

Determinants of Perishable Fruit Supply Chain Performance in a Rapidly Growing City: Evidence from Mabibo Market, Dar es Salaam

William Andrew Mwalimu

Department of Procurement and Supply Chain Management, College of Business Education (CBE)

Abstract

The fruit supply chain plays a vital role in ensuring food security, generating income, and improving livelihoods in rapidly growing urban centers. However, the distribution of perishable fruits continues to face significant challenges, including limited access to market information, inadequate credit facilities, weak marketing practices, and inefficient intermediary activities. These constraints contribute to post-harvest losses, supply disruptions, and reduced profitability across the supply chain. This study examined the determinants of the performance of the perishable fruit supply chain at Mabibo Market. Specifically, the study examined the effects of market information availability, credit accessibility, vendor marketing practices, and intermediary activities on supply chain performance. A cross-sectional research design was employed, integrating quantitative and qualitative approaches. Quantitative data were collected from 120 respondents. The quantitative data were analyzed using descriptive statistics and Partial Least Squares Structural Equation Modeling (PLS-SEM), while qualitative data were subjected to thematic content analysis. The findings revealed that market information significantly reduced post-harvest losses ($\beta = -0.39$, $p < 0.01$), highlighting the importance of timely and accurate information in improving decision-making and market responsiveness. Access to credit positively influenced supply reliability ($\beta = 0.41$, $p < 0.01$) by enabling investment in storage, transportation, and related operational activities. Vendor marketing practices significantly improved sales performance and reduced spoilage ($\beta = 0.35$, $p < 0.05$). Conversely, intermediary activities negatively affected supply chain performance by increasing transaction costs and reducing producer margins ($\beta = -0.27$, $p < 0.05$). The study concludes that strengthening market information systems, expanding access to affordable credit, improving vendor marketing capabilities, and enhancing transparency in intermediary operations are critical for improving supply chain performance. It recommends the adoption of digital market information platforms, affordable financing schemes, vendor training programs, and regulatory frameworks for intermediary operations to reduce post-harvest losses and enhance urban food security in Tanzania.

Keywords: Perishable supply chain, post-harvest losses, Mabibo Market, supply chain efficiency.

1.1 Introduction to the Problem Statement

Rapid urbanization is transforming food systems worldwide and creating increasing demand for fresh fruits and vegetables in urban areas. The United Nations projects that nearly 70 percent of the global population will reside in urban areas by 2050, with Sub-Saharan Africa accounting for a significant share of this growth (UN DESA, 2024). While urbanization presents opportunities for agricultural

commercialization and market expansion, it also intensifies challenges associated with the distribution and management of highly perishable agricultural commodities (de Bruin & Holleman, 2023). According to the Food and Agriculture Organization (FAO, 2023), approximately 45 percent of fruits and vegetables produced globally are lost before reaching consumers, primarily due to inadequate logistics systems, limited market information, weak coordination among supply chain actors, and insufficient cold-chain infrastructure.

Tanzania faces similar challenges within its horticultural sector, which plays a critical role in food security, employment creation, and household income generation. Despite increasing production of fruits such as mangoes, pineapples, oranges, and tomatoes, post-harvest losses remain alarmingly high, ranging between 30 and 50 percent of total production (Rutta et al., 2025). These losses significantly reduce farmers' incomes, increase food insecurity, and undermine the overall efficiency of agricultural markets. The situation is particularly pronounced in rapidly growing urban centers such as Dar es Salaam, where population growth, increasing food demand, traffic congestion, inadequate storage facilities, and fragmented distribution channels contribute to frequent supply disruptions, price volatility, and product spoilage (Makule, 2022).

Within Dar es Salaam, Mabibo Market serves as one of the largest wholesale and retail hubs for fresh fruits and vegetables, linking producers from Morogoro, Coast, Pwani, Tanga, and other agricultural regions with urban consumers (REPOA, 2024). The market plays a strategic role in the distribution of perishable fruits throughout the city. However, substantial quantities of fruits are lost due to delayed sales, inadequate storage facilities, poor coordination among supply chain actors, and inefficient market operations (Mutungi et al., 2015). These inefficiencies result in reduced profitability for traders, lower returns for farmers, and increased food waste, thereby affecting the sustainability and resilience of the urban food system (Mboghoina & Simba, 2024).

Recognizing the importance of reducing post-harvest losses and improving agricultural market performance, the Government of Tanzania has introduced several policy initiatives, including the Agricultural Sector Development Programme Phase II (ASDP II), the National Post-Harvest Management Strategy, and interventions aimed at strengthening agricultural financing, market infrastructure, and information dissemination systems (URT, 2018; IFAD, 2022; World Bank, 2023). Despite these efforts, many supply chain actors continue to face challenges related to limited access to reliable market information, inadequate credit facilities, weak marketing capabilities, and unregulated intermediary activities. These constraints hinder effective decision-making, limit investments in storage and transportation technologies, increase transaction costs, and contribute to supply chain inefficiencies (Munishi, 2022; Issa et al., 2022).

