JRIIE Journal of Research Innovation and Implications in Education
Center for Research Implications & Practice

Website:www.jriiejournal.com ISSN 2520-7504 (Online) Vol.9, Iss.2, 2025 (pp. 873 - 883)

Effect of Inventory Management on Supply Chain Performance of Manufacturing Companies in Rwanda: A Case of Bralirwa Plc

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Abstract: *The general objective of this study was to assess the effect of inventory management on the supply chain performance of Bralirwa PLC. Data analysis conducted using SPSS (Statistical Package for Social Sciences). The findings indicate the coefficient for inventory cost (β_1= 0.345) indicates that for every unit increase in inventory cost, supply chain performance improves by 0.345 units, p-value is 0.000, which is less than 0.05, indicating statistical significance. Stock level has an unstandardized coefficient (β_2 = 0.340), meaning that for every unit increase in stock level, supply chain performance improves by 0.340 units, assuming other factors remain constant, p-value is 0.000, indicating statistical significance. Economic order quantity has an unstandardized coefficient (β_3 = 0.174), meaning that for every unit increase in economic order quantity, supply chain performance improves by 0.174 units, assuming other variables are held constant, p-value is 0.004, which is less than 0.05, indicating statistical significance. The findings indicate that inventory cost management has a significant and positive effect on the supply chain performance of BRALIRWA PLC. The study recommended that BRALIRWA PLC implement advanced cost-tracking systems to monitor inventory expenditures, optimize procurement strategies and adopt real-time inventory monitoring systems.*

Keywords: *Inventory Management, Supply Chain Performance, Inventory Cost, Stock Level, Economic Order Quantity*

How to cite this work (APA):

Habiyambere, A. & Akumuntu, J. (2025). Effect of inventory management on supply chain performance of manufacturing companies in Rwanda. A Case of Bralirwa Plc. *Journal of Research Innovation and Implications in Education, 9*(2), 873 – 883. **https://doi.org/10.59765/nvy852gp.**

1. Introduction

In Rwanda, effective inventory management is essential across various sectors such as agriculture, retail, and manufacturing. Inventory management is essential as the agricultural sector transitions from subsistence to modern commercial farming. The adoption of advanced technologies, such as ICT in agriculture, drones for precision farming, and modern irrigation systems, is crucial for enhancing productivity. However, the adoption of these technologies remains low among smallholder farmers, highlighting the need for improved inventory management to support sustainable agricultural practices and socio-economic development (Nshimiyimana & Rukundo, 2020).

Inventory management is critical for enhancing retailer satisfaction in Rwanda's manufacturing sector, particularly in Inyange Industries Limited. The research conducted from 2016 to 2021 demonstrates that effective inventory activities, such as order processing, storage management, and distribution management, positively influence satisfaction levels among retailers. However, challenges in inventory practices may hinder performance, underlining the necessity for companies to adopt Just-In-Time (JIT) strategies and accurate demand forecasting. This focus on improving inventory management is essential for maintaining strong retailer relationships and supporting overall supply chain efficiency (Gakwaya & Irechukwu, 2022). Additionally, Rwandan manufacturers are implementing lean

inventory practices. By focusing on reducing waste and optimizing resource utilization, these firms are minimizing overhead costs and improving their competitiveness (Nimpano, 2021).

In Rwanda, the manufacturing sector is essential for economic development, yet it is often plagued by inefficient inventory management, which adversely affects supply chain performance. Various studies have highlighted the significance of effective inventory management in enhancing the performance of manufacturing industries in Rwanda. For example, at ADMA International, Bwatete and Irechukwu (2024) demonstrated the impact of improved transportation processes, such as fleet management (41%), route planning (20.6%), and order processing (42.5%) on supply chain performance, which led to significant increases in efficiency.

Similarly, Mahoro and Dushimimana (2024) reported that effective supplier relationship management at Inyange Industries in Kicukiro District significantly improved supply chain performance, quantified by notable percentage increases. Specifically, information sharing resulted in a 91.9% improvement, quality dependability led to an 85.5% enhancement, service reliability saw an 80.8% increase, and strategic supply chain management improved performance by 91.2%. Furthermore, in Agri-Manufacturing Firms, Nimpano (2021) demonstrated that the implementation of Green Supply Chain practices resulted in efficiency improvements of 38%, 44%, and 52%. Moreover, Sulfo Rwanda Industries experienced efficiency increases of 48%, 53%, and 66% due to enhancements in transportation processes (Mbonimana & Akayezu, 2021).

Despite these advancements, many firms, including BRALIRWA PLC, continue to face significant challenges due to inadequate inventory management. According to Uwamahoro *et al.* (2024), poor inventory practices have significantly impacted the efficiency of manufacturing firms in Rwanda. Specifically, inefficiencies due to inadequate inventory management have led to declines in performance by 60% across various firms. Hakizimana *et al.* (2021) highlighted similar inefficiencies in the Medical Procurement and Production Division, where poor supply chain management contributed to inefficiencies of 90%, with poor storage management and excessive product supply accounting for 68% and 67%, respectively.

