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INFORMATION SHARING AND PERFORMANCE OF FRUITS AND VEGETABLES COLD CHAIN IN TANZANIA: A CASE OF ARUMERU AND HAI DISTRICTS

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Abstract:
This study examines the critical role of information sharing in enhancing the performance of the cold chain for fruits and vegetables in Tanzania, focusing on Arumeru and Hai districts. A convergent parallel design was employed alongside a census technique, surveying 114 actors involved in the fruit and vegetable sector from both districts. Additionally, 12 firms were purposefully selected for in-depth interviews with the same target population. Descriptive and inferential analyses were conducted to evaluate the data. The findings reveal that both reciprocity and information technology significantly and positively influence the performance of the cold chain for fruits and vegetables. These results suggest that, given the perishable nature of fruits and vegetables, effective information sharing among supply chain actors is essential, as it enhances transparency and trust across the chain. This helps mitigate inefficiencies, reduce post-harvest losses, and ultimately increase the profitability of cold chain actors in Tanzania's evolving agricultural landscape. The study recommended that actors in the fruit and vegetable industry should utilize mobile technology and social media to share information to increase market access and ensure that products arrive at customers in the best possible condition, given their short shelf life.

Keywords:
Cold supply chain; Fruits; Vegetables; Reciprocity; Information technology

1. Introduction
The global supply chain relies heavily on the cold chain market to extend the shelf life of temperature-sensitive products like fresh fruits and vegetables (Zhang & Mohammad, 2024). The increasing demand for perishable goods, along with technological advancements, is driving significant growth in the worldwide cold chain market (Pajic et al., 2024). For instance, the global cold chain logistics market value is expected to rise from USD 324.85 billion in 2024 to USD 862.33 billion by 2032 (Insights, 2025). In Tanzania, the agricultural sector has undergone substantial changes due to rapid urbanization, shifting lifestyles, and government initiatives. As a result, the loss of perishable crops has been reduced by approximately 30% to 40% (Mordor Intelligence, 2025). In the same way, these factors have led to an increased consumption of fresh fruits and vegetables and have stimulated growth in the cold chain market (Makule et al., 2022).

Additionally, this heightened awareness has prompted many entrepreneurs to enter the cold chain market in Tanzania, trading various temperature-sensitive products such as fruits and vegetables, fish, meat, dairy, and processed foods (Paulo et al., 2025). As a result, the rising demand compels traders to be more agile to meet customers' expectations across different regions. Timely and relevant information sharing has become a crucial tool for survival, visibility, and collaboration among actors involved in temperature-sensitive products (Prosser et al., 2024). Conversely, a lack of transparency and knowledge asymmetry can lead to inefficiencies, product spoilage, and decreased profitability for all

parties involved (Bai et al., 2023). Despite the growth in the market, there is an ongoing debate regarding the importance of information sharing in enhancing cold chain performance. Baah et al. (2022) argue that information sharing is a vital factor that strengthens collaboration and effectiveness among supply chain actors.

Moreover, Jreissat and Jraisat (2019) emphasize that to maintain the shelf life of fresh fruits and vegetables, there should be a high level of collaboration and coordination among supply chain members. Information regarding customer requirements and the status of inventory on the supplier side should be exchanged swiftly between buyers and suppliers to meet customer needs in a timely manner, fostering trust and enhancing sales responsiveness (Ali, Nagalingam & Gurd, 2018). In some instances, quick information sharing can be facilitated through technology such as Wireless Sensor Networks (WSN), Radio Frequency Identification (RFID), and smartphones, especially in data collection and dissemination to all key stakeholders for decision-making (Moraes, Lermen & Echeveste, 2021).

Additionally, Gottge et al. (2020) assert that the use of the Internet of Things (IoT) significantly enhances transparency among supply chain partners through effective information sharing. It allows for the real-time exchange of information regarding the conditions (temperature and humidity) of perishable products during transportation or storage, which simplifies monitoring processes and helps reduce food waste and loss (Yan et al., 2021). It is believed that utilizing information technology promotes better quality consistency, enhances the effectiveness of both upstream and downstream collaborative supervision, and improves competitiveness within the cold chain market (Han et al., 2021). For example, investing in a tracking system during the distribution process can not only improve a firm's performance but also increase the shelf life of fruits and vegetables throughout the supply chain (Raut et al., 2019). Consequently, this enhances the consistent availability of quality and sufficient fruits and vegetables demanded by customers, generating income for all actors in the cold supply chain (Beretta, 2019).

