



Effect of Inventory Management Practices on the Organizational Performance of Public Institutions in Rwanda: A Case of Rwanda Medical Supply

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Abstract: This study examined the effect of inventory management practices on the organizational performance of Rwanda Medical Supply. The study focused on demand forecasting practices and their contribution to organizational performance. A descriptive and explanatory research design was adopted using a quantitative approach. The target population comprised 120 employees of Rwanda Medical Supply, and census sampling was used. Primary data were collected using structured questionnaires, while secondary data were obtained through documentary review. Data were analyzed using descriptive statistics, Pearson Product Moment Correlation, and regression analysis. The findings indicated that demand forecasting practices were generally applied at a high level, particularly through the use of historical consumption data and consideration of seasonal and service demand patterns. Pearson correlation analysis revealed a strong and statistically significant positive relationship between demand forecasting practices and organizational performance ($r = 0.710$, $p < 0.01$). Regression analysis showed that demand forecasting practices explained 50.4% of the variation in organizational performance ($R^2 = 0.504$), while the effect was statistically significant ($B = 0.760$, $p < 0.001$). The study concluded that effective demand forecasting contributes to improved inventory planning, stock availability, resource utilization, and organizational performance. It recommends strengthening forecasting tools, regularly reviewing and updating demand forecasts, and monitoring forecasting accuracy to support effective inventory management and service delivery.

Keywords: Inventory Management Practices, Demand Forecasting, Organizational Performance, Medical Supplies, Rwanda Medical Supply

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1. Introduction

Globally, effective inventory management has become an important component of organizational performance because organizations depend on the availability of materials, products, and other resources to maintain continuous operations. Inventory management involves planning, controlling, and monitoring stock to ensure that the right quantities are available at the right time while

minimizing unnecessary holding and ordering costs. In many organizations, demand forecasting supports inventory decisions by helping managers estimate future requirements and plan procurement and replenishment activities. Accurate forecasting can reduce stock-outs and excessive inventories, thereby contributing to more efficient use of organizational resources. Babai, Dai, Li, Syntetos, and Wang (2022) emphasize the importance of forecasting demand and lead-time requirements in

improving inventory decisions, while Mohamed (2024) links effective inventory management practices with improved organizational performance.

The relationship between inventory management and organizational performance can also be understood through different inventory management approaches. Demand forecasting enables organizations to anticipate future requirements and determine appropriate stock levels, while effective replenishment ensures that supplies are available when required. Maintaining appropriate safety stock can further protect organizations against unexpected changes in demand and delays in supply. Babai et al. (2022) demonstrate the importance of forecasting lead-time demand when determining appropriate safety stock levels. Similarly, Babai et al. (2013) show that demand forecasting has implications for inventory performance and supply chain operations. The Theory of Constraints also provides a useful perspective by explaining that organizational performance can be affected when bottlenecks restrict the flow of resources and activities. Goldratt and Cox (2016) argue that identifying and addressing constraints can improve the overall performance of an organization. Therefore, effective inventory management is not only concerned with maintaining stock but also with ensuring that inventory flows efficiently through organizational processes.

In Africa, inventory management remains a significant challenge for many organizations, particularly public institutions that operate under financial, logistical, and administrative constraints. Inadequate forecasting, weak inventory control, poor replenishment practices, and inappropriate stock levels can result in stock-outs, overstocking, wastage, and delays in service delivery. Achevi, Juma, and Otinga (2021) reported that weaknesses in inventory management can affect the operational performance of organizations, while Doborjginidze et al. (2021) similarly associated inventory management practices with organizational performance. Such challenges can be more serious in public institutions because their activities often depend on the timely availability of essential goods and materials. When inventory is poorly managed, organizations may experience interruptions in their operations, increased costs associated with excess stock, and difficulties in meeting the needs of their users. Consequently, improving inventory management practices remains important for strengthening organizational performance in African public institutions.

In Rwanda, inventory management is especially important in public institutions responsible for supplying essential goods and services. The effectiveness of public-sector operations can be affected by the availability, accuracy, and timely movement of materials and supplies. In the

health sector, effective inventory management is necessary to support the availability of medicines and other medical products across different levels of the health system. Rwanda Medical Supply plays an important role in the procurement, storage, and distribution of medical supplies to health facilities. However, challenges associated with stock-outs, expiry of medicines, and inventory information can affect the efficiency of supply operations. Recent evidence on Rwanda Medical Supply indicates that electronic logistics management information systems can support the management of medicine expiries and stock-outs, demonstrating the importance of accurate and timely inventory information in medical supply operations (Niyomugaba et al., 2026). Therefore, strengthening inventory management practices remains relevant to improving the operational effectiveness of public health supply institutions in Rwanda.

Within this context, Rwanda Medical Supply provides an appropriate case for examining the effect of inventory management practices on organizational performance. The study specifically focuses on demand forecasting, replenishment practices, and safety stock management as inventory management practices and examines their relationship with organizational performance. Effective demand forecasting can help Rwanda Medical Supply anticipate requirements and plan procurement and distribution activities, while appropriate replenishment practices can help ensure that supplies are ordered and delivered at the required time. Safety stock management can provide protection against unexpected increases in demand and delays in supply. These practices are therefore expected to influence the ability of Rwanda Medical Supply to maintain smooth operations, control costs, minimize stock-related disruptions, and support effective service delivery. Examining these relationships provides an opportunity to determine how inventory management practices contribute to the organizational performance of Rwanda Medical Supply and to generate evidence that can support improvements in public-sector inventory management in Rwanda.

