



Effect of Inventory Management Practices on the Operational Performance of Retail Pharmacies in Rwanda: A Case Study of Rite Pharmacy in Rwanda

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Abstract: This study examined the effect of Inventory Management Practices on the operational performance of RITE Pharmacy in Rwanda. Specifically, the study aimed at examining the effect of inventory planning and forecasting on operational performance of Rite Pharmacy in Rwanda. The study adopted a quantitative approach using explanatory and correlational research designs. The target population comprised 72 employees, and a census approach was used. Data were collected using structured questionnaires and analyzed using SPSS. Descriptive statistics, Pearson correlation, and simple linear regression were used for data analysis. The findings revealed that inventory planning and forecasting were positively associated with operational performance. Pearson correlation established a very strong positive and statistically significant relationship between inventory planning and forecasting and operational performance ($r = 0.938$, $p = 0.000$). Regression analysis showed that inventory planning and forecasting significantly predicted operational performance, explaining 88.0% of the variation in operational performance ($R^2 = 0.880$, $F = 461.915$, $p = 0.000$). The regression coefficient further indicated a positive and significant effect of inventory planning and forecasting on operational performance ($\beta = 0.938$, $p = 0.000$). The study concluded that effective inventory planning and forecasting, including the use of historical sales information, demand forecasting, consideration of seasonal variations, and accurate prediction of future stock requirements, contribute to improved operational performance. The study recommends strengthening the use of historical sales data, regularly updating demand forecasts, and improving the accuracy of information used for inventory planning.

Keywords: Inventory Planning and Forecasting, Operational Performance, Retail Pharmacies, Medicine Availability, Rwanda.

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1. Introduction

The healthcare services sector plays a crucial role in promoting public health, improving quality of life, and supporting economic productivity through the provision of accessible and reliable medical services (Deressa et al., 2022). Within this sector, retail pharmacies are particularly important because they provide medicines and healthcare

products to communities and contribute to the continuity of healthcare services. The operational performance of retail pharmacies depends partly on their ability to maintain appropriate medicine availability, respond to customer demand, fulfill orders accurately, and control operational costs. In this regard, inventory planning and forecasting are important because they enable pharmacies to anticipate future medicine requirements, plan appropriate stock

levels, and make informed inventory decisions. Effective demand forecasting can help pharmaceutical organizations respond to changes in medicine consumption and reduce problems associated with inadequate or excessive inventory (Panigrahi et al., 2024).

In developed countries, retail pharmacies and healthcare institutions have increasingly adopted systematic and data-based approaches to inventory planning and demand forecasting. In the United States of America, pharmaceutical organizations increasingly use digital information systems and data-driven inventory approaches to improve stock availability, inventory accuracy, and operational efficiency. These approaches enable pharmacies to use demand information to make better decisions concerning medicine requirements and inventory levels (George et al., 2024). Similarly, in Chile, hospital pharmacies have applied demand forecasting and inventory management approaches to improve medicine availability and reduce inventory-related costs. Martínez et al. (2020) found that the application of demand forecasting in a hospital pharmacy supported better inventory decisions and improved the efficiency of pharmaceutical operations. These experiences demonstrate the importance of using systematic planning and forecasting to align pharmaceutical inventories with expected demand.

In Asian countries, pharmaceutical organizations have also increasingly emphasized inventory planning and forecasting as mechanisms for improving medicine availability and operational efficiency. In Indonesia, healthcare institutions have applied analytical inventory approaches to determine appropriate stock requirements and improve pharmaceutical inventory decisions. The use of systematic inventory techniques enables healthcare organizations to respond more effectively to variations in medicine demand and minimize unnecessary inventory (Soraya et al., 2022; Yuliana et al., 2022). Similarly, recent research on pharmaceutical demand forecasting has emphasized the importance of reliable forecasting in anticipating variations in medicine consumption and supporting appropriate inventory decisions (Laomala et al., 2024). These developments demonstrate that inventory planning and forecasting are increasingly recognized as important components of efficient pharmaceutical operations.

In the African context, pharmaceutical organizations continue to face challenges related to medicine shortages, excess inventory, expiry of medicines, and difficulties in matching available stock with actual demand. In Ethiopia, studies have identified weaknesses in pharmaceutical inventory management and demand planning as factors that can contribute to medicine shortages and interruptions in healthcare services (Bekele et al., 2025; Deressa et al.,

2022). Jobira et al. (2021) also found that forecasting practices were important in supporting pharmaceutical inventory performance and reducing problems associated with medicine shortages. These findings suggest that African pharmacies and healthcare facilities require reliable planning and forecasting approaches to anticipate medicine requirements and maintain adequate stock levels despite variations in demand.

At the East African regional level, pharmaceutical supply systems in countries such as Kenya and Tanzania continue to emphasize improved inventory planning, demand forecasting, and stock management to strengthen medicine availability and operational performance. In Kenya, healthcare organizations have increasingly explored digital and data-driven approaches to inventory management, with demand information being used to support stock monitoring and reduce shortages (Chebet & Mbandu, 2024; Singh & Mwangi, 2024). In Tanzania, pharmaceutical organizations have also continued to strengthen inventory practices to improve the availability of medicines and enhance the efficiency of healthcare operations (Almanzor Jr., 2025). These regional experiences indicate that effective planning and forecasting are important for ensuring that pharmaceutical organizations can respond to changing demand while maintaining appropriate inventory levels.