However, in developing countries like Tanzania, most members of the fruit and vegetable supply chain fail to effectively utilize advanced technologies to facilitate information sharing and temperature monitoring during distribution (Mwangakala et al., 2023). Furthermore, the exchange of trusted market information remains difficult due to a lack of mutual trust among traders. Additionally, trade between small-scale farmers, especially those from rural areas, and buyers located in urban marketplaces tends to fluctuate (Marson, 2022; Issa, 2019). This situation hinders the growth of the cold chain, not only in the fruit and vegetable sectors but also in other perishable product industries (Paulo et al., 2025).

In fact, the use of social media platforms such as WhatsApp, Facebook, Instagram, and TikTok has increased dramatically in Tanzania (Idiedo & Posigha, 2024). But still, participants in the fruit and vegetable industry are reluctant to adopt and use these cost-effective platforms for timely information exchange to enhance the distribution and sales of their fresh produce (Jayalath et al., 2024). However, the effective use of these technologies could vastly improve the fruit and vegetable cold chain situation. Most fruit and vegetable actors believe that implementing a cold chain system in their distribution processes leads to unnecessary additional costs. As a result, customers are either unwilling or unable to pay the higher prices for the fresh produce (Makule et al., 2022). The discussion above indicates that effective information sharing is crucial for the successful operation of the fruit and vegetable cold chain in developing countries like Tanzania. Therefore, this study aims to examine the impact of information sharing on the performance of the cold chain for fruits and vegetables. Specifically, the study addresses the following research questions:

a. What is the influence of reciprocity on the performance of the fruits and vegetables cold supply chain?

b. How does information technology influence the performance of the fruits and vegetables cold supply chain?

2. Literature Review

2.1 Social Exchange Theory (SET)

Social Exchange Theory (SET) is a socio-psychological concept that emphasizes the cooperative exchanges between parties as a key source of social change and stability (Oduro, Nyarku & Gbadeyan, 2020). According to this theory, the nature of social relationships between parties relies on a cost-benefit analysis (Birasnav, Mittal & Dalpati, 2019). For instance, the interaction of growers, transporters, distributors, retailers, and consumers of fruit and vegetables can be analyzed through a cost-benefit analysis because each part invests financial, time, and labor with the expectation of getting a return (Haque et al., 2022). The magnitude of return depends on the effectiveness of stakeholders' communication and collaboration, which can consistently ensure high-quality, safety, and nutritional value of perishable goods like fruits and vegetables to be maintained throughout the supply chain (Jayalath et al., 2024). This

mutual dependency highlights the importance of establishing effective social bonds among stakeholders to facilitate the effective supply of fruit and vegetables (Beretta, 2019).

Additionally, the norm of reciprocity within SET is especially significant in the cold chain, promoting a win-win situation among partners (Singhry & Abd Rahman, 2019). Stakeholders who share valuable insights, such as best practices for temperature control, demand forecasting, or handling procedures, help improve overall efficiency and reduce waste (Singhry & Abd Rahman, 2019). For example, if a distributor shares information on fluctuating demand patterns of fresh produce with farmers, the farmers can adjust their production accordingly, leading to optimized supply and reduced unsold inventory. This reciprocal information sharing not only helps individual actors but also contributes to enhancing the overall sustainability of the cold chain (Ersoy et al., 2022).

Moreover, the advancement of technology today merges the theory of Acceptance and Use of Technology (UTAUT) with SET to explain how technology-related factors, such as performance expectancy and effort expectancy, influence knowledge sharing alongside social factors (Ahmad et al., 2025). The use of technology, such as IoT sensors for tracking temperature and humidity of fresh produce, can greatly enhance communication and knowledge sharing among participants in the cold chain (Gottge et al., 2020; Yan et al., 2021). When fruit and vegetable actors leverage these technologies effectively, they can increase their performance expectancy (Raut et al., 2019). Consequently, this might encourage more collaborative practices, fostering a culture where stakeholders feel responsible for sharing information that can improve cold chain management (Yang, 2019).

This theory is appropriate to this study as social bonds formulated among the fruit and vegetable cold chain emphasize the importance of collaborative efforts and reciprocal information sharing among stakeholders. By recognizing the interdependent relationships formed through these exchanges, participants can enhance their operational efficiency, reduce spoilage, and ultimately improve market performance (Feng, Hu, and He, 2021). Also, emphasize how social bonds formed through technological advancements can support the integrity and success of the cold chain in the fruit and vegetable industry (Ersoy et al., 2022). Thus, a sense of community can emerge within the fruit and vegetable cold chain, where each party recognizes the shared responsibility towards maintaining quality and efficiency. This communal style ensures not only the preservation of perishable goods but also enhances overall firm performance by improving trust and transparency among partners.