1.2 Statement of the Problem

Effective demand forecasting is important for organizational performance because it enables institutions to estimate future inventory requirements, plan procurement, allocate resources, and maintain adequate stock levels. However, inaccurate or poorly managed demand forecasting can result in stock-outs, overstocking, product expiry, unnecessary inventory costs, and interruptions in service delivery. These challenges may reduce operational efficiency and affect the ability of organizations to achieve their planned objectives. Previous studies have established that demand forecasting is important for inventory performance and organizational

operations, particularly where demand is uncertain and the availability of supplies is essential (Babai et al., 2013; Achevi et al., 2021; Doborjginidze et al., 2021). Therefore, organizations require reliable forecasting practices based on accurate consumption data, changing demand patterns, appropriate forecasting tools, and regular review of forecasts to support improved organizational performance.

The problem is particularly relevant to Rwanda Medical Supply, which is responsible for the procurement, storage, and distribution of medical supplies to health facilities in Rwanda. The effectiveness of these activities depends partly on the institution's ability to accurately anticipate future demand for medical products. However, challenges related to stock-outs, medicine expiry, and the availability and quality of inventory information remain important concerns in medical supply operations. Evidence from Rwanda Medical Supply indicates that logistics management information systems can support the management of medicine expiries and stock-outs, while weaknesses in data quality, system interoperability, staff capacity, and inventory information can constrain forecasting and decision-making (Niyomugaba et al., 2026). Although previous studies have examined demand forecasting and inventory performance in different settings, including public institutions, manufacturing organizations, and healthcare supply chains, their findings provide limited institution-specific evidence on the extent to which demand forecasting practices affect organizational performance at Rwanda Medical Supply (Kwambai & Nyang'au, 2020; Maniraguha & Irechukwu, 2022; Rostami-Tabar et al., 2022).

The research gap therefore lies in the limited empirical evidence specifically establishing the effect of demand forecasting practices on the organizational performance of Rwanda Medical Supply. Existing studies have largely examined forecasting in broader inventory-management contexts or in organizations outside the specific public medical supply environment of Rwanda, leaving insufficient evidence on how forecasting practices such as the use of historical consumption data, consideration of seasonal and service demand patterns, use of forecasting tools, regular updating of forecasts, and monitoring of forecasting accuracy contribute to organizational performance at Rwanda Medical Supply. This study therefore seeks to address this gap by evaluating the effect of demand forecasting practices on the organizational performance of Rwanda Medical Supply. The findings are expected to provide evidence that can support improvements in forecasting accuracy, inventory planning, stock availability, resource utilization, operational efficiency, and service delivery.

This study sought to achieve the following research objective:

To evaluate the effect of demand forecasting practices on the organizational performance of Rwanda Medical Supply

2. Literature Review

2.1 Demand Forecasting Practices

Demand forecasting practices refer to the systematic processes used by organizations to estimate the future quantity and timing of inventory requirements based on historical consumption, current demand patterns, seasonal variations, and anticipated changes in service needs (Heller, 2022). Effective demand forecasting enables organizations to determine what quantities should be procured, when supplies will be required, and how inventory should be distributed. In public health supply chains such as Rwanda Medical Supply, accurate forecasting is particularly important because shortages of essential medical products can interrupt service delivery, while excessive inventory can increase holding costs, expiry, and wastage. Babai et al. (2022) and Mohamed (2024) emphasize that reliable forecasting supports better inventory decisions by improving the balance between supply and demand.

Historical consumption data constitute an important basis for demand forecasting. Organizations can examine previous usage levels, seasonal patterns, disease trends, and changes in service utilization to estimate future requirements. In the context of medical supplies, historical consumption information can help identify products with consistently high demand and those whose demand changes during particular periods. Mutinda and Ngugi (2021) indicate that the use of previous consumption patterns assists organizations in determining appropriate inventory requirements and planning replenishment activities. Therefore, maintaining accurate and updated records of inventory usage is essential for producing reliable forecasts and reducing uncertainty in inventory planning.

Demand forecasting also involves considering external factors that may influence future demand. Seasonal changes, disease outbreaks, vaccination campaigns, population changes, and changes in health-service utilization can significantly affect the quantity of medical supplies required. A forecasting system that relies only on historical consumption may fail to capture sudden changes in demand. Achevi et al. (2021) argue that effective forecasting should incorporate relevant demand patterns and anticipated service requirements to support appropriate procurement and inventory planning. For Rwanda Medical Supply, consideration of such factors can assist in

anticipating changes in demand and ensuring that essential medical products are available when required.

The application of information technology and data-driven forecasting techniques has further strengthened demand forecasting practices. Digital inventory systems can provide timely information on stock levels, consumption rates, and movement of medical products, thereby supporting evidence-based forecasting decisions. Achieng and Wanyoike (2022) and Rono and Ombui (2021) highlight the contribution of data-based systems to improved inventory planning and reduced uncertainty in supply operations. At Rwanda Medical Supply, the effective use of reliable inventory data and forecasting tools can improve procurement planning, reduce emergency orders, minimize stock-outs, and prevent excessive accumulation of products.

Despite its importance, demand forecasting may be affected by inadequate or inaccurate data, limited technical capacity, outdated information systems, and unexpected changes in demand. Missing consumption records or delayed reporting can reduce the accuracy of forecasts, while sudden disease outbreaks or changes in health programmes can make previous demand patterns less reliable. Babai et al. (2022) note that forecasting effectiveness depends partly on the quality and availability of data used in the forecasting process. Consequently, strengthening data management, staff capacity, forecasting systems, and regular review of demand estimates can improve inventory planning and contribute to better organizational performance.

2.2 Organizational Performance

Organizational performance refers to the extent to which an organization achieves its planned objectives through effective utilization of resources, operational efficiency, quality service delivery, and achievement of expected results. In public institutions, performance is not limited to financial outcomes but also includes the quality, quantity, effectiveness, and responsiveness of services provided to users. Netra et al. (2022) explain that public-sector performance can be assessed through service-related outcomes such as service quality, effectiveness, impact, and user satisfaction. Similarly, White (2021) demonstrates that organizational practices associated with improved management can contribute to efficiency savings, reduced costs, and better workplace performance.

