

The Effect of Inventory Management Practices on Supply Chain Performance of Perishable Food Products: A Case of Small Enterprises in Dar es Salaam

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Abstract

This study examines how inventory management practices affect supply chain performance for perishable food products among small enterprises in Dar es Salaam, Tanzania, addressing the challenge of managing perishables efficiently in resource-constrained environments. Perishable goods require precise inventory practices due to their limited product lifespan and high risk of spoilage. The study focused on inventory turnover, inventory record accuracy, and demand forecast accuracy as key variables influencing supply chain performance. A quantitative research design was employed, with data collected from 292 respondents using structured questionnaires targeting managers and staff involved in inventory and supply chain operations. Descriptive statistics and multiple regression analysis were used to interpret the data. The results revealed that all three inventory practices had a statistically significant positive impact on supply chain performance, with inventory turnover exerting the greatest influence. Accurate inventory records and reliable demand forecasts were also found to be essential for improving order fulfillment and minimizing waste. The study concludes that improving inventory practices can significantly enhance the performance of perishable supply chains in small enterprises. It recommends adopting simple tracking tools, coordinated ordering strategies, and basic forecasting methods, along with staff training, to strengthen operational capacity in informal urban markets.

Keywords: Inventory Management, Supply Chain Performance, Inventory Record Accuracy, Inventory Turnover, Small Enterprises.

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Introduction

Inventory management is a key determinant of efficiency in supply chains, particularly for perishable products (Burawat, 2016). In Dar es Salaam City, Small enterprises dealing in fruits, vegetables, dairy, and meat and other related food items have a very high difficulty level in inventory management because of the limited resource base, low level of technology adoption, and also due to the nature of goods being handled, which are sensitive to time and need care and quick distribution.

In this context, poor practices of inventory management often encourage high levels of product wastage, increase operational cost, reduce profitability, and finally affect performance in the supply chain. Globally, the role of inventory management practices in improving inventory performance in Malaysian public hospitals, The research highlights that accurate demand forecasting helps hospitals maintain optimal stock levels, reducing the risks of stockouts and overstocking.

It emphasizes that effective forecasting methods, such as historical data analysis, trend projections, and seasonal demand patterns, improve inventory planning and ensure the availability of essential medical supplies. Additionally, the study suggests that integrating technology, such as automated forecasting systems, enhances inventory efficiency, minimizes waste, and improves overall hospital supply chain performance.

In Africa, the studies by Odhiambo & Kihara (2018) investigated the effect of inventory management practices on supply chain performance in government health facilities in Kisumu County, Kenya. Their research highlights inventory record accuracy as a key element in ensuring efficient healthcare supply chains. The research emphasizes that discrepancies between recorded and actual stock levels may lead to stockouts, overstocking, and inefficiencies in resource allocation. Also, Atnafu & Balda (2018) examined the impact of inventory management practices on the competitiveness and organizational performance of micro and small enterprises in Ethiopia's manufacturing sector.

The research concluded that a high inventory turnover indicates effective inventory control, reducing excess stock and associated costs, while a low turnover suggests overstocking or slow-moving inventory, which can negatively affect cash flow and profitability. In Tanzania, evaluated the impact of inventory management practices on the performance of public hospitals, focusing on a specific case in Arusha. This study highlighted that effective inventory management practices, such as accurate inventory tracking and timely replenishment, significantly improve resource allocation and service delivery in the public health sector.

Transaction Cost Theory and Constraint Theory have provided useful through which to view inventory management. According to TCT, which was developed by Coase in 1937, every firm tries to minimize the transaction costs, including those that involve supply chain inefficiencies. For the perishable food products, this theory would mean that small enterprises try to reduce inventory-related costs, such as holding and shortage costs, by making their inventory management practices more efficient (Rindfleisch, 2020). On the other hand, Constraint Theory by Goldratt in 1984 is concerned with identifying and addressing constraints or bottlenecks within supply chain processes.