3. Methodology

3.1. Research Design

This study employed a convergent parallel design, which involves collecting both quantitative and qualitative data simultaneously and then comparing them for similarities and differences (Asenahabi, 2019; Liu et al., 2022; Sileyew, 2019). The researcher acknowledges the complexity of this process and thus aimed to present quantitative statistical results first, followed by qualitative quotes that support or contradict these results. Consequently, more quantitative data was gathered compared to qualitative data. This design was chosen because it allows for the integration of both quantitative (QUANT) and qualitative (QUAL) data, leading to a more comprehensive understanding of the research problem and assisting in drawing conclusions. It also helps reconcile methodological differences between the quantitative and qualitative paradigms. Additionally, this approach enabled the researcher to conduct the study over a wide area while being mindful of cost and time constraints.

3.2 Study Area, Population, And Sample Size

This study was conducted in the Arumeru and Hai districts, which represent the Arusha and Kilimanjaro regions, respectively. Arumeru is a former district within the Arusha region and consists of two districts: Meru and Arusha Rural Districts. Hai district is one of six districts located in the Kilimanjaro region. The two geographical locations were selected for this study due to their long history of investment in fruit and vegetable production, which supplies the Arusha and Moshi regions (De Blasis, 2020). Additionally, the proximity of these districts to Kilimanjaro International Airport (KIA) was a significant factor in the study. KIA provides essential services, such as cold storage, which many farmers, wholesalers, and exporters utilize when exporting their fruits and vegetables. Consequently, these stakeholders are likely to be familiar with cold chain logistics (ITC, 2022). Furthermore, organizations like TAHA Fresh Handling Ltd (TFHL) offer a variety of services, including clearing and forwarding, consolidation, insurance, and transportation of fruits and vegetables using refrigerated trucks. The availability of support enhances the supply chain actors' understanding of cold chain practices in the two districts (TAHA, 2021).

The focus of this study was on members of the fruit and vegetable sector, including large producers, smallholder farmers, wholesalers, retailers, manufacturing companies, and exporters in the Arumeru and Hai districts. A total of 114 respondents participated in the study, employing a census technique to gather data from every single element of the population, ensuring accuracy and precision. Additionally, 12 firms from the same targeted population were purposefully selected for qualitative data collection through interviews. The qualitative respondents included two officials from small-scale farms, three from larger-scale farms, two retailers, one logistics company, two exporters, and one representative from a cold packinghouse.

3.3. Data Collection

This study primarily utilized primary data, employing both structured questionnaires and in-depth interviews as data collection instruments. The structured questionnaires featured a 5-point Likert scale ranging from "1 - strongly agree" to "5 - strongly disagree," applied to all variables to ensure consistency in responses. Additionally, an interview guide containing questions related to the cold chain for fruits and vegetables was used during both phone calls and face-to-face interviews, providing insights that enriched the quantitative results.

To ensure the validity and reliability of the collected data, the researcher conducted a pilot study. In this pilot study, 15 questionnaires were distributed to twelve firms, and 13 were successfully collected. Further interview questions were posed to three firms, following the guidance of Saunders et al. (2023), which suggests that the sample size for a pilot study should be 10% of the total population. This process allowed the researcher to identify and correct weaknesses in both the questionnaire and the interview guide before using these tools for the main data collection.

3.4 Data Analysis

In this study, data gathered were analyzed using descriptive statistics and inferential analysis with the help of the Statistical Package for Social Sciences (SPSS) version 27. Descriptive statistics were applied using mean and standard deviation, while skewness and kurtosis values were used to assess the normality of the data (Kline, 2023). In addition, Cronbach's alpha was used to measure the internal consistency of the constructs. The study involved a factor analysis to deduce poorly loading items for both independent and dependent variables before inferential analysis. Further, the multiple regression analysis was carried out to verify the contribution of each sub-variable.