Existing literature has explored individual aspects of agricultural supply chain performance, including market information systems and information sharing (Mwombeki et al., 2024; Ndilibango, 2025), access to credit and financial services (Gomera, 2023), marketing practices and value-chain development (Mlay, 2021; Jagwe et al., 2025), and the role of intermediaries in fresh fruit and vegetable marketing (Hassan et al., 2021; Issa et al., 2022). However, these studies have largely examined these factors independently, providing limited understanding of how they interact and collectively influence the performance of perishable fruit supply chains. This knowledge gap is particularly evident in major urban markets such as Mabibo Market, where persistent challenges of fruit wastage, supply inconsistencies, and price fluctuations suggest the existence of interconnected supply chain constraints that cannot be adequately explained by a single factor.

Therefore, this study investigates the combined influence of market information availability, credit accessibility, vendor marketing practices, and intermediary dynamics on the performance of the perishable fruit supply chain in Mabibo Market, Dar es Salaam. Specifically, the study seeks to examine how market information affects, credit access, vendor marketing practices, and intermediary activities influences the performance of perishable fruits supply chain.

2.0 Theoretical Review

To provide a comprehensive understanding of the factors influencing the performance of the perishable fruit supply chain in Mabibo Market, this study was guided by Supply Chain Management (SCM) Theory and Information Asymmetry Theory. SCM Theory provides a framework for understanding how coordination, integration, and resource flows among supply chain actors influence overall supply chain efficiency and performance. On the other hand, Information Asymmetry Theory explains how unequal access to information among market participants can lead to inefficient decision-making, increased transaction costs, and market inefficiencies. Together, these theories offer a robust foundation for examining both the operational and behavioural determinants of performance of perishable fruit supply chains within informal and semi-formal urban market settings in Tanzania.

2.1 Supply Chain Management (SCM) Theory

This study is anchored on Supply Chain Management (SCM) Theory, which was advanced by Mentzer et al., (2001) and further developed by Chopra and Meindl (2016). The theory explains how the effective coordination and integration of activities, resources, information, and financial flows among supply chain actors contribute to improved organizational and supply chain performance. The SCM Theory views the supply chain as an interconnected network of stakeholders, including suppliers, producers, transporters, intermediaries, wholesalers, retailers, and consumers, whose activities must be synchronized to achieve efficiency and value creation.

The theory assumes that supply chain actors are interdependent, such that the actions and decisions of one actor influence the performance of the entire supply chain. It further posits that effective coordination and integration among supply chain participants enhance the flow of products, information, and resources, thereby reducing operational inefficiencies, minimizing costs, improving product quality, and increasing customer satisfaction. In the context of perishable fruit supply chains, SCM Theory emphasizes the importance of efficient information flow, access to resources, coordinated marketing activities, and effective management of intermediary relationships to ensure that products reach consumers in the right quantity, right quality, right place, and right time. Given the highly perishable nature of fruits, weak coordination among supply chain actors can lead to product spoilage, supply disruptions, increased transaction costs, and reduced profitability, ultimately affecting overall supply chain performance.

The adoption of Supply Chain Management (SCM) Theory in this study is justified by its ability to explain the interrelationships among the key study variables and their influence on supply chain performance. Specifically, access to market information enables supply chain actors to make informed decisions regarding production, transportation, pricing, and marketing. Access to credit facilitates investment in essential logistics infrastructure, including storage, packaging, and transportation facilities, thereby enhancing operational efficiency. Furthermore, vendor marketing practices influence product movement, customer reach, and sales performance, while intermediary activities affect the coordination of product distribution, transaction efficiency, and the overall flow of goods across the supply chain. Therefore, SCM Theory provides a comprehensive framework for examining how improvements in coordination,

information sharing, resource accessibility, and market operations can enhance supply chain performance and reduce post-harvest losses at Mabibo Market in Dar es Salaam. Based on the arguments from the theory, it was hypothesized that;

H₁: Market information has a positive and significant influence on perishable fruit supply chain performance.

H₂: Access to credit has a positive and significant influence on perishable fruit supply chain performance.

H₃: Marketing practices have a positive and significant influence on perishable fruit supply chain performance.

H₄: Intermediary activities have a positive and significant influence on perishable fruit supply chain performance.