BRALIRWA PLC faces specific inventory management challenges that hinder its supply chain performance. One major issue is the failure to maintain optimal stock levels, resulting in frequent overstocking or understocking, which causes increased storage costs and potential sales losses. Furthermore, BRALIRWA struggles with managing obsolete inventory, which incurs additional costs and waste. Additionally, the company's demand forecasting is inaccurate, leading to mismatches between inventory and market demand, causing both excess inventory and shortages (Gasasira, 2021).

This research aimed to address a gap identified in previous mentioned studies, which have not specifically focused on the effect of inventory management on supply chain performance of BRALIRWA PLC. The findings were not only providing a comprehensive outline for improving inventory management at BRALIRWA but also served as a model for other Rwandan manufacturing companies facing similar challenges.

The general objective of this study was to assess the effect of inventory management on the supply chain performance of BRALIRWA PLC.
Specific objectives:

1. To assess the effect of inventory cost on the supply chain performance of BRALIRWA PLC.
2. To examine the effect of stock level on the supply chain performance of BRALIRWA PLC.
3. To assess the effect of economic order quantity on the supply chain performance of BRALIRWA PLC.

The following were the null hypotheses of the study formulated based on research objectives:

$H0_1$: Inventory cost has no statistically significant effect on the supply chain performance of BRALIRWA PLC.

$H0_2$: Stock level has no statistically significant effect on the supply chain performance of BRALIRWA PLC.

$H0_3$: Economic order quantity has no statistically significant effect on the supply chain performance of BRALIRWA PLC.

2. Literature Review

This is a summary of existing research and notable findings related to the topic. This includes discussing key studies that have shaped the current understanding of the issue.

2.1 Inventory cost and supply chain performance

Gebisa (2023) examined the effect of supply chain methods on business performance, focusing on how inventory management and information exchange influence organizational success. It involved collecting data from 170 individuals knowledgeable about the firms' supply chain processes and analyzing it through structural equation modeling (SEM). The findings revealed that both information exchange and inventory management practices significantly impact business performance, both directly and indirectly. Specifically,

companies showed improved performance when they practiced effective information sharing and maintained good inventory management (Gebisa, 2023). The research confirmed the theoretical perspective that these factors are crucial for enhancing supply chain efficiency. Furthermore, the study emphasized important management implications, suggesting that organizations should adopt and integrate information technology into their operations to bolster inventory management and information sharing, which in turn can lead to better overall performance (Gebisa, 2023).

Ruzigana (2022) investigated ADMA's inventory management practices and inventory turnover ratio, with specific goals focusing on the effects of lean manufacturing on lead time, bulk purchasing on the cost of products sold, and demand forecasting on average inventory. A descriptive survey was conducted to gather data, selecting 103 participants from a total population of 200 using the Yamane formula and purposive sampling. Data analyzed through descriptive statistics, including mean and standard deviation, revealed significant changes in the inventory turnover ratio due to lean manufacturing, with a significance value of 0.021, below the threshold of 0.05. Additionally, bulk purchasing also had a significant impact, evidenced by a significance value of 0.017. Furthermore, demand forecasting was found to significantly influence the inventory turnover ratio, as indicated by a significance value of 0.038. Implementing lean manufacturing principles more broadly to further improve efficiency, optimizing bulk purchasing strategies to reduce costs, and enhancing demand forecasting techniques to maintain an optimal inventory level, thereby further increasing inventory turnover (Ruzigana, 2022).

Park and Kim (2021) explored the relationship between inventory turnover and company performance in the restaurant sector, particularly focusing on how commodity price risk moderates this connection. Despite the crucial role of effective inventory management in restaurants, there is little evidence of adequate inventory turnover within the industry. The research utilized the Mergent Online database to gather data on publicly listed U.S. restaurant chains spanning from 1999 to 2015. The findings indicated a positive correlation between inventory turnover and financial success. Furthermore, the study revealed that the relationship between inventory turnover and profitability is influenced by the interaction of commodity price risk exposure. This research is notable for being the first empirical investigation into the application of inventory management in the restaurant sector. The results suggest that effective inventory management strategies should be tailored to various restaurant types to enhance overall performance and address the challenges posed by commodity price fluctuations.

Salim *et al.* (2023) investigated the influence of strategic inventory management practices on the performance of logistics organizations in Oman. Their study utilized a mixed-methods approach, including surveys and interviews with logistics managers to gather data on demand forecasting, procurement optimization, and inventory control techniques. Key performance indicators examined included order fulfilment rates, on-time delivery, inventory turnover, and customer satisfaction. The findings revealed that effective strategic inventory management positively impacts these performance metrics by enhancing resource allocation, minimizing stockouts, and improving supply chain responsiveness. Specifically, practices such as Just-in-Time (JIT) inventory management, regular audits, and advanced technological tools were found to significantly boost operational efficiency. The study highlights the necessity of a well-designed inventory management strategy in achieving high organizational performance and suggests that logistics organizations must also consider other supply chain aspects for overall effectiveness. Future research is recommended to explore the broader implications of these practices in different regional contexts.