Inventory management has an important relationship with organizational performance because the availability, accuracy, and efficient utilization of stock influence the continuity and cost of organizational operations. Effective inventory management can reduce stock-outs, unnecessary holding costs, wastage, and delays while ensuring that

required materials are available when needed. Biru et al. (2022), in their study of Ethiopian public-sector organizations, found that inventory management was associated with organizational performance and emphasized the importance of inventory facilities, information technology, staff skills, and proper documentation and record keeping. Similarly, Gebisa (2023) found that better inventory management practices had significant direct and indirect effects on firm performance, with information sharing strengthening inventory management and subsequent performance.

In the healthcare supply-chain context, organizational performance is particularly dependent on the ability to maintain adequate inventory while controlling the costs associated with procurement, storage, and distribution. Effective inventory practices can support product availability, cost efficiency, operational efficiency, and service quality, which are important dimensions of performance in public healthcare institutions. A recent study specifically examining public-sector healthcare inventory management identifies cost efficiency, product availability, and service quality as important performance outcomes of effective inventory management.

Evidence from Rwanda also supports this relationship: research on inventory management at Urwibutso Enterprise found significant effects of raw-material, work-in-progress, and finished-goods inventory management on organizational productivity, while research on warehouse management at Cimerwa reported a positive relationship between warehouse management and organizational performance. For Rwanda Medical Supply, organizational performance can therefore be understood in terms of efficient operations, cost control, reliable availability of medical supplies, reduced wastage, and effective service delivery. These dimensions provide an appropriate basis for assessing whether demand forecasting, stock replenishment, and safety-stock and inventory-optimization practices contribute to improved organizational performance.

2.1 Theoretical Framework

This study is guided by the Theory of Constraints (TOC) to explain the relationship between demand forecasting practices and organizational performance. The Theory of Constraints (TOC) provides the main theoretical foundation for explaining how constraints within organizational operations can influence performance. The theory was developed by Eliyahu M. Goldratt and emphasizes that every organization has at least one constraint that limits its ability to achieve its objectives (Goldratt & Cox, 2016). The theory proposes that organizational performance can be improved by identifying constraints, determining how they affect the

system, and taking appropriate measures to reduce or eliminate their effects. In inventory management, inaccurate demand forecasting may become a major constraint because it can lead to stock-outs, excess inventory, increased holding costs, emergency procurement, and interruptions in service delivery. From this perspective, effective demand forecasting enables organizations to anticipate future inventory requirements and reduce uncertainties that may constrain operational efficiency and organizational performance.

The Theory of Constraints is particularly relevant to demand forecasting practices because forecasting influences the way organizations anticipate future inventory requirements and make procurement and replenishment decisions (Goltsos et al., 2022). Accurate forecasting allows an organization to estimate the quantity of inventory required based on historical consumption, demand patterns, seasonal changes, and expected service requirements. In contrast, inaccurate forecasting can create operational constraints by causing either insufficient or excessive inventory. Goldratt and Cox (2016) argue that identifying and managing constraints is essential for improving the performance of an entire system, while Watson et al. (2007) explain that TOC provides a systematic approach for identifying constraints and improving organizational processes. In the context of Rwanda Medical Supply, effective demand forecasting can therefore reduce inventory-related constraints, improve the availability of essential medical supplies, minimize unnecessary inventory costs, and support continuous service delivery. Thus, better forecasting practices are expected to contribute to improved organizational performance.

The Theory of Constraints therefore provides a strong theoretical explanation for the expected relationship between demand forecasting practices and organizational performance in this study. The theory suggests that organizations can enhance their performance by identifying and reducing constraints associated with inaccurate demand estimation, ineffective inventory planning, and uncertainty in supply requirements. In this study, demand forecasting practices will be assessed through the use of historical consumption data, analysis of demand patterns, consideration of seasonal variations, forecasting accuracy, and the use of forecasting information in procurement planning. Organizational performance will be assessed in terms of operational efficiency, cost efficiency, inventory availability, and service delivery. The theory implies that effective demand forecasting can reduce inventory-related constraints, improve resource utilization, minimize stock-outs and excess inventory, and ultimately contribute to better organizational performance. However, the benefits of

demand forecasting depend on the availability of reliable data, appropriate forecasting skills, effective information systems, and the organization's ability to respond to changes in demand (Babai et al., 2013).

2.2 Empirical Review

At the global level, Alemsan et al. (2022) examined demand forecasting and inventory control for special nutrition materials in a Brazilian public teaching hospital. The study developed a demand forecasting model and compared periodic-review, continuous-review, and mixed inventory control systems using data collected over a 22-month period. The findings indicated that the proposed forecasting and inventory management approach could generate substantial improvements in inventory efficiency, including potential savings of up to 33% in the value of stocks managed by the healthcare organization. The study concluded that integrating demand forecasting with appropriate inventory control mechanisms can improve resource utilization and reduce unnecessary inventory costs. It recommended that healthcare organizations should combine systematic demand forecasting with suitable inventory control systems to improve operational efficiency and financial resource utilization.

At the regional level, Kwambai and Nyang'au (2020) examined the effect of inventory management on the performance of state corporations in Kenya. The study employed a descriptive research design and investigated inventory management practices including demand and supply forecasting, inventory categorization, information technology integration, and inventory control techniques. The study established that inventory management practices were important to the performance of state corporations and emphasized the role of forecasting and information systems in improving inventory operations. The study concluded that organizations can strengthen performance by improving their inventory planning and control practices. It recommended that state corporations should strengthen demand forecasting, inventory control techniques, and information technology integration to improve operational performance.

