

**DETERMINANT ON HOW REVERSE LOGISTICS FACILITATES COST REDUCTION IN
OPERATION AND PRODUCTION OF GLASS BOTTLES: A CASE OF SEVEN UP
BOTTLING LIMITED SBC**

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ABSTRACT

The purpose of this study was to determine how reverse logistics facilitates cost reduction in operation and production of glass bottles. The study adopts a descriptive research design and uses the sample size of 50 staff such as production managers, procurement officers, bottling managers and co-workers. Data were collected through survey, a list of a questionnaire to 50 respondents and analyzed through quantitative approach. In summary the finding revealed that, the use of third part logistic or outsourcing, transportation of product with description and fleet capacity utilization as a mechanism of handling logistic associated cost are positively significantly related to the effective implementation of reverse logistics of empty glass bottles by SBC Tanzania. Also, the findings indicated that the communities surrounded by SBC have enough skills, environmental conservation knowledge and environmental education on reserve logistics. Furthermore, the findings noted that, lack of awareness, poor infrastructures, and lack of supportive technology, poor personnel and insufficient financial resources are the challenges affecting reverse logistics of empty glass bottles by SBC Tanzania. The study recommends to Seven-Up Bottling Company Limited (SBC) that they should increase awareness to their community about reserve logistics of glass bottles; additionally, policy maker should reform the environmental policies that will support the current global environmental laws and regulation for better community health.

Key word; reverse, logistics cost reduction, production.

1.0 INTRODUCTION

Reverse logistic covers the handling of goods that costumers return backs to the manufacturers. This involves the execution of numerous logistical activities, which are small part of the total logistics of the manufacturer. The upstream flow of products from end users to the manufacturer determines the fate of the returned goods and affects the performance of the manufacturer (Labiri, &Dhouib, 2015). The importance of reverse logistics is increasing swiftly nowadays owing to the growing awareness of increasing value of products, ability of the sophisticated technologies as well as environmental conservation measures (Marisa &Romert, 2013). The value placed on being environmentally conscious grows and customers expect the products they purchase will not affect negatively the environment

Worldwide specifically In Switzerland, (Rogers & Ronald, 2000) concluded that increased demand for reverse logistic has been triggered by manufacturers to alter their previous procedures for managing used glass bottles., the rapidly expanding industrial sector, and the introduction of automation have led to mass production and raised the amount of goods put on the market. Due to the over use of natural resources caused by this exponential growth, there is now more industrial waste than before. The problem of final disposal of waste materials is made worse by the growing urbanization and population density in metropolitan regions where the majority of industrial items are consumed (Tiwari, 2013). Increased environmental pollution occurs from this. Different environmental conservation strategies from around the world have been called for by nations, environmental activists, and organizations due to the rise in environmental pollution brought on by industrial wastes (Marisa & Romert, 2013).

Nonetheless, in developing countries the implementation of reverse logistics has been a risk endeavor for the top business management as it involves financial and operations cost implications, which affect the performance of the company in the long run. Corporate governance, corporate social responsibility and environmental issues have a rising impact on operations. The industry is more competitive than ever and there is an ever-growing pressure for cost reductions.

In Kenya, reverse logistic has been incorporâtes in to the auto motive, manufacturing, service, ICT, medical and even the liquefied petroleum gas (LPG) firms though the level of adoption varies. For liquefied petroleum gas companies, reverse logistics plays a crucial role in ensuring profitability and survival. These companies practice reverse logistics through return of cylinders for refilling, reuse and proper disposal. The major challenges faced by LPG firms in Kenya are loss of cylinders, pirate filling, high cost of filling, illegal and legal competitors, inability to trace flow of cylinders, inadequately trained staff, safety concerns and heavy taxes (Change, 2013). Around 5-7% of the population presently uses liquefied petroleum gas as a primary source of fuel whereas the rest use charcoal, firewood, dung or crop waste (Global LPG Partnership, 2013).

On the other hand, returned products use reverse logistic chain to arrive back to the manufacturer. Among the options firms have to do with the returned products, the first choice would be to return it to supplier for a full refund. Often products that haven`t been used can be sold to a different customer, or may be sold through a different outlet store and Each product recovery options involve collection of used products and components and redistribution (Ahmed2015). Green

success indicators of supply chain are quantifiers, which are used in assessing efficiency and effectiveness of green supply chain practices (Labiri2015).