2.2 Stock level and supply chain performance

Yousfani *et al.* (2023) investigated how inventory management strategies, including inventory control systems, inventory levels, and warehouse operations, impact the supply chain performance of private hospitals in Hyderabad, Pakistan. Over a four-month data collection period, 200 questionnaires were distributed to staff in the stores and purchasing departments of four private hospitals. Data analysis employed principal component analysis and multiple regression techniques. The findings indicated that the supply chain performance of private hospitals is significantly and positively influenced by their inventory management systems, inventory levels, and warehouse operations. These results provide valuable insights for academics and healthcare consultants by highlighting the critical components that affect supply chain effectiveness in the healthcare sector. Additionally, the study suggests several research questions that can guide future investigations in this field, emphasizing the need for continued exploration of inventory management practices in healthcare settings.

Mondol (2021) examined the impact of smart inventory systems and blockchain technology on supply chain performance within the UAE retail sector. A survey was developed and distributed via email, resulting in 202 valid responses that were analyzed to determine the effects of these technologies on retail operations. The statistical analysis confirmed both direct and indirect effects of blockchain technology on supply chain performance, with smart inventory systems acting as a mediator in this relationship. Findings indicated that the integration of blockchain technology has significantly

enhanced efficiency in retail operations and is becoming essential in the industry. The research highlights the importance of embracing innovative technologies such as blockchain and smart inventory systems to improve supply chain performance in the competitive retail landscape of the UAE.

George and Elrashid (2023) explored the impact of demand forecasting and inventory level management on the performance of the Pharmaceutical Supply Chain (PSC) within private hospitals in Bahrain. A survey was conducted with 171 hospital employees, and the responses were analyzed using structural equation modeling. The findings revealed a positive correlation between PSC performance and both inventory level control and demand forecasting. The research emphasizes the importance of effective inventory management strategies to help hospital pharmacies avoid stockouts, manage supply fluctuations, and maintain an adequate stock of essential medications. It highlights those hospitals should utilize statistical methods for accurate demand predictions to better adapt to changes in demand and enhance patient care. The study suggests that improving pharmaceutical inventory management practices can lead to reduced operational costs, increased responsiveness, and greater patient satisfaction. The research provides valuable insights for hospital pharmacists and healthcare professionals, guiding them to optimize PSC performance and improve medication provision.

Tadayonrad and Ndiaye (2023) examined the significance of demand forecasting and safety stock levels in supply chain planning, particularly their impact on inventory management. The research aimed to predict future product or service purchases through the analysis of past sales data and relevant internal and external factors. Effective demand predictions were shown to reduce overproduction and stockouts, enabling companies to better plan their production, logistics, and inventory levels. The study underscored the necessity of maintaining a buffer stock of inventory to address unexpected supply or demand fluctuations and highlighted the importance of determining optimal safety stock levels to meet customer expectations while avoiding excessive carrying costs. Additionally, the research introduced a Key Performance Indicator (KPI) for demand forecasting to enhance cost-effective inventory management and presented a new method for calculating ideal safety stock quantities. By leveraging historical demand patterns and logistical supply reliability data, the study demonstrated an improved approach to forecasting accuracy and safety stock optimization, thus mitigating the risks of stock outs and excess inventory.

2.3 Economic Order Quantity and Supply Chain Performance

Khalid (2024) examined the impact of inventory control systems on the supply chain performance of Kitui Flour Mills in Mombasa County. The research focused on four key inventory management strategies: Just-In-Time (JIT), Economic Order Quantity (EOQ), First-In-First-Out (FIFO), and ABC Analysis. A descriptive research approach was employed, involving a survey of 200 employees across various departments, with a representative sample of 133 respondents selected through stratified random sampling. Data was collected using a structured questionnaire and analyzed using SPSS. The results indicated strong positive correlations between supply chain performance and the four inventory control systems, with JIT showing the highest correlation (0.539), followed by EOQ (0.469), FIFO (0.281), and ABC Analysis (0.159). Recommendations from the study included adopting JIT to improve responsiveness, utilizing EOQ to optimize order amounts, applying FIFO to enhance turnover, and utilizing ABC Analysis for better inventory categorization. Overall, effective inventory management strategies were shown to significantly enhance supply chain performance.

Sugut and Ondara (2023) investigated inventory management operations and supply chain effectiveness in Nairobi City County, focusing on strategic supplier alliances, economic order amounts, just-in-time delivery, and material resource planning. Grounded in theories of lean manufacturing and stock diffusion, the research utilized a descriptive and positivist approach. The population included 340 individuals, with a sample of 183 procurement officers from relevant county offices. A quantitative methodology involving a questionnaire was used to gather data, analyzed through descriptive and inferential statistics with SPSS. Results showed that supply chain performance improved significantly through the implementation of Economic Order Quantity, just-in-time, and material requirements planning, while the impact of strategic supplier alliances was minimal. Recommendations include broadening the use of effective strategies, enhancing supplier engagement, maintaining constant communication, and forming long-term partnerships with fewer suppliers to improve supply chain performance. Further investigation into the causes of weak supplier partnerships could provide insights for stronger collaborations.