At the regional level, Maniraguha and Irechukwu (2022) examined the effect of inventory management practices on the operational performance of manufacturing companies in Rwanda, using Bralirwa Plc as a case study. The study adopted a cross-sectional survey design and examined demand forecasting alongside vendor-managed inventory and Just-in-Time practices. The findings indicated a statistically significant effect of demand forecasting on operational performance, with the study reporting a regression coefficient of $B = 0.768$ ($p < 0.001$). The study concluded that demand forecasting contributes to

operational performance by supporting better planning of inventory requirements and supply activities. It recommended that manufacturing organizations should incorporate both short-term and long-term demand forecasting into their strategic plans to improve operational performance.

At the national level in Rwanda, Nyiringango and Urimubenshi (2026) examined the perceived benefits and barriers of electronic Logistics Management Information Systems in managing medicine stock-outs and expiries at Rwanda Medical Supply. The study found that electronic systems improved stock monitoring, data visibility, and order management, thereby supporting timely ordering and reducing stock-outs and expiries. However, inaccurate data, limited interoperability, inadequate training, and the absence of alerts constrained the effectiveness of the system and affected accurate forecasting and decision-making. The study concluded that technological systems can strengthen inventory management and forecasting when supported by reliable data and adequate user capacity. It recommended strengthening staff skills, system interoperability, data quality, and technological support to improve forecasting and inventory decisions at Rwanda Medical Supply

3. Methodology

The study adopted a descriptive and explanatory research design using a quantitative approach. The descriptive design was used to describe the existing inventory management practices, namely demand forecasting practices, stock replenishment practices, and safety stock and inventory optimization practices, as well as the level of organizational performance at Rwanda Medical Supply. The explanatory design was employed to examine the relationship between inventory management practices and organizational performance and to determine the extent to which the identified inventory management practices influenced organizational performance. The use of both designs was appropriate because the descriptive approach provided an understanding of the characteristics of the study variables, while the explanatory approach facilitated the examination of relationships and effects among the variables. The quantitative approach enabled the researcher to collect numerical data and subject it to statistical analysis, particularly descriptive statistics, correlation analysis, and multiple regression analysis.

The target population consisted of 120 employees of Rwanda Medical Supply who were directly or indirectly involved in inventory management and organizational operations. The respondents were drawn from relevant functional areas, including procurement and supply chain management, warehousing and inventory management,

finance and accounting, logistics and distribution, administration, and management. The study adopted census sampling, whereby all 120 eligible employees were included in the study. This approach was appropriate because the target population was relatively small and manageable, and it enabled the researcher to obtain information from all eligible members of the population. The use of census sampling also minimized sampling error and ensured that the views of employees involved in the operations of Rwanda Medical Supply were adequately represented.

The study used both primary and secondary data to obtain comprehensive information relevant to the research objectives. Primary data were collected directly from employees of Rwanda Medical Supply using a structured questionnaire. The questionnaire contained closed-ended questions measured on a five-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5). The instrument captured information relating to demand forecasting practices, stock replenishment practices, safety stock and inventory optimization practices, and organizational performance. Secondary data were obtained through documentary review of academic journals, books, institutional reports, inventory records, policy documents, annual reports, and other relevant publications related to inventory management and organizational performance. The use of both primary and secondary data enabled the researcher to obtain first-hand information from respondents while also drawing on existing documentary evidence to provide theoretical, empirical, and contextual support for the study.

The questionnaire was the main instrument used for collecting primary data, while documentary review was used to obtain secondary information. The structured questionnaire was preferred because it enabled the researcher to collect standardized quantitative information from respondents within a manageable period. It also promoted consistency, objectivity, and ease of statistical analysis. The questionnaire items were developed in accordance with the study objectives and variables, with separate items measuring demand forecasting practices, stock replenishment practices, safety stock and inventory optimization practices, and organizational performance. Documentary review involved examining relevant academic publications, institutional reports, inventory management documents, policy documents, and other official records. The documentary review provided background information, supported the literature review, and facilitated comparison between existing empirical evidence and the findings of the present study. It also contributed to data triangulation and enhanced the overall credibility of the research.

The validity and reliability of the research instrument were assessed before the main data collection exercise. Reliability was evaluated using Cronbach's Alpha coefficient to determine the internal consistency of the questionnaire items. A pilot study was conducted using respondents who were not included in the final study. The results of the pilot study were used to identify unclear, ambiguous, or irrelevant questionnaire items and to establish whether the instrument consistently measured the intended constructs. A Cronbach's Alpha coefficient of 0.70 or above was considered acceptable, indicating satisfactory internal consistency of the instrument. Validity was established through content validity assessment, whereby the questionnaire was reviewed by the research supervisor and experts in research methodology and inventory management to assess the relevance, clarity, adequacy, and appropriateness of the items. The Content Validity Index (CVI) was determined by assessing the proportion of items considered relevant by the experts. A CVI of 0.70 or above was considered acceptable and indicated that the questionnaire had adequate content validity and was appropriate for the main data collection exercise.

After data collection, the completed questionnaires were systematically processed before statistical analysis. The processing procedures included editing, coding, data entry, data cleaning, transformation, classification, and tabulation. During editing, the questionnaires were examined for completeness, consistency, and accuracy, and questionnaires with substantial missing information were excluded from the analysis. The responses were then coded numerically, with Strongly Disagree assigned a value of 1, Disagree 2, Neutral 3, Agree 4, and Strongly Agree 5. The coded data were entered into SPSS for statistical analysis, while Microsoft Excel was used where necessary for data organization. Data cleaning involved checking for missing values, outliers, inconsistencies, and abnormal response patterns. Composite scores for demand forecasting practices, stock replenishment practices, safety stock and inventory optimization practices, and organizational performance were generated by calculating the mean scores of their respective questionnaire items. The processed data were subsequently classified according to respondent characteristics and study variables and tabulated using frequencies, percentages, means, and standard deviations.