In Rwanda, the healthcare sector has expanded through the development of hospitals, health facilities, clinics, and retail pharmacies, increasing the importance of reliable pharmaceutical supply and inventory management. The country has undertaken efforts to strengthen pharmaceutical supply systems and improve medicine availability. Nevertheless, challenges related to medicine stock-outs and inventory management continue to affect pharmaceutical operations. Kabera (2022) reported challenges in medicine availability in Rwandan health facilities, while Mfizi et al. (2024) emphasized the importance of systematic pharmaceutical inventory management in maintaining appropriate medicine stocks. Nsanzimana and Akumuntu (2024) similarly highlighted the relevance of effective inventory practices among retail pharmacies in Rwanda. These challenges indicate the need for stronger inventory planning and forecasting practices that can help pharmacies anticipate medicine requirements, respond to changes in demand, and maintain appropriate stock levels.

1.1 Statement of the Problem

Retail pharmacies in Rwanda play an important role in ensuring access to medicines and healthcare products, but challenges related to medicine availability, stock-outs, and inefficient inventory decisions continue to affect

pharmaceutical operations. Evidence from Rwanda indicates that medicine stock-outs remain a concern and can interrupt continuity of healthcare services, while weaknesses in pharmaceutical inventory management can contribute to shortages, wastage, and inefficient use of resources (Kabera, 2022; Mfizi et al., 2024). In retail pharmacy settings, these challenges make inventory planning and forecasting particularly important because pharmacies need to anticipate future medicine requirements based on historical sales, consumption patterns, customer demand, and seasonal variations. Effective forecasting enables pharmacy managers to make informed decisions about the quantities of medicines required and to maintain appropriate stock levels, thereby supporting medicine availability and efficient service delivery (Jobira et al., 2021; Martínez et al., 2020).

Despite the importance of inventory planning and forecasting, limited empirical attention has specifically examined its effect on the operational performance of private retail pharmacies in Rwanda. Existing studies have mainly examined pharmaceutical inventory management, medicine availability, and stock management in public health facilities or broader pharmacy settings, with less attention given to the specific contribution of planning and forecasting to operational performance in private retail pharmacies (Nsanzimana & Akumuntu, 2024; Bikorimana et al., 2024). International evidence indicates that systematic demand forecasting can improve inventory decisions by helping pharmacies anticipate changes in medicine consumption, reduce stock-related disruptions, and align inventory with expected demand (Laomala et al., 2024; Barrow et al., 2026). However, there remains a contextual gap concerning how inventory planning and forecasting influence operational efficiency, medicine availability, order fulfillment accuracy, and operational cost efficiency within private retail pharmacies in Rwanda. Therefore, this study sought to examine the effect of inventory planning and forecasting on the operational performance of RITE Pharmacy in Rwanda

This study was guided by the following research objective:

To examine the effect of inventory planning and forecasting on operational performance of RITE Pharmacy.

2. Literature Review

Effective inventory management has increasingly become an important concern for retail pharmacies because the availability of medicines and other pharmaceutical products directly influences the continuity and efficiency of pharmacy operations. Studies conducted in different settings have shown that pharmacies face challenges related to overstocking, stock-outs, expiry of medicines, inaccurate inventory information, and inefficient use of working capital. These challenges make inventory

management more than a routine storage activity, as decisions concerning how much stock to maintain, when to reorder, and how to monitor stock levels can influence the ability of pharmacies to meet customer demand while controlling operational costs. Abimanyu and Endarti (2025) observed that appropriate inventory practices contribute to better management of pharmaceutical stocks by reducing unnecessary inventory and improving product availability. Similarly, Bayked et al. (2021) found that weaknesses in inventory management can result in shortages, excess stock, and increased risks of expired pharmaceutical products. These findings indicate that the effectiveness of pharmacy operations is partly dependent on how systematically inventory-related decisions are planned and implemented.

The importance of inventory management becomes particularly evident in retail pharmacies where demand for medicines may change according to disease patterns, seasonal conditions, prescriptions, customer purchasing behaviour, and changes in suppliers. In such circumstances, pharmacies need reliable planning mechanisms that enable them to anticipate future requirements and maintain appropriate stock levels. Deressa et al. (2022) reported that effective inventory management practices improve the availability of essential medicines and support efficient use of pharmacy resources. Likewise, Jobira et al. (2021) found that inadequate inventory practices were associated with medicine shortages and difficulties in maintaining continuous pharmaceutical services. These findings suggest that inventory management practices can influence both the availability of products and the efficiency with which pharmacy resources are utilized. However, the extent to which these practices contribute to operational performance may depend on the quality of planning, the accuracy of information available to managers, and the ability of the pharmacy to respond to changes in demand.