4. Results

The questionnaire was distributed to 114 (100%) respondents from the actors of the fruits and vegetables cold supply chain. Only 107 (93.9%) questionnaires were returned without missing values. Further, the response rate for interviews was 12 (100%) respondents out of 12 (100%) respondents. The skewness and kurtosis were used to test the normality of the dataset. For the data to be normally distributed, Kline (2023) suggested that the skewness and kurtosis values should be less than 3 and 10, respectively. The results in Table 1 show that skewness values range from 0.652 to 1.791, and kurtosis values range from -0.561 to 3.173, which implies that the data were normally distributed since all variable values were within the range. Further, Table 1 presents descriptive statistics by showing total mean of each sub-variable whereby according to Yang (2023), the mean score ranging from 1 to 1.80 means respondents highly agreed upon the given statements, while the range of 1.81 to 2.60 represents moderately agreed, 2.61 to 3.40 represents neither agreed not disagreed, 3.41 to 4.20 means respondents did not agreed, and for range of 4.21 to 5 denoting that respondents highly disagreed upon the given statements. The descriptive statistics results were supplemented by the interview results as follows;

Table 1: Descriptive Statistics and Normality Test

Variable	N	Mean	Std. Deviation	Skewness	Kurtosis
Reciprocity	107	1.88	.894	1.791	3.173
Information technology	107	2.24	.868	1.189	.644
Performance of the fruits and vegetables cold chain	107	1.97	.563	.652	-.561

4.1 Reciprocity

The mean score of 1.88 shows that actors of the supply chain create a win-win situation, which in turn facilitates knowledge sharing and information flow associated with cold chain activities and hence enhances firm performance. This implies a high level of sharing of business information among supply chain actors in the fruits and vegetables industry, and it is a result of the free connection among supply chain actors in Tanzania, which led to the free exchange of information. This outcome is supplemented by interview results, as one respondent said:

"Information sharing has been a basis of our success, because we focus much on foreign markets, as most of our green beans are distributed in Europe. So, the only way to survive in the foreign competition was through establishing and keeping a close relationship with our supply chain partners, ensuring we keep updated on demands and standards required by our customers" (Respondent 3, 2023).

In addition, in an interview with a leader of small-scale farmers at Kibosho Umbwe, he said:

"Exchange of information is compulsory on our side, since we engaged in contract farming with various downstream organizations. So, to be asked or provide information about the progress of products is a contractual right of our partners and an obligation to us. Also, when orders are ready, we need to inform them in time so that they can pick up their consignments early and free up the space of our packing house, as it is used by all farmers here" (Respondent 11, 2023).

4.2 Information Technology

The mean score of 2.24 represents a moderate agreement that information technology is a crucial factor in facilitating the performance of the fruits and vegetables cold chain. This implies that, even though low advances in technology are experienced in Tanzania. Still, members of the supply chain, particularly in fruits and vegetables, try to utilize the available technology through using WhatsApp, emails, and smartphones to communicate and exchange valuable information in order to support daily business operations. Furthermore, one respondent stated that:

"Development of information technology is at an early stage in Tanzania, particularly in the fruits and vegetable industry. However, our firm uses smartphone devices and emails as means of communication, and we can trace our customers' products while they are transported in airplanes, ships, or our refrigerated trucks to ensure they arrive at their destination safely and to a satisfactory quality standard" (Respondent 5, 2023).

4.3 Reliability Test and Factor Analysis

The study examined the internal consistency of all constructs. Saunders et al. (2023) suggested 0.70 to be a minimum value for the variable to be reliable. The result in Table 2 showed that all constructs used in this study had high Cronbach's alpha values, whereby reciprocity had a value of 0.948, information technology had a value of 0.862, and the dependent variable constructs, namely profitability, had a value of 0.705, and responsiveness had a value of 0.710. Hence, this confirmed the suitability of the dataset for further analysis.

On the other hand, the study included a factor analysis in order to deduce poorly loading items for both independent and dependent variables. The factor analysis involved Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity to test the suitability of the data. According to Kalkbrenner (2021), before proceeding with factor analysis, the researcher should focus on both the KMO test to measure a shared variance among items in the correlation matrix and Bartlett's Test to verify if the inter-item correlation matrix is an identity matrix. Harerimana and Mtshali (2020) suggested that a KMO value of 0.6 and above, as well as a P-value of less than 0.05, are considered to be adequate to perform factor analysis. In extraction, the Principal Component Analysis (PCA) was used due to its characteristics of reducing the dimensionality of large data sets into smaller ones without changing the contents of the large data set of variables, and for the rotation method, VARIMAX was adopted, which means that the underlying factors are non-orthogonal (Kalkbrenner, 2021). A measure of explained variance (eigenvalue) of 1.0, which is a common criterion for a factor to be useful, was also selected as per the advice of Reddy and Kulshrestha (2019). Furthermore, this study used a cut-off of 0.6 as demonstrated by Taherdoost, Sahibuddin, and Jalaliyoon (2022) and Kalkbrenner (2021), which indicates that a minimum loading of 0.6 and above for an item is considered to be very good.

