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Influence of Inventory Control Systems on Supply Chain Performance of Selected Retail Pharmacies in Kicukiro District, Rwanda

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Abstract: *This study examined the effect of inventory control techniques on supply chain performance in selected retail pharmacies in Kicukiro District, Rwanda. Specifically, it examined the effect of inventory control techniques on supply chain performance. A descriptive and correlational research design was adopted using a quantitative approach. The study targeted 85 Responsible Pharmacists, from whom 83 respondents completed and returned the questionnaires. Data were collected through structured questionnaires and analyzed using SPSS. Descriptive statistics, Pearson Product Moment Correlation, and regression analysis were used for quantitative analysis. The findings revealed that inventory control techniques were highly practiced, with an overall mean of 3.80. The Pearson Product Moment Correlation analysis revealed a very strong positive and statistically significant relationship between inventory control techniques and supply chain performance ($r = .982$, $p = .000$, $N = 83$). Regression analysis further showed that inventory control techniques had a positive and statistically significant contribution to supply chain performance, with a standardized coefficient of $\beta = .759$, $t = 10.273$, $p = .000$ within the multiple-predictor regression model. The study concluded that inventory control techniques significantly contribute to supply chain performance in retail pharmacies. It recommends strengthening ABC/VEN classification, improving the application of Economic Order Quantity (EOQ), using demand-based ordering, aligning procurement with market demand, strengthening inventory monitoring, and improving the management of slow-moving medicines to enhance supply chain performance.*

Keywords: *Inventory control techniques, Supply chain performance, Retail pharmacies, Economic Order Quantity, ABC/VEN, Kicukiro District, Rwanda*

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1. Introduction

Inventory management is an important function within pharmaceutical supply chains because medicines must be available when required while unnecessary costs, wastage, expiry, and stock-outs are minimized. Effective inventory control enables pharmacies to maintain appropriate stock levels, determine suitable order quantities, monitor stock movement, and respond to changes in customer demand. According to Chopra et al. (2019) and Christopher (2016), effective inventory management contributes to efficient supply chain operations by balancing product availability with the costs associated with holding and managing inventory. In pharmaceutical organizations, this responsibility is particularly important because poor inventory decisions can affect not only organizational performance but also the availability of medicines required by patients.

At the global level, pharmaceutical supply chains operate within complex environments where demand fluctuations, procurement uncertainties, storage requirements, and financial constraints can create difficulties in maintaining optimal inventory levels. The World Health Organization

emphasizes the importance of reliable medicine availability in achieving universal health coverage. However, stock-outs and overstocking continue to represent major inventory management challenges in many healthcare systems. Stock-outs may interrupt treatment and reduce customer satisfaction, whereas overstocking can increase holding costs and the likelihood of medicines becoming obsolete or expiring. Scientific inventory control approaches such as Economic Order Quantity (EOQ), ABC analysis, and Just-in-Time (JIT) have therefore been developed and applied to improve inventory efficiency. These techniques help organizations determine appropriate quantities, prioritize important items, and reduce unnecessary inventory-related costs.

In developed economies, pharmaceutical organizations increasingly use scientific and technology-supported inventory management practices to improve operational efficiency. Techniques such as EOQ and ABC classification support evidence-based purchasing and inventory decisions, while demand-oriented approaches help organizations match stock levels with consumption patterns. Effective inventory control improves visibility of stock, supports appropriate ordering decisions, reduces excessive holding costs, and contributes to better order fulfillment. Nevertheless, differences in technological capacity and organizational practices mean that not all pharmaceutical organizations benefit equally from these approaches. Some organizations continue to depend on traditional or partially manual systems, making it difficult to maintain accurate information about inventory levels and future demand.

In Sub-Saharan Africa, pharmaceutical inventory management continues to face challenges related to logistics infrastructure, procurement systems, limited inventory visibility, demand uncertainty, and technical capacity. Ineffective inventory management can create a situation in which essential medicines are unavailable while other products remain in excess. This imbalance can increase wastage and operational costs while simultaneously affecting service delivery. The literature reviewed in the study indicates that poor inventory control is associated with difficulties in maintaining appropriate stock levels and responding to changing demand. In such environments, scientific inventory control techniques can help pharmacy managers make better decisions concerning stock classification, purchasing quantities, inventory prioritization, and cost management.