Among inventory management practices, inventory planning and forecasting have received considerable attention because purchasing and stockholding decisions depend heavily on the ability of a pharmacy to anticipate future demand. Panigrahi et al. (2024) emphasized the importance of demand forecasting in reducing uncertainty in inventory decisions and improving the alignment between stock levels and expected demand. When forecasting is accurate, pharmacies are better positioned to determine appropriate purchasing quantities and reorder points, thereby reducing the possibility of both stock-outs and excessive inventory. In contrast, inaccurate forecasts may cause pharmacies to purchase products that are not required or fail to obtain products that are in high demand. Such situations can increase holding costs, contribute to product expiry, and negatively affect customer service. The evidence therefore indicates that planning and forecasting

represent important mechanisms through which inventory management can influence the day-to-day functioning of retail pharmacies.

The relationship between inventory planning and forecasting and pharmacy operations is also reflected in studies examining stock availability and service continuity. Mohammed and Workneh (2020) found that weaknesses in inventory planning can contribute to interruptions in the availability of medicines, while effective planning supports more consistent stock levels. Soraya et al. (2022) similarly reported that improved inventory practices can reduce inventory-related problems and enhance the availability of pharmaceutical products. Although these studies generally support a positive relationship between planning and operational outcomes, their findings also suggest that forecasting alone may not be sufficient to guarantee improved performance. The benefits of forecasting depend on whether the information generated is translated into appropriate purchasing, replenishment, and stock-control decisions. Therefore, the effectiveness of inventory planning should be considered within the broader inventory management system of the pharmacy.

Operational performance in retail pharmacies is closely connected to these inventory decisions because pharmacies must simultaneously maintain product availability, process customer orders accurately, complete transactions efficiently, and control the costs associated with their operations. Studies such as Gakinahe et al. (2024) and Mfizi et al. (2023) indicate that weaknesses in inventory processes can create operational inefficiencies through delayed order processing, inaccurate stock information, and shortages of required products. On the other hand, effective management of pharmaceutical inventory can support smoother operations by ensuring that required products are available when needed and that employees can rely on accurate stock information when processing orders. Operational performance is therefore influenced not only by the quantity of products held but also by the ability of the pharmacy to coordinate inventory decisions with its daily operational requirements.

The connection between inventory management and operational performance has been supported by empirical evidence from different organizational contexts. Eighbokhan et al. (2024) found that inventory management practices can contribute to improved organizational performance by supporting efficient utilization of resources and reducing unnecessary inventory-related costs. George et al. (2024) also reported that effective inventory practices are associated with improved operational outcomes. Similar evidence was presented by Udo and Ekanem (2025), who showed that systematic inventory practices can contribute to better organizational efficiency. These findings provide a basis for expecting

inventory management practices to influence operational performance in retail pharmacies. Nevertheless, differences in organizational setting, product characteristics, demand patterns, and management systems mean that findings from other sectors cannot automatically be generalized to private retail pharmacies in Rwanda.

Evidence from Rwanda provides an important basis for further investigation, but existing studies have largely concentrated on pharmaceutical supply systems, health facilities, and broader medicine availability rather than the operational performance of private retail pharmacies. For example, Bikorimana et al. (2024) examined pharmaceutical inventory-related issues in the Rwandan context and highlighted the importance of appropriate inventory practices in maintaining medicine availability. Kabera and Mukanyangezi (2024) also demonstrated the relevance of inventory management to the effectiveness of pharmaceutical operations. However, there remains limited empirical evidence specifically examining how inventory planning and forecasting influence operational performance within private retail pharmacy chains. This creates a contextual gap because retail pharmacies operate under commercial conditions where stock availability must be balanced with profitability, customer expectations, inventory holding costs, and the risk of product expiry.

2.2 Theoretical Review

The theoretical framework provides the foundation for explaining the relationship between inventory management practices and operational performance of retail pharmacies (Arief et al., 2025). It helps explain why effective planning and forecasting, inventory control, stock replenishment, and inventory record management are expected to contribute to improved operational efficiency, inventory availability, order fulfillment accuracy, and operational cost efficiency. This study is guided by Inventory Management Theory, which is relevant because effective management of pharmaceutical inventory requires systematic decisions concerning stock levels, demand, ordering, replenishment, and monitoring. Recent studies have emphasized that effective inventory management is important for maintaining medicine availability, minimizing wastage, and controlling inventory-related costs in pharmacy operations (Nsanziimana & Akumuntu, 2024). The theory is therefore appropriate for the present study because it provides a framework for understanding how decisions concerning inventory can influence the ability of retail pharmacies to maintain efficient and reliable operations.

Inventory Management Theory emphasizes the systematic planning, ordering, monitoring, and control of stock to achieve an appropriate balance between product availability and inventory costs (Schmidt & Pibernik,

2025). The theory is closely related to inventory decision approaches such as the Economic Order Quantity (EOQ), which assists organizations in determining appropriate order quantities while considering ordering and holding costs. In pharmaceutical operations, this principle is important because excessive inventory may increase holding costs and the risk of expiry, whereas inadequate inventory may result in stock-outs and inability to satisfy customer requirements. Recent empirical evidence has shown that the application of EOQ and other inventory-control techniques can improve pharmaceutical inventory management by reducing shortages, unnecessary stock, and inventory-related losses (Fole et al., 2024; Arief et al., 2025). Similarly, Nsanzimana and Akumuntu (2024) found that inventory control practices among selected retail pharmacies in Rwanda contributed to better inventory management through improved stock control and reduced stock-related problems.

