

The Relationship Between Stakeholders' Participation in Glass Bottle Reverse Logistics and Supply Chain Performance: A Case of SBC Tanzania Limited

George Ezekiel Mkuburo¹, Edward B. Makoye²

¹Department of Management Science, Faculty of Logistics and Business Studies, National Institute of Transport, Tanzania

²Department of Procurement and Logistics Management, School of Business, Mzumbe University, Tanzania

Email: georgeezequel56@gmail.com

Abstract

This study investigates the relationship between stakeholders' participation in glass-bottle reverse logistics and supply-chain performance at SBC Tanzania Limited in Arusha. A descriptive research design was adopted, using questionnaires and interviews with 152 participants comprising consumers, retailers, distributors, and company staff. Stratified random sampling was applied for quantitative data collection and purposive sampling for qualitative interviews. Quantitative data were analyzed using descriptive and inferential statistics through IBM SPSS 27, while qualitative data were analyzed using content analysis. The findings revealed a strong positive correlation between stakeholder participation and supply-chain performance ($r = 0.784$, $p < 0.01$). Despite this, 68.1% of respondents reported that SBC Tanzania primarily reuses rather than recycles bottles, leading to customer dissatisfaction regarding packaging quality. Additionally, 65.9% expressed dissatisfaction with the current financial incentives for bottle returns. The study concludes that improving transparency, revising incentive structures, and strengthening communication can enhance stakeholder engagement and supply-chain sustainability. The findings contribute to the growing body of literature on circular-economy practices in developing economies by contextualizing stakeholder theory within reverse-logistics operations.

Keywords: Reverse Logistics; Stakeholder Participation; Supply-Chain Performance; Circular Economy; Tanzania.

Received: August 20, 2026
Revised: September 15, 2026
Accepted: October 17, 2026

Introduction

Reverse logistics has gained increasing attention within sustainable supply-chain management because of its contribution to resource recovery, waste reduction, and the efficient utilisation of materials. The United Nations Environment Programme (UNEP) and International Solid Waste Association (ISWA, 2024) emphasise the importance of waste prevention, resource recovery, and coordinated action among stakeholders in the transition towards a circular economy. Similarly, the Organisation for Economic Co-operation and Development (OECD, 2022) identifies weaknesses in collection, sorting, and recycling systems as significant challenges in plastic-waste management. Although the latter evidence concerns plastic materials, it illustrates the broader importance of effective recovery systems in improving resource utilisation. In the beverage industry, reverse logistics provides an opportunity to

62

recover packaging materials, reduce dependence on newly manufactured containers, and improve supply-chain performance through the return and reuse of suitable bottles.

Glass-bottle reverse logistics involves the collection, transportation, inspection, and return of used bottles for subsequent reuse or material recovery. Reusable bottles are cleaned and refilled when they remain suitable for further use, whereas discarded glass can be processed into cullet for manufacturing new glass products. Labelle and Frayret (2023), in their study of first-mile reverse logistics for glass-bottle recovery, demonstrated the importance of collection-system configuration and population-specific characteristics in determining return rates. Their findings indicate that the organisation of collection points and the characteristics of the population served are relevant to the effectiveness of glass-recovery systems. Similarly, Ezeudu and Kennedy (2024), examining returnable glass-bottle systems in Nigeria, identified collaboration among value-chain actors, cost reduction, and improved environmental management as important enablers of circular business models. Their study also identified infrastructure, technological, and financial constraints that may hinder implementation. These findings establish that effective glass-bottle recovery requires both operational arrangements and coordination among the actors involved in returning containers.

The effectiveness of reverse logistics also depends on the behavioural and economic factors that influence participation in recovery activities. Guo et al. (2023) analysed deposit-refund and reward-based policies for packaging recovery and demonstrated that the relative effectiveness of these mechanisms depends partly on consumers' environmental awareness and the economic conditions under which recovery takes place. Their findings suggest that incentives should be considered alongside consumers' willingness to participate and the economic feasibility of the recovery system. In a different context, Labelle and Frayret (2023) found that population-specific characteristics could influence glass-bottle return rates, further demonstrating that recovery performance is shaped by the characteristics of the collection system and the people it serves. These findings are relevant to returnable glass-bottle systems, where consistent stakeholder participation is necessary to maintain the availability of containers for subsequent production cycles.

In Tanzania, evidence on stakeholder participation in beverage reverse logistics has largely examined plastic packaging and broader waste-management strategies. Nahimana (2023) investigated end-user participation in reverse logistics for plastic-packaged beverages in Moshi Municipality and identified behavioural factors, awareness, and financial incentives as relevant considerations in participation. Rutaba (2025), examining disposable bottle waste in Dodoma Region, identified stakeholder collaboration, communication, technological development, and regulation as relevant considerations in sustainable reverse-logistics strategies. Although these studies contribute to understanding participation in Tanzania's beverage-waste management systems, their focus on plastic packaging and disposable bottle waste limits the extent to which their findings explain participation in the recovery and reuse of glass bottles. The distinction is important because returnable glass-bottle systems require containers to be recovered in suitable condition, transported through distribution networks, and processed for subsequent use.

Stakeholder participation is particularly relevant to supply-chain performance because the returnable-bottle process involves interdependent activities among consumers, retailers, distributors, suppliers, and company employees. Ezeudu and Kennedy (2024) established that returnable glass-bottle systems depend on collaboration among formal and informal value-chain actors, while Labelle and Frayret (2023) demonstrated the importance of collection-

system design in determining glass-bottle recovery rates. Afum et al. (2021), examining reverse logistics and supply-chain performance in Ghana's manufacturing sector, also found that stakeholder influence was associated with reverse-logistics adoption and that reverse-logistics adoption was associated with improved supply-chain performance. Although their research was not specific to reusable glass bottles, it provides broader empirical support for investigating stakeholder participation in relation to supply-chain outcomes. Collectively, these studies suggest that awareness of return procedures, willingness to participate, financial incentives, and coordination among supply-chain actors are relevant dimensions for understanding the performance of glass-bottle reverse logistics.