Essien and Otu (2022) explored the impact of Economic Order Quantity (EOQ) on organizational performance by reviewing relevant literature in the field. The research utilized the Critical Assessment Skills Programme (CASP) tools checklist to assess and select appropriate articles for inclusion. Following the PRISMA flow chart guidelines, twenty papers met the researcher's inclusion and exclusion criteria for further analysis. The findings

revealed a general consensus among researchers that EOQ positively affects business outcomes, with a strong correlation identified between EOQ implementation and improved organizational performance. The study concluded by recommending that organizations adopt EOQ principles and integrate them into their manufacturing processes to enhance efficiency and effectiveness. By systematically reviewing the literature and employing robust evaluation tools, the research provided valuable insights into the importance of EOQ as a strategic approach to optimizing inventory management and ultimately improving business success.

Mikhago *et al.* (2024) examined the impact of Economic Order Quantity (EOQ) implementation on the performance of sugar production companies in Kenya. Using economic order theory as a framework, the research employed an anchoring correlational strategy and surveyed 144 managers from various departments, including purchasing, inventory, and finance. A random sample of 110 participants was selected, and primary data was gathered through questionnaires, supplemented by secondary data from financial records. To ensure construct validity, expert evaluations and factor analysis were conducted, with reliability assessed using Cronbach's alpha. Descriptive statistics, alongside multiple regression and Pearson correlation analysis were utilized to interpret the data. Results indicated a significant positive impact of EOQ adoption on organizational performance, with a regression coefficient of 0.988, indicating that EOQ accounted for a 61.6% variation in performance. The findings indicate that sugar company managers could leverage these insights to develop cost-cutting and productivity-enhancing strategies, highlighting the importance of training procurement officials on EOQ systems for improved financial performance.

3. Methodology

This section provides an overview of the research methodology that was used in order to evaluate the impact that inventory management has on the execution of the supply chain at BRALIRWA PLC. The purpose of this section is to provide a comprehensive overview of the various methods that was used in the execution of the study, including the processes that used for data collection, analysis, and interpretation.

3.1 Research Design

This study used descriptive and correlational research design. Descriptive approaches and detailed existing inventory management practices at BRALIRWA PLC, while correlation design explored relationship with supply chain performance indicators. Descriptive approaches detailed existing inventory management practices at BRALIRWA PLC, while correlation design explored relationship with supply chain performance indicators. The research identified critical factors contributing to supply chain performance, offering actionable insights for operational improvements.

3.2 Study Population

For the purposes of this study, the population of interest was 317 employees of BRALIRWA PLC who are employed in a various departments. In particular, participants in the research were drawn from the departments of production, finance, marketing, sales, and human resources, as well as representatives from the supply chain.

3.3 Sample Size and Sampling

The Slovin (1960) formula was used in order to determine the appropriate sample size. This is due to the fact that it provides a straightforward approach for determining the specific number of participants who are required for the study.
The following formula was used to calculate the total sample:

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

In this formula, n represents the size of the sample, N the number of participants, and e the margin of error (0.05).

$$n=\frac{317}{1+317(0.05)^2}=\frac{317}{1+0.7925}=\frac{317}{1.7925}=177$$

This calculation compared to the previous equation gives a representative sample of 177 for the study.
The study used simple random sampling as a method of sampling that ensured each member of a population has a known and non-zero chance of being selected, each member of the population had an equal chance of being selected. The use of stratified sampling helped to divide into distinct subgroups or strata and random samples are drawn from each stratum.

3.4 Data Collection Instruments

For the purpose of this investigation, secondary data gathered from the reports, records, and other pertinent material that are managed by BRALIRWA PLC. In order to give context and background information that supports the main data gathered via other techniques, this approach makes use of the information. For the purpose of gaining insights into historical patterns and present practices, the documentary approach included evaluating firm data relating to inventory management procedures and supply chain performance.

In order to acquire quantifiable data from workers, this research made use of a questionnaire that contained questions that did not allow for open-ended responses. The use of closed-ended questions, which provide predetermined answer alternatives, makes it easier to achieve consistency in replies and streamlines the process of data processing. The questionnaire

disseminated in person as well as via electronic means in order to address a significant portion of the population that sampled.

3.5 Data Analysis

The statistical approach may be thought of as a toolbox. It is used to quantify the outcomes of study.

In order to help the reader, grasp the full scope of the study, the researcher included numerical and statistical figures. The research used the Social Science Statistical Package (SPSS). A 5-point scale, with 1 representing Strongly Disagree and 5 Strongly Agree used to assess respondents' degree of agreement or disagreement.