In Rwanda, considerable efforts have been made to strengthen pharmaceutical supply chain management through institutional reforms, improved procurement arrangements, and greater emphasis on accountability and efficiency. Rwanda Medical Supply (RMS Ltd.) has contributed to the professionalization and centralization of medicine procurement and distribution within the public health sector, while the Ministry of Health has emphasized pharmaceutical logistics and supply chain improvement. Despite these developments, the private retail pharmacy sector remains an important part of the final stage of medicine delivery to patients. Retail pharmacies must maintain adequate stocks while also managing financial resources, demand fluctuations, expiry risks, and customer expectations. Effective inventory control is therefore necessary to enable private pharmacies to balance medicine availability with financial and operational efficiency.

Kicukiro District provides an important setting for examining inventory control techniques because of its growing urban population, increasing healthcare demand, and concentration of private retail pharmacies. Pharmacies operating in this environment must make daily decisions concerning which medicines to stock, how much to order, when to reorder, and how to control slow-moving or high-value products. The source dissertation indicates that although scientific inventory techniques such as EOQ and ABC/VEN analysis are available, their application may vary among pharmacies. Some pharmacies may continue to rely on manual records and experience-based decisions, which may affect their ability to maintain optimal inventory levels. The need to reduce operational costs while ensuring medicine availability makes inventory control a strategic issue for pharmacies in Kicukiro District.

1.2 Statement of the Problem

Retail pharmacies play an important role in Rwanda's healthcare system because they provide medicines directly to patients and therefore represent an important link between pharmaceutical suppliers and final consumers. For these pharmacies to perform effectively, they must maintain adequate stocks of medicines while controlling the costs associated with procurement, storage, expiry, and stock management. However, ineffective inventory control can result in stock-outs of essential medicines, overstocking of slow-moving products, increased expiry, unnecessary financial commitments, and reduced customer satisfaction. These challenges can negatively affect supply chain performance because pharmacies may fail to provide medicines when required or may incur unnecessary costs in maintaining excess inventory.

The problem is particularly important in Kicukiro District because pharmacies operate in an environment

characterized by changing demand and different levels of inventory management capacity. Although techniques such as ABC/VEN classification, Economic Order Quantity, and demand-based ordering can assist pharmacies in controlling stock, their application may not be uniform across all retail pharmacies. Some pharmacies may continue to rely on manual records and experience-based ordering rather than systematic inventory analysis. Lack of standardized application of inventory control techniques may make it difficult to determine optimal stock levels, prioritize medicines according to their value or clinical importance, and prevent unnecessary investment in slow-moving stock.

Previous studies have examined pharmaceutical inventory management in Rwanda, but important gaps remain. Nsanzimana and Akumuntu (2024), for example, examined healthcare inventory management practices among selected retail pharmacies in Gasabo District, while Mfizi et al. (2023) examined pharmaceutical inventory management using ABC/VEN analysis in Nyamagabe District. These studies provide useful evidence concerning inventory management, but their geographical and institutional contexts differ from private retail pharmacies in Kicukiro District. In addition, previous studies have not sufficiently isolated the contribution of inventory control techniques to supply chain performance in this specific setting.

Therefore, a contextual and empirical gap exists concerning the effect of inventory control techniques on supply chain performance in retail pharmacies in Kicukiro District. There is a need to establish whether practices such as ABC/VEN classification, EOQ, clinical prioritization, demand-based ordering, procurement synchronization, and control of slow-moving stock are associated with improved supply chain performance. Addressing this gap can provide useful evidence for pharmacy managers, policymakers, regulators, and other stakeholders concerned with pharmaceutical supply chain efficiency. The present study therefore examined the effect of inventory control techniques on supply chain performance in selected retail pharmacies in Kicukiro District, Rwanda.

1.3 Purpose of the Study

The purpose of this study was to determine the effect of inventory control techniques on supply chain performance in retail pharmacies in Kicukiro District, Rwanda. The study focused on the application of techniques such as ABC/VEN classification, Economic Order Quantity, clinical prioritization, demand-based ordering, procurement synchronization, and control of slow-moving inventory. The study sought to establish whether effective application of these techniques contributes to improved supply chain outcomes, including medicine availability, operational efficiency, cost control, and reduction of stock-related problems.

2. Literature Review

This section reviews literature related to inventory control techniques and supply chain performance. It presents the conceptual review, theoretical framework, empirical literature, conceptual relationship, and research gap. The review focuses specifically on inventory control techniques because they constitute the independent variable addressed by the first objective. It examines how scientific inventory management practices can influence medicine availability, cost efficiency, inventory utilization, and service delivery.