Despite these contributions, a contextual and empirical gap remains concerning the relationship between stakeholder participation and supply-chain performance in Tanzanian beverage-manufacturing organisations that operate glass-bottle reuse systems. Existing research has examined the configuration of glass-bottle collection systems (Labelle & Frayret, 2023), circular business models involving returnable glass bottles in Nigeria (Ezeudu & Kennedy, 2024), incentive mechanisms for packaging recovery (Guo et al., 2023), and stakeholder participation in Tanzania's plastic-packaging and disposable-bottle waste systems (Nahimana, 2023; Rutaba, 2025). However, these studies do not directly establish how stakeholder awareness, willingness to participate, and financial incentives relate to supply-chain performance at SBC Tanzania Limited. In particular, further organisation-specific evidence is needed on the relationship between these dimensions of stakeholder participation and the rate of returned glass bottles and cost savings associated with reuse. Addressing this gap extends the existing literature by examining stakeholder participation within the operational context of a Tanzanian beverage manufacturer.

Therefore, this study examines the relationship between stakeholder participation in glass-bottle reverse logistics and supply-chain performance at SBC Tanzania Limited. The company provides an organisational setting for investigating stakeholder involvement in the return, inspection, cleaning, and reuse of glass bottles within a beverage distribution network. The study considers consumers, retailers, distributors, suppliers, and company employees as relevant stakeholders and focuses on three dimensions of participation: awareness, willingness to participate, and financial incentives. Supply-chain performance is assessed through the rate of returned glass bottles and cost savings associated with reuse. Using a descriptive research design and correlational analysis, the study examines the relationship between stakeholder participation and supply-chain performance without presuming a causal effect. The findings contribute organisation-specific evidence from Tanzania to the literature on reverse logistics and stakeholder engagement, with practical relevance for improving the management of returnable glass-bottle systems.

Literature Review

Theoretical Literature Review

Stakeholder Theory

This study is grounded in stakeholder theory, originally developed by Freeman (1984), which posits that organizations should create value for a broad spectrum of stakeholders rather than focusing solely on shareholders. These stakeholders include consumers, employees, suppliers,

local communities, and the environment. By recognizing and addressing the diverse needs and expectations of these groups, firms can enhance legitimacy, foster trust, and achieve long-term sustainability and performance (Parmar et al., 2010; Changalima et al., 2021).

In this context, stakeholder theory underscores that effective participation from all relevant actors is vital to realizing the environmental, economic, and operational benefits of reverse logistics. This includes active engagement in glass-bottle return schemes, awareness of environmental practices, and motivation through appropriate incentive structures. Through such engagement, SBC Tanzania Limited can not only minimize waste and operational costs but also strengthen community relations and improve its corporate image (Kusi et al., 2021; Wondimu, 2016a).

Moreover, stakeholder theory highlights the importance of inclusive decision-making and collaboration throughout the reverse-logistics network. Participation by consumers, suppliers, and internal staff in activities such as returning, sorting, and cleaning glass bottles enhances supply-chain performance by ensuring a consistent supply of reusable containers and reducing procurement costs. Unlike general applications of the theory, this study emphasizes stakeholder interactions within the Tanzanian context, where cultural norms, infrastructure constraints, and regulatory frameworks influence how reverse-logistics practices are perceived and implemented (Ismail et al., 2023).

As Sarkis et al. (2011) note, engaging stakeholders in environmental initiatives such as reverse logistics not only improves operational performance but also promotes shared ownership of sustainability goals. This aspect is particularly relevant in developing economies, where regulatory enforcement may be weak and community-driven solutions are critical. For instance, consumers who understand the environmental and financial value of returning glass bottles are more likely to participate in collection systems, thereby increasing recovery rates and reducing production costs (Nahimana, 2023). Similarly, suppliers and retailers benefit from stronger partnerships with companies like SBC Tanzania that prioritize sustainability and consistent reverse-logistics practices (Changalima, 2024).

Empirical Literature Review

Stakeholders' Participation and Supply Chain Performance

Nahimana (2023) examined end users' involvement in reverse logistics for plastic packaged beverages in Moshi Municipality, Tanzania. Using a cross-sectional design, the study collected data from 400 respondents through survey questionnaires, interviews, and literature reviews. The research aimed to identify factors influencing end users' participation in reverse logistics, the impact of financial incentives, and their awareness of reverse logistics practices. Analysis using SPSS and SmartPLS4 software revealed that willingness, attitude, and perceived behavioural control significantly affected participation in sorting and returning plastic packaged beverages. Financial incentives were crucial in increasing engagement in waste management activities. However, barriers such as lack of time, essential materials, and drop-off centres hindered participation. Although the study provided valuable insights, it faced limitations such as its geographic focus, potential biases in data collection, reliance on self-

reported data, a narrow scope of factors considered, and the cross-sectional design's limitations in establishing causality. These limitations suggest a need for more comprehensive future research.

Furthermore, Maheswari et al., (2017) investigated stakeholder engagement in managing mobile phone e-waste in Indonesia using the quattro helix model, which encompasses manufacturers, government entities, take-back operators, and consumers. The study involved 100 participants and developed a new stakeholder collaboration model through systematic literature review and analysis. The findings highlighted the importance of involving all key stakeholders to effectively manage e-waste. The quattro helix model identified six types of engagement to address each stakeholder's interests and motivations, aiming to bridge existing gaps in involvement for sustainable e-waste management. The research emphasized societal participation in reducing e-waste, businesses adopting recycling and refurbishing strategies, and government support in regulating practices and waste management. This study provides a structured framework for enhancing stakeholder collaboration and suggests future research to explore the model's practical application and impact on e-waste reduction and sustainability in the mobile phone industry.