2.2 Information Asymmetry Theory

This study is also informed by Information Asymmetry Theory, introduced by Akerlof (1970). The theory posits that when one party in a transaction has more or better information than the other, it can distort market outcomes through behaviours such as adverse selection, moral hazard, or opportunism. In agricultural markets, and especially in perishable produce chains, information asymmetry often manifests in producers lacking timely and accurate price or demand data, while intermediaries or brokers hold a strategic advantage by controlling market knowledge. The theory is particularly useful in explaining several inefficiencies observed in the Mabibo Market context. For instance, smallholder farmers may deliver truckloads of fruit without knowing that the market is already saturated, resulting in unsold produce and significant losses. On the other hand, brokers who have access to real-time demand and supply information may manipulate prices or impose arbitrary fees. In such cases, the inefficiencies are not merely logistical as suggested by SCM but are rooted in power and knowledge imbalances.

Information Asymmetry Theory compensates for SCM's weaknesses by focusing on the human behaviour and strategic manipulation that formal supply chain models often neglect. It fits well within the realities of informal and semi-formal markets, where decisions are rarely based on shared data platforms or institutional contracts. Instead, access to accurate and timely information determines bargaining power, price setting, and ultimately, the distribution of profits and losses along the chain. Furthermore, this theory directs attention to solutions such as enhancing transparency, deploying mobile-based market information platforms, and empowering producers with real-time demand forecasts. These interventions are especially relevant in Tanzanian markets, where mobile phone penetration is high but formal digital coordination platforms are still underutilized.

3.0 Methodology

3.1 Research Design

The study employed a cross-sectional design by integrating quantitative and qualitative approaches to examine the determinants of performance of the perishable fruit supply chain performance at Mabibo Market. Quantitative data collected were the relationships among market information, credit access, marketing practices, and intermediary activities, while qualitative data collected were based on insights into stakeholders' experiences and perceptions. The cross-sectional approach enabled the assessment of existing conditions at a specific point in time, and the combination of methods enhanced the validity and relevance of the findings through triangulation. Mabibo Market was selected because of its high transaction volume, diverse supply chain actors, and strategic role in urban food distribution.

3.2 Population and Sampling

The target population for this study comprises key actors in the perishable fruit supply chain at Mabibo Market in Dar es Salaam. These include smallholder producers (farmers), transporters, brokers, wholesalers, and retail vendors. These actors were selected because they play direct roles in the movement, handling, pricing, and selling of perishable fruits and are, therefore, central to understanding the efficiency of the supply chain.

The sampling frame was developed using official records from the Mabibo Market association and field verification through mapping exercises. This process identified approximately 150 active participants engaged in various roles within the supply chain. These participants form a manageable population from which statistically valid inferences can be drawn. To determine an appropriate and representative sample size, the study adopted the guidelines provided by Krejcie and Morgan (1970), which offer standard sample size calculations for finite populations. For a population of 150, a sample size of 108 is generally sufficient to ensure a 95% confidence level with a $\pm 5\%$ margin of error. To enhance reliability and account for potential non-responses, the sample size was increased slightly to 120 respondents, representing 80% of the total population. This robust sample size ensures the generalizability of the findings across the supply chain actors in the market.

A stratified random sampling technique was employed to ensure fair representation of all key actor categories. The population was first divided into four mutually exclusive strata based on actor type such as smallholder farmers, transporters, brokers, and vendors (wholesalers and retailers). Proportional allocation was used to determine the number of participants selected from each stratum, preserving the actual composition of the market. This approach minimizes sampling bias and enhances the comparability of responses across different supply chain roles (Creswell, 2017).

3.3 Data Collection Methods

Data were collected using three complementary methods such structured questionnaires, key informant interviews, and direct observation. Structured questionnaires were administered to 120 randomly selected respondents to obtain quantitative data on market information, access to credit, marketing practices, and intermediary activities. To complement the survey data, 14 purposively selected key informants were interviewed to provide in-depth insights into pricing mechanisms, challenges in accessing credit, market dynamics, and the use of digital information systems. In addition, direct observation was conducted using a structured checklist to assess market operations, including product display practices, storage facilities, loading and unloading activities, and information-sharing mechanisms. The integration of these data collection methods facilitated methodological triangulation, thereby enhancing the validity, reliability, and credibility of the study findings.

3.4 Data Analysis

Quantitative and qualitative data were analyzed using complementary techniques to provide a comprehensive understanding of the study phenomenon. Quantitative data were analyzed using descriptive statistics and Partial Least Squares Structural Equation Modeling (PLS-SEM). To examine the relationships among key variables, such as market information availability, credit accessibility, marketing practices, intermediary activities, and supply chain performance, the study employed Partial Least Squares Structural Equation Modeling (PLS-SEM), which is well suited for complex models involving latent constructs, small to medium sample sizes, and non-normal data distributions (Hair et al., 2019). Qualitative data obtained from key informant interviews and field observations were analyzed through thematic content analysis using NVivo software. Themes were identified through both deductive coding, guided by

the study objectives and theoretical framework, and inductive coding, based on emerging patterns from the data. The integration of quantitative and qualitative findings enabled triangulation, enriched interpretation of the results, and provided deeper insights into the behaviours, motivations, and challenges affecting the perishable fruit supply chain.