2.1.1 Inventory Control Techniques

Inventory control techniques refer to systematic methods used to determine what should be stocked, how much should be ordered, when orders should be placed, and how inventory should be monitored (Geoffrey, et al., 2025). In pharmaceutical organizations, these techniques are particularly important because medicines have different levels of value, clinical importance, demand patterns, and expiry risks. Effective inventory control enables pharmacies to maintain sufficient stock while minimizing unnecessary holding costs, wastage, and stock-outs. Common techniques include ABC/VEN classification, Economic Order Quantity, Just-in-Time approaches, demand-based ordering, and stock monitoring.

Economic Order Quantity (EOQ) is a quantitative inventory technique used to determine an appropriate order quantity while balancing ordering and holding costs. In a pharmacy environment, EOQ can assist managers in deciding how much medicine should be purchased at a particular time rather than relying entirely on intuition. ABC analysis classifies medicines according to their monetary value, with high-value items receiving greater management attention. VEN analysis complements ABC classification by considering the clinical importance of medicines. Combining these approaches allows pharmacies to prioritize medicines that are both financially significant and clinically critical (Hakizimana, 2021).

Demand-based inventory control is also important because pharmacy demand can vary according to patient needs, disease patterns, seasonality, and market conditions. Ordering according to actual demand can reduce unnecessary accumulation of stock, while synchronizing procurement with market demand can help prevent overstocking. In addition, controlling slow-moving stock is

important because capital can become tied up in products that are not frequently sold. These techniques therefore provide pharmacy managers with practical mechanisms for balancing medicine availability and financial efficiency (Meltzer, et al, 2021).

2.1.2 Supply Chain Performance in the Pharmaceutical Sector

Supply chain performance refers to the effectiveness and efficiency with which products and related activities move from suppliers to final users (Christopher, 2023). In the pharmaceutical retail environment, supply chain performance is particularly important because poor performance can directly affect medicine availability and customer service. Chopra and Meindl emphasize the need to balance supply chain responsiveness with efficiency. For retail pharmacies, this means maintaining sufficient medicine availability while controlling the costs associated with procurement, storage, expiry, and inventory management.

Supply chain performance can be assessed through several indicators, including order fulfillment, inventory turnover, lead time, cost efficiency, reduction of stock-outs, reduction of wastage, and customer satisfaction (Chopra & Mender, 2019). The source study measured supply chain performance using indicators related to operational cost, prescription fulfillment, lead time, stock-outs, expired medicines, inventory turnover, medicine availability, competitive advantage, and overall inventory management effectiveness.

2.2 Theoretical Framework

This study was anchored in the Resource-Based View (RBV), which provides an important theoretical basis for explaining how internal organizational resources and capabilities can influence supply chain performance. Barney (1991) argues that organizations can achieve superior performance when they possess and effectively utilize valuable resources and capabilities. In retail pharmacies, inventory control techniques can be viewed as organizational capabilities because they involve the knowledge, procedures, systems, and managerial skills used to plan, procure, store, monitor, and replenish pharmaceutical products. These capabilities enable pharmacies to use their financial and pharmaceutical resources more efficiently. Therefore, RBV is relevant to this study because it helps explain how the effective use of inventory control capabilities can contribute to better supply chain performance in retail pharmacies (Mfizi et al., 2023).

The relevance of RBV to this study is further demonstrated through the specific inventory control techniques examined. ABC/VEN classification enables pharmacies to prioritize medicines according to their financial value and clinical importance, while Economic Order Quantity (EOQ) supports decisions concerning appropriate order quantities. Similarly, demand-based ordering and regular stock monitoring can help pharmacies avoid excessive inventory, reduce shortages, minimize expiry and wastage, and prevent unnecessary tying up of financial resources. These practices represent capabilities through which pharmacies can transform inventory resources into improved operational outcomes. Thus, the theory provides a basis for expecting that pharmacies with stronger inventory control capabilities will achieve better supply chain performance (Nsabimana, 2023).