Similarly, Jalil et al. (2016) examined the mutual influence between households and local authorities (LAs) in household recycling reverse logistics. Utilizing semi-structured interviews and thematic analysis with 14 participants, the study identified a reciprocal relationship where both parties affected each other's recycling behaviours. Key factors contributing to this dynamism included personal elements like self-awareness and knowledge, as well as situational aspects such as accessibility and availability of recycling facilities. The research highlighted the critical role of stakeholder engagement and coordination in improving waste management practices. It suggested that future research should validate these findings in various regions and industries to gain a broader understanding of this symbiotic effect in waste management systems.

Moreover, Nik Abdullah & Yaakub (2014) explored the adoption of reverse logistics and its impact on firm performance among Malaysian manufacturing companies. Surveying 101 managers from Northern Malaysia and the Klang Valley, the study revealed a low level of reverse logistics adoption. It found that regulatory pressure significantly influenced adoption, while customer and stakeholder pressure had a moderate effect, and there was no significant link between reverse logistics adoption and firm performance. The main barriers to implementation included lack of awareness, high costs, resource constraints, and management commitment issues. The study emphasized the need for increased awareness among Malaysian manufacturers about the benefits of comprehensive reverse logistics strategies. Future research should include a more diverse industry sample to enhance generalizability and further investigate the roles of stakeholder engagement and regulatory pressure in promoting sustainable business practices.

Also, Kusi et al. (2021) investigated the relationship between reverse logistics (RL), stakeholder influence, and supply chain performance in Ghana's manufacturing sector, aiming to provide managerial insights for RL support and enhanced supply chain efficiency. Through a survey of 193 managers and structural equation modelling, it revealed that stakeholder factors significantly influenced RL adoption, leading to improved supply chain performance. RL

adoption was found to address environmental concerns, meet customer expectations, and enhance firm competitiveness, while compliance with RL practices and effective waste management policies were emphasized. The study underscored the importance of stakeholder engagement in driving RL adoption and improving supply chain performance, with implications for firms to adopt environmentally friendly practices and comply with regulations.

Sharma et al. (2022) conducted a study at Metro Cash & Carry examined cost optimization in reverse logistics operations using a quantitative research approach, involving 100 respondents selected through selective sampling from the reverse logistics and quality inspection teams. Data collection included face-to-face interviews and structured questionnaires, supplemented by secondary data. The study found that effective reverse logistics practices positively impacted cost efficiency by reducing procurement costs, enhancing profitability, and improving supply chain operations. Involving supply chain partners in the reverse logistics process maximized cost optimization benefits through better coordination and resource utilization. The findings emphasized the importance of stakeholder collaboration in achieving cost efficiency. However, limitations included the focus on a single organization, which may restrict the generalizability of the results, and the lack of exploration of long-term effects and external factors. Future research should address these limitations by conducting comparative studies across different industries and regions to validate the findings and provide a comprehensive understanding of cost optimization in reverse logistics.

Moreover, Sureka et al. (2018) examined the efficiency and effectiveness of reverse logistics in Sri Lanka's soft drink industry, employing Pareto analysis and the Analytical Hierarchy Process (AHP) to identify transportation costs as the most influential factor, followed by accidents and packaging costs. The study emphasized the importance of efficiently managing these factors to improve the reverse logistics process. However, its scope was limited to a specific industry and region, indicating the need for broader research encompassing diverse sectors and geographical areas for more generalized insights. Future studies could expand the sample size and include various industries to validate these findings and develop comprehensive cost management strategies in reverse logistics. Also, Ran et al. (2016b) investigated the cost implications of a dual-channel recycling and revenue-sharing model in the glass packaging industry using mathematical modelling. Their findings revealed that the integrated supply chain model resulted in higher overall profit compared to the independent model. Specifically, optimal price and recovery rates under the integrated model were \$146.08 and 0.41, respectively, yielding a total profit of 24,371.83 RMB, while the independent model's optimal values were \$154.41 and 0.42, with a total profit of 17,034.15 RMB. This highlights the economic benefits of coordination and revenue-sharing in closed-loop supply chains, emphasizing the importance for manufacturers and retailers to adopt integrated strategies for enhanced profitability and sustainability.

Furthermore, Mobolaji (2017) examined the cost dynamics of reverse logistics in managing beverage containers in Lagos, revealing key insights from a survey of 94 consumers. The findings of the study highlighted that in Finland, the costs of recovering used beverage containers are efficiently managed through payments and subscriptions by manufacturers to PALPA, a non-profit organization. In contrast, Nigeria's lack of a similar structured system leads to higher costs and inefficiencies in reverse logistics. Despite reducing municipal solid waste management costs and promoting sustainability by channelling used containers to