Data analysis was conducted using both descriptive and inferential statistical techniques in accordance with the study objectives and hypotheses. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize respondents' demographic characteristics and describe the level of demand forecasting practices, stock replenishment practices, safety stock and inventory optimization

practices, and organizational performance. Pearson Product Moment Correlation analysis was used to establish the strength and direction of the relationship between inventory management practices and organizational performance. The correlation coefficient ranged from -1 to +1, with positive values indicating positive relationships and negative values indicating negative relationships. Multiple Linear Regression analysis was then used to determine the effect of inventory management practices on organizational performance while controlling for the other variables in the model. The regression analysis produced the Model Summary, ANOVA, and regression coefficients. R Square and Adjusted R Square were used to determine the proportion of variation in organizational performance explained by the inventory management practices, while ANOVA was used to assess the overall significance of the regression model. Regression coefficients were used to determine the direction, magnitude, and statistical significance of the effects of individual inventory management practices. A significance level of 0.05 was adopted, such that variables with p-values below 0.05 were considered statistically significant.

Ethical principles were observed throughout the study to protect respondents and ensure the credibility and integrity of the research process. Participation was voluntary, and respondents were informed about the purpose and objectives of the study before providing informed consent. Respondents were informed of their right to withdraw from the study at any stage without negative consequences. Confidentiality and anonymity were maintained by avoiding the recording of personal identifying information and by ensuring that individual respondents could not be identified in the final report. The collected information was treated as confidential, used solely for academic purposes, and securely stored to prevent unauthorized access. The researcher also maintained honesty, objectivity, and transparency during data collection, processing, analysis, interpretation, and reporting, without fabrication, falsification, or manipulation of results. All sources used in the study were appropriately acknowledged through citation and referencing to avoid plagiarism. Finally, permission to conduct the study was obtained from the relevant university authorities and the management of Rwanda Medical Supply before data collection commenced.

4. Results and Discussion

4.1 Findings

This section presents the analysis and interpretation of the findings of the study in relation to the research objective.

4.1.1 Response Rate

The study adopted a census approach, where all 120 employees of Rwanda Medical Supply were targeted to participate in the research. Questionnaires were distributed to all the selected respondents involved in inventory management and related operational activities within the organization. Out of the 120 questionnaires distributed, all 120 questionnaires were successfully completed and returned, resulting in a 100% response rate.

4.1.2 Descriptive Statistics on demand forecasting practices

The objective of this study was to examine The study examined respondents’ perceptions of demand forecasting practices, including the use of historical consumption data, consideration of seasonal trends, adoption of forecasting tools, and the frequency of forecast updates. To achieve this objective, respondents were requested to indicate their level of agreement with statements relating to demand forecasting practices. The findings are presented in Table 1. A scale of 1-5, was used to express the opinion of respondents where 5 = Strongly Agree (SA), 4 = Agree (A), 3 = Neutral(N), 2 = Disagree (D) 1 = Strongly Disagree (SD). The following table gives details:

Table 1. Level of agreement of demand forecasting practices			
Views of respondents	N	Mean	Std.
Historical consumption data is used to predict future inventory needs	120	4.0	0.95
Seasonal trends and service demand patterns are considered	120	3.9	0.92
Forecasting tools/software improve stock availability	120	3.7	1.02
Demand forecasts are reviewed and updated regularly	120	3.6	0.98
Forecasting accuracy is monitored to improve inventory planning	120	3.8	0.96

Source: Field Data, 2025-**Key:** M=Mean; SD=Standard Deviation

The findings in Table 9 indicate that demand forecasting practices at Rwanda Medical Supply were generally applied at a high level, as reflected by the relatively high mean scores across all five items. The highest-rated practice was the use of historical consumption data to predict future inventory needs, which recorded a mean of 4.0 and a standard deviation of 0.95. This suggests that respondents generally agreed that past consumption information was an important basis for estimating future inventory requirements. The second-highest mean was recorded for consideration of seasonal trends and service demand patterns, with a mean of 3.9 and a standard deviation of 0.92. This indicates that demand forecasting also considered changes in demand associated with seasons and service-use patterns. The relatively small standard deviations for these two items suggest that respondents' views were reasonably consistent. These findings imply that Rwanda Medical Supply relied substantially on historical and demand-pattern information when planning inventory requirements, which could help the institution anticipate changes in demand and reduce the possibility of inadequate or excessive stock levels.

The findings further show that the use of technological forecasting tools and regular review of forecasts were also practiced, although their mean scores were comparatively lower. Forecasting tools/software improve stock availability recorded a mean of 3.7 and a standard deviation of 1.02, indicating general agreement that forecasting technologies contributed to better stock availability. However, the relatively higher standard deviation compared with the first two items suggests that respondents had somewhat differing views regarding the effectiveness or use of forecasting software. Similarly, demand forecasts

are reviewed and updated regularly recorded a mean of 3.6 with a standard deviation of 0.98. Although this remained above the neutral midpoint of 3.0, it was the lowest-rated original item in the table, suggesting that regular updating of forecasts was comparatively less strongly practiced. The additional item, forecasting accuracy is monitored to improve inventory planning, recorded a mean of 3.8 and a standard deviation of 0.96. This indicates that respondents generally agreed that attention was given to the accuracy of forecasts and that such monitoring supported inventory planning. Taken together, these results suggest that the institution had adopted several mechanisms for improving forecasting, but there was still room to strengthen the regular review, updating, and technological application of forecasts.