More specifically, the study examines whether the application of inventory control techniques is associated with improved supply chain performance in retail pharmacies in Kicukiro District. The dependent variable, supply chain performance, reflects outcomes such as efficient operations, reduced operational costs, improved prescription fulfillment, shorter lead times, fewer stock-outs, reduced expiry of medicines, effective inventory turnover, and improved customer access. RBV suggests that when pharmacies develop and effectively apply inventory management capabilities, they can utilize their available resources more efficiently and achieve better operational results. Therefore, the theory directly supports the study's first specific objective, which is to determine the effect of inventory control techniques on supply chain performance in retail pharmacies in Kicukiro District.

2.3 Empirical Review

The empirical review examines previous studies that have investigated the relationship between inventory control techniques and supply chain performance, with particular attention to pharmaceutical and healthcare settings. It reviews evidence from previous researchers on practices such as ABC/VEN classification, Economic Order Quantity (EOQ), demand-based ordering, stock monitoring, and inventory level management. The review helps establish what is already known about inventory control and supply chain performance and identifies the research gap that the present study seeks to address in retail pharmacies in Kicukiro District.

2.3.1 Inventory Control Techniques and Supply Chain Performance

Nsanzimana and Akumuntu (2024) examined healthcare inventory management practices among selected retail pharmacies in Gasabo District, Rwanda. Their study found that structured inventory management practices

contributed to improved inventory outcomes, including reduction of stock-outs and better inventory management. The study also identified EOQ as an important inventory control technique. Although the study was conducted in Gasabo District rather than Kicukiro District, its findings provide relevant evidence that systematic inventory control can contribute to pharmaceutical supply chain performance. However, the geographical difference creates a contextual gap that justifies examining the issue specifically in Kicukiro District.

Mfizi et al. (2023) examined pharmaceutical inventory management using ABC/VEN analysis in Rwanda. Their study demonstrated the importance of classifying medicines according to both financial value and clinical importance. The findings showed that a relatively small proportion of high-value medicines accounted for a substantial proportion of pharmaceutical expenditure, while VEN analysis helped identify medicines requiring strict control because of their clinical importance. The study concluded that ABC/VEN analysis can support better resource allocation and medicine availability. These findings are directly relevant because ABC/VEN classification forms an important component of the inventory control techniques examined in the present study.

Hakuzimana et al. (2021) provided evidence concerning pharmaceutical inventory management in Rwanda by identifying poor forecasting and inventory practices as contributors to medicine expiry and stock-related losses. Their findings demonstrate that ineffective management of pharmaceutical inventory can negatively affect both financial performance and medicine availability. The findings support the need for structured inventory control practices capable of maintaining appropriate stock levels and reducing unnecessary accumulation of medicines. The present study extends this evidence by examining the statistical relationship between inventory control techniques and supply chain performance in private retail pharmacies in Kicukiro District.

3. Methodology

This section describes the methodology that was used to examine the effect of inventory control techniques on supply chain performance in retail pharmacies in Kicukiro District. The study adopted a cross-sectional descriptive-correlational research design using a quantitative approach. The descriptive design enabled the researcher to describe the extent to which inventory control techniques were practiced in the selected retail pharmacies, while the correlational design helped to establish the strength and direction of the relationship between inventory control techniques and supply chain performance. The quantitative approach was considered appropriate because the study collected numerical information from respondents and used statistical procedures to analyze the data and test the research hypothesis. The target population consisted of 85 Responsible Pharmacists working in 85 registered retail pharmacies in Kicukiro District. Responsible Pharmacists were selected because they are directly involved in procurement, inventory control, medicine storage, stock monitoring, and other pharmacy operations, making them knowledgeable about the study variables.

Because the target population of 85 Responsible Pharmacists was relatively small and manageable, the study adopted a census approach, whereby all members of the identified population were targeted for participation. The use of a census minimized the possibility of excluding relevant respondents and enabled the researcher to obtain information from the entire defined population. Out of the 85 questionnaires distributed, 83 completed questionnaires were returned and used for analysis, giving a response rate of 97.6%.

Data were collected using a structured questionnaire containing statements related to inventory control techniques and supply chain performance. The inventory control section covered practices such as ABC classification, Economic Order Quantity (EOQ), clinical prioritization of medicines, demand-based ordering, synchronization of procurement with market demand, reduction of operational costs, and management of slow-moving stock. Respondents provided their responses using a five-point Likert scale. Before the main data collection, the questionnaire was assessed for validity and reliability to ensure that the items appropriately measured the intended study variables and produced consistent results.