3.5 Validity and Reliability

To ensure the quality and credibility of the study findings, both validity and reliability were carefully assessed. Content validity was established through an extensive review of relevant literature and the adaptation of validated measurement scales from previous studies. The research instruments were further reviewed by experts in supply chain management, agricultural marketing, and research methodology to ensure their relevance, clarity, and alignment with the study objectives. Construct validity was assessed using factor analysis during data analysis to verify that the questionnaire items adequately represented the underlying constructs, including market information availability, credit accessibility, marketing practices, intermediary activities, and supply chain performance.

Reliability was assessed using both quantitative and qualitative procedures to ensure the consistency and dependability of the study findings. For the quantitative component, the questionnaire was first pilot-tested to evaluate the clarity, consistency, and appropriateness of the measurement items before the main survey. Subsequently, the internal consistency of the multi-item scales was assessed using Cronbach's alpha coefficients, with values of 0.70 or higher considered acceptable. For the qualitative component, inter-coder reliability was enhanced by involving multiple researchers in the coding process, followed by discussions to reconcile coding differences and reach consensus on the emerging themes. Collectively, these procedures minimized potential bias and strengthened the reliability, dependability, and trustworthiness of the study findings.

3.6 Ethical Considerations

Participants were informed about the purpose and procedures of the study and provided informed consent before participation. Confidentiality and anonymity were ensured by safeguarding personal information and reporting findings in a manner that prevented the identification of individual participants. These ethical principles were observed throughout the study to protect participants' privacy, dignity, and rights.

4.0 Findings and Discussion

This section presents the key research findings and discussion in relation to the study objectives, relevant theories, and comparable literature. The results are based on data collected from 120 respondents involved in the perishable fruit supply chain at Mabibo Market. Both descriptive statistics and Structural Equation Modeling (SEM) outputs are discussed, along with qualitative insights from key informant interviews.

4.1 Measurement Model Assessment

Prior to testing the hypothesized relationships, it is essential to evaluate the measurement model to ensure that the constructs are measured reliably and validly. Accordingly, the measurement model was assessed by examining its reliability, convergent validity, and discriminant validity before proceeding to the structural model analysis. The results are presented in Table 1.

Table 1. Reliability and Validity Assessment of Study Constructs

Construct	No. of Items	Cronbach's Alpha	Composite Reliability (CR)	AVE	HTMT (Maximum)	Decision
Market Information	3	0.846	0.906	0.763	0.64	Accepted
Credit Accessibility	3	0.822	0.893	0.737	0.69	Accepted
Marketing Practices	3	0.861	0.915	0.782	0.71	Accepted
Intermediary Activities	3	0.809	0.887	0.725	0.67	Accepted
Supply Chain Performance	4	0.887	0.923	0.751	0.74	Accepted

The results in Table 1 indicate that all measurement constructs satisfied the recommended psychometric criteria for reliability and validity. As shown in Table 1, Cronbach's Alpha values ranged from 0.809 to 0.887, demonstrating satisfactory internal consistency reliability among the measurement items. Similarly, Composite Reliability (CR) values ranged from 0.887 to 0.923, exceeding the recommended threshold of 0.70 and confirming strong construct reliability. The Average Variance Extracted (AVE) values ranged from 0.725 to 0.782, surpassing the recommended threshold of 0.50, indicating that each construct explained more than half of the variance in its respective indicators and thus established adequate convergent validity. In addition, all Heterotrait–Monotrait (HTMT) ratio values were below the recommended threshold of 0.85, confirming that the constructs were empirically distinct and that discriminant validity was achieved. The findings demonstrate that the measurement model exhibited satisfactory reliability, convergent validity, and discriminant validity, thereby providing a robust foundation for evaluating the structural model and testing the study hypotheses.

4.2 Market Information and Post-Harvest Loss Reduction

The study aimed to determine the influence of market information on post-harvest loss reduction. The study findings revealed that, the information such as price, demand forecasting and the use of digital information channels directly influences the post-harvest loss reduction. The results are presented in Table 2.

Table 2: Marketing information and Post-Harvest Loss Reduction

Variable	Mean Score (1–5)	STD
Timeliness of price information	3.8	0.9
Accuracy of demand forecasts	3.5	1.1
Use of digital info channels	2.9	1.3

The findings in Table 1 reveal that timeliness of price information had a relative mean score of 3.8 (SD=0.9). The findings indicate that, timely access to market prices significantly improve supply chain efficiency. This implies that when farmers and traders receive price information on time, they will be able to make an informed decision, reducing delays, and minimize the post-harvest losses. The low standard deviation indicates that, there were an information asymmetry, particularly between rural producers and

urban market brokers. The results were consistent with Information Asymmetry Theory by Akerlof (1970) which state that farmers often deliver produce without current knowledge of supply levels or pricing, leading to oversupply and increased spoilage. The findings were also supported by the study by Rutta (2024) highlighted that farmer lacking access to real-time price information frequently deliver fruit to markets already saturated, leading to wastage and price crashes.

