

**A STUDY OF THE EFFECT OF REVERSE LOGISTICS PRACTICES ON COMPANY  
PERFORMANCE CASE STUDY OF SIMBA BREWERIES IN RDC**

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**A Dissertation submitted to the University of Zambia in partial fulfilment of the  
requirements for the award of the Degree of Master of Science in Operations, Projects,  
and Supply Chain Management**

**THE UNIVERSITY OF ZAMBIA**

**LUSAKA**

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## DECLARATION

I, **LUMBA KISUMPA ALEX**, do hereby declare that this work is my original work achieved through personal reading and research. This work has never been submitted to the University of Zambia or any other Universities. All sources of data used and literature on related works previously done by others, used in the production of this Dissertation have been duly acknowledged. If any omission has been made, it is not by choice but by error.

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## APPROVAL

This Dissertation by **LUMBA KISUMPA ALEX** is approved as a partial fulfilment of the requirements for the award of the Degree of Master of Science in Operations, Projects, and Supply Chain Management

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## ABSTRACT

Recently the subject of RL has grown exponentially due to an increase in the global population and consumption activities. As it accounts for the products' Life Cycle, companies are now pressurized to be more responsible when dealing with the environment and the end-of-life products they produce. Though RL has been proven to be an effective and efficient way of dealing with the environment and optimizing the performance of companies in developed countries, companies in developing countries such as Africa are still unable to implement it in their businesses. In developing economies such as the Republic Democratic of Congo, a limited number of studies have been conducted on RL in general and on evaluating its economic effects on the performance of companies. This research identifies the gap and aims to evaluate the effects of RL practices on the performance of SIMBA Breweries. The objectives are to determine the impact of Remanufacturing, to measure the effects of Recycling, and to evaluate the effects of Reuse practices on the performance of the company.

The study adopted a descriptive research design, and data was collected from 70 respondents knowledgeable in the RL. Stratified random sampling was used to select the sample size of respondents from different departments, and primary data was collected using a questionnaire through a drop-and-pick-later method. Secondary data was collected from published and unpublished sources. Data was analyzed using descriptive statistics of mean and standard deviations to elaborate the pattern and trend, and inferential statistics was performed to determine the components of the multiple regression that predicted the relationship between variables in Microsoft Excel. Only Reuse was implemented and had a strong and positive relation with the company performance with a correlation and regression coefficient of 0.91 and 3.38. Recycling and Remanufacturing were not correlated with the performance of the company as the correlation and regression were null. Reuse decreased the company's cost by 65% and increased profitability by 60%. It is therefore recommended that the management should look at RL practices as a strategic method that can be used to improve its performance. Recycling and Remanufacturing should also be implemented to improve the performance of the company. Employees need to be trained and equipped with sufficient and appropriate knowledge of the RL system.

**Keywords:** Reverse logistics, Reuse, Remanufacturing, Recycling, and Company performance.

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This research study is dedicated to my Father ILUNGA KISUMPA Martin and my son ILUNGA KISUMPA LUMBA Genesis.

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## LIST OF ACRONYMS

ANOVA: Analysis of Variance

CSR: Corporate Social Responsibility

CLSC: Close Loop Supply Chain

CLM: Council of Logistics Management

EPR: Extended Producer Responsibility

IT: Information Technology

SC: Supply Chain

SCM: Supply Chain Management    LC: Life  
Cycle

PPW: Post-consumer plastic packaging waste

PC: Portable computer

RDC: Republic Democratic du Congo

RL: Reverse Logistics

RBV: Research-Based View

RoHS: Restriction of Hazardous Substances

UNFPA: United Nations Population Fund

UEPA: Utility Environmental Protection Act

WEEE: Waste Electrical and Electronic Equipment

## **CHAPTER ONE: RESEARCH BACKGROUND**

### **1.0 Introduction**

In the past few decades, the subject of the inverse flow of material has grown exponentially due to an increase in production and consumption activities, and this movement is the result of the growth in the global population and the awareness of consumers on the green concept (Mobolaji, 2017; UNFPA, 2020). Reverse logistics system brings about economic, environmental, and social benefits in the performance of companies through activities such as reuse, recycling, and remanufacturing (Sarkis, et al., 2011). It deals with the inverse flow of products at the end of their life cycle for recapturing value and proper disposal (Banihashemi, et al., 2019; Chemel, et al., 2012).

RL is an effective and efficient tool used by many companies in developed countries to protect the environment and optimize their performance by decreasing the cost of production and increasing profitability (Oko & Anayo, 2013). However, in developing countries the subject of RL is still in its infancy due to several barriers; companies are not yet able to implement the practices of this system, and others are not yet knowledgeable about its existence (Bouzon & Rodriguez, 2018; Mwanza, 2018). Reverse logistics practices can be used by manufacturing companies of different industries in developing countries as a strategic tool to leverage their performance by cutting their cost of production and maximizing their profits. They can also protect the environment in which they are doing business by managing products at the end of their life cycle. Companies can only take advantage of this system's direct and indirect benefits when implemented efficiently and effectively.

In this study on the evaluation of the effect of reverse logistics on company performance: a case study of Simba breweries, the first chapter gives a background of the study, and it is divided into the following sections: Background, Purpose of the research, Objectives of the research, Research questions, Significance of the research, Scope of the research, and Outline of the dissertation.