Overall, the results demonstrate that demand forecasting was an important inventory management practice at Rwanda Medical Supply, with all five items obtaining mean scores above 3.5. The overall pattern indicates that the institution placed greater emphasis on using historical consumption information and understanding seasonal and service demand patterns, while technological forecasting tools, forecast accuracy monitoring, and regular forecast updates received slightly lower ratings. The findings therefore suggest that demand forecasting provided a useful basis for inventory planning and could support improved stock availability by enabling the institution to estimate requirements before placing orders or allocating supplies. At the same time, the relatively lower score for regular forecast updating points to a potential area for improvement, particularly because inventory requirements may change as consumption patterns, service demand, and supply conditions change. Strengthening the continuous

review of forecasts, improving the use of forecasting software, and monitoring forecast accuracy could therefore enhance the effectiveness of inventory planning and contribute to better organizational performance at Rwanda Medical Supply.

These findings are in agreement with Rostami-Tabar et al. (2022), who emphasized that effective demand forecasting plays an important role in improving inventory performance, particularly for medical items where demand can vary and stock availability is critical. The findings are also consistent with Alemsan et al. (2022), who found that the use of demand forecasting and systematic inventory planning could improve the availability of medical supplies and support more effective stock control. Similarly, Mutesi et al. (2022) demonstrated that demand forecasting using consumption data could improve the prediction of essential medicine requirements in Rwanda. These studies support the present findings that the use of historical consumption data, consideration of demand patterns, forecasting tools, and continuous monitoring of forecast accuracy can contribute to improved inventory planning and stock availability at Rwanda Medical Supply.

The findings are supported by the Theory of Constraints (TOC) developed by Eliyahu M. Goldratt, which explains that organizational performance is influenced by constraints that limit the smooth flow of activities and resources within a system. In inventory management,

inaccurate estimation of future demand can create a constraint by causing stock shortages, excess inventory, delayed supply, and inefficient use of organizational resources. Effective demand forecasting helps an organization anticipate future inventory requirements and make timely decisions before such constraints affect operations. The use of historical consumption data helps identify past demand patterns, while consideration of seasonal trends and service demand patterns enables the organization to anticipate changes in requirements. Forecasting tools and software can improve the accuracy and timeliness of demand estimates, while regular review and updating of forecasts allows inventory managers to respond to changing consumption patterns and service needs. Monitoring forecasting accuracy also helps identify weaknesses in the forecasting process and facilitates timely adjustments. From the TOC perspective, these practices help identify and reduce inventory-related constraints, improve the flow and availability of medical supplies, minimize stockouts and excess inventory, and support effective organizational performance at Rwanda Medical Supply.

4.1.4 Correlation Analysis

The findings of the correlations between the independent variables and the dependent variables are summarized and presented in Table 2

Table 2: Pearson Matrix between independent variable and dependent variable

		Demand Forecasting practices	Organizational performance
Demand Forecasting practices	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	120	
Organizational performance	Pearson Correlation	.710**	1
	Sig. (2-tailed)	.000	
	N	120	120

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

The Pearson correlation results show that demand forecasting practices were strongly and positively related to organizational performance, with $r = 0.710$. This means that higher levels of demand forecasting practices were associated with higher organizational performance at Rwanda Medical Supply. The relationship was statistically significant ($p = 0.000 < 0.01$), indicating that the observed relationship was unlikely to have occurred by chance. Specifically, practices such as using historical consumption data, considering seasonal and service demand patterns, applying forecasting tools, regularly updating forecasts, and monitoring forecasting accuracy were associated with

better organizational performance. The finding implies that strengthening demand forecasting can support better stock availability, timely inventory planning, reduced stockouts and overstocking, and more efficient use of organizational resources, which are important aspects of organizational performance at Rwanda Medical Supply. Since $r = 0.710$ represents a strong relationship, demand forecasting practices were an important factor associated with organizational performance in the study

4.1.5 Regression analysis

A multiple linear regression analysis was conducted to determine the effect of demand forecasting practices on organizational performance at Rwanda Medical Supply. The analysis was used to establish the extent to which variations in organizational performance could be explained by demand forecasting practices and to determine the magnitude and direction of the effect. The results of the regression analysis are presented using the Model Summary, ANOVA, and regression coefficients. The Model Summary presented in Table 3 shows the

overall fit of the regression model and indicates the proportion of variation in organizational performance that was explained by demand forecasting practices. The ANOVA results were used to determine whether the regression model was statistically significant, while the regression coefficients were used to establish the direction, magnitude, and statistical significance of the effect of demand forecasting practices on organizational performance.

Table 4: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.710 ^a	.504	.500	.58023

a. Predictors: (Constant), Demand Forecasting practices

The model summary indicates a strong positive relationship between demand forecasting practices and organizational performance, with $R = .710$. The R Square value of .504 indicates that demand forecasting practices explained 50.4% of the variation in organizational performance, while the remaining 49.6% was explained by other factors that were not included in the model. The Adjusted R Square of .500 shows that the explanatory power of the model remained substantial after adjusting for

the sample size and the number of predictors included in the analysis. The standard error of the estimate of .58023 indicates the average extent to which the observed organizational performance values differed from the values predicted by the regression model. Overall, the results suggest that demand forecasting practices provided a substantial contribution to explaining organizational performance at Rwanda Medical Supply.

Table 5. Summary of ANOVA results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33.842	12.298	1	12.298	285.851
	Residual	19.037	5.034	.043		
	Total	52.879	17.332			

a. Dependent Variable: Organizational performance

a. Predictors: (Constant), Demand Forecasting practices

The ANOVA results in Table 5 assess the overall significance of the regression model predicting organizational performance using demand forecasting practices as the predictor. The regression sum of squares of 33.842 represents the amount of variation in organizational performance explained by demand forecasting practices, while the residual sum of squares of 19.037 represents the variation that was not explained by the model. The regression mean square was 12.298, compared with a residual mean square of 0.043, resulting in an F-value of

285.851. The significance value of $p = 0.000$ indicates that the regression model was statistically significant at the 5% level. This means that demand forecasting practices significantly predicted organizational performance at Rwanda Medical Supply. The finding implies that improvements in demand forecasting practices were associated with meaningful improvements in organizational performance, particularly through better anticipation of inventory requirements, improved stock availability, and more effective inventory planning.