In the case of perishable products, this theory would suggest that inventory management practices are matched with constraints pertaining to the product's shelf life, storage capacity, and limitations on transportation (Şimşit et al., 2014). Generally, this research is important as it aims to address literature gap on inventory management practices and their effects on supply chain performance for Small enterprises dealing with perishable food products. The results will also provide practical implications for owners of businesses, policymakers, and supply chain professionals in designing inventory management strategies that reduce waste, hence improving efficiency and enhancing supply chain performance within the perishable goods sector.

Methods

The study was conducted in Tanzania, Dar es Salaam (6.7924° S, 39.2083° E), covering small enterprises managing perishable food products within supply chain operations. Dar es Salaam is the country's commercial hub, with a high concentration of small enterprises involved in food processing, distribution, and retail. The city's strategic location, extensive market networks, and logistical challenges in handling perishable goods make it an ideal study area (Snyder et al., 2015). According to Ministry of Industry and Trade Dar es Salaam region had approximately 5,900 Small Enterprises. This study adopted a positivist research philosophy,

which assumes that reality is objective and can be measured through observable and quantifiable phenomena. This approach allowed for the use of structured methodologies, empirical data collection, and statistical analysis to examine the relationships between inventory management practices and supply chain performance. A deductive research approach was applied, beginning with established theories related to inventory turnover, record accuracy, and forecasting accuracy, which guided the formulation of research questions and the development of data collection instruments. The research strategy employed was a survey, enabling the collection of standardized quantitative data from a large sample of small enterprises in Dar es Salaam City. This strategy was suitable for assessing the effects of inventory management practices on the performance of perishable food product supply chains. A quantitative research design was utilized to generate numerical data on inventory indicators, allowing for objective analysis and the generation of empirical evidence on their influence on supply chain performance.

In this study, Solvin formula was employed to determine the appropriate sample size. From solvin formula.

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

Where:

n = sample size

N = population size (5,900)

e= margin of error (commonly 5% or 0.05)

$$n = \frac{5900}{1+(5900 \times 0.05^2)}$$

Thus, the required sample size is approximately n=375 Small enterprises. The study used a simple random sampling technique to select small enterprises involved in food processing, distribution, and retail. To conduct the simple random procedure, the study clearly identified the population of interest. The researcher created a comprehensive list of all individuals in the population, from which the sample was randomly selected, ensuring that each enterprise had an equal chance of being included.

In this study, data were gathered using a structured survey questionnaire. The data collected were analyzed using descriptive and inferential statistics. Descriptive statistics were used to summarize and describe the data collected from the questionnaires. Inferential statistics were employed to test the research questions that inventory management practices affect supply chain performance of perishable food products. Statistical software, IBM SPSS Statistics version 27, was used to analyze the data. Multiple regression analysis was employed to examine whether there was a significant relationship between the dependent and independent variables.

$$Y = \beta_0 + \beta_1 + \beta_2 B + \beta_3 C + \varepsilon$$

(2)

Where,

Y= Supply Chain Performance of small enterprises

A=Inventory Turnover

B= Inventory Record Accuracy

C= Demand Forecasting Accuracy

ε = Error term

β_0 , β_1 , β_2 and β_3 these coefficients show how much Y is expected to change when the corresponding independent variable increases by one unit, assuming other variables remain constant.

Results and Discussion

The study targeted a total of 384 respondents from small enterprises engaged in handling perishable food products within Dar es Salaam. Out of these, 292 respondents successfully completed and returned the questionnaires. This resulted in a response rate of approximately 76.04%, which is considered sufficient for quantitative data analysis and generalization of findings.