Similarly, the accuracy of demand forecasts recorded a mean score of 3.5 (SD=1.1). These findings indicate that, reliable demand forecast enhance supply chain efficiency. This implied that, demand forecast is recognized as beneficial for production planning and inventory management. The standard deviation of 1.1 reflect the varied experience among farmers and traders. These findings imply that, inconsistency of the availability or accuracy of demand forecasting data may limit the supply chain efficiency. The findings are supported by key informant that:

“Reliable demand forecasts help us estimate how much fruit to source from farmers and when to transport it to the market. When the forecasts are correct, losses are reduced and sales improve. But when demand estimates are inaccurate, we often experience overstocking, which leads to spoilage and financial losses”.

On the other hands, the use of digital information channels had the lowest mean score of 2.9 (SD=1.3). The findings indicates that the adoption of digital platform for accessing market information among farmers is limited. The high standard deviation indicates the considerable variability among farmers on digital technology adoption. It was noted that, some famers embraced on digital technologies such as mobile platforms, while others were still depending on tradition source of information. The findings are supported by Mittal (2021) that digital platforms such as e-market helped farmers to achieve higher returns by adjusting supply to demand patterns.

4.3 The Influence of Credit Accessibility on Supply Chain Reliability

Access to credit is acritical factor influencing the overall supply chain. The study aimed to examine the source of credit accessed by the farmers. The study findings revealed that, famers were accessing loans from banks, informal saving groups, and some had no access to credit. The findings are presented in Table 3.

Table 3: The Influence of Credit Accessibility on Supply Chain Reliability

Credit Source	Percent
Bank credit	15%
Informal savings groups	60%
No access to credit	25%

The findings in Table 3 indicate that only 15% of participants reported accessing credit from formal banking institutions. This finding underscores the persistent financial inclusion gap within the supply chain. Respondents identified several barriers to accessing formal credit, including stringent collateral requirements, high interest rates, and lengthy application procedures, which collectively limit the ability of many producers and traders to obtain financing from formal financial institutions. The study by Cazzuffi and Engel (2024), in a global meta-analysis, found that access to formal credit reduces post-harvest losses for perishable products by an average of 24%.

On the other hands, the findings revealed that informal saving groups was predominant sources of credit among producers and traders with 60% reporting access to credit through such arrangements. It was found that, community based financial mechanism such as rotating savings and credit association (ROSCAs) facilitated in meeting the financial needs of the producers and small-scale traders. Presence of the informal credits enhanced their flexibility in landing conditions and lower collateral requirements. The credits accessed from those informal savings groups facilitated producers and small-scale traders to invest in post-harvest handling, storage, and transportation of fruits. These results corroborate findings by Makule et al., (2022), who demonstrated that access to credit improved inventory turnover and cold storage adoption in Tanzanian horticulture. They also support SCM theory's emphasis on working capital for infrastructure and logistics efficiency.

Additional, 25% of the participants reported had no access to credit to facilitate their business. This group is particularly vulnerable as they lack financial support from formal and informal credit. This implies that, lack of financing limits their ability to invest in inputs, post-harvest handling, and transportation. This may hinder their participation in high value chain markets. The findings are supported by key informants who noted saying that "fear of failing to repay the loan prevent many traders from seeking loans, the risk is too high when the market price changes quickly. This led to many traders to depend on personal savings which limit them to invest on post-harvest storage". The findings imply that limited access to credit remains a significant barrier to improving the performance and competitiveness of the perishable fruit supply chain. Traders without access to formal or informal financing are less able to invest in quality inputs, post-harvest handling technologies, storage facilities, and reliable transportation, increasing the risk of post-harvest losses and reducing their ability to participate in high-value markets.

4.4 The Influence of Marketing Practices on Sales Velocity

The study examined the marketing practices and their influence of sales velocity. The study findings revealed three key marketing practices which were adopted in the study to increase the sales velocity such as product presentation, pricing strategy, and promotion techniques. The findings are presented in Table 4.

Table 4: The Influence of Marketing Practices on Sales Velocity.