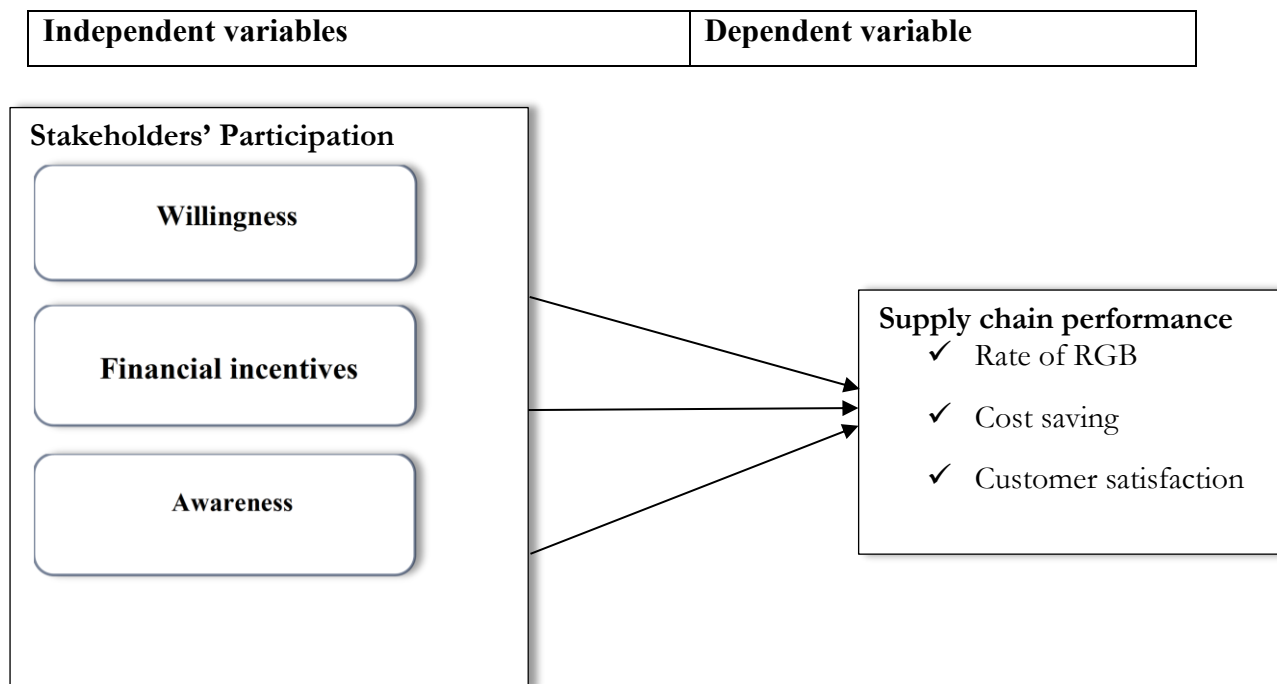
recycling facilities, Lagos faces challenges due to the absence of standardized prices and incentives for returning containers. The findings emphasize the need for structured policies and stakeholder cooperation to optimize reverse logistics costs in Nigeria, with suggestions for future research to explore other industries and regions. Furthermore, Wondimu (2016b) conducted a study on measuring the performance of the reverse logistics system in PET bottle recovery at EABSCO in Addis Ababa, Ethiopia, using a mixed-methods approach that combined surveys and interviews with participants from micro and small enterprises (MSEs). The study involved a sample of 100 respondents selected through stratified random sampling, representing various entities within the waste recovery chain such as street boys, private sector enterprises, scavengers, and korales. Data collection included detailed questionnaires and semi-structured interviews to gather both quantitative and qualitative insights. Results indicated significant variability in quality, with the majority of MSEs (60%) engaged in both collection and sorting, while a smaller portion focused solely on one of these activities. The study underscored the lack of recycling and final disposal functions within these enterprises, leading to inconsistencies in quality control and overall recovery efficiency. Limitations included the study's narrow geographic focus and the absence of a comprehensive policy framework for reverse logistics, which may limit the generalizability of the findings to other regions or industries. To address these limitations, future research could broaden its scope and include a wider range of industries to validate these observations.

On other hand, Sangwan (2017) conducted a study on decision variables and performance indicators of reverse logistics at the Birla Institute of Technology and Science, Pilani, India. The study utilized a conceptual framework approach, aiming to develop key activities, decision variables, and performance indicators for reverse logistics. Data was derived from existing literature, focusing on collection, sorting/testing, recovery, and redistribution processes. The research found that the average reverse logistics costs account for 9.5% of total logistics costs, highlighting the significant financial impact of these activities. Key decision variables influencing costs include the location and capacity of collection centres, types of recovery options, and the integration with forward logistics. Quality variables identified in the study include the speed of processing returns, the condition of returned items, and the accuracy of sorting processes. Strengths of the study include a comprehensive analysis of decision variables and performance indicators, which provide valuable insights for managers in reverse logistics. However, the study's reliance on existing literature and the lack of empirical data collection may limit the practical applicability of the findings. Future research could benefit from empirical validation across diverse industries to enhance generalizability.

Similarly, Umer & Afzal (2014) conducted an analysis of reverse logistics in soft-drink bottling industry of Islamabad, Pakistan, employing a qualitative research approach. The study collected primary data through in-depth interview with distribution and logistics managers from Coca-Cola and PepsiCo, and secondary data from these companies' sales and supply chain departments. The study focused on reverse logistics' impact on quality, specifically the reuse of RGB, feedback mechanisms, and barriers to implementation. The findings revealed that reverse logistics significantly improves product quality and customer satisfaction through efficient feedback loops. However, the study noted challenges like inadequate infrastructure and management commitment. The strength of this study lies in its detailed, industry-specific insights, while its weakness includes limited generalizability due to its focus on two companies within a single industry.

Conceptual Framework

The Figure 1.1 elucidates the relationship between stakeholders' participation and supply chain performance at SBC Tanzania Limited. This conceptual framework considers stakeholders' awareness, willingness, and financial incentives as predictor variables for supply chain performance.



Source: Researcher, (2024)

Figure 1.1: Conceptual Framework

As illustrated in Figure 1.1, the three variables were expected to influence supply chain performance, which is measured by the rate of RGB, cost savings, and customer satisfaction.

Stakeholder awareness refers to the extent to which stakeholders were informed about SBC Tanzania's reverse logistics processes, including the collection, cleaning, and reuse of glass bottles. Previous studies demonstrated that increased awareness enhanced engagement by improving stakeholders' understanding of their role within the system (Jalil et al., 2016; Nahimana, 2023). Well-informed stakeholders were more likely to support and participate in sustainability initiatives. The variable – Willingness – captured the behavioural intention and readiness of stakeholders to return used glass bottles. This dimension reflected intrinsic motivation, influenced by attitudes, social norms, and perceived behavioural control (Eagly & Chaiken, 2015). In the case of SBC Tanzania, stakeholders who recognized the benefits of reverse logistics would be more inclined to engage regularly.