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Reverse logistics affords the main supply of aggressive benefit to groups through making sure that they are able to usually reply quicker and effectively than the competition to their customers' necessities on an international basis. Outsourcing of logistics requirements holds the potential to optimize the role of logistics of a company, which may therefore lead to many improvements and other possibilities for the organization. It increases customer service level, reduces supply chain costs, reduces capital requirements, increases competitive advantage and profitability. In Tanzania, hazardous wastes and materials, environmental impacts and the growing need for control and disposition of human and animal wastes to protect the health and safety of the population have been taken into consideration since the enactment of the Public Procurement Act (amended in 2011, land its regulation of 2013). Despite the effort, there are numerous challenges in the transportation in Tanzania like by high cost, low services quality due to various reason including the massive lack of infrastructure maintenance and rehabilitation, inadequate capacity caused by low level of investment in resources, as well as low level of safety enforcement, environmental sustainability and gender issue. The transportation challenges affect proper performance of reverse logistics by increasing the cost logistic management (Transportation sector investment program (2007/2008-2011/2012). Most of companies opt for outsourcing strategy: Outsourcing is a sensitive issue for employees as it is accompanied by the consciousness of retrenchment that leads to unemployment (Gegeleso at el, 2021). It can also result in the loss of certain skills and knowledge and loss of morale and dedication of employees Many studies have been conducted on direct logistics of soft drinks and beverage companies in the country. Literature provides information on the usefulness of the logistics aspect in providing good performance. National environment report of 2019 estimated that more than 10,000 tons of municipal solid waste are generated per day in the country and only 10 percent to 30 percent are collected and disposed to controlled dumpsites, leaving a huge volume of waste unattended (Nyampundu at el, 2021) This challenge is exacerbated by the existing poor waste management systems, poor infrastructures and technologies, unsustainable production and consumptions patterns.

Moreover, both public and private sector have been working to ensure presence of clean environment through the formulation and enforcement of laws and regulations by the government as well as reverse logistics by the manufacturers. Nonetheless, the management of the empty glass bottles still suffers serious challenges that contribute to environmental pollution across the country.

Therefore, there is a need to go beyond what has been studied by exploring the reverse logistics of the empty glass bottles. This helped to understand the factors that affect reverse logistics of the

empty glass bottle, nature of the challenges, depth of the problem and the cost of the logistics. The thorough understanding of the problem yielded the knowledge bank useful information that helped to improve the reverse logistics of empty glass bottle by the SBC Tanzania limited and other companies in the industry. Therefore, this study intends to assess the challenges affecting reverse logistics of empty glass bottles by using SBC Tanzania limited as a case study.

2.0 LITERATURE REVIEW

Theoretical review

2.1.1 Reverse Logistics Theory

Stock (1998), Development and implementation of Reverse Logistics Programs says product returns product recalls, end of- lease equipment, old/obsolete in terms being replaced, packaging materials are among the many items that come back and which require reverse logistics processing. This theory link with the objective in terms of one, cost reduction in operation and production of glass bottles, two, increase awareness on reverse logistics of glass bottles, third, evaluate the influence of legislation on adoption of reverse logistics.

2.2.2 Cost Reduction Theory

Transaction on cost economics (TCE) has established a theory for analyzing how an organization economy on transaction costs by selecting government structures can minimize cost (Cease, 2007; Williamson, 2010) criticism on transaction on costs economies argues that theory self-bounded on cost reduction on providing little insight into strategic marketing choices. The profit from soft drink could cover the loss recycling as well as the cost of reverse logistics, allowing the remanufacturing company to gain profit and try find out what they have in common and their major differences and see whether or not the previous researches accomplished in solving the objectives for the sake of knowledge expansion that in one way or the other will assist in building up of this research paper.

Empirical Literature Review

2.2 Cost reduction in production and operation

For the companies reverse logistics or (returns) can quickly become a significant cost. Smooth return processes can help to reduce the cost of reverse logistics, but overall, the best way to reduce number of returns overall. This is because items that are returned often have limited re sell value, and sometimes cannot be resold at all.

Rogers & Tibben-lemcke (2013), on a title thesis' Going Backwards Reverse Logistics trends and practices' The European firms are required by law to take back transport packaging that is used for your product. Because of this the firm tries to reduce their cost by reusing as much of the material as possible and also reclaiming when can be used anymore.