Respondents' views on each variable analysed quantitatively, and the report's components examined using Pearson's correlation to determine the nature of the correlations between them.
The model was used in the study and took the form below:
$Y= \alpha+\beta_1X_1+ \beta_2X_2+ \beta_3X_3 + \beta_4X_4 + ę$
Where: Y = Supply Chain Performance
X1 = Inventory Cost
X2 = Stock Level
X3 = Economic Order Quantity
α= Constant Term
β= Beta Coefficient –These measures how many standard deviations a dependent variable will change, per standard deviation increase in the independent variable.

3.6 Ethical Considerations

The research was carried out in compliance with ethical standards by ensuring that all individuals who may be affected by the research were fully informed of the study's objectives and given their consent before proceeding with the investigation. Respondents were selected in a non-discriminatory manner, with no arbitrary considerations such as religion, gender, color, or any other feature being considered. The research was done in a way that ensured confidentiality, and the findings were utilized to promote the study's aims, as stated in the introduction.

4. Results and Discussion

This section provided the findings based on data gathered via field questionnaires and interviews. To investigate the connections between variables, regression analysis and Pearson correlation were used, resulting in a more complete knowledge of the data. The results show that the study achieved a high response rate, with 91.53% of the distributed questionnaires being completed, which corresponds to 162 responses. Only 8.47% of the questionnaires, equivalent to 15 responses, were unfilled. This indicates effective data collection and participant engagement, contributing to the reliability and validity of the research findings.

4.1 Correlation Analysis

Correlation measures the strength and direction of the linear relationship between two variables, typically ranging from -1 to +1, with values close to +1 indicating a strong positive relationship, values close to -1 indicating a strong negative relationship, and values around 0 suggesting no relationship.

Table 1: Correlation analysis

		Inventory Cost	Stock Level	Economic Order Quantity	Supply Chain Performance
Inventory Cost	Pearson Correlation	1	.731**	.556**	.733**
	Sig. (2-tailed)		.000	.000	.000
	N	162	162	162	162
Stock Level	Pearson Correlation	.731**	1	.616**	.742**
	Sig. (2-tailed)	.000		.000	.000
	N	162	162	162	162
Economic Order Quantity	Pearson Correlation	.556**	.616**	1	.608**
	Sig. (2-tailed)	.000	.000		.000
	N	162	162	162	162
Supply Chain Performance	Pearson Correlation	.733**	.742**	.608**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	162	162	162	162

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

Source: Research Findings, 2024

Table 1 shows the correlation analysis between different inventory management dimensions and supply chain performance at BRALIRWA PLC. The correlation between inventory cost and supply chain performance is r = 0.733, demonstrating a strong positive relationship. The results are consistent with Ruzigana (2022), demonstrating that inventory management practices significantly influence organizational efficiency. At BRALIRWA PLC, the strong positive relationship between inventory cost and both stock levels and supply chain performance aligns with findings at ADMA, where lean manufacturing, bulk purchasing, and demand

forecasting significantly improved the inventory turnover ratio. These correlations emphasize the importance of strategic approaches to inventory management for enhancing cost-effectiveness and operational efficiency.

Stock level has a very strong positive correlation with supply chain performance (r = 0.742), confirming its crucial role in influencing supply chain effectiveness. The results are consistent with Mondol (2021), highlighting the significance of stock levels in shaping supply chain performance. The very strong positive correlation between stock levels and supply chain performance of BRALIRWA PLC mirrors a similar pattern observed in the UAE retail sector, where the integration of blockchain technology and smart inventory systems enhances operational efficiency. Maintaining optimal stock levels, much like embracing innovative technologies, is essential for achieving improved supply chain effectiveness in dynamic environments.

Economic order quantity is also positively correlated with supply chain performance (r = 0.608), reflecting its substantial impact on BRALIRWA performance. The results are consistent with Sugut and Ondara (2023), emphasizing the positive correlation between Economic Order Quantity and supply chain performance. Similar to the findings in Nairobi City County, the implementation of Economic Order Quantity at BRALIRWA PLC significantly enhances supply chain efficiency. The study highlights that effective inventory management practices, such as Economic Order Quantity, lead to improved supply chain outcomes, particularly when complemented by strategies like just-in-time delivery and material requirements planning.

All correlations are significant at the 0.05 level, affirming the significant relationship between inventory cost, stock level, economic order quantity and supply chain performance at BRALIRWA PLC.

4.2 Regression Analysis

Regression analysis goes a step further by quantifying the relationship between a dependent variable and one or more independent variables, allowing researcher to assess how changes in independent variables impact the dependent variable. Through regression, researcher derived an equation that predicts the dependent variable based on the values of independent variables, along with coefficients that indicate the size and significance of these associations.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.805[a]	.648	.641	.37362	1.575

a. Predictors: (Constant), Economic Order Quantity, Inventory Cost, Stock Level

b. Dependent Variable: Supply Chain Performance

Source: Research Findings, 2024

Table 2 shows an R-squared value of 0.648, meaning that approximately 64.8% of the variance in supply chain performance is explained by economic order quantity, inventory cost, and stock level. This high percentage indicates the collective effect of these inventory management factors on the supply chain performance of BRALIRWA PLC. The Durbin-Watson statistic of 1.575 indicates a moderate level of autocorrelation in the residuals of the regression model.

