according to the results of Harman's single factor test, this limitation was not critical for the research. Finally, the lack of qualitative information and longitudinal approach does not allow capturing managerial opinions and dynamics of inventory practices.

Future Research Directions

The scope of this research could be expanded through the inclusion of other entities like regional importers and public sector agencies like the Ethiopian Pharmaceutical Supply Service (EPSS) to facilitate comparison between different institutional environments. The addition of performance

variables, which include things like expiration, stock out, and lead times, together with perceptual variables, would lend greater validity and comprehensiveness to the findings obtained from the research. Methodologically, mixed methods research design could be utilized to gather quantitative data using surveys and qualitative data by means of interview techniques with relevant stakeholders such as the customs officials and regulators, as well as suppliers. Finally, it may prove useful to examine the role played by new technology such as blockchain, Internet of Things (IoT), and demand sensing in supply chain management theory.

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Appendices

Appendix I: Survey Questionnaire

ADDIS ABABA UNIVERSITY
SCHOOL OF COMMERCE

Survey Questionnaire to be filled by Employees of Pharmaceutical Importing Companies

Dear Participant,

My name is Bamlak Azezew, a postgraduate student at the School of Commerce, Addis Ababa University. Currently, I am conducting my research entitled "EVALUATING INVENTORY MANAGEMENT PRACTICES ON OPERATIONAL PERFORMANCE: EVIDENCE FROM SELECTED PRIVATE PHARMACEUTICAL IMPORTERS IN ADDIS ABABA, ETHIOPIA". The purpose of this questionnaire is to gather the perception of employees of the selected pharmaceutical importing companies regarding how the success of their inventory operations is affected by inventory management practices. The area of this survey encompasses concepts namely record accuracy, inventory security, inventory turnover, supply responsiveness, storage compliance, and demand forecasting.

Your honest and sincere responses to this questionnaire will play a great role in making the research successful. I assure you that all the responses will be treated confidentially and only be used for academic purposes. Participation is purely voluntary and no need to write your name.

I thank you in advance for offering your golden time.

Sincerely,

Bamlak Azezew

Prospect Graduate

Addis Ababa University

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e-mail: bamlakazezew4@gmail.com

General Information

Your Participation is voluntary.

Do not write your name.

I. Demographic Profile of Respondents

Direction: Please write the necessary information on the blank space provided and, in the optional items, indicate your answer by putting a "x" mark in the box.

1. Sex: Male ☐ Female ☐
2. Age (Years): 21–30 ☐ 31–40 ☐ 41–50 ☐ >50 ☐
3. Education: High School ☐ Diploma ☐ 1st Degree ☐ Master's and above ☐
4. Department: Procurement ☐ Warehouse/Inventory ☐ Logistics ☐ Quality Control ☐ Finance ☐ Customer Service ☐ Other ☐
5. Position: Manager ☐ Coordinator ☐ Supervisor ☐ Senior Officer ☐ Junior Officer ☐
6. Tenure: 1–5 years ☐ 6–10 years ☐ >10 years ☐

Part II. Questions related to Inventory Management and Operational Performance

Please read each statement carefully and show your level of agreement by putting "X" mark in the boxes using the following 5-scale Likert scales: Strongly Agreed (SA)=5, Agreed (A)=4, Neutral (N)=3, Disagreed (D)=2, Strongly Disagreed (SD)=1

Items	1	2	3	4	5
Record Accuracy					

Inventory records are updated in real-time					
Physical stock counts match system records regularly					
Data entry errors are quickly identified and corrected					
Barcode scanning/RFID technology is used for tracking					
Regular cycle counting is conducted to verify records					
Inventory Security					
Warehouse access is restricted to authorized personnel					
Security cameras and surveillance systems are in place					
FIFO/FEFO rotation is strictly followed to prevent expiry					
Theft prevention measures are effective					
Expiry date monitoring prevents product wastage					
Inventory Turnover					
Fast-moving items are identified and prioritized					
Stock levels are optimized to prevent overstocking and stock-outs					
Slow-moving inventory is reviewed regularly					
ABC classification is used for inventory management					
Inventory turnover rate meets industry benchmarks					
Supply Responsiveness					
Lead times from international suppliers are consistently short					
Customs clearance processes are efficient					
Alternative suppliers are available when primary suppliers face delays					
Emergency orders can be processed quickly					
Supply chain disruptions are responded to promptly					
Storage Compliance					
Temperature and humidity are monitored continuously					
Storage conditions meet WHO guidelines					
Products are stored on proper shelving and pallets					
Storage areas are clean and well-organized					
Temperature monitoring equipment is calibrated regularly					
Demand Forecasting					

Historical sales data is used for forecasting					
Forecast accuracy is measured regularly					
Customer demand patterns are well understood					
Forecasts are updated regularly based on new information					
Collaboration with customers improves forecast accuracy					
Forecast errors are analyzed to improve future predictions					
Operational Performance					
Inventory holding costs are well-managed					
Stock-out frequency is low					
Customer orders are fulfilled accurately					
Order delivery is consistently on time					
Customer satisfaction with product availability is high					

END OF QUESTIONNAIRE

THANK YOU FOR YOUR PARTICIPATION!