Table 1. Response Rate

Category	Number
Questionnaires Distributed	375
Questionnaires Returned	292
Response Rate (%)	77.9

Results According to the Objectives

This section presents the study results in alignment with the specific research objectives. Each objective is addressed through the analysis of relevant variables to determine their relationship with supply chain performance in small enterprises dealing with perishable food products. Questions asked to each objective were based on 5 points Likert scale where by respondent rated to their degree of agreeing by using,

1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree and 5= Strongly Agree

Inventory Turnover

Table 2 shows respondents' perceptions of inventory turnover practices and their impact on supply chain performance for perishable food products. The finding shows that 49% of respondents reported the existence of established inventory turnover targets per period, while 38.3% disagreed, indicating variability in strategic inventory planning among enterprises. Furthermore, 52.4% acknowledged that increased distribution frequency enhances performance, suggesting a broad recognition of its positive effect on supply chain responsiveness and product freshness. Regarding inventory holding duration, 50.3% agreed that inventory remained in storage for short periods, reflecting efficiency in stock flow to minimize spoilage risk, whereas 33.2% reported the opposite, highlighting challenges in timely turnover. Similarly, 48.3% indicated that ordering processes ensured a consistent supply of fresh products, though 35.9% disagreed, pointing to weaknesses in demand forecasting or procurement planning. Lastly, 50% agreed that inventory levels were frequently checked to

prevent spoilage, while 33.5% disagreed, indicating inadequacies in inventory monitoring in certain enterprises.

Table 2. Inventory Turnover

Statement	1	2	3	4	5
There is a set inventory turnover target per period.	14.7%	23.6%	12.7%	30.5%	18.5%
Higher distribution frequency indicates better performance.	12.3%	15.4%	19.9%	32.9%	19.5%
Inventory stays in storage for a short time.	14%	19.2%	16.4%	30.8%	19.5%
Our ordering process ensures a steady supply of fresh products.	15.4%	20.5%	15.8%	29.8%	18.5%
We frequently check inventory levels to avoid spoilage	11.6%	21.9%	16.4%	33.2%	16.8%

Inventory record accuracy

Table 3 presents respondents' perceptions of inventory record accuracy in small enterprises managing perishable food products, indicating moderate adoption of accurate record-keeping practices. Specifically, 46.6% agreed that inventory records are well-maintained, while 37.3% disagreed, reflecting inconsistencies in accuracy. Similarly, 45.9% affirmed that reports are timely and error-free, compared to 38.7% who disagreed. Periodic reconciliation of stock and purchase records was reported by 47.6% of respondents, with 35.6% dissenting, and 46.9% confirmed periodic inventory counts, against 34.6% who disagreed. Regarding human resource capacity, 49% agreed that employees possess sufficient inventory management experience, while 51.1% stated that records provide complete information on all items, although 38.3% expressed uncertainty, indicating potential deficiencies in data completeness and reliability.

Table 3. Inventory Record Accuracy

Statement	1	2	3	4	5
Inventory records are well-maintained	17.8%	19.5%	16.1%	30.8%	15.8%
Reports and records are prepared on time and without errors.	17.1%	21.6%	15.4%	30.8%	15.1%
Stock records are regularly reconciled with purchase records.	16.4%	19.2%	16.8%	28.8%	18.8%
Inventory counts are conducted periodically	15.8%	18.8%	18.5%	28.4%	18.5%
Employees managing inventory records have sufficient experience.	17.1%	20.2%	13.7%	26.4%	22.6%
The inventory records in a business consistently provide complete information on all items.	17.8%	20.5%	10.6%	29.5%	21.6%

Demand Forecasting Accuracy

Table 4 shows respondents' views on demand forecasting accuracy in small enterprises managing perishable food products, revealing moderate confidence in current forecasting practices. While 48.9% believed their forecasts were consistent and reliable, 35% disagreed, indicating room for improvement. Similarly, 47.3% claimed to predict seasonal demand accurately, though 37.7% disagreed, suggesting uneven forecasting precision. A slight majority (49.3%) reported using historical sales data to inform forecasts, reflecting partial adoption of

data-driven approaches. Additionally, 51.7% recognized that accurate forecasting reduces product wastage, highlighting its practical value. However, the split in opinions on forecast consistency over time points to variability in forecasting effectiveness among enterprises.