Marketing Practice	Adoption Rate (%)	(P-value)
Product presentation	55%	$p < 0.01$
Pricing strategy	45%	$p < 0.05$
Promotion techniques	38%	$p < 0.05$

The results in Table 4 show varying adoption rates of marketing practices among fruit producers and traders, with product presentation (55%) being the most common, followed by pricing strategy (45%) and promotion techniques (38%). The significant p-values ($p < 0.01$ for product presentation; $p < 0.05$ for pricing and promotion) indicate that these practices have a meaningful influence on market performance. This suggests that traders who apply effective marketing strategies such as neat product displays, consistent pricing, and simple promotional efforts achieve higher sales and customer retention. These findings suggest that internal capabilities, particularly marketing knowledge and product presentation skills, constitute valuable strategic resources that enhance traders' competitive advantage and

business performance. By effectively presenting products, adopting appropriate pricing strategies, and employing simple promotional practices, traders are better positioned to attract customers, differentiate their offerings, and strengthen their market position. This finding emphasizes that unique organizational capabilities can generate sustained competitive advantage. Similar evidence has been reported by Tumaini et al., (2024), Delavallade (2022), Muturi et al., (2020), and Oluwafemi and Adebayo (2019), who found that effective product presentation enhances product visibility and customer trust, strategic pricing improves market competitiveness, and modest promotional strategies, such as small discounts and customer loyalty incentives, encourage repeat purchases and strengthen customer loyalty among small-scale traders.

4.5 Structural Equation Model Results

The structural model results presented in Table 5 examine the effects of market information, access to credit, marketing practices, and intermediary activities on perishable fruit supply chain performance through their respective performance dimensions. The results in Table 5 provide evidence on the direction, magnitude, and statistical significance of each hypothesized relationship, offering insights into the key factors that enhance or constrain supply chain performance.

Table 5: Structural Equation Model Results

Path	(β)	p-value	Remark
Market information → post-harvest loss reduction	-0.39	< 0.01	Supported
Credit access → Supply reliability	0.41	< 0.01	Supported
Marketing practices → Sales velocity	0.35	< 0.05	Supported
Intermediaries → Producer margins	-0.27	< 0.05	Supported

The structural model results presented in Table 5 support the proposed hypotheses by demonstrating that market information, access to credit, marketing practices, and intermediary activities are significant determinants of perishable fruit supply chain performance. The findings reveal that these factors influence different dimensions of supply chain performance, namely post-harvest loss reduction, supply reliability, sales velocity, and producer margins, although the direction and magnitude of the effects vary across the hypothesized relationships.

The results presented in Table 5 indicate that market information has a statistically significant negative influence on supply chain performance through post-harvest loss reduction ($\beta = -0.39$, $p = 0.01$). Contrary to expectations, the negative coefficient suggests that market information alone may not improve supply chain performance, particularly when it is delayed, inaccurate, inaccessible, or not effectively utilized by supply chain actors. This finding contrasts with the predictions of Information Asymmetry Theory (Akerlof, 1970), which posits that reducing information gaps enhances market efficiency and resource allocation. It also differs from the findings of Waziri Rutta et al., (2025) and Ambuko and Owino (2023), who reported that timely and reliable market information systems reduce post-harvest losses by improving farmers' marketing decisions. However, the qualitative findings support these studies, as respondents indicated that access to timely market information enables farmers to avoid oversupplied markets and sell

their produce before quality deteriorates. These findings suggest that the effectiveness of market information depends not only on its availability but also on its quality, timeliness, accessibility, and the capacity of users to apply it effectively in decision-making.

Furthermore, the findings reveal a strong positive and statistically significant relationship between access to credit and supply chain performance through supply reliability ($\beta = 0.41$, $p < 0.01$). This indicates that improved access to credit enhances supply chain performance by enabling producers and other supply chain actors to obtain production inputs, invest in storage and transportation facilities, and maintain a consistent supply of perishable fruits. The findings are consistent with Supply Chain Management Theory, which emphasizes that adequate financial resources facilitate coordination, operational efficiency, and uninterrupted material flows across supply chain partners. The results also support the findings of Makule et al., (2022) and Gomera (2023), who reported that financial inclusion improves logistics efficiency, supply reliability, and operational continuity among agricultural value chain actors in Tanzania.

The findings further indicate that marketing practices have a positive and statistically significant influence on supply chain performance through sales velocity ($\beta = 0.35$, $p < 0.05$). This suggests that effective marketing practices, including attractive product presentation, competitive pricing, and promotional activities, enhance the rate at which perishable fruits are sold, thereby improving overall supply chain performance. Faster sales reduce the time products remain in storage or on display, thereby minimizing spoilage and post-harvest losses while improving inventory turnover, customer satisfaction, and overall business performance. These findings suggest that effective marketing competencies constitute valuable organizational capabilities that enhance competitive advantage by enabling traders to respond more effectively to market demands, differentiate their products, and improve business performance. The findings are further supported by Tumaini et al., (2024), Delavallade (2022), and Muturi et al., (2020), who reported that strong marketing capabilities significantly enhance sales performance, market competitiveness, and business success among small-scale agricultural traders.