After data collection, the completed questionnaires were checked for completeness, coded, and entered into SPSS for statistical analysis. The analysis was organized according to the study objective, which focused specifically on inventory control techniques as the independent variable and supply chain performance as the dependent variable. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize respondents' perceptions concerning inventory control techniques and supply chain performance. The mean scores were interpreted using the study's five-point scale: very high (4.40–5.00), high (3.80–4.39), moderate (3.00–3.79), low (2.00–2.99), and very low (1.00–1.99). Pearson Product Moment Correlation was used to determine the strength and direction of the relationship between inventory control techniques and supply chain performance. The correlation coefficient ranges from -1 to +1, with a positive coefficient indicating a positive relationship between the variables. Statistical

significance was evaluated at the 5% significance level ($p \leq 0.05$).

Inferential analysis was also considered in assessing the contribution of inventory control techniques to supply chain performance. The original dissertation used a multiple linear regression model involving several dimensions of the inventory control system. In this revised study, however, the conceptual focus is restricted to X_1 = Inventory Control Techniques as the only independent variable. The original regression output reported an inventory control techniques coefficient of $\beta = 0.759$, $t = 10.273$, and $p = 0.000$. Because this coefficient was obtained from the original multiple-predictor regression model, it should be interpreted as the contribution of inventory control techniques after controlling for the other predictors included in that original model, rather than as a newly estimated single-predictor coefficient. Therefore, the revised study does not claim a new X_1-only regression coefficient unless the raw dataset or a dedicated SPSS regression output containing only inventory control techniques and supply chain performance is available.

The study also considered limitations and ethical considerations. The study was limited to retail pharmacies in Kicukiro District; therefore, the findings may not be directly generalizable to pharmacies located in other districts or to public healthcare institutions. In addition, the study relied mainly on questionnaire responses, which reflected respondents' perceptions and might not capture every operational aspect of inventory management. The interpretation of the regression results was also limited by the fact that the available regression output originated from the broader original model rather than a newly estimated X_1-only model. Regarding ethics, the study observed the principles of voluntary participation, informed consent, confidentiality, privacy, and responsible use of information. Respondents were informed about the purpose of the study and participated voluntarily. The information collected was used for academic purposes, while the identities of respondents and individual pharmacies were protected.

4. Research Findings and Discussion

This section presents, analyzes, and discusses the findings concerning the effect of inventory control techniques on supply chain performance in selected retail pharmacies in Kicukiro District. The presentation follows the first specific objective of the study. The findings are presented using the response rate, descriptive statistics, Pearson correlation analysis, regression evidence from the source dissertation, hypothesis testing, and discussion of findings.

4.1 Response Rate

The study targeted 85 Responsible Pharmacists from selected retail pharmacies in Kicukiro District. Out of the 85 questionnaires distributed, 83 questionnaires were completed and returned, while 2 questionnaires were not returned. This resulted in a response rate of 97.6%, with an unreturned rate of 2.4%. The high response rate provided sufficient information for conducting the statistical analysis and interpreting the findings concerning inventory control techniques and supply chain performance.

Table 1: Response rate

Response status	Frequency	Percentage (%)
Returned questionnaires	83	97.6
Unreturned questionnaires	2	2.4
Total	85	100

Source: Field data, 2026

Table 1 shows that 83 out of 85 questionnaires, representing 97.6%, were successfully completed and returned. Only 2 questionnaires (2.4%) were not returned. The response rate was therefore very high and provided a strong basis for analyzing the effect of inventory control techniques on supply chain performance in retail pharmacies in Kicukiro District.

4.2 Descriptive Statistics on Inventory Control Techniques

Respondents were asked to indicate their level of agreement with statements concerning inventory control techniques using a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree. The study classified mean scores of 4.40–5.00 as very high, 3.80–4.39 as high, 3.00–3.79 as moderate, 2.00–2.99 as low, and 1.00–1.99 as very low. Standard deviations above 0.50 indicated some heterogeneity in respondents' views.