Table 4. Demand Forecasting Accuracy

Statement	1	2	3	4	5
Our demand forecasts are consistent and reliable.	15.1%	19.9%	16.1%	32.5%	16.4%
We accurately predict seasonal changes in customer demand.	16.8%	20.9%	15.1%	30.5%	16.8%
We use past sales trends to improve future demand forecasts.	14.7%	21.6%	14.4%	33.9%	15.4%
Accurate demand forecasting reduces wastage of products.	13.7%	21.1%	12.7%	32.9%	18.8%
There is minimal variation in our demand forecasts over time.	16.8%	21.2%	12.7%	31.2%	18.2%

Modal Summary

In table 5 below the modal summary shows that a strong positive relationship ($R = 0.761$) between inventory turnover, inventory record accuracy, and demand forecasting accuracy with supply chain performance. The R Square value of 0.580 indicates that 58.0% of the variation in supply chain performance is explained by these three variables. The Adjusted R Square (0.575) confirms the model's reliability after accounting for the number of predictors. The standard error of 0.49195 suggests a good model fit. Thus, the three inventory management practices significantly influence supply chain performance.

Table 5. Modal Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.761 ^a	.580	.575	.49195

Analysis of Variance (ANOVA)

The ANOVA results presented in Table 6 demonstrate that the regression model is statistically significant, with an F-value of 132.493 and a p-value of 0.000, which is below the 0.05. This indicates that the model provides a good fit to the data and that at least one independent variable has a significant effect on supply chain performance. Moreover, the regression sum of squares (96.197) compared to the residual sum of squares (69.701) shows that a considerable proportion of the variation in supply chain performance is explained by the model.

Table 6. ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	96.197	3	32.066	132.493	.000 ^b
	Residual	69.701	288	.242		
	Total	165.898	291			

Coefficients

The coefficients table 7 below presents the individual contribution of each independent variable to the dependent variable supply chain performance. The regression equation expressed as:

$$Y = 0.191 + 0.439X_1 + 0.352X_2 + 0.169X_3 + \varepsilon$$

Where:

Y = Supply chain performance

X₁ = Inventory turnover

X₂ = Inventory record accuracy

X₃ = Demand forecasting accuracy

ε = Error term

The regression analysis revealed that all three inventory management practices had a statistically significant positive impact on supply chain performance ($p < 0.05$). Inventory Turnover showed the strongest influence, with an unstandardized coefficient ($\beta = 0.439$), indicating that a one-unit increase in turnover leads to a 0.439-unit improvement in supply chain performance, holding other factors constant. Inventory Record Accuracy also had a notable effect ($\beta = 0.352$), suggesting that greater accuracy in inventory records enhances operational efficiency. Demand Forecast Accuracy had a positive but comparatively weaker effect ($\beta = 0.169$), indicating its relevance, though less affect than the other predictors. Overall, the results confirm that each of the independent variables significantly contributes to explaining variations in supply chain performance.

Table 7. Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.191	.159		1.197	.232
	Inventory turnover	.439	.041	.444	10.599	.000
	Inventory record accuracy	.352	.038	.379	9.299	.000
	Demand forecast accuracy	.169	.034	.200	4.929	.000

Discussions

This study adds new understanding about how inventory management helps small businesses that sell perishable food products improve their supply chain. While many earlier studies looked at inventory turnover, record accuracy, or demand forecasting separately, this study combines all three and shows how they work together in small businesses. Unlike other research that focuses on big companies or non-perishable goods, this study focuses on small businesses in Dar es Salaam and the everyday challenges they face. The results show that simple actions like turning over inventory quickly, keeping accurate records, and using local knowledge to predict demand can reduce food spoilage and make the supply chain work better. This new focus helps small businesses manage perishable goods better and adds useful information for improving supply chains in developing countries.