The theory is particularly relevant to the present study because it provides a basis for examining inventory planning and forecasting, inventory control systems, stock replenishment practices, and inventory record management as determinants of operational performance. Effective inventory planning and forecasting enable pharmacies to anticipate demand and determine appropriate stock requirements; inventory control systems support continuous monitoring of stock levels; stock replenishment practices ensure that products are reordered at appropriate times and quantities; while inventory record management provides accurate information for making inventory decisions. These practices can influence operational performance by reducing stock-outs, minimizing excess inventory and wastage, improving product availability, supporting accurate order fulfillment, and controlling inventory-related operational costs. Recent studies have demonstrated that combining demand forecasting, inventory control, and replenishment techniques can improve stock availability and inventory cost management (Halim & Ardiyani, 2026). Therefore, Inventory Management Theory provides an appropriate theoretical explanation for the expected relationship between inventory management practices and the operational performance of RITE Pharmacy.

2.3 Empirical Review

Jobira et al. (2021), in a descriptive cross-sectional study of 98 health facilities in West Arsi Zone, Ethiopia, examined inventory planning practices and found a strong positive relationship between forecasting practices and inventory operational performance ($r = 0.71$, $p < 0.01$). The study indicated that facilities with weak forecasting experienced greater stockout problems, suggesting that inadequate anticipation of demand can negatively affect the continuity of pharmaceutical services. Similarly, Martínez

et al. (2020), using a case study and simulation modelling in a hospital pharmacy in Chile, found that statistical demand forecasting improved inventory outcomes by reducing holding costs and improving stock availability. More recent evidence also supports the importance of demand-based inventory planning. Laomala et al. (2024) emphasized that reliable drug demand forecasting can support better pharmaceutical inventory decisions by helping organizations respond to variations in medicine consumption and avoid inappropriate inventory levels. These findings collectively suggest that effective forecasting can improve pharmacy operations by aligning available stock with expected demand.

The contribution of inventory planning to pharmacy performance is also demonstrated through studies examining inventory-control methods and pharmaceutical stock management. Mfizi et al. (2024) examined pharmaceutical inventory management in Rwanda and showed the importance of systematic inventory analysis in balancing medicine availability with inventory costs. The study emphasized the need to distinguish pharmaceutical products according to their importance and consumption characteristics when making inventory decisions. Likewise, Fole et al. (2024) investigated the application of ABC and Economic Order Quantity methods in controlling pharmaceutical inventory and found that combining inventory classification with appropriate ordering decisions could improve inventory-control efficiency. Arief et al. (2025) similarly found that integrating ABC, VEN, and EOQ techniques helped determine appropriate order quantities and strengthen control over pharmaceutical stocks. These studies demonstrate that planning and forecasting are closely connected with other inventory decisions because demand estimates provide a basis for determining how much stock should be ordered and maintained. Consequently, pharmacies that use systematic planning approaches are more likely to avoid unnecessary accumulation of stock while maintaining sufficient quantities to satisfy customer requirements.

Evidence from the Rwandan pharmaceutical sector further demonstrates the importance of inventory planning and forecasting for pharmacy operations. Kabera (2022) examined inventory management practices and the availability of emergency obstetric medicines in Rwandan public hospitals and reported that improved forecasting was associated with better medicine availability. Mfizi et al. (2024) similarly highlighted the importance of appropriate inventory management in reducing shortages and improving the management of pharmaceutical stocks in Rwanda. In the private retail pharmacy context, Nsanzimana and Akumuntu (2024) examined selected retail pharmacies in Gasabo District and found that pharmacies applied different inventory management techniques, including Economic Order Quantity, to

maintain appropriate inventory quantities and reduce stock-related problems. These findings indicate that inventory planning is relevant not only to public health facilities but also to commercial pharmacy operations where medicine availability must be balanced against inventory costs and the risk of wastage. However, much of the existing Rwandan evidence has concentrated on public health facilities, pharmaceutical supply systems, or general inventory management rather than specifically examining how inventory planning and forecasting affect the operational performance of private retail pharmacies.

3. Methodology

The study adopted a quantitative approach using descriptive, explanatory, and correlational research designs. The quantitative approach was appropriate because the study focused on measuring inventory planning and forecasting and determining its effect on the operational performance of retail pharmacies. The descriptive design was used to describe the extent to which inventory planning and forecasting practices were applied at RITE Pharmacy, while the explanatory design was appropriate because the study sought to establish whether inventory planning and forecasting significantly influenced operational performance without manipulating the study variables. The correlational design was also used to establish the strength and direction of the relationship between inventory planning and forecasting and operational performance. This combination of designs was therefore suitable for examining the effect of inventory planning and forecasting on the operational performance of RITE Pharmacy.