Financial incentives referred to the economic rewards provided by SBC to encourage consistent participation in bottle return activities. Studies in similar contexts indicated that financial

motivation was a critical factor for sustained stakeholder engagement, particularly in developing economies (Kusi et al., 2021; Wondimu, 2016).

Supply chain performance, as a dependent variable, was assessed through three key indicators: the rate of returned glass bottles, cost savings resulting from reuse practices, and customer satisfaction related to packaging quality. Literature showed that effective reverse logistics systems contributed to enhanced performance by reducing production costs, improving resource efficiency, and strengthening customer perceptions (Tan et al., 2016; Sharma et al., 2022).

Methodology

Research design

A descriptive research design was adopted to systematically explore and depict the current state of reverse logistics in the glass bottle supply chain performance. Descriptive research design is well-suited for providing an accurate representation of characteristics, behaviours, and relationships within the research context without manipulating the environment or variables (Saunders et al., 2019). Through this design, the study determined the relationship between stakeholders' participation and supply chain performance.

Population and Sample size

Target population

The target population for this study comprised of various stakeholders, including consumers, retailers, distributors/suppliers and SBC Tanzania staff. The study targeted a total of 245 participants across the groups.

Sample size

Sample size refers to the number of individuals or observations included in a research study (Cochran, 2015). The study obtained a sample size of 152 participants using Slovin's formula from the target population of 245 respondents.

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

Where: n = Sample size, N = Total population, e = Margin of error, Total population (N) = 245, Confidence level = 95%

Margin of error (E) = 5%

$$n = \frac{245}{1+(245*0.05^2)}$$

$$n = \frac{245}{1+(245*0.0025)}$$

$$n = \frac{245}{1+0.6125} = n = \frac{245}{1.6125}$$

Sample size (n) = 151.94 approximately 152

Table 1.1: Population and Sample size

Participant	Population	Sample size
Consumers	201	125
Retailers	8	5
Distributors/suppliers	5	3
SBC Tanzania staff	31	19
Total	245	152

Source: Researcher, (2024)

Sampling strategy

Stratified random sampling was used for quantitative data collection, while purposive selection was employed for qualitative data. Stratified random sampling ensured that all subgroups within the target population, including consumers, retailers, distributors/suppliers, and SBC Tanzania staff were represented. This technique involved dividing the target population into subgroups, known as strata, that shared similar characteristics and randomly selecting members from each stratum. This strategy, when well used, could lead to generalization and unbiased quantitative findings (Creswell, 2018). For qualitative data, purposive selection was used to select retailers, distributors/suppliers, and SBC Tanzania staff who had in-depth knowledge and experience relevant to the study thus allowing for a precise evaluation of stakeholders' participation. Additionally, snowball sampling was employed to obtain consumers, whereby initial consumers helped to identify and recommend to other consumers thus ensuring a comprehensive and diverse consumer sample size.

Data collection methods

The study employed questionnaires, interviews, and documentary reviews to gather data that aligned with the study objectives. The primary instruments included the structured questionnaire and an interview guide. The questionnaire collected quantitative data from consumers and SBC Tanzania staff, focusing on stakeholder awareness, participation willingness and financial incentives. The interview guide facilitated qualitative interviews with key informants such as quality assurance and operation staffs from SBC, retailers and suppliers in order to gain insights into cost, quality, and satisfaction levels related to reverse logistics practices. Additionally, a documentary review analysed SBC's performance reports and customer feedbacks to provide contextual background and supporting evidence. This triangulation enabled a better understanding of how glass bottle reverse logistics affects supply chain performance at SBC Tanzania Ltd, evaluated through RGB processing rates, cost savings, and customer.

Data analysis

The study employed descriptive statistics to analyse and summarize the levels of awareness, financial incentives and willingness among stakeholders. Thematic analysis was employed to provide deeper insights into stakeholders' awareness and willingness regarding their participation in reverse logistics activities. Lastly Pearson correlation was employed to determine the relationship. The integrated approach to analysis, combining quantitative techniques (descriptive statistics and correlation) with qualitative methods (thematic analysis of interviews and documentary reviews), offered a comprehensive evaluation of stakeholder participation in reverse logistics on supply chain performance at SBC Tanzania Limited as presented in subsequent sections of the paper.

Results and Discussion

Descriptive results

Findings on stakeholders' participation in glass bottle reverse logistics and supply chain performance

Table 1.2 presents results about stakeholders' awareness, willingness and financial incentives on their participation in glass bottle reverse logistics at SBC Tanzania Limited. The inclusion of such variables was important in providing a nuanced understanding on how actively stakeholders, including consumers, retailers and suppliers, engage with the glass bottle reverse logistics program.

Table 1.2: Stakeholders' participation

Statement	1	2	3	4	5		
	F (%)	F (%)	F (%)	F (%)	F (%)	M	SD
I am aware that SBC Tanzania collects used glass bottles from consumers and retailers for recycling	40 (29.6%)	52 (38.5%)	10 (7.4%)	25 (18.5%)	8 (5.9%)	2.33	1.245
I am aware that SBC Tanzania sorts the collected glass bottles based on their condition and quality	3 (2.2%)	3 (2.2%)	11 (8.1%)	77 (57.0%)	41 (30.4%)	4.11	0.816
I am aware that SBC Tanzania cleans the collected glass bottles before reusing them	2 (1.5%)	6 (4.4%)	17 (12.6%)	66 (48.9%)	44 (32.6%)	4.07	0.874
I am aware that SBC Tanzania reuses cleaned glass bottles in their production process	3 (2.2%)	8 (5.9%)	17 (12.6%)	64 (47.4%)	43 (31.9%)	4.01	0.942

I understand the benefits of participating in SBC Tanzania's glass bottle return program	4 (3.0%)	2 (1.5%)	10 (7.4%)	80 (59.3%)	39 (28.9%)	4.10	0.827
I actively engage in returning glass bottles to designated collection points	8 (5.9%)	4 (3.0%)	27 (20.0%)	58 (43.0%)	38 (28.1%)	3.84	1.057
Financial incentives provided by SBC encourage me to participate in bottle return programs	54 (40.0%)	35 (25.9%)	19 (14.1%)	17 (12.6%)	10 (7.4%)	2.21	1.295

Source: Field Data (2024)

Note. 1 = Strongly Disagree, 5 = Strongly Agree; M = Mean, SD = Standard Deviation.