Inventory Turnover and Supply Chain Performance of Perishable Food Products in Small Enterprises

The findings of this study indicate that efficient inventory turnover positively influences the supply chain performance of perishable food products in small enterprises. Respondents generally agreed that timely turnover practices, such as regular inventory checks, rapid stock movement, and high distribution frequency, contribute to improved supply outcomes by reducing spoilage and maintaining product freshness. Mohammadi et al. (2023) emphasized the role of efficient inventory turnover in sustainable supply chain models for perishable goods, showing that optimal replenishment and pricing reduce holding costs and waste. Their model demonstrates how timely turnover mitigates deterioration, aligning with this study's findings that effective turnover practices enhance perishable supply chain performance. Wan et al. (2024) highlighted the impact of transshipments on inventory turnover and fulfillment. Their study shows that well-coordinated stock redistribution improves turnover rates and reduces inefficiencies across locations. This aligning with the study's findings by underscoring how effective inventory movements, even within small-scale contexts, enhance supply chain responsiveness.

Henry et al. (2023) found that supplier-customer collaboration and real-time information sharing significantly improve inventory turnover by aligning supply with demand. These insights support study's results, which imply that small enterprises with coordinated replenishment processes achieve better turnover. Burawat (2016) demonstrated a positive correlation between inventory turnover and organizational performance, with higher turnover linked to better profitability and liquidity. The findings align with this study by reinforcing the importance of rapid inventory movement. Similarly, Park & Kim (2021) found that high inventory turnover is associated with greater profitability, ROI, and market share. Their findings provide further evidence of the benefits of efficient turnover, supporting the assertion that well-managed inventory cycles improve supply chain outcomes.

These findings can also be interpreted through the Theory of Constraints (TOC). TOC posits that system performance is limited by the most critical constraint, and improving this constraint enhances overall system efficiency. In the context of small enterprises handling perishable goods, the constraint often lies in slow inventory turnover, which leads to spoilage and inefficiency. By implementing efficient turnover practices, as practical in this study, enterprises effectively address the constraint, thereby improving supply chain performance, reducing waste, and enhancing operational throughput.

Inventory Record Accuracy and Supply Chain Performance of Perishable Food Products in Small Enterprises

The findings from this study determine that accurate inventory records significantly enhance the supply chain performance of perishable food products in small enterprises. Respondents indicated that precise inventory documentation minimizes stock discrepancies, facilitates timely replenishment, reduces spoilage, and supports effective planning key factors in managing time-sensitive goods. Odhiambo & Kihara (2018) revealed that inventory record accuracy substantially improves supply chain performance by preventing stockouts, reducing waste, and enabling efficient replenishment, particularly in public health facilities managing perishable medical supplies. Their findings support this study's results by demonstrating the operational value of accurate records.

Sathiya et al. (2024) found that the use of technology significantly enhanced inventory record accuracy in perishable food supply chains through real-time data monitoring and improved traceability. These findings align with the study in supporting the performance benefits of accurate records. Ahmadi et al. (2022) demonstrated that intelligent inventory systems using

computational models could improve record accuracy and reduce perishables' waste in pharmaceutical supply chains. This supports the observed relationship in the study between record precision and enhanced supply performance. Tundura & Wanyoike (2016) identified a positive correlation between inventory record accuracy and organizational performance using inventory reconciliation techniques. This supports the study's findings by emphasizing that accurate records contribute to operational and financial improvements.

reported a negative correlation between inventory record accuracy and manufacturing performance, suggesting that excessive focus on record precision might introduce inefficiencies. While this introduces a critical perspective, the study's exclusion of perishable products and its industrial focus limit its relevance to the perishability-sensitive food supply chains examined in the current research. From the perspective of the Theory of Constraints (TOC), inaccurate inventory records represent a key constraint limiting the flow of goods and overall system efficiency. By ensuring accurate records, small enterprises effectively improve this constraint, enabling smoother replenishment cycles, reducing spoilage, and improving complete supply chain performance.