The value can be regained through reparation or refurbishment when returned to the market place, components from product returns can be reused as refurbished components or as spare parts. Also,

this agrees with (Rogers & Tibben, 2012) who noted that the European company tries to reduce their cost by reusing as much of the materials as possible and also reclaiming material when they cannot be reused anymore.

2.2.1 Third part logistic and its benefit

Benefits of contracting third part Logistics Work According to Gegeleso et al. (2021), logistics outsourcing is a fast-growing source of competitive advantage and cost savings in a variety of businesses. He said that several businesses frequently reduced their logistics expenses by 30 to 40% and were able to considerably optimize their international logistics operations as a result of outsourcing. The competitive advantage of a corporation is greatly influenced by logistics. The most obvious justification for contracting with a third party to deliver better services and higher quality at a cheaper cost is to provide a very effective means of cost reduction.

3.0 RESEARCH METHODOLOGY

3.1 Area of the Study

The study was conducted at SBC Tanzania limited located at Arusha region in Tanzania. The company started operating in the country in 2001 as a manufacturer and distributor of non-alcoholic beverage drinks. The company has made great achievements in the soft-drinks industry in terms of production, employment creation and contributing to tax revenue. The company provides jobs to about 3,000 Tanzania and business opportunities to thousands of Tanzanians through the distribution chain of its products. The study is exploratory in nature. using.

3.3 Research Design

Kothari (2006); define Research design as an arrangement of condition for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedures. This study adopted case study design. This design seeks to establish the status of affairs without manipulating study variables. A case study involves careful and complete examination of cost reduction, challenges in the company, and the involvement of community and embrace depth of a study.

3.4 Research Approach

This involves systematic empirical investigation quantitative properties and phenomena and their relationship, by asking a narrow question and collecting numerical data to analyze it utilizing statistical method. The study applied mixed research approach. Data has been collected using interviews in a qualitative approach, whereas questionnaires in a quantitative approach. A mixed-approach approach research study combines both research ideas, methodologies, approaches, and features into a single study (Johnson & Christensen, 2017).

Utilizing a hybrid strategy is justified in order to allow the researcher to triangulate the results utilizing various data collection techniques (John & Christensen, 2017; Creswell, 2012; Creswell & Plato Clark, 2011). Qualitative research focuses on observing objects in their natural

environments and comprehending and interpreting events (Aspers & Corte, 2019). On the other side, quantitative research focuses on quantifying and analyzing variables, according to (Apuke, 2017). Additionally, it involves the generation of data in quantitative from which is rigorous quantitative analysis in formal and rigid fashion (Kothari 2004).

3.5 Population of the Study

Population refers to the group of individuals or object from which the sample of the study is drawn (Mugenda & Mugenda, 2009). SBC has a total of 50 employees. This comprises the production managers, operational managers, procurement officers, bottling managers and the factory workers. The employees are essential in ensuring the successful performance of the reverse logistics of the glass bottles used by the company. Table 1 shows the number of employees at SBC across the various departments.

Table 1: Target Populations

Participants	Frequency	Percentage (%)
Production manager	3	6
Operational manager	5	10
Factory workers	34	68
Bottling manager	5	10
Procurement officers	3	6
Total	50	100

Source: (Researcher, 2022)

Sample Size and Sampling Techniques

Sample size refers the number of items to be selected from the universe to constitute a sample. It should be neither excessively large nor too small (Kothari 2004). This study was employ Purposive sampling procedure in which a researcher specifies the features of the population of interest and indicates individual with those features (Johnson & Christensen, 2017). Purposive sampling (maximum variation sampling) was used through researcher's judgment towards a specific type of information want to get from participants because of the questions were formulated and selection of candidates across a broad relating to the topic of study (Creswell, 2012). In this study, purposive sampling was used to select government officials in Purposely selected to answer the intended response during data gathering. Also given the small number of employees in the company (as shown in Table 1), the study used census study design where all the 50 employees were interviewed.