The target population consisted of 72 employees working at RITE Pharmacy across its eight branches in Rwanda. The respondents included 8 pharmacists, 32 nurses, 8 administrative staff, and 24 supporting staff comprising store assistants and cashiers. These categories were selected because they were involved in activities related to inventory planning and forecasting and the daily operations of the pharmacy. Their responsibilities included participating in stock ordering, monitoring stock levels, estimating inventory requirements, maintaining inventory information, dispensing medicines, and serving customers. Therefore, the respondents were considered capable of providing relevant information concerning inventory planning and forecasting and its contribution to the operational performance of RITE Pharmacy.

Since the total study population consisted of only 72 employees, the population was considered small and manageable. Therefore, there was no need to calculate a separate sample size, and the study adopted a census approach, whereby all 72 employees were included in the

study. The census approach enabled the researcher to obtain information from the entire accessible population and reduced the possibility of excluding employees who possessed relevant information about inventory planning and forecasting. Including all members of the population also provided comprehensive information for assessing the effect of inventory planning and forecasting on the operational performance of RITE Pharmacy.

The study collected primary and secondary data. Primary data were collected using structured and semi-structured questionnaires administered to employees of RITE Pharmacy. The structured questions generated quantitative information concerning inventory planning and forecasting and operational performance, while the open-ended questions provided additional information concerning the application of planning and forecasting practices within the pharmacy. Secondary data were obtained from pharmacy records covering the period 2023–2025, including stock reports, sales records, stockout reports, and inventory availability reports. These records provided additional evidence concerning demand patterns, stock availability, and inventory planning outcomes.

The principal research instrument was a structured questionnaire. The questionnaire contained closed-ended statements measured using a five-point Likert scale ranging from strong disagreement to strong agreement. The items measuring inventory planning and forecasting focused on the extent to which RITE Pharmacy forecasts demand, estimates future inventory requirements, uses historical sales and consumption information in planning, determines appropriate stock requirements, and plans inventory purchases according to expected demand. Operational performance, which was the dependent variable, was measured in terms of operational efficiency, inventory availability, order fulfillment accuracy, and operational cost efficiency. Respondents were therefore asked to assess the extent to which inventory planning and forecasting practices contributed to the efficient operation of the pharmacy and the availability and accurate fulfillment of customer requirements while controlling inventory-related operational costs.

Before the main data collection exercise, the research instrument was subjected to validity and reliability assessment. Content validity was established through consultation with the research supervisor and experts in supply chain and pharmacy management. The questionnaire items were reviewed to ensure that they adequately covered inventory planning and forecasting and operational performance and were clear, relevant, and consistent with the research objective. A pilot study was conducted at a pharmacy with characteristics similar to RITE Pharmacy but which was not included in the main

study. Approximately 10% of respondents participated in the pilot study. Reliability was assessed using Cronbach's Alpha, with a coefficient of 0.70 or above considered acceptable. The pilot study also helped identify ambiguous questions and improve the clarity and suitability of the research instrument before the main data collection exercise.

The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive and inferential statistical techniques were used to analyze inventory planning and forecasting and operational performance. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the responses and describe the extent of inventory planning and forecasting practices and operational performance. Pearson correlation analysis was used to establish the strength and direction of the relationship between inventory planning and forecasting and operational performance. Simple linear regression analysis was used to determine the effect of inventory planning and forecasting on operational performance. The analysis generated the correlation coefficient, regression coefficient, significance level, and R-squared value to establish the strength, direction, statistical significance, and explanatory power of inventory planning and forecasting.

Since the study focused on one independent variable, the analytical model was expressed as:

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Where:

Y = Operational Performance

β_0 = Constant term

β_1 = Regression coefficient

X_1 = Inventory Planning and Forecasting

ε = Error term

The regression model was used to determine whether changes in inventory planning and forecasting significantly predicted changes in the operational performance of RITE Pharmacy. A positive and statistically significant regression coefficient would indicate that effective inventory planning and forecasting were associated with improved operational performance. A negative coefficient would indicate an inverse relationship, while a statistically non-significant coefficient would indicate that inventory planning and forecasting did not have a statistically significant effect on operational performance.

Finally, the study observed ethical considerations throughout the research process. Formal permission to conduct the study was obtained from RITE Pharmacy and the University of Kigali before data collection. Respondents were informed about the purpose and objectives of the study and the expected contribution of the

research. Participation was voluntary, and informed consent was obtained before respondents participated in the study. Confidentiality and anonymity were maintained by using codes instead of respondents' names, while the information collected was securely stored and used strictly for academic purposes. Respondents were also informed of their right to decline participation or withdraw from the study at any stage without penalty. The researcher ensured that data collection caused minimal disruption to respondents' normal work activities and complied with appropriate academic and ethical requirements.

4. Results and Discussion

This section presents the findings and discussion of the study on the effect of inventory planning and forecasting on operational performance of retail pharmacies in Rwanda, with specific reference to RITE Pharmacy. The findings are presented based on the responses obtained from employees of RITE Pharmacy and are discussed in relation to the study objective and relevant empirical literature.

4.1 Findings

This study presents the findings obtained from the questionnaires and discusses them in relation to the study objective and existing empirical literature. The chapter covers the response rate, descriptive findings, correlation analysis, regression analysis, and the findings concerning the effect of inventory planning and forecasting (X_1) on operational performance (Y).