The results are consistent with Truong (2023), emphasizing the critical role of effective inventory management in enhancing supply chain performance. The findings in Vietnam, where accurate inventory management is key to balancing supply and demand, driving productivity, and improving business outcomes.

Table 3: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	40.547	3	13.516	96.543	.000[b]
	Residual	22.056	158	.140		
	Total	62.603	161			

a. Dependent Variable: Supply Chain Performance

b. Predictors: (Constant), Economic Order Quantity, Inventory Cost, Stock Level

Source: Research Findings, 2024

Table 3 tests the overall significance of the regression model, assessing whether the combined effects of economic order quantity, inventory cost, and stock level have a statistically significant effect on supply chain performance. The F-statistic is 96.543, which is high. A larger F-value indicates that the regression model provides a good fit for the data, meaning the independent variables (inventory management factors) significantly explain the variability in supply chain performance. The p-value is 0.000, which is less than 0.05, indicating that

the model is statistically significant. This means that the combination of the three inventory management variables has a significant effect on the supply chain performance of BRALIRWA PLC.

The results are consistent with Kelka (2024), highlighting the significance of inventory management in improving supply chain performance. Companies like Volkswagen and Adidas demonstrate the importance of effective inventory management, such as synchronized production schedules and predictive analytics, in enhancing operational efficiency.

Table 4: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.635	.178		3.567	.000		
	Inventory Cost	.345	.066	.369	5.227	.000	.447	2.235
	Stock Level	.340	.070	.360	4.857	.000	.402	2.490
	Economic Order Quantity	.174	.059	.181	2.949	.004	.596	1.677

a. Dependent Variable: Supply Chain Performance

Source: Research Findings, 2024

Table 4 presents the results of each independent variable (inventory cost, stock level, and economic order quantity) on the dependent variable (supply chain performance). The model used in the study is represented as:

$Y= \alpha+\beta_1X_1+ \beta_2X_2+ \beta_3X_3 + \beta_4X_4 + ę$
Where:

Y = 0.635 + 0.345 (Inventory Cost) + 0.340 (Stock Level) + 0.174 (Economic Order Quantity) + 0.178

The unstandardized coefficient for inventory cost (β_1 = 0.345) indicates that for every unit increase in inventory cost, supply chain performance improves by 0.345 units, holding other variables constant. The t-value is 5.227, which is high, showing inventory cost is a strong predictor of supply chain performance. The p-value is 0.000, which is less than 0.05, indicating statistical significance. Hence, Ho1 (that inventory cost has no statistically significant effect on supply chain performance of BRALIRWA PLC) is rejected.

The findings are supported by Park and Kim (2021), emphasizing the significant relationship between inventory cost and performance. The strong t-value and statistically significant p-value for inventory cost in the BRALIRWA PLC study align with the positive correlation between inventory turnover and financial performance observed in the restaurant sector. The study highlights the importance of effective inventory management in improving performance, especially in industries facing external challenges, such as commodity price fluctuations.

Stock level has an unstandardized coefficient (β_2 = 0.340), meaning that for every unit increase in stock level, supply chain performance improves by 0.340 units, assuming other factors remain constant. The t-value is 4.857, reflecting its strong influence on supply chain performance. The p-value is 0.000, indicating statistical significance. Thus, Ho2 (that stock level has no statistically significant effect on supply chain performance of BRALIRWA PLC) is rejected.

The findings are supported by George and Elrashid (2023), emphasizing the significant effect of stock level on supply chain performance. Similar to their findings in the pharmaceutical supply chain, the study at BRALIRWA PLC demonstrates that stock level management directly influences supply chain performance. The positive correlation between stock level and supply chain efficiency aligns with the observed impact of effective inventory management practices, highlighting the importance of maintaining optimal stock levels to enhance operational performance.

Economic order quantity has an unstandardized coefficient (β_3 = 0.174), meaning that for every unit increase in economic order quantity, supply chain performance improves by 0.174 units, assuming other variables are held constant. The t-value is 2.949, which is moderate, showing its impact on supply chain performance. The p-value is 0.004, which is less than 0.05, indicating statistical significance. Therefore, Ho3 (that economic order quantity has no statistically significant effect on supply chain performance of BRALIRWA PLC) is rejected.

The findings are supported by Essien and Otu (2022), highlighting the positive effect of Economic Order Quantity (EOQ) on supply chain performance. Similar to their literature review, which demonstrated a strong correlation between EOQ and improved organizational performance, the results at BRALIRWA PLC show that an increase in EOQ leads to a measurable improvement in supply chain efficiency. This aligns with the broader consensus that adopting EOQ principles enhances inventory management and contributes to organizational success.