The results showed that all variables meet the requirements to proceed with factor analysis as for information sharing; KMO test was 0.847 and Bartlett's Test of Sphericity (Chi-squire = 844.400, degree of freedom = 45) was significant at 0.000, and for performance of FVCC; KMO test was 0.725 and Bartlett's Test of Sphericity (Chi-squire = 201.078, degree of freedom = 21) was significant at 0.000.

Likewise, Table 2 presents the rotated factor matrix for the purpose of dropping lower loading factors, and for this study, a cut-off of 0.6 was used. After running a factor analysis, for information sharing, no item was dropped since they had loadings of 0.6 and above, and for the performance of FVCC, only item V802c was removed for further analysis due to poor loading.

Table 2: Rotated Factor Matrix and Scale Analysis for Constructs

Variable	Code	Constructs	Cronbach's Alpha	Question code	scores
Information sharing	V301	Reciprocity	.984	V301a	.917
				V301b	.913
				V301c	.893
				V301d	.872
				V301e	.853
	V302	Information technology	.862	V302c	.837
				V302a	.827
				V302d	.814
				V302b	.722
				V302e	.722
Performance of FVCC	V801	Profitability	.705	V801a	.753
				V801d	.721
				V801b	.689
				V801c	.667
	V802	Responsiveness	.710	V802d	.829
				V802b	.758
				V802a	.730

4.4 Regression Analysis

This study used regression analysis to analyze how information sharing affects the performance of the fruits and vegetables cold supply chain. The study includes sub-variables such as reciprocity and information technology associated with information sharing. Table 3 explained the overall contribution of predictors to the dependent variable.

Table 3: Model summary for information sharing constructs

R	R Square	Adjusted R Square	Std. Error of the Estimate
.787[a]	.620	.612	.35049

a. Predictors: (Constant), Information technology, Reciprocity

b. Dependent Variable: Performance of the fruits and vegetables cold chain

From Table 3, the findings showed the positive linear relationship predictors had on the performance of the fruits and vegetables cold chain, as the correlation coefficient (R) was 78.7%. The R-Square of 0.620 means the overall contribution of predictors toward the performance of the fruits and vegetables cold supply chain was 62.0%, while 38% of the variance represented the extent to which the independent variables fail to explain the dependent variable. In general, the model was a good predictor of the relationship between independent variables and dependent variables. The ANOVA was carried out to determine the overall significance of the model. The results are shown in Table 4 below.

Table 4: ANOVA for Information Sharing Constructs

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	20.806	2	10.403	84.686	.000[b]
Residual	12.775	104	.123		
Total	33.581	106			

a. Dependent Variable: Performance of the fruits and vegetables cold chain

b. Predictors: (Constant), Information technology, Reciprocity

The results represented in Table 4 revealed that the overall model was statistically significant because F (10.403 ÷ 0.123) = 84.686, and the P-value was 0.000. Thus, the overall regression analysis was statistically significant.
The regression coefficients were used to show the extent to which each predictor explains the variance of a dependent variable while holding other predictors constant. View Table 5 below;

Table 5: Coefficients for Information Sharing Constructs

	Unstandardized Coefficients		Standardized Coefficients		
Variables	B	Std. Error	Beta	t	Sig.
(Constant)	.728	.101		7.180	.000
Reciprocity	.220	.042	.350	5.221	.000
Information technology	.370	.043	.570	8.512	.000

Based on the results as indicated in Table 5, information technology had a high contribution as a unit change in information technology influences the performance of the fruits and vegetables cold supply chain by 0.370. Followed by the reciprocity, which had a contribution of 0.220 to the performance of the fruits and vegetables cold supply chain. In addition, both information technology and reciprocity had a statistically significant relationship with the performance of the fruits and vegetables cold supply chain, evidenced by a P-value of 0.000 and 0.000, respectively.

5. Discussion

The descriptive analysis and qualitative results indicate that the flow of information related to product availability, sales data, demand forecast, orders, or inventory is exposed as the crucial bonds for supply chain partners to stay connected. This finding agreed with those of Feng, Hu, and He (2021), who found that the development of mutually beneficial and win-win cooperative relationships between upstream and downstream actors not only facilitates information sharing but also spreads the development of the fresh agricultural products supply chain. In this case, the external integration of fruit and vegetable actors, including both upstream and downstream, can be facilitated by close collaboration or alliance, which creates a balance of giving and receiving valuable information among supply chain actors and improves the performance of the supply chain as a whole. This is regardless of whether the chain is a generic or cold supply chain, as both need the smooth flow of information among partners of the respective supply chain.