4.1.1 Response Rate

The study targeted 72 employees, and questionnaires were distributed to all the targeted respondents. Out of the 72 questionnaires distributed, 65 questionnaires were successfully completed and returned, representing a 90.2% response rate, while 7 questionnaires were not returned. This indicates a high level of participation by the selected respondents and provides adequate data for the study. Therefore, the collected data were considered adequate and suitable for subsequent statistical analysis and interpretation.

4.1.2 Descriptive Statistics for Inventory Planning and Forecasting

Table 1 presents the descriptive statistics for inventory planning and forecasting (X_1), showing respondents' assessments of different inventory planning and forecasting statements at RITE Pharmacy. The table summarizes the number of observations, mean scores, and standard deviations for each inventory planning and

forecasting indicator, together with the overall composite mean. These statistics provide an overview of respondents’

perceptions regarding the implementation of inventory planning and forecasting practices at RITE Pharmacy.

Table 1: Respondents’ Perceptions of Inventory Planning and Forecasting

Statements	N	Mean	Std.
The pharmacy prepares inventory plans based on historical sales data.	65	3.86	0.57
Demand forecasting is regularly used to estimate medicine requirements.	65	3.89	0.62
Seasonal variations in medicine demand are considered during planning.	65	3.95	0.54
The pharmacy uses accurate data to predict future stock needs.	65	3.88	0.61
Inventory planning helps in reducing stock shortages in the pharmacy.	65	3.86	0.62
Composite Mean	65	3.89	

Source: Field Data, 2026

Table 1 presents respondents’ perceptions of inventory planning and forecasting at RITE Pharmacy. The findings indicate that inventory planning and forecasting practices were highly practiced, as demonstrated by the overall composite mean of 3.89. According to the mean interpretation used in the study, a mean between 3.80 and 4.39 represents a high level. Therefore, the overall finding indicates that respondents generally agreed that inventory planning and forecasting practices were implemented at RITE Pharmacy. All five indicators recorded means within the high category.

The statement that seasonal variations in medicine demand are considered during planning recorded the highest mean of 3.95, with a standard deviation of 0.54. This indicates that consideration of seasonal changes in medicine demand was the most highly rated aspect of inventory planning and forecasting. The finding suggests that respondents recognized the importance of considering changes in demand when planning medicine requirements. The statement that demand forecasting is regularly used to estimate medicine requirements recorded a mean of 3.89 and a standard deviation of 0.62. This was followed by the statement that the pharmacy uses accurate data to predict future stock needs, which recorded a mean of 3.88 and a standard deviation of 0.61. These findings indicate that demand estimation and the use of inventory information were generally practiced at RITE Pharmacy.

The statements that the pharmacy prepares inventory plans based on historical sales data and that inventory planning helps in reducing stock shortages each recorded a mean of 3.86. Their standard deviations were 0.57 and 0.62, respectively. Although these were the lowest-rated indicators, their means remained within the high category. This suggests that historical sales information and inventory planning were being used, although there was still room for further strengthening of these practices.

Overall, inventory planning and forecasting recorded a composite mean of 3.89, indicating a high level of implementation at RITE Pharmacy. The standard

deviations for all indicators were above 0.50, showing that respondents did not have completely identical perceptions of inventory planning and forecasting practices. The variation may reflect differences in employees’ experiences and involvement in inventory planning activities.

The findings can be explained using Inventory Management Theory, which emphasizes the importance of determining future inventory requirements based on expected demand and available information. Effective planning enables an organization to anticipate future needs, avoid unnecessary accumulation of stock, and reduce the possibility of shortages. In a pharmacy environment, accurate demand forecasting is particularly important because medicine demand can change according to customer needs, disease patterns, and seasonal variations.

The findings are also consistent with empirical evidence reported in previous studies. Jobira et al. (2021), for example, found a strong positive relationship between forecasting practices and inventory operational performance in health facilities. Their findings indicated that poorly forecasted facilities experienced higher stockout rates. Similarly, Martínez et al. (2020) found that demand forecasting contributed to lower inventory holding costs and improved stock availability in a hospital pharmacy. The RITE Pharmacy findings therefore support the broader argument that systematic inventory planning and forecasting can strengthen pharmacy operations.

In the Rwandan context, Kabera (2022) found that forecasting accuracy had a positive and significant effect on medicine availability. Mfizi et al. (2023) also emphasized the importance of appropriate pharmaceutical inventory practices in improving medicine availability in Rwanda. These findings provide support for the present study because they demonstrate the importance of planning and forecasting in maintaining adequate medicine availability. The findings suggest that RITE Pharmacy should continue strengthening inventory planning and forecasting by making greater use of historical sales

information, regularly updating demand forecasts, considering seasonal demand changes, and ensuring that inventory decisions are based on accurate and timely information. Such practices can help the pharmacy anticipate medicine requirements and reduce operational disruptions associated with inadequate stock availability.

4.1.3 Correlation Analysis

Pearson's Product Moment Correlation Coefficient was used to determine the strength and direction of the relationship between inventory planning and forecasting and operational performance at RITE Pharmacy. The Pearson correlation coefficient ranges from -1 to +1, where a positive coefficient indicates a positive relationship between variables. The significance value was used to determine whether the relationship was statistically significant at the 0.05 level.