3.8 Data Collection Methods

3.8.1 Questionnaire

Questionnaire is a research instrument that contains in depth written questions will be distributed to be filed by respondent (Komba & Tromp, 2016). Questionnaire is significant because it is systematic, easier to obtain a number of information from various elements of sample, and economical. Open ended questions, structured questions were employed together information in

this research study. Researcher used this method of data collection because it enables collection of data from large number of people within a minimum period of time. Questionnaire was used to collect information from employees

3.9.2 Quantitative Data Analysis

In analyzing quantitative data, the study used multiple regression models to predict the Challenges facing SBL on effective implementation of reverse logistic. The study used SPSS software version 21 to present data in form of charts, frequencies and percentages. The data was coded and presented in the form of texts, charts and tables. Both descriptive and inferential statistics were employed in this study whereby frequencies, percent's, mean, Standard Deviation and multiple regressions were performed

The multiple linear regression analysis was used to analyse the relationship between the identified leading variables

$$y_i = B_0 + B_1x_1 + B_2x_2 + B_3x_3 + \dots + E$$

Where;

y_i = Implementation of reverse logistic

x_1 = The use of third-party Logistics

x_2 = Fleet capacity utilization

x_3 = Transporting Product with descriptions

e = random error in prediction

E = random error in prediction

B_0 = y intercept at time zero

4.0 FINDING AND DISCUSSION

Facilitation of Reverse Logistics on Cost Reduction in Operation and Production of Glass Bottles in SBC Tanzania

4.1 Descriptive statistics

The findings exemplified below in Table 2 shows the descriptive statistics results about facilitation of reserve logistics on cost reduction in operation and production of glass bottles in SBC Tanzania. The findings indicates that majority of respondents about 50% agreed that reverse logistic employ a lot of handling cost especially uploading and offloading. Also, the findings indicate 42% of respondents agreed that a lot of accident involved during reverse logistic implementation in companies' operation.

Table 2: Reverse Logistics on Cost Reduction

Statements	SD	D	N	A	SA
Reverse logistic employ a lot of handling cost especially uploading and offloading	0 (0%)	9 (18.0)	0 (0%)	25 (50%)	16 (32%)
Companies incur huge cost of transporting bottles from customers point to the production centers	4 (8%)	5 (10)	15 (30%)	11 (22%)	15 (30%)
A lot of accident involved during reverse logistic implementation in companies' operation	4 (8%)	5 (10%)	10 (20%)	21 (42%)	10 (20%)

4.2 Inferential statistics

Entered, processed, and analyzed data of cost reduction in the operation and production variables into the linear regression equation and gave the findings shown in Table 3. The indicated R-square and adjusted R-square of the estimate are 79.3% and 77.9% which imply the goodness of fit of the model.

Table 3: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.890 ^a	.793	.779	.44829

The findings as demonstrated in Table 4 shows the ANOVA F statistic which was generated after entering the cost reduction in the operation and production variables to test whether the regression model as a whole was significant. The ANOVA F statistic was generated to test whether the regression model as a whole was significant. The p-value is 0.000 which is less than the critical value of 0.05, an indication that the altogether influence of the independent variable on the dependent variable was significant. Therefore, the use of linear regression models is doubtlessly authorized. Thus, the independent variable forecasts the dependent variable effective implementation of reverse logistics.

Table 4: Analysis of Variance (ANOVA)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	35.336	3	11.779	58.611	.000 ^b
Residual	9.244	46	.201		
Total	44.580	49			

4.2.1 Third part logistics

The below findings as illustrated in Table 6 revealed that third part approach is positively significantly related to the effective implementation of reverse logistics at $\beta= 0.375$ and a p-value of 0.002. This implies that a 1 unit increase in the use of third part approach increases the effective implementation of reverse logistics at 37.5%.

4.2.2 Product with descriptions

The findings as illustrated in Table 6 revealed that product with descriptions is positively significantly related to the effective implementation of reverse logistics at $\beta= 0.335$ and a p-value of 0.000. This implies that 1 unit increase in product with descriptions increases the effective implementation of reverse logistics at 33.5%.

4.2.3 Fleet capacity utilization

The findings as illustrated in Table 6 revealed that fleet capacity utilization is positively significantly related to the effective implementation of reverse logistics at $\beta= 0.162$ and a p-value of 0.036. This implies that 1 unit increase in fleet capacity utilization increases the effective implementation of reverse logistics at 37.3%.