Table 5: Collinearity Diagnostics

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	Inventory Cost	Stock Level	Economic Order Quantity
1	1	3.953	1.000	.00	.00	.00	.00
	2	.021	13.604	.85	.10	.14	.00
	3	.016	15.691	.13	.18	.02	.93
	4	.010	20.334	.03	.71	.84	.07

a. Dependent Variable: Supply Chain Performance

Source: Research Findings, 2024

This table 5 presents the collinearity diagnostics for the model assessing the relationships between inventory cost, stock level, and economic order quantity as predictors of supply chain performance. The eigenvalues and condition indices suggest potential multicollinearity among the variables. A condition index exceeding 15 (notably 15.691 and 20.334 for dimensions 3 and 4) indicates moderate to strong multicollinearity, especially for stock level and economic order quantity. Variance proportions further confirm this, as these variables contribute significantly to the last two dimensions, particularly stock level (0.71 in dimension 4) and economic order quantity (0.93 in dimension 3).

Table 6: Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.3535	4.5882	3.5531	.50184	162
Residual	-.80853	1.15101	.00000	.37013	162
Std. Predicted Value	-2.390	2.063	.000	1.000	162
Std. Residual	-2.164	3.081	.000	.991	162

a. Dependent Variable: Supply Chain Performance

Source: Research Findings, 2024

This table summarizes the residuals statistics for the predictive model of supply chain performance. The predicted values of supply chain performance range from 2.3535 to 4.5882, with an average value of 3.5531 and a standard deviation of 0.50184. The residuals, which measure the differences between observed and predicted values, range from -0.80853 to 1.15101 with a mean of 0, indicating that the model has no systematic bias in prediction. The standard deviation of the residuals (0.37013) indicates reasonable accuracy.

4.3 Hypotheses Results

Based on the results provided, here are the comments on each hypothesis:

H_{01}: Inventory cost has no statistically significant effect on the supply chain performance of BRALIRWA PLC.

The results demonstrate a significant effect of inventory cost on supply chain performance, as indicated by an unstandardized coefficient of $\beta_1 = 0.345$ and a p-value of 0.000. These statistics allow the researcher to reject the null hypothesis (H_{01}).

H_{02}: Stock level has no statistically significant effect on the supply chain performance of BRALIRWA PLC.

The analysis indicates a significant effect of stock level on supply chain performance, evidenced by an unstandardized coefficient of $\beta_2 = 0.340$ and a p-value of 0.000. This significant result leads to the rejection of the null hypothesis (H_{02}).

H_{03}: Economic order quantity has no statistically significant effect on the supply chain performance of BRALIRWA PLC.

The findings reveal a significant effect of economic order quantity (EOQ) and supply chain performance, as demonstrated by an unstandardized coefficient of $\beta_3 = 0.174$ and a p-value of 0.004. These results are statistically significant, allowing the rejection of the null hypothesis (H03).

All three null hypotheses (H_{01}, H_{02}, and H_{03}) were rejected based on the evidence from the analysis, supporting the conclusion that inventory cost, stock level, and economic order quantity all play significant roles in shaping the supply chain performance of BRALIRWA PLC.

5. Conclusion and recommendations

5.1 Conclusion

The findings indicate that inventory cost management has a significant and positive impact on BRALIRWA PLC's performance. Respondents strongly agree that effective handling of inventory costs is essential for enhancing the company's operations, with most aspects receiving high ratings.

The analysis reveals that managing stock levels plays a critical role in improving supply chain performance at BRALIRWA PLC. Respondents' high ratings emphasize the value of maintaining optimal stock levels to support efficiency and productivity. Although opinions vary

slightly, the results collectively confirm the importance of effective stock level management in driving supply chain success.

The study demonstrates that economic order quantity strategies significantly contribute to supply chain performance at BRALIRWA PLC. Respondents rate these strategies highly, recognizing their importance in enhancing operational efficiency and ensuring a well-functioning supply chain.

5.2 Recommendations

1. Management should regularly review and optimize procurement strategies to minimize unnecessary costs while maintaining adequate stock levels to meet market demand effectively.
2. BRALIRWA PLC should enhance supply chain collaboration with stakeholders through shared platforms for real-time data exchange, improving decision-making and supply chain efficiency.

5.3. Area for Further Research

Future studies could examine the effect of cost-tracking systems on the performance of BRALIRWA PLC. Research could also explore the effects of real-time inventory monitoring systems on maintaining optimal stock levels. Additionally, future studies might investigate the influence of flexible supplier contracts' performance of BRALIRWA PLC.

References

Bwatete, M., & Irechukwu, E. N. (2024). Influence of transportation process on supply chain performance of selected manufacturing industries in Rwanda: A case of ADMA International. I*nternational Journal of Advanced Research, 12*(6), 1082-1096.

Essien, E. E., & Otu, U. E. (2022). An assessment of economic order quantity and organizational performance: A literature review. *Business & Social Sciences Journals,* 7(2), 67–92.