Stakeholders' Awareness and Supply Chain Performance

The findings presented in Table 1.2 highlight a critical awareness gap in SBC Tanzania's reverse logistics system. While a majority of respondents demonstrated strong knowledge of internal operational practices such as sorting (87.4%, mean = 4.11) and cleaning (81.5%, mean = 4.07) of glass bottles only 29.6% were aware that SBC collects used bottles for recycling, reflected by a low mean score of 2.33. This disparity suggests that while operational transparency exists at certain stages, broader communication about the company's reverse logistics objectives is lacking. The narrative emerging from the responses points to a system that is functionally active but weak in stakeholder engagement beyond the transactional level. A supplier shared:

"We return empty glass bottles to SBC Tanzania when we buy new soda crates, and from what we observe, they focus on reusing glass bottles rather than recycling them. The bottles are cleaned and reused, but broken or damaged glass bottles are rejected by SBC. They only accept bottles that are in good condition, and this creates an issue as some customers tend to reject sodas because the packaging quality is not always good. Although SBC's reuse process works well, improving the quality of returned bottles and offering better incentives for bottle returns could enhance the overall system."

This indicates a process constrained by quality requirements and limited stakeholder understanding. From a stakeholder theory perspective, this lack of broader awareness reduces the likelihood of voluntary participation, as stakeholders are less inclined to support practices they do not fully understand or perceive as valuable. The issue is not only one of communication but also of strategic positioning, stakeholders need to see themselves as part of a value-adding cycle, not merely passive actors returning bottles out of necessity.

Stakeholders' Willingness and Supply Chain Performance

Despite the awareness gap, the findings in Table 1.2 show that the willingness to participate is relatively high, with 71.1% of stakeholders actively engaging in bottle return practices and 88.2% recognizing the benefits, there is a latent opportunity for SBC to cultivate a more robust and proactive reverse logistics culture. However, the willingness revealed in the data is largely conditional and transactional. As one retailer noted:

"Customers generally do not bother returning bottles unless they need new soda... If they do not need a soda, they often sell the bottles to us for 100 or 200 TZS."

Similarly, one distributor explained *"We return bottles when placing new orders, but it is more of a routine and how the system works, not really something we do consciously to support recycling."*

This insight reveals a behaviour pattern rooted in immediate need rather than long-term commitment to sustainability. While stakeholder theory encourages fostering shared goals, in practice, these goals are often overridden by pragmatic concerns. The organization's challenge, therefore, lies in moving stakeholders from passive returners to active participants in a closed-loop system.

Moreover, the existing willingness can be viewed as a valuable asset that remains underutilized due to the absence of institutional mechanisms that build on stakeholders' intrinsic motivation. Without these mechanisms such as public recognition, awareness campaigns, or consistent reinforcement, willingness remains reactive, not strategic.

Financial Incentives and Supply Chain Performance

As shown in Table 1.2, the dissatisfaction with financial incentives, reported by 65.9% of respondents (mean = 2.21), illustrates the most critical bottleneck in SBC Tanzania's reverse logistics initiative (see Table 1.2). The absence of compelling financial motivation not only discourages proactive participation but also undermines existing stakeholder goodwill. An SBC staff member observed:

"We have noticed challenges with getting enough bottles back, as the current financial incentives do not seem to encourage wide participation..."

This view was echoed by a distributor, who stated, *"Some people hold on to bottles because the refund is too little or no at all. If it was more attractive, even casual consumers would be willing to return them regularly."*

These insights reveal that stakeholders perceive the incentive scheme as inadequate and disconnected from the actual costs and efforts involved in returning bottles. Within Tanzania's socio-economic context, where small financial gains can drive behavioural shifts, the lack of a meaningful incentive system not only reduces return frequency but also weakens the overall effectiveness of the reverse logistics process. From a stakeholder theory perspective, this gap suggests a misalignment between organizational expectations and stakeholder interests, resulting in diminished collaboration and reduced supply chain performance.

Correlation results

Table 1.3 presents the results of the relationship between stakeholders' participation in glass bottle reverse logistics and supply chain performance.

Table 1.3 Correlation results

Variables	r	Sig. (2-tailed)	N
Stakeholders' participation and supply chain performance	0.784	0.000	135

Note: *r* refers to Pearson's correlation coefficient. $p < 0.01$ (2-tailed).

As shown in Table 1.3, the correlation coefficient ($r = 0.784$, $p < 0.01$) indicates a strong relationship between stakeholder participation and supply chain performance. Beyond the statistical evidence, this relationship underscores that stakeholder engagement is not merely a supplementary function but a cornerstone of reverse logistics success. However, the quality of participation is equally as important as its quantity.

This finding highlights the need for systems that foster reflective, rather than merely reactive, behaviour. Stakeholders should feel empowered, well-informed, and genuinely motivated to act, not out of necessity, but from a shared commitment to sustainability. While SBC's existing infrastructure offers a solid foundation, the lack of adaptive policies and inclusive practices poses a risk of stagnating performance improvements.

Discussion

The findings of this study have revealed a strong positive correlation ($r = 0.784$, $p < 0.01$) between stakeholders' participation and supply chain performance, confirming the objective of this study. This relationship aligns with the conceptual framework that posited stakeholder awareness, willingness, and financial incentives as key antecedents to reverse logistics performance at SBC Tanzania. Stakeholder theory, as articulated by Freeman (1984) and further emphasized by Parmar et al. (2010), suggests that organizations thrive when they generate value for a broad spectrum of stakeholders. This value creation is evident in reverse logistics, where the engagement of actors such as consumers, retailers, and suppliers contributes to more efficient reuse practices, cost reduction, and improved customer satisfaction.