Table 2: Level of agreement of Inventory Control Techniques

Inventory control technique statement	N	Mean	SD	Interpretation
Medicines are categorized by value (A, B and C)	83	3.8	0.57	High
Pharmacy uses EOQ to determine optimal order quantity	83	3.71	0.62	Moderate
Inventory control is prioritized according to clinical importance	83	3.83	0.6	High
Medicines are ordered in small quantities according to actual patient demand	83	3.78	0.61	Moderate
Procurement is synchronized with market demand to minimize overstocking	83	3.92	0.62	High
Inventory techniques have reduced operational costs	83	3.75	0.62	Moderate
Inventory techniques help avoid tying up cash in slow-moving stock	83	3.78	0.62	Moderate
Overall Mean	**83**	**3.8**	**—**	**High**

Source: Field data, 2026

The findings in Table 2 show that procurement synchronized with market demand to minimize overstocking recorded the highest mean score of 3.92 (SD = 0.62), interpreted as high. This indicates that respondents generally agreed that pharmacies align procurement decisions with market demand to avoid purchasing excessive quantities of medicines. Inventory control prioritized according to clinical importance also recorded a high mean of 3.83 (SD = 0.60), suggesting that pharmacies give attention to the importance of medicines when making inventory decisions. Similarly, categorization of medicines by value using A, B and C classification recorded a mean of 3.80 (SD = 0.57), also interpreted as high. These findings indicate that pharmacies use classification and demand-related techniques to support inventory decisions and improve the management of pharmaceutical stocks.

On the other hand, several inventory control techniques recorded moderate mean scores. The use of EOQ to determine optimal order quantity recorded a mean of 3.71 (SD = 0.62), while ordering medicines in small quantities according to actual patient demand recorded 3.78 (SD = 0.61). The finding on reduction of operational costs through inventory techniques recorded a mean of 3.75 (SD = 0.62), while avoiding the tying up of cash in slow-moving stock recorded 3.78 (SD = 0.62). These results suggest that although these practices were present, their application was not as strong as the higher-rated techniques. The relatively moderate score for EOQ, in particular, may indicate that some pharmacies could strengthen the systematic use of quantitative ordering methods when determining appropriate procurement quantities.

Overall, the mean score of 3.80 indicates a high level of inventory control techniques among the surveyed retail pharmacies. The standard deviations, ranging from 0.57 to 0.62, indicate relatively limited variation in respondents' views concerning the application of the different inventory control techniques. The results therefore suggest that inventory control was generally an established practice within the pharmacies, although some techniques, particularly EOQ, demand-based ordering, operational cost reduction, and management of slow-moving stock, had room for further improvement. These findings provide the descriptive basis for examining whether the observed application of inventory control techniques was associated with supply chain performance, which was the main concern of the first specific objective.

4.4 Correlation Analysis

Pearson Product Moment Correlation analysis was conducted to determine the strength and direction of the relationship between inventory control techniques and supply chain performance. A positive correlation indicates that higher levels of inventory control technique application are associated with higher levels of supply

chain performance. The statistical significance of the relationship was assessed at the 5% level of significance.

Table 2: Correlation Matrix between independent and dependent variables

Variables	Inventory Control Techniques	Supply Chain Performance
Inventory Control Techniques – Pearson Correlation	1.000	.982**
Sig. (2-tailed)	—	.000
N	83	83
Supply Chain Performance – Pearson Correlation	.982**	1.000
Sig. (2-tailed)	.000	—
N	83	83

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

The results reveal a very strong positive relationship between inventory control techniques and supply chain performance, with r = .982 and p = .000. The positive coefficient indicates that higher levels of application of inventory control techniques are associated with higher levels of supply chain performance. Since the p-value of .000 is below the 0.05 level of significance, the relationship is statistically significant. The finding therefore provides strong evidence that inventory control techniques are closely associated with supply chain performance in the selected retail pharmacies.

4.5 Regression analysis

This section presents the regression results used to assess the contribution of inventory control techniques to supply chain performance and to determine whether the first null hypothesis should be rejected or retained. The analysis focuses on the reported coefficient, significance level, and statistical decision concerning inventory control techniques (X_1).

Table 3: Coefficient Results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.086	.096		.0.899	.0372
	Functional Structure	0.731	0.071	0.759	10.273	0.000

a. Dependent Variable: Inventory Control Techniques

The results in Table 3 show that inventory control techniques had a positive and statistically significant contribution to supply chain performance. The standardized beta coefficient was β = 0.759, with a t-value of 10.273 and a significance level of p = 0.000. Since the significance value is less than 0.05, inventory control techniques significantly contributed to supply chain performance. The positive beta coefficient indicates that better application of inventory control techniques was associated with improved supply chain performance.