Gasasira, J. (2021). *Audit quality and financial performance in Rwandan listed companies: a case of bank of Kigali and BRALIRWA Plc* (Doctoral dissertation, University of Rwanda).

Gebisa, D. (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.

George, S., & Elrashid, S. (2023). Inventory management and pharmaceutical supply chain performance of hospital pharmacies in Bahrain: A structural equation modeling approach. *SAGE Open, 13*(1), 21582440221149717.

Hakizimana, T., Kayumba, P. C., Hahirwa, I., & Kabalisa, M. (2021). Assessment of factors contributing to medicine expiry in Rwanda: Case of the Medical Procurement and Production Division. *Rwanda Journal of Medicine and Health Sciences, 4*(2), 281-291.

Ho, G. T., Tang, Y. M., Tsang, K. Y., Tang, V., & Chau, K. Y. (2021). A blockchain-based system to enhance aircraft parts traceability and trackability for inventory management. *Expert Systems with Applications*, 179, 115101.

Jama, M. (2022). *Linking inventory management practices to inventory and warehouse performance in the retail industry in Gauteng and KwaZulu-Natal Provinces* (Doctoral dissertation, Vaal University of Technology).

Khalid, S. M., & Ndolo, J. (2024). Effect of inventory control systems on supply chain performance at Kitui Flour Mills, Mombasa County. *Reviewed Journals, 5*(1), 327–343.

Koçyiğit, E. G., & Kadilar, C. (2024). Information theory approaches ranked set sampling and new sub-ratio estimators. *Communications in Statistics-Theory and Methods*, 53(4), 1331-1353.

Mahoro, I., & Dushimimana, J. D. (2024). The role of supplier relationship management on supply chain performance: A case of Inyange Industries in Kicukiro District, Rwanda. *Journal of Procurement & Supply Chain, 8*(1), 86-106.

Mbonimana, G., & Akayezu, M. N. (2021). Impact of transportation and supply chain of manufacturing industries: A case study of Sulfo Rwanda Industries. *International Journal of Advanced Research, 12*(6), 1082-1096.

Mikhago, E., Fozia, & Atieno, M. (2024). Effect of economic order quantity on organizational performance of sugar manufacturing firms in Kenya. *American International Journal of Business Management, 7*(5), 24–36.

Mondol, E. P. (2021). The impact of block chain and smart inventory system on supply chain performance at retail industry. *International Journal of Computations, Information and Manufacturing (IJCIM), 1*(1).

Nimpano, D. (2021*). Effects of green supply chain adoption on supply chain performance of agri-manufacturing firms in Rwanda.* [Doctoral

dissertation, Jomo Kenyatta University of Agriculture and Technology].

Nshimiyimana, A., & Rukundo, J. P. (2020). Updates on modern agricultural technologies adoption and its impacts on the improvement of agricultural activities in Rwanda: A review. *International Journal of Innovative Science and Research Technology*, *5*(12), 222-229.

Park, E. (O.), & Kim, W.-H. (2021). The effect of inventory turnover on financial performance in the US restaurant industry: The moderating role of exposure to commodity price risk. *Tourism Economics*, *27*(7), 1417–1429.

Rubel, K. (2021). Increasing the Efficiency and Effectiveness of Inventory Management by Optimizing Supply Chain through Enterprise Resource Planning Technology. *EFFLATOUNIA-Multidisciplinary Journal*, *5*(2), 1739-1756.

Ruzigana, U. A. (2022). The effect of inventory management on the inventory turnover ratio of organization: Case of ADMA. *Global Scientific Journal*, *10*(12), 1417-1418.

Salim, M. S., Jamaluddin, Z., & Zulkifli, N. (2023). The impact of strategic inventory management on logistics organization's performance. *International Journal of Business and Technology Management*, *5*(3), 24-39.

Sugut, J. C., & Ondara, A. (2023). Inventory management practices and performance of supply chain at the Nairobi City County, Kenya. *The Strategic Journal of Business & Change Management*, *10*(4), 396–416

Tadayonrad, Y., & Ndiaye, A. B. (2023). A new key performance indicator model for demand forecasting in inventory management considering supply chain reliability and seasonality. *Supply Chain Analytics*, 3, 100026.

Truong, K. D. (2023). Impact of inventory management on firm performance a case study of listed manufacturing firms on HOSE. *International Journal of Information, Business and Management*, *15*(1), 93-115.

Uwamahoro, A., Shale, N. I., & Wachiuri, E. (2024). Performance measurement integration and performance of manufacturing firms in Rwanda. *International Journal of Social Science and Humanities Research*, *2*(1), 221-236.

Yousfani, K., Shah, S. S. A., Shaikh, R. A., & Junejo, I. (2023). The effect of inventory management practices on supply chain performance: Evidence from private hospitals of Sindh, Pakistan. *Journal of Namibian Studies*, *34*(S2), 1942-1958.