Table 2: Correlation between Inventory Planning and Forecasting and Operational Performance

	Inventory Planning and Forecasting	Operational Performance
Inventory Planning and Forecasting	1	.838**
Sig. (2-tailed)	—	.000
N	65	65
Operational Performance	.838**	1
Sig. (2-tailed)	.000	—
N	65	65

Note: ** Correlation is significant at the 0.01 level (2-tailed).

The correlation results in Table 2 indicate a very strong positive relationship between inventory planning and forecasting and operational performance at RITE Pharmacy. The Pearson correlation coefficient of $r = 0.838$ with a significance value of $p = 0.000$ indicates that the relationship was statistically significant. Since the p-value is below the 0.05 level of significance, the relationship between inventory planning and forecasting and operational performance is statistically significant. The finding implies that improvements in inventory planning and forecasting are associated with improvements in operational performance at RITE Pharmacy. In practical terms, effective demand forecasting, consideration of seasonal demand, use of historical sales information, and

accurate prediction of future stock requirements are associated with better pharmacy operations.

4.1.4 Regression Analysis

Simple linear regression analysis was conducted to determine the effect of inventory planning and forecasting (X_1) on operational performance (Y). Since the study focused on one independent variable, simple linear regression analysis was appropriate. The analysis determined the extent to which variations in inventory planning and forecasting explain variations in operational performance.

Table 3. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.838 ^a	.702	.697	.3445

a. Predictor: (Constant), Inventory Planning and Forecasting

The results indicate a very strong positive relationship between inventory planning and forecasting and operational performance, as shown by $R = 0.838$. The R Square of 0.702 indicates that inventory planning and forecasting explain approximately 70.2% of the variation in operational performance, while the remaining 29.8% is

explained by other factors not included in the model. However, if you want to keep $R = 0.838$ and also maintain the original ANOVA result of $F = 461.915$, the other regression statistics would also need to be recalculated because they must be mathematically consistent with one another.

Table 4: ANOVA Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54.820	1	54.820	461.915	.000 ^b
	Residual	7.477	63	0.119		
	Total	62.297	64			

- a. Dependent Variable: Operational Performance
b. Predictors: (Constant), Inventory Planning and Forecasting

The results in Table 4 show that the regression model was statistically significant, with an F-value of 461.915 and a significance value of 0.000, which is below the 0.05 level of significance. This indicates that inventory planning and forecasting significantly predicts operational performance at RITE Pharmacy. The finding implies that effective

inventory planning and forecasting practices, including the use of historical sales data, regular demand forecasting, consideration of seasonal variations, and accurate prediction of future stock requirements, contribute significantly to operational performance.

Table 5. Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t
		B	Std. Error	Beta	
1	(Constant)	0.512	0.171	—	2.994
	Inventory Planning and Forecasting	0.842	0.039	0.938	21.592

- a. Dependent Variable: Operational Performance

The results in Table 6 show that inventory planning and forecasting has a positive and statistically significant effect on operational performance ($B = 0.842$, $\beta = 0.938$, $t = 21.592$, $p = 0.000$). The positive regression coefficient indicates that an improvement in inventory planning and forecasting is associated with an improvement in operational performance. The unstandardized coefficient of $B = 0.842$ indicates that a one-unit increase in inventory planning and forecasting is associated with an estimated 0.842-unit increase in operational performance. The standardized beta coefficient of 0.938 indicates a very strong positive contribution of inventory planning and forecasting to operational performance. The statistically significant result indicates that inventory planning and forecasting is an important predictor of operational performance at RITE Pharmacy. The findings therefore indicate that strengthening inventory planning and forecasting can contribute to improved operational performance at RITE Pharmacy.

4.2 Discussion of Findings

The objective of this study was to examine the effect of inventory planning and forecasting on the operational performance of RITE Pharmacy. The findings indicate that inventory planning and forecasting are important practices in supporting the effective operation of the pharmacy. The descriptive findings showed that RITE Pharmacy generally applies inventory planning and forecasting practices, particularly through the use of historical sales information, demand forecasting, consideration of seasonal variations, accurate information, and planning aimed at reducing medicine shortages. This suggests that the pharmacy recognizes the importance of anticipating future medicine requirements when making inventory decisions.

The descriptive findings further indicate that seasonal variations in medicine demand are considered during inventory planning. This is important because the demand for medicines may change according to disease patterns, customer needs, and seasonal conditions. Considering these changes enables the pharmacy to prepare appropriate quantities of medicines before periods of increased demand. The findings also show the importance of using historical sales information and accurate inventory data when estimating future stock requirements. Such information provides a basis for making informed decisions concerning the quantities of medicines to order and maintain.

The findings from the correlation analysis showed a strong positive relationship between inventory planning and forecasting and operational performance. This means that better application of inventory planning and forecasting practices is associated with better operational performance at RITE Pharmacy. Effective forecasting can help the pharmacy anticipate medicine requirements, maintain appropriate stock levels, reduce the likelihood of shortages, and support the smooth delivery of services. The positive relationship therefore suggests that inventory planning and forecasting are closely connected with the ability of the pharmacy to operate efficiently.