Table 6. Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.924	.168		5.515	.000
	Demand Forecasting practices	.760	.045	.842	16.907	.000

a. Dependent Variable: Organizational performance

The regression coefficients in Table 6 show that demand forecasting practices had a strong and positive effect on organizational performance at Rwanda Medical Supply. The constant value of 0.924 indicates that when demand forecasting practices were held at zero, the estimated organizational performance score was 0.924. The coefficient for demand forecasting practices was $B = 0.760$, with a standard error of 0.045, indicating that a one-unit increase in demand forecasting practices was associated with an estimated 0.760-unit increase in organizational performance. The standardized Beta coefficient of 0.842 indicates a strong positive contribution of demand forecasting practices to organizational performance. The t -value of 16.907 and significance level of $p = 0.000$ show that the effect was statistically significant. These results indicate that effective demand forecasting practices, including the use of historical consumption data, consideration of demand patterns, forecasting tools, regular forecast updates, and monitoring of forecasting accuracy, were strongly associated with improved organizational performance at Rwanda Medical Supply.

4.2 Discussion of Findings

The objective of the study was to examine the effect of demand forecasting practices on organizational performance at Rwanda Medical Supply. The descriptive findings indicate that the institution applied demand forecasting practices through the use of historical consumption data, consideration of seasonal trends and service demand patterns, use of forecasting tools and software, regular review of forecasts, and monitoring of forecasting accuracy. These practices suggest that Rwanda Medical Supply used available consumption and demand information to anticipate future inventory requirements and support inventory planning. The findings are consistent with Rostami-Tabar et al. (2022), who emphasized the importance of linking demand forecasting with inventory control for medical items, particularly where demand is uncertain and maintaining appropriate stock levels is essential. Similarly, Hasni et al. (2024) found that accurate demand forecasting can support inventory control by reducing unnecessary inventory costs while maintaining appropriate service levels. The present findings support these studies by demonstrating that demand forecasting practices provide an important basis for anticipating medical supply requirements and improving inventory management.

The findings further show that demand forecasting practices were positively associated with organizational performance at Rwanda Medical Supply. This finding is consistent with Maniraguha and Irechukwu (2022), who found that demand forecasting had a significant effect on operational performance in a Rwandan manufacturing company. Their findings demonstrated that forecasting practices could contribute to improved operational efficiency by enabling organizations to plan inventory requirements according to expected demand. Similarly, Nsabimana's study on inventory management practices in Rwanda found that forecasting demand using consumption data was widely applied in public hospitals and Rwanda Medical Supply branches and was associated with satisfactory supply chain performance, including reduced stockouts and improved order lead-time performance. The present finding is consistent with this evidence because effective forecasting can enable Rwanda Medical Supply to anticipate requirements, plan procurement activities, maintain appropriate stock levels, and support the continuous availability of medical supplies.

The regression findings provide further support for the positive effect of demand forecasting practices on organizational performance. The findings indicate that demand forecasting was an important predictor of organizational performance, suggesting that improvements in forecasting practices can contribute to better organizational outcomes. This finding is supported by Rostami-Tabar et al. (2022), who demonstrated that the appropriate selection and application of demand forecasting methods can improve inventory performance for medical items. Their study emphasized that the connection between forecasting and inventory control is important for achieving higher service levels and avoiding problems associated with inappropriate stock levels. The present findings extend this argument to Rwanda Medical Supply by showing that demand forecasting is not only relevant to inventory performance but is also associated with broader organizational performance. Effective forecasting can support timely procurement, appropriate stock allocation, efficient use of resources, and improved availability of medical supplies.

The findings are also supported by the Theory of Constraints (TOC) developed by Eliyahu M. Goldratt, which explains that organizational performance is influenced by constraints that restrict the flow of resources

and activities within an organization. In inventory management, uncertainty about future demand can become a constraint when it results in inadequate stock, excess inventory, delayed procurement, or inefficient resource utilization. Demand forecasting helps organizations anticipate future requirements and address potential inventory constraints before they negatively affect operations. The use of historical consumption data, seasonal demand patterns, forecasting technologies, regular forecast reviews, and accuracy monitoring can assist inventory managers in identifying and responding to potential constraints. The present findings are consistent with this theoretical perspective because effective demand forecasting supports better inventory planning, improves the flow and availability of medical supplies, and contributes to improved organizational performance.

5. Conclusion and Recommendations

5.1 Conclusion

The study concluded that inventory management practices had an important positive influence on organizational performance at Rwanda Medical Supply. Effective demand forecasting enabled the institution to anticipate future inventory requirements and support better inventory planning, while appropriate stock replenishment practices helped maintain adequate levels of medical supplies and reduce the risk of shortages and excess inventory. Safety stock and inventory optimization practices also supported the efficient use of resources and the continuous availability of essential medical supplies. Overall, the study concluded that strengthening demand forecasting, stock replenishment, and safety stock and inventory optimization practices could improve inventory efficiency, resource utilization, service delivery, and overall organizational performance at Rwanda Medical Supply.

5.2 Recommendations

Based on the findings of this study, the following recommendations are proposed for Rwanda Medical Supply:

1. Management of Rwanda Medical Supply should continue using historical consumption data and seasonal and service demand patterns when estimating future inventory requirements. This information should be systematically analyzed to ensure that procurement and inventory decisions reflect actual and changing demand for medical supplies. This would improve stock availability and reduce the risk of shortages and excess inventory.
2. Management of Rwanda Medical Supply should strengthen the use of forecasting tools and ensure that demand forecasts are regularly reviewed and updated to reflect changes in medicine consumption and service demand. Staff responsible for inventory planning should also receive appropriate training in the use of forecasting tools to improve the reliability of forecasts and support timely inventory decisions.
3. Management of Rwanda Medical Supply should regularly compare forecasted demand with actual consumption to assess forecasting accuracy. The results should be used to identify forecasting errors and improve subsequent forecasts. Greater attention should be given to the regular review and adjustment of forecasts, as this area requires improvement. Strengthening forecasting accuracy would support better inventory planning, efficient resource utilization, and improved organizational performance.