Table 5: Multiple regression results

Model	B	Std. Error	Beta	t	Sig.
(Constant)	.528	.261		2.025	.049
Third party Logistics approach	.375	.111	.404	3.372	.002
Product with descriptions	.335	.073	.438	4.588	.000
Fleet capacity utilization	.162	.075	.198	2.159	.036

DISCUSSION OF THE FINDING

4.3.1 Cost reduction in production and operation

4.3.2 The use of third part logistics

As it was presented in the findings that third part logistics is positively significantly related to the effective implementation of reverse logistics that means third part logistics increases a certain unit to the effective implementation of reserve logistics. For the companies reverse logistics or (returns) can quickly become a significant cost. Smooth return processes can help to reduce the cost of reverse logistics, but overall, the best way to reduce number of returns overall. This is because items that are returned often have limited re sell value, and sometimes cannot be resold at all.

4.3.3 Product with description

Also, the findings indicated that transporting product with description as a mechanism of handling accidental cost has a positively significantly related to the effective implementation of reverse logistics that means product with description increases a certain unit to the effective implementation of reserve logistics. The same findings were revealed by Rogers &Tibben-lemcke (2013), on a title thesis' Going Backwards Reverse Logistics trends and practices' The European firms are required by law to take back transport packaging that is used for your product. Because of this the firm tries to reduce their cost by reusing as much of the material as possible and also reclaiming when can be used anymore.

4.3.4 Fleet capacity utilization

Furthermore, the findings indicated fleet capacity utilization is positively significantly related to the effective implementation of reverse logistics that means fleet capacity utilization increases a certain unit to the effective implementation of reserve logistics. The value can be regained through reparation or refurbishment when returned to the market place, components from product returns can be reused as refurbished components or as spare parts. Also, this agrees with (Rogers &Tibben, 2012) who noted that the European company tries to reduce their cost by reusing as much of the materials as possible and also reclaiming material when they cannot be reused anymore.

4.4 Summary of the Findings

In summary the finding revealed that, third part approach, product with description and fleet capacity utilization are positively significantly related to the effective implementation of reverse logistics of empty glass bottles by SBC Tanzania. Also, the findings indicated that the communities surrounded by SBC have enough skills, environmental conservation knowledge and environmental education on reserve logistics. Furthermore, the findings noted that, lack of awareness, poor infrastructures, and lack of supportive technology, poor personnel and insufficient financial resources are the challenges affecting reverse logistics of empty glass bottles by SBC Tanzania

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

At the residences, SBC staffs and other beneficiaries and stakeholders are in good position of their awareness to reserve logistics of empty glass bottles by SBC Tanzania. So, if there is poor reserve logistics it might be caused by other factors apart from the community awareness. Other factors might be the challenges within the community towards reverse logistics of empty glass bottles by SBC Tanzania.

Besides lack of awareness, the community of Seven-Up Bottling Company Limited (SBC) is affected by some hindering factors in reserve logistics of empty glass bottles by SBC Tanzania. Such factors include; poor infrastructures and lack of supportive technology, poor personnel and insufficient financial resources are the challenges affecting reverse logistics of empty glass bottles by SBC Tanzania. Therefore, the efforts of reserve logistics is not only affected by the internal factors but also is been affected by the external factors which are not on the capacity of SBC community and the management.

5.2 Recommendations

The study recommends to Seven-Up Bottling Company Limited (SBC) that they should increase awareness to their community about reserve logistics of glass bottles. This could be done by enabling an awareness campaign of educating the citizen about reserve logistics through television, radio and other local media methods.

The study recommends to the government that, it should enable on supportive infrastructures that are friendly to the environment so that it will be easy to reach and transport bottle material to the specific areas of dumping the materials.

Also, the study recommends to the government that, it should enable on friendly environment so that it will be easy for the adoption of new supportive technology of recycling materials such as glass bottles. Those friendly environments include, enabling on subsidies and tax exemptions on the facilities of cycles of materials of glass bottles.

The study recommends to the Seven-Up Bottling Company Limited (SBC) that they should increase their budget in order to strength their capacity on dealing with reserve logistics of glass bottles. This could be done internally for the purposes of hiring and outsourcing of qualified personnel who will meet the reserving logistics issues in the community.

The study recommends to the policy maker of the united republic of Tanzania to reform the environmental policies that will support the current global environmental laws and regulation for better community health

5.3 Area for Further Studies

Other studies are expected to face some solved limitations during the period of data collection and analysis. One of those limitations is transportation and material costs and time to reach the expectations of this study as per IAA guidelines. The researcher recommends these limitations be

the author to use their own internal costs and budget so that all necessary services and materials will be accommodated. Another expected limitation was data analysis expertise. The researcher recommends to other authors to find an expert who is well capable in statistics so that the information collected leads to the desired output.

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