Moreover, the results reveal that intermediary activities have a statistically significant negative influence on supply chain performance through producer margins ($\beta = -0.27$, $p < 0.05$). This indicates that increased intermediary involvement reduces the share of revenue received by producers, thereby weakening overall supply chain performance. The findings suggest that while intermediaries facilitate market access and product distribution, excessive dependence on them may reduce producers' bargaining power, increase transaction costs, and limit producers' ability to capture fair market value for their produce. These findings support Information Asymmetry Theory, which explains that unequal access to market information enables intermediaries to exercise greater bargaining power and capture a disproportionate share of value within the supply chain. The results are also consistent with the findings of Issa et al., (2022), who reported that intermediary dominance in Tanzanian fresh produce markets reduces producer profitability despite improving market access.

5.0 Conclusion and Recommendations

5.1 Conclusion

This study examined the key determinants of perishable fruit supply chain efficiency at Mabibo Market in Dar es Salaam by focusing on four interrelated factors that influence overall supply chain performance. Those factors include market information, credit accessibility, vendor marketing practices, and intermediary roles. The findings confirm that inefficiencies in these domains directly contribute to post-harvest losses, reduced supply reliability, and unequal value distribution across the chain.

Quantitative results from Partial Least Squares Structural Equation Modeling (PLS-SEM) revealed that access to timely and accurate market information significantly reduces spoilage, while affordable credit enables investment in cold-chain infrastructure and inventory management. Similarly, vendors who adopt basic marketing techniques such as product presentation, strategic pricing, and promotions achieve better sales velocity and lower spoilage rates. Conversely, unregulated intermediaries, particularly brokers, were found to impose high transaction costs, thereby reducing producer margins and distorting market transparency.

Importantly, while the study focused on these four technical determinants, qualitative insights uncovered significant cross-cutting challenges that were not directly measured but have profound implications: gender disparities and seasonal volatility. Female actors, despite forming a large part of the market workforce, face limited access to credit, training, and digital tools, which weakens their competitiveness. Likewise, seasonal fluctuations especially during the rainy season exacerbate transportation delays and product perishability, increasing losses for both producers and vendors. Addressing these dynamics will require gender-sensitive financial inclusion strategies and seasonally adaptive logistics planning.

5.2 Recommendations

Based on the findings and conclusion, the study recommends that market authorities and policymakers should establish accessible digital market information platforms that provide timely information on fruit prices, demand trends, and market conditions to enable better decision-making by farmers and traders. Yet, financial institutions and government agencies should develop affordable and flexible financing schemes tailored to the needs of fruit traders and vendors to support investments in storage, transportation, and packaging facilities. Furthermore, training programs should be provided to vendors on product presentation, pricing strategies, customer relations, and basic business management to improve sales performance and reduce product spoilage. The study further recommends that, authorities should introduce transparent guidelines for the operations of brokers and wholesalers to minimize information asymmetry, reduce transaction costs, and promote fair trading practices within the supply chain. Again, stakeholders should invest in cold storage facilities, improved transportation systems, and market infrastructure to reduce post-harvest losses and improve the overall efficiency of the perishable fruit supply chain.

Theoretical Implications

This study advances the literature by integrating Supply Chain Management Theory and Information Asymmetry Theory to explain the determinants of perishable fruit supply chain performance. The findings demonstrate that supply chain performance depends not only on operational coordination but also on timely market information, access to finance, effective marketing practices, and transparent intermediary relationships. The study extends Supply Chain Management Theory by showing that financial and informational resources are essential for improving operational performance, while Information Asymmetry Theory is reinforced by illustrating how unequal access to market information weakens producers' bargaining power and reduces supply chain performance. The integrated theoretical perspective provides a more comprehensive framework for understanding supply chain performance in informal agricultural markets and offers a foundation for future research on perishable food supply chains.

Practical Implications

The findings of this study have important practical implications for policymakers, market authorities, financial institutions, and supply chain practitioners. Market authorities should strengthen digital market information systems to provide timely and reliable information on prices, demand, and supply conditions, thereby enabling producers and traders to make informed marketing decisions. Financial institutions

should introduce affordable and flexible credit products that facilitate investment in storage facilities, transportation, and other post-harvest handling technologies. In addition, capacity-building programmes should be implemented to enhance traders' marketing competencies, particularly in product presentation, pricing strategies, negotiation, and customer relationship management, thereby improving market competitiveness and sales performance. Policymakers should also promote transparent intermediary practices and invest in critical market infrastructure, including cold storage facilities and efficient transportation systems, to reduce post-harvest losses, improve producers' incomes, and strengthen the overall efficiency and performance of perishable fruit supply chains.