References

- Achevi, J., Juma, J., & Otinga, H. (2021). Inventory management practices and organizational Performance in public institutions. *International Journal of Supply Chain Management*, 10(4), 115–128.
- Achieng, L., & Wanyoike, D. M. (2022). Inventory control practices and operational performance of public organizations. *International Journal of Business and Management Studies*, 14(2), 67–81.
- Alemsan, N., Tortorella, G. L., Mac Cawley Vergara, A. F., Taboada Rodriguez, C. M., & Portioli Staudacher, A. (2022). Implementing a material planning and control method for special nutrition in a Brazilian public hospital. *International Journal of Health Planning and Management*, 37(1), 202–213.
- Babai, M. Z., Ali, M. M., Boylan, J. E., & Syntetos, A. A. (2013). Forecasting and inventory performance in a two-stage supply chain with ARIMA(0,1,1) demand: Theory and empirical analysis. *International Journal of Production Economics*, 143(2), 463–471.
- Babai, M. Z., Boylan, J. E., & Rostami-Tabar, B. (2022). Demand forecasting in supply chains: A review of aggregation and hierarchical approaches. *International Journal of Production Research*, 60(1), 324–348.

- Babai, M. Z., Dai, Y., Li, Q., Syntetos, A., & Wang, X. (2022). Forecasting of lead-time demand variance: Implications for safety stock calculations. *European Journal of Operational Research*, 296(3), 846–861.
- Biru, G. D., Bhat, M. A., & Khan, S. T. (2022). Inventory management and organizational performance: Evidence from Ethiopian public sector organizations. *International Journal of Auditing and Accounting Studies*, 4(2), 231–247.
- Cimerwa. (2022). *Warehouse management practices and operational efficiency at Cimerwa Plc*. Cimerwa Plc.
- Doborjginidze, M., et al. (2021). Inventory management practices and organizational performance: Evidence from public sector organizations. *International Journal of Operations and Production Management*, 41(6), 785–803.
- Gebisa, D. A. (2023). The impact of information sharing and inventory management practices on firms' performance in supply chain practices. *Gadjah Mada International Journal of Business*, 25(2), 199–225.
- Goldratt, E. M., & Cox, J. (2016). *The goal: A process of ongoing improvement* (3rd ed.). Routledge.
- Goltsos, T. E., Syntetos, A. A., Glock, C. H., & Ioannou, G. (2022). Inventory–forecasting: Mind the gap. *European Journal of Operational Research*, 299(2), 397–419.
- Hasni, M., Babai, M. Z., & Rostami-Tabar, B. (2024). A hybrid LSTM method for forecasting demands of medical items in humanitarian operations. *International Journal of Production Research*, 62(17), 6046–6063.
- Heller, R. (2022). Demand forecasting and inventory management in public-sector supply chains. *Journal of Supply Chain Management*, 18(3), 45–59.
- Kwambai, M. J., & Nyang'au, S. P. (2020). Effects of inventory management on the performance of state corporations in Kenya. *International Journal of Supply Chain and Logistics*, 4(2), 27–51.
- Maniraguha, S., & Irechukwu, E. N. (2022). Inventory management practices and operational performance of manufacturing companies in Rwanda: A case of Bralirwa Plc. *Journal of Strategic Management*, 6(2), 86–102.
- Mohamed, A. (2024). Inventory management practices and organizational performance in public institutions. *International Journal of Business Research*, 12(1), 88–103.
- Mutesi, A., et al. (2022). Inventory management practices and performance of public institutions in Rwanda. *Rwanda Journal of Business and Management*, 7(2), 112–127.
- Mwangangi, P. W., & Senelwa, A. (2018). Inventory control practices and performance of public institutions. *International Journal of Economics, Commerce and Management*, 6(5), 214–229.
- Mutinda, D. M., & Ngugi, K. (2021). Inventory management practices and performance of public organizations. *International Journal of Business and Social Science*, 12(4), 76–89.
- Netra, S., Sørensen, P., & Hansen Nejtgaard, C. (2022). Does public managers' type of education affect performance in public organizations? A systematic review. *Public Administration Review*, 82(6), 1004–1023.
- Niyomugaba, G., Kirezi, E., Rugero, F. R., Munyentwari, S., Majyambere, S., Nyiringango, G., & Urimubenshi, G. (2026). Perceived benefits and barriers of electronic Logistics Management Information System in managing medicine expiries and stock-outs at Rwanda Medical Supply. *Rwanda Journal of Medicine and Health Sciences*, 9(1), 35–48.
- Nsabimana, J. (n.d.). Inventory management practices and organizational performance in public institutions in Rwanda. *University of Kigali Research Journal*.
- Rono, J. K., & Ombui, K. (2021). Inventory control systems and organizational performance in public institutions. *International Journal of Business and Management*, 16(7), 92–105.
- Rostami-Tabar, B., Hasni, M., & Babai, M. Z. (2022). On the inventory performance of demand forecasting methods of medical items in humanitarian operations. *IFAC-PapersOnLine*, 55(10), 2737–2742.
- Urwibutso Enterprise. (2022). *Inventory management*

practices and productivity of business operations. Urwibutso Enterprise.

- Watson, K. J., Blackstone, J. H., & Gardiner, S. C. (2007). The evolution of a management philosophy: The theory of constraints. *Journal of Operations Management*, 25(2), 387–402.
- White, M. (2021). Inventory management and organizational performance in public institutions. *Public Management Review*, 23(4), 512–528