The first variable, stakeholders' awareness, revealed that while respondents were familiar with specific internal practices (e.g., bottle sorting and cleaning), only 29.6% were aware of recycling initiatives. This gap highlights a lack of systemic communication and aligns with findings from Jalil et al. (2016), who emphasized that awareness and effective information dissemination are critical for enabling stakeholder participation in recycling systems. Limited awareness hinders broader engagement and reduces the sustainability of the program thus supporting stakeholder theory's assertion that information asymmetry weakens participatory processes. Additionally, SBC's failure to clearly differentiate between reuse and recycling diminishes stakeholders' perceptions of the program's environmental significance.

In terms of willingness, the findings revealed that 71.1% of respondents actively returned glass bottles, while 88.2% recognized the benefits of the program. This indicates the presence of intrinsic motivation, albeit not fully utilized. Responses from suppliers and retailers further highlighted that willingness is primarily driven by necessity, such as returning bottles as a condition for receiving new crates, rather than a genuine sense of environmental responsibility. This aligns with Eagly and Chaiken's (2015) psychological perspective, which emphasizes that attitudes and behaviours are shaped by situational factors. Furthermore, the study supports Nahimana's (2023) conclusions, which identified willingness and perceived behavioural control as significant predictors of engagement in reverse logistics.

Moreover, the critical barrier across all stakeholder groups was the lack of sufficient financial incentives. With 65.9% of respondents expressing dissatisfaction and an average score of only 2.21, it is evident that SBC's current incentive structure fails to motivate stakeholders through meaningful rewards. This finding supports Kusi et al. (2021), who showed that stakeholder influence is often shaped by the perceived fairness and adequacy of compensation in reverse

logistics systems. Similarly, Wondimu (2016a) stressed that in developing economies, financial incentives are often the primary drivers of sustained stakeholder engagement. The absence of structured rewards creates a disconnection between SBC's operational needs and stakeholder motivations and therefore weakening the resilience of the supply chain.

The findings from this study subscribe to existing literature that stakeholder participation significantly enhances reverse logistics performance. For example, the strong correlation ($r = 0.784$, $p < 0.01$) aligns with Kusi et al. (2021), who found stakeholder involvement is critical to reverse logistics adoption and supply chain efficiency. Similarly, Nahimana (2023) highlighted on the willingness and behavioural control as key drivers of participation. In the same line, the current study reaffirms, though with added context, that engagement at SBC Tanzania is often reactive rather than proactive. Furthermore, the finding regarding dissatisfaction with financial incentives supports Wondimu's (2016a) argument that in developing economies, monetary rewards are essential for sustained engagement. Moreover, the limited awareness about collection processes echoes Jalil et al. (2016), who stressed that weak communication impedes stakeholder involvement. These findings reinforce stakeholder theory (Freeman, 1984) by emphasizing that organizations must generate value through inclusion, transparency, and responsiveness to stakeholder needs.

Theoretically, this study contributes to the extension of stakeholder theory by contextualizing participation mechanisms within a developing economy setting like Tanzania. In developed economies like Japan and South Korea, stakeholder engagement in reverse logistics is often institutionalized through well-established regulatory frameworks, advanced infrastructure, and widespread environmental awareness (Appolloni et al., 2014; Hazen et al., 2017). Participation in such contexts tends to be proactive, values-driven, and supported by consistent incentive schemes, including government-backed refund programs and digital tracking systems (Govindan et al., 2015). In contrast, findings from this study reveal that in under-researched settings like Tanzania, stakeholder participation is primarily transactional, reactive, and shaped by situational necessity rather than intrinsic motivation or shared environmental values. For example, while stakeholders at SBC Tanzania do participate in bottle returns, their engagement is largely conditional, triggered by the need to exchange bottles for new products or modest financial gain. This divergence illustrates that the mechanisms of stakeholder participation in Tanzania are not only influenced by economic constraints and limited infrastructure (World Bank, 2023), but also by gaps in communication and environmental education (Nahimana, 2023; Jalil et al., 2016). As such, stakeholder theory in this context must be applied with an appreciation for socio-economic realities and institutional limitations. This calls for a more adaptive interpretation of the theory that considers context-specific drivers of behaviour, informal systems of participation, and the need for localized engagement strategies to foster inclusive and sustainable reverse logistics practices.

On a practical level, these findings resonate with studies from Metro Cash & Carry (Sharma et al., 2022) and Serengeti Breweries Limited (Mbovu & David, 2018). Both studies demonstrated how the efficiency of reverse logistics systems was closely tied to stakeholder collaboration. Key benefits like cost savings, improved product availability and customer satisfaction were linked to effective reverse flow integration. The high correlation identified in this study ($r = 0.784$) further emphasizes the importance of stakeholder-focused reverse logistics models.

Conclusion

This study establishes stakeholder participation as an important factor associated with supply-chain performance in glass-bottle reverse logistics at SBC Tanzania Limited. The findings revealed a significant disparity between stakeholders' awareness of internal bottle-handling processes and their understanding of the broader bottle-return system. Although 87.4% of respondents were aware of bottle-sorting practices and 81.5% were aware of bottle-cleaning processes, only 29.6% were aware of the company's glass-bottle collection activities. Furthermore, despite 71.1% of respondents reporting active participation in bottle returns, their engagement was largely transactional rather than driven by environmental responsibility. Inadequate financial incentives emerged as a major constraint, with 65.9% of respondents expressing dissatisfaction with the existing arrangements. The correlation analysis revealed a strong positive relationship between stakeholder participation and supply-chain performance (($r = 0.784$), ($p < .01$), ($N = 135$)). These findings demonstrate that effective glass-bottle reverse logistics requires more than established collection and reuse procedures; it also requires informed, motivated, and actively engaged stakeholders. Nevertheless, the correlational findings establish an association rather than causation.