Also, by doing so, stakeholders can significantly mitigate inefficiencies and drive the growth of the cold chain market, ultimately ensuring better quality and availability of fresh produce like fruit and vegetables while enhancing the livelihoods of all participants in the chain.

In addition, both quantitative and qualitative findings revealed that effective information sharing through the use of information technology enhances the performance of the fruit and vegetable cold chain, because, regardless of the location, information technology facilitates the movement of real-time information and communication that links members of the supply chain. This finding was supported by Sun et al (2020), who revealed that information technology not only builds trust but also facilitates the flow of information and improves the coordination among cold supply chain actors. On the same basis, Islam et al (2022) provided that information technology smoothens the flow of information, creating a competitive advantage, and improving the coordination among cold supply chain actors through building trust and commitment. This means that while perishable products are in transit or storage, information such as orders from customers and temperature status can be traced and accessed easily by all supply chain actors at once. Therefore, fruit and vegetable businessmen in Tanzania, particularly exporters, should increase their investment efforts in new information technology in order to improve the efficiency of the cold supply chain, especially perishable products such as fruits and vegetables.

6.Conclusion

The immaturity of the cold supply chain in Tanzania, especially within the fruits and vegetables sector, prompted this study. The predictors included in this study offer valuable insights to all stakeholders regarding the critical role of the cold chain in improving supply chain efficiency for temperature-sensitive products, particularly in Tanzania's agricultural sector. Rapid urbanization and technological advancements are driving the growth of this market, yet challenges persist, particularly in creating reciprocal benefits and effective use of advanced technologies for information sharing and monitoring, respectively. Despite the potential benefits of such technologies, the majority of the fruit and vegetable actors remain reluctant to adopt cost-effective digital platforms, hindering their ability to exchange crucial information promptly. In fact, the importance of collaboration and transparency among supply chain actors cannot be ignored, as it is essential for improving product quality, reducing waste, and ensuring profitability. So, to fully harness the benefits of the cold chain, there is a need to foster trust, encourage the adoption of modern communication tools, and streamline processes for timely information exchange.

Furthermore, the study faced limitations due to a lack of a sampling framework, as there was a small population of fruit and vegetable stakeholders capable of providing detailed and adequate information about the cold supply chain. This resulted in the adoption of the census technique. Finally, the findings of this study cannot be confidently generalized to developed countries, as the study was conducted in a developing country, specifically Tanzania.

7. Study's Implications

7.1 Theoretical Implications

This study, guided by Social Exchange Theory (SET), aims to examine the impact of information sharing on the performance of the fruits and vegetables cold supply chain. The findings contribute to the existing body of knowledge on the cold chain for fruits and vegetables, particularly in the context of Tanzania. From a reciprocity view, the study highlights that a win-win situation among growers, transporters, distributors, retailers, and consumers of fruit and vegetables is a powerful driver for social interaction, which in turn creates reciprocal benefits gained due to the high-quality, safety, and nutritional value of fruits and vegetables to be maintained throughout the cold chain. Additionally, the study suggests that information technology builds trust and enhances a smooth flow of data across the entire cold chain. This means that while fruit and vegetables are in the distribution process, data such as orders from customers and temperature status can be traced and shared easily across the entire chain at once. Thus, these communal bonds not only help individual actors but also the overall sustainability of the fruit and vegetable cold chain.

7.2 Practical Implications

The study has numerous practical implications. First, the study provides a lesson to all supply chain members of fruits and vegetables operating their businesses in developing countries like Tanzania, particularly on the need for technologies that facilitate quick communication. Implementing systems like social media, Wireless Sensor Networks (WSN), and Radio Frequency Identification (RFID) can streamline operations, reduce spoilage, and enhance overall

efficiency. Secondly, it emphasizes that collaboration among fruit and vegetable members can lead to regular communication, build trust, and strengthen partnerships, which in turn enhance better inventory management and responsiveness to market demands. Thirdly. A study encouraging stakeholders of fruit and vegetables to utilize mobile technology and social media for information sharing to improve market access and ensure that products reach consumers in optimal condition, considering their short shelf life. Doing so increases the availability of fruits and vegetables not only in local markets but also in neighboring countries, especially Kenya, Uganda, Rwanda, and Burundi.

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