Demand Forecast Accuracy and Supply Chain Performance of Perishable Food Products in Small Enterprises

The study finding shows that demand forecast accuracy plays a significant role in improving the supply chain performance of perishable food products in small enterprises. Accurate forecasting minimizes spoilage, enhances inventory control, and ensures timely replenishment elements crucial for managing goods with short shelf lives. Huber et al. (2017) demonstrated that cluster-based hierarchical forecasting techniques, which use machine learning and segmentation based on historical demand patterns, significantly improved forecasting accuracy. These improvements led to reduced waste and stockouts, enhancing overall supply chain performance for perishables. Kaizer et al. (2022), through a systematic review, identified that advanced forecasting models ranging from time-series to hybrid artificial intelligence approaches enhance demand prediction for perishable goods. The study confirmed that accurate forecasts improve inventory turnover and minimize wastage.

Priyadarshi et al. (2019) provided empirical evidence that machine learning models, such as neural networks, outperform traditional methods in forecasting demand for perishable vegetables at the retail stage. Accurate forecasting enabled more precise inventory management, reducing spoilage. Zhu et al. (2021) observed that in the pharmaceutical industry, improved demand forecast accuracy allows better alignment of inventory levels with actual demand, thereby reducing stockouts and excess inventory. The study concluded that such alignment enhances supply chain efficiency and reduces operational disruptions. Though based in the pharmaceutical context, the findings support the current study by emphasizing the universal importance of accurate forecasting in reducing supply mismatches and associated inefficiencies. Amer et al. (2020) found that firms with accurate demand forecasts experienced fewer disruptions due to better synchronization between production and demand.

They also noted improved safety stock management, which led to enhanced supply chain performance. These findings align closely with the current study's results, reinforcing that precise demand forecasting is critical in managing perishables, especially where overproduction or underproduction could result in substantial losses. From the perspective of the Transaction Cost Theory (TCT), inaccurate demand forecasts constitute a critical constraint that limits the flow of products and overall system performance (Ronald Coase in 1937 and later expanded by Oliver Williamson in 1975). By improving forecast accuracy, small

enterprises can improve this constraint, synchronize supply with demand, reduce spoilage, and enhance throughput across the supply chain.

Novelty of the Study

The novelty of this study lies in its integrated examination of inventory turnover, inventory record accuracy, and demand forecasting accuracy, and their combined influence on supply chain performance of perishable food products within small enterprises. While existing literature has extensively explored these practices individually and largely in the context of large organizations, manufacturing sectors, or non-perishable commodities, limited attention has been directed toward small enterprises managing perishable goods in resource-constrained environments such as Dar es Salaam. This study contributes to the body of knowledge by demonstrating how simple, low-cost, and context-specific inventory management practices can significantly reduce spoilage, enhance operational efficiency, and improve overall supply chain performance.

Conclusion

Generally, effective inventory management through improved turnover, accurate records, and precise demand forecasting significantly enhances the supply chain performance of perishable food products in small enterprises. These practices help reduce waste, ensure timely replenishment, and align stock levels with market demand, thereby improving overall efficiency and competitiveness.

Suggestions

Based on the study findings, small enterprises handling perishable food products in Dar es Salaam are advised to improve inventory turnover by adopting simple replenishment strategies, such as frequent restocking in smaller quantities and applying the first-in, first-out method to reduce spoilage. To enhance inventory record accuracy, enterprises should use basic manual controls like stock cards, regular physical counts, and simple record-keeping systems, while assigning specific personnel for accountability. For better demand forecast accuracy, businesses should utilize local sales data, seasonal trends, and experiential knowledge, supported by basic training in demand planning using historical data.

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