Accordingly, SBC Tanzania Limited should strengthen its reverse-logistics system by aligning stakeholder engagement strategies with the operational requirements of bottle recovery and reuse. Priority should be given to improving communication about bottle-return procedures, introducing attractive and transparent financial incentives, expanding accessible collection points, and implementing digital tracking to monitor returns and rewards. The company should also strengthen bottle inspection and cleaning procedures to maintain packaging quality and customer satisfaction while evaluating whether improved recovery rates generate measurable cost savings. At the institutional level, environmental regulators and local government authorities should support coordinated industry guidelines and public-awareness initiatives that encourage responsible packaging recovery. Future research should employ longitudinal or experimental designs to determine whether these interventions produce sustained improvements in stakeholder participation, bottle-return rates, and supply-chain performance. Such evidence would help establish which interventions are most effective and provide a stronger basis for scaling up sustainable glass-bottle reverse logistics across Tanzania's beverage industry.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work the authors used Grammarly and CHATGPT in order to check the grammar and paraphrase. After using this tool/service, the authors reviewed and edited the content as needed and takes full responsibility for the content of the published article.

References

- Afum, E., Sun, B. Z., & Kusi, C. L. Y. (2021). Reverse logistics, stakeholder influence and supply chain performance in Ghanaian manufacturing sector. *Journal of Supply Chain Management Systems*, 10(3), 20–34.

- Appolloni, A., Sun, H., Jia, F., & Li, X. (2014). Green procurement in the private sector: A state-of-the-art review between 1996 and 2013. *Journal of Cleaner Production*, 85, 122–133. <https://doi.org/10.1016/j.jclepro.2014.08.106>
- Changalima, J. (2024). Stakeholder perspectives in sustainable procurement. *Journal of African Supply Chain Research*, 6(1), 45–59.
- Creswell, J. W. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Eagly, A. H., & Chaiken, S. (2015). *The psychology of attitudes*. Wadsworth, Cengage Learning.
- Ezeudu, O. B., & Kennedy, C. (2024). Insights and dynamics of circular business model in developing countries' context: The empirical analysis of the returnable glass bottles process. *Business Strategy and Development*, 7(1), Article e349. <https://doi.org/10.1002/bsd2.349>
- Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman.
- Guo, X., Li, X., Bian, J., & Yang, C. (2023). Deposit or reward: Express packaging recycling for online retailing platforms. *Omega*, 117, Article 102828. <https://doi.org/10.1016/j.omega.2022.102828>
- Ismail, A. M., Mwakajinga, D., & Semboja, H. (2023). Localizing stakeholder theory in developing economies: Evidence from Tanzanian SMEs. *Sustainable Business Review*, 4(2), 101–117.
- Jalil, E. E., Grant, D., & Nicholson, J. (2016). Reverse logistics in household recycling and waste systems: A symbiosis perspective. *Journal of Cleaner Production*, 132, 96–104.
- Kusi, L., Afum, E., Sun, B. Z., Lawrence, C., & Kusi, Y. (2021). Reverse logistics, stakeholder influence and supply chain performance in Ghanaian manufacturing sector. *Journal of Supply Chain Management Systems*, 10(3), 20–34.
- Labelle, A., & Frayret, J.-M. (2023). First-mile reverse logistics: An agent-based modelling and simulation application for glass bottle recovery. *Journal of Cleaner Production*, 422, Article 138574. <https://doi.org/10.1016/j.jclepro.2023.138574>
- Nahimana, S. (2023). *End users' participation on reverse logistics performance for plastic packaged beverages in Moshi Municipality, Tanzania* [Master's dissertation, Moshi Co-operative University].
- Organisation for Economic Co-operation and Development. (2022). *Global plastics outlook: Economic drivers, environmental impacts and policy options*. OECD Publishing. <https://doi.org/10.1787/de747aef-en>
- Parmar, B. L., Freeman, R. E., Harrison, J. S., Wicks, A. C., de Colle, S., & Purnell, L. (2010). Stakeholder theory: The state of the art. *Academy of Management Annals*, 4(1), 403–445. <https://doi.org/10.5465/19416520.2010.495581>
- Ran, W., Chen, F., Wu, Q., & Liu, S. (2016). A study of the closed-loop supply chain coordination on waste glass bottles recycling. *Mathematical Problems in Engineering*, 2016, Article ID 1049514. <https://doi.org/10.1155/2016/1049514>
- Rutaba, Y. (2025). Developing sustainable reverse logistics strategies for the beverage industry's disposable bottle waste in Dodoma Region, Tanzania. *Journal of Education, Management and Development Studies*, 5(1), 80–94. <https://doi.org/10.52631/jemds.v5i1.274>
- Sangwan, K. S. (2017). Key activities, decision variables and performance indicators of reverse logistics. *Procedia CIRP*, 61, 257–262. <https://doi.org/10.1016/j.procir.2016.11.185>

- Sarkis, J., Gonzalez-Torre, P., & Adenso-Diaz, B. (2011). Stakeholder pressure and the adoption of environmental practices: The mediating effect of training. *Journal of Operations Management*, 29(3), 236–249. <https://doi.org/10.1016/j.jom.2010.12.001>
- Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Pearson.
- Tan, K. H., Zailani, S., & Jayaraman, K. (2016). Going green: A model of green supply chain initiatives and performance. *International Journal of Production Economics*, 171, 489–504.
- United Nations Environment Programme, & International Solid Waste Association. (2024). *Global waste management outlook 2024: Beyond an age of waste—Turning rubbish into a resource*. <https://doi.org/10.59117/20.500.11822/44939>
- Wondimu, S. (2016). Measuring performance of reverse logistics system in PET bottles recovery in EABSCO. *Addis Ababa University Repository*.
- World Bank. (2023). *Position note on green logistics*. Multi-Donor Trust Fund for Sustainable Logistics (MDTF-SL).