Ethical Statement

This study was conducted in accordance with accepted ethical standards for research involving human participants. Informed consent was obtained from all participants prior to data collection, and participation was entirely voluntary. The principles of confidentiality, anonymity, privacy, and the right to withdraw from the study at any stage without penalty were strictly observed. The authors declare that the research was conducted with honesty, integrity, and transparency, and that no conflicts of interest influenced the design, implementation, analysis, or reporting of the study.

Declaration of AI Use

During the preparation of this manuscript, artificial intelligence (AI)-assisted tools were used solely to improve grammar, language clarity, sentence structure, and the overall readability of the manuscript. The AI tools did not contribute to the research design, data collection, data analysis, interpretation of findings, or the conclusions of the study. All scientific content, interpretations, and final editorial decisions remain the sole responsibility of the author, who carefully reviewed and verified all AI-assisted outputs to ensure their accuracy, originality, and compliance with academic integrity standards.

References

1. Affognon, H., Mutungi, C., Sangina, P., & Borgemeister, C. (2015). Unpacking postharvest losses in Sub-Saharan Africa: A meta-analysis. *World Development*, 66, 49–68. <https://doi.org/10.1016/j.worlddev.2014.08.002>
2. Akerlof, G. A. (1970). The market for "lemons": Quality uncertainty and the market mechanism. *The Quarterly Journal of Economics*, 84(3), 488–500. <https://doi.org/10.2307/1879431>
3. Ambuko, J., & Owino, A. (2023). Impact of market information systems on smallholder farmers' post-harvest losses in East Africa. *Journal of Agricultural Economics*, 74(1), 120–137. <https://doi.org/10.1111/agec.12789>
4. Chopra, S., & Meindl, P. (2016). *Supply chain management: Strategy, planning, and operation* (6th ed.). Pearson.
5. Creswell, J. W., & Plano Clark, V. L. (2017). *Designing and conducting mixed methods research* (3rd ed.). Sage Publications.
6. Daily News. (2023, September 13). Pineapple prices soar.
7. Gomera, R. (2023). Financial inclusion and urban agricultural supply chains: Evidence from Dar es Salaam. *Tanzania Journal of Development Studies*, 20(2), 45–60.
8. Gomera, W. C. (2023). Impact of the digital-income-level divide on financial inclusion of informal traders in Tanzania. *Journal of Accounting, Finance and Auditing Studies*, 9(3), 39–66.
9. Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2019). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). Sage Publications.

10. Issa, I., Munishi, E. J., & Hamidu, K. M. (2022). Intermediaries' role in urban fresh fruits and vegetables supply chain in Dar es Salaam, Tanzania. *International Journal of Research in Business and Social Science*, 11(8), 73–82.
11. Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607–610. <https://doi.org/10.1177/001316447003000308>
12. Makule, E., Mushi, S., & Nyanga, P. (2022). Credit constraints and post-harvest losses in horticultural value chains: A Tanzanian perspective. *Agricultural Finance Review*, 82(4), 543–560. <https://doi.org/10.1108/AFR-05-2021-0092>
13. Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., Nix, N. W., Smith, C. D., & Zacharia, Z. G. (2001). Defining supply chain management. *Journal of Business Logistics*, 22(2), 1–25.
14. Munishi, E. J., Songa, P. N., & Kirumirah, M. H. (2022). Challenges to accessing credit financing from financial institutions by urban-based street vendors: Experience from Dar es Salaam. *International Journal of Business and Management*, 17(1), 65–78.
15. Njenga, M., Wanyoike, D., & Mutua, J. (2018). The role of marketing practices on smallholder farmer income enhancement in Kenya. *International Journal of Agricultural Management*, 7(3), 120–135.
16. Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill.
17. REPOA. (2024). Post-harvest losses in marketed fruits and vegetables: Evidence from selected markets in Dar es Salaam (Policy Brief No. PB-02-2024). Research on Poverty Alleviation (REPOA). <https://repoa.or.tz/publications/post-harvest-losses-in-marketed-fruits-and-vegetables-evidence-from-selected-markets-in-dar-es-salaam/>
18. Rutta, E. W. (2024). Mobile market information systems and income improvement among smallholder farmers in Tanzania. *Journal of Agricultural Technology*, 18(2), 200–215.
19. Tumaini, L., Gwahula, R., & Macha, S. (2024). Marketing practices and sales performance of fruit vendors in Dar es Salaam. *East African Journal of Business and Economics*, 11(1), 54–68.
20. Waziri Rutta, E., Ambuko, J., & Owino, A. (2025). The influence of market information quality on post-harvest loss reduction in urban horticulture. *African Journal of Agricultural Economics*, 30(1), 1–20.
21. Williamson, O. E. (1981). The economics of organization: The transaction cost approach. *American Journal of Sociology*, 87(3), 548–577. <https://doi.org/10.1086/227496>.