4.7 Discussion of Findings

The descriptive findings indicate that retail pharmacies in Kicukiro District apply different inventory control techniques in managing pharmaceutical products. These techniques include ABC classification, EOQ, clinical prioritization, demand-based ordering, procurement synchronization, and management of slow-moving stock. Their application helps pharmacies determine which medicines require greater attention, how much to order, and when to replenish stock. Effective use of these

techniques can help pharmacies maintain appropriate inventory levels, minimize unnecessary stock accumulation, reduce wastage, and make better use of available financial resources. This finding is consistent with Mfizi et al. (2023), who emphasized the importance of systematic pharmaceutical inventory management in supporting medicine availability and efficient allocation of resources.

The correlational analysis shows that inventory control techniques are positively associated with supply chain performance. This suggests that pharmacies that apply inventory control practices more effectively are more likely to experience better supply chain operations. Proper inventory control can contribute to improved medicine availability, timely fulfillment of prescriptions, reduction of stock-outs, better inventory turnover, and control of inventory-related costs. This finding is in agreement with Nsanzimana and Akumuntu (2024), who found that healthcare inventory management practices are important to the performance of selected retail pharmacies in Rwanda. The finding therefore demonstrates that inventory control is an important component of effective pharmaceutical supply chain management.

The regression analysis further indicates that inventory control techniques contribute to supply chain performance. This implies that inventory control is not only associated with supply chain performance but can also be considered an important organizational capability for improving supply chain operations. When pharmacy managers use appropriate classification, ordering, monitoring, and demand-based inventory practices, they can make more informed decisions concerning pharmaceutical resources. This interpretation is consistent with the Resource-Based View of Barney (1991), which explains that organizational capabilities can support improved performance when they are effectively developed and utilized. Therefore, inventory control capabilities can provide pharmacies with the means to improve operational efficiency and supply chain outcomes.

Overall, the findings demonstrate that effective inventory control techniques are important for supply chain performance in retail pharmacies in Kicukiro District. The descriptive analysis shows the application of inventory control practices, while the correlational and regression analyses demonstrate their importance in relation to supply chain performance. The findings are also consistent with previous pharmaceutical inventory studies in Rwanda, particularly Mfizi et al. (2023) and Nsanzimana and Akumuntu (2024). Therefore, strengthening inventory control practices can help retail pharmacies improve medicine management, resource utilization, and the overall effectiveness of their supply chain operations.

5. Conclusion and Recommendations

5.1. Conclusion

The study concludes that inventory control techniques have a positive and statistically significant relationship with supply chain performance in selected retail pharmacies in Kicukiro District. The high overall mean of demonstrates that inventory control techniques were highly practiced, while the very strong correlation coefficient of confirms a strong association between inventory control techniques and supply chain performance. The study therefore concludes that inventory control techniques should be regarded as an important organizational capability within retail pharmacies. Strengthening these practices can help pharmacies improve the utilization of financial and pharmaceutical resources, reduce unnecessary inventory costs, minimize wastage, and support medicine availability. This conclusion is also consistent with the Resource-Based View, which emphasizes the contribution of valuable organizational capabilities to improved performance.

5.3 Recommendations

Based on the findings of this study, the following recommendations were made:

1. Retail pharmacy managers should strengthen the systematic application of ABC/VEN inventory classification. Medicines should be classified according to both financial value and clinical importance so that management attention and financial resources are directed toward products that are particularly important. High-value and vital medicines should receive closer monitoring to reduce the possibility of stock-outs, while lower-value and slow-moving products should be managed carefully to avoid unnecessary accumulation.

2. Retail pharmacies should strengthen the application of Economic Order Quantity (EOQ) and demand-based ordering. Pharmacy managers should use available consumption and sales information when determining order quantities rather than relying entirely on personal experience or intuition. Appropriate order quantities can help reduce excessive inventory holding costs while maintaining sufficient stock to meet customer requirements.

3. Pharmacies should strengthen procurement planning by synchronizing purchasing decisions with actual market demand. The finding that procurement synchronization received the highest level of agreement indicates that this practice is already recognized as important. Managers should nevertheless continue improving demand analysis and procurement planning to minimize overstocking, reduce expiry, and ensure that available financial resources are used efficiently.
4. Retail pharmacy managers should establish regular procedures for identifying and managing slow-moving medicines. Regular review of inventory movement can help managers identify products in which capital is unnecessarily tied up. Appropriate purchasing decisions, stock monitoring, and timely management of slow-moving products can reduce financial losses and improve inventory turnover.

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