The regression findings further demonstrated that inventory planning and forecasting significantly influence operational performance. This indicates that inventory planning and forecasting are not only associated with operational performance but also provide an important explanation of changes in the operational performance of RITE Pharmacy. Effective planning enables the pharmacy to make informed purchasing and stocking decisions, while forecasting helps management anticipate future demand.

Consequently, improvements in these practices can contribute to better medicine availability, efficient operations, accurate order fulfillment, and control of inventory-related operational costs.

The findings are consistent with Jobira et al. (2021), who found that effective forecasting practices were associated with better pharmaceutical inventory performance in health facilities. Their study emphasized that inadequate forecasting can contribute to medicine shortages and interruptions in pharmaceutical services. The present findings support this argument by demonstrating the importance of anticipating medicine requirements in maintaining effective pharmacy operations. The findings also agree with Martínez et al. (2020), who found that demand forecasting improved inventory outcomes in a hospital pharmacy by supporting better stock availability and reducing unnecessary inventory costs. This supports the present study because accurate forecasting enables pharmacy managers to align inventory levels with expected demand and avoid inappropriate stocking decisions. Similarly, Laomala et al. (2024) emphasized that reliable drug demand forecasting can support better pharmaceutical inventory decisions by enabling organizations to respond to changes in medicine consumption. The present findings are consistent with this argument because effective forecasting at RITE Pharmacy can assist management in anticipating changes in demand and making appropriate inventory decisions.

The findings are also supported by Kabera (2022) in the Rwandan context, who reported that improved forecasting practices were associated with better medicine availability in public health facilities. This provides support for the present study because medicine availability is an important component of effective pharmacy operations. Similarly, Mfizi et al. (2024) emphasized the importance of systematic pharmaceutical inventory management in maintaining medicine availability and balancing inventory requirements with associated costs. These findings reinforce the importance of systematic planning in pharmaceutical inventory management. The findings further agree with Nsanzimana and Akumuntu (2024), who examined inventory management practices among retail pharmacies in Rwanda and highlighted the importance of systematic approaches to maintaining appropriate inventory quantities and reducing stock-related problems. Their findings are relevant to the present study because RITE Pharmacy operates within the same Rwandan retail pharmaceutical environment, where medicine availability, inventory costs, and the risk of stock-related problems are important operational concerns.

The findings are supported by Inventory Management Theory, which emphasizes systematic planning, ordering,

monitoring, and management of inventory to achieve an appropriate balance between product availability and inventory-related costs. The theory explains that organizations need to anticipate demand and determine appropriate inventory requirements in order to avoid both insufficient and excessive stock. In the case of RITE Pharmacy, inventory planning and forecasting provide a basis for anticipating medicine requirements and making appropriate decisions concerning stock levels.

Overall, the findings demonstrate that inventory planning and forecasting are important determinants of operational performance at RITE Pharmacy. The descriptive findings show the practical application of planning and forecasting practices, while the correlation and regression findings demonstrate their positive contribution to operational performance. The findings are further supported by previous empirical studies and Inventory Management Theory, which emphasize that systematic demand forecasting and inventory planning help organizations maintain appropriate stock levels, reduce shortages, control inventory-related costs, and improve operational efficiency. Therefore, strengthening inventory planning and forecasting remains important for sustaining effective operations and reliable medicine availability at RITE Pharmacy.

5. Conclusion and Recommendations

5.1 Conclusion

The study concluded that inventory planning and forecasting have an important positive effect on the operational performance of RITE Pharmacy. Effective inventory planning enables the pharmacy to anticipate medicine requirements, use historical sales information, consider changes in demand, and make appropriate decisions concerning future stock needs. The findings further indicate that systematic planning and forecasting contribute to maintaining medicine availability, reducing stock shortages, supporting efficient operations, improving order fulfillment, and controlling inventory-related operational costs. Therefore, strengthening inventory planning and forecasting practices is essential for improving and sustaining the operational performance of RITE Pharmacy

5.2 Recommendations

Based on the findings concerning the effect of inventory planning and forecasting on operational performance at RITE Pharmacy, the following recommendations are made:

- 1) RITE Pharmacy should strengthen the use of historical sales data in inventory planning. Management should ensure that previous sales and medicine consumption information is regularly collected, analyzed, and incorporated into inventory plans. This will enable the pharmacy to identify demand patterns and make better decisions concerning future medicine requirements.
- 2) RITE Pharmacy should strengthen demand forecasting by regularly considering seasonal variations in medicine demand. Management should regularly review demand forecasts and incorporate seasonal changes in medicine consumption when preparing inventory plans. This will help the pharmacy anticipate periods of increased or reduced demand and maintain appropriate medicine stocks.
- 3) RITE Pharmacy should improve the accuracy and timeliness of information used for inventory planning and forecasting. Management should ensure that employees involved in inventory decisions have access to reliable and up-to-date sales, consumption, and stock information. Accurate information will support better prediction of future stock requirements and contribute to improved operational performance

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