### **1.1 Background of the Research**

Recently, the world has witnessed a huge increase in the number of its population (UNFPA, 2020; Waqas, et al., 2018), this unprecedented growth in the number of the global population has led to a significant increase in the level of production and consumption (Ezeah & Robert,

2012; Borini, et al., 2014). Wastes materials are a result of companies' production and customers' consumption, products they purchase come with packaging materials such as glass, paper, aluminium, cans, and plastic bottles; when these materials used for packaging are not properly handled at the end of their life cycles, they constitute a waste of resources and pollute the environment (Mobolaji, 2017). Reverse logistics has been pointed out by many researchers as being an effective and efficient way to deal with the protection of the environment and the optimization of the performance of companies. This can be achieved by collecting used products from customers' point of consumption to the point of production for reuse, repair, recycling, remanufacturing, or proper disposal (Yu, et al., 2018).

Over the years, the subject of reverse logistics has received growing importance across the globe (Agrawal, et al., 2015); companies in different industries are adopting this system as a strategic tool for its ability to bring about economic benefits, corporate social image, and value of businesses (Govindan, et al., 2012; Chiou, et al., 2012). Reverse logistics deals with the collection of used products to recapture value or dispose of them in a more environmentfriendly manner (Govindan, et al., 2015). It accounts for the end-of-life cycle of products such as plastic material in both, developed as well as in developing countries (Govindan & Soleimani, 2017). However, reverse logistics practices are more effectively and efficiently implemented in developed countries than in developing countries (Kinobe, et al., 2012 ). Developed nations have put in place rules and regulations such as EPR and DPRs among others to deal with waste management and protect the environment, and this has significantly increased the interest in the topic across the globe (Chiou, et al., 2012). Through reverse logistics practices, more than 5.8 million packages were returned to the United States (Mazareanu, 2020). In Europe, companies are held accountable for the waste they generate through their processes (Luthra, et al., 2017; Yu, et al., 2018). In the construction industry of South Australia for instance, companies are adopting practices of the RL system to minimize the negative effects of waste they generate on the environment (Chileshe, et al., 2015). In Germany, firms producing the packaging material have a legal obligation to take them back and recover them as they reach the end of their life cycle. In Japan, firms in electronic equipment are forced to account for the end of their product's life cycle; in Taiwan, RL practices are compulsory for firms manufacturing cars, and packaging materials; this is done to cut the cost of production and fight the plastic pollution (Kannan, et al., 2012). On the other side, the majority of companies in developing countries are still struggling with post-consumer products, and waste management and reverse logistics practices are still in the infancy stage (Sarkis, et al., 2011; Bouzon, et al.,

2015; Waqas, et al., 2018). Post-consumer products such as used bottles of beverages are buried in landfills, dumped on roadsides, burnt, and thrown away in significant amounts; this leads to issues such as environmental pollution, health problems, and waste of resources (Menon, et al., 2017). Waste of one manufacturing company can be used as a source of raw material by another company, leading to the protection of the environment and the minimization of cost (Abila & Kantola, 2013). Waste generation is categorized into four sources: production, waste treatment, maintenance, and waste packaging (Usapein & Chavalparit, 2014).

RL practices are implemented by firms in the construction industry of South Africa to deal with waste (Shakantu & Emuze, 2012; Badenhorst & Nel, 2012). In Nigeria, Firms in the food and beverages industry collect the used material as glass bottles for reuse; this practice leads to a reduction in the cost of production and increases the corporate image of companies by protecting the environment (Somuyiwa & Iyabo, 2014). In the Brazilian beverages industry, materials used for packaging are reinjected in the system for the collection of intrinsic value when they reach the end of their life cycle (Mobolaji, 2017; Beiller & Rampasso, 2020).

RL practices include waste management, materials recovery, reuse, reprocessing, and recycling among other practices (Lai, et al., 2013; Chileshe, et al., 2015). It moves used goods from their typical destination to recapture value and/or proper disposal (Olukanni & Oresanya, 2018; Kinobe, et al., 2012 ). RL system is not only about environmental and social benefits, but it also brings about economic benefits in the performance of companies (Guarnieri & Streit, 2015; Huang & Yang, 2014; Santos, et al., 2014; Oliviera & Correia, 2019). Containers used in the breweries industry of Gana such as glass, plastic, and aluminium are captured by taking them from their place of consumption to the place of production (Mobolaji, 2017). When waste materials are not collected, they will be wasted, thus polluting the environment, and the RL system can be a strategic tool to deal with this issue (Afum, et al., 2019).

Despite considerable efforts, regulations, and laws put in place by governments in developing countries, solid waste management is still a persistent and big challenge to deal with as it affecting the performance of companies by wasting resources and polluting the environment. One efficient and effective way of handling this matter is to ensure that companies implement appropriately the RL practices in the performance of their businesses, they also need to be able to evaluate this system (Mobolaji, 2017; Oko & Anayo, 2013).

## **1.2 Statement of the Problem**

The Reverse logistics system and its practices have been proven to have the ability to improve the performance of companies in terms of economic, social, and environmental advantages, it improves material management, corporate image, financial performance, and improve the green environment (Abdul-Rashid, et al., 2017). Simba Breweries adopted the RL system to ensure that it has enough glass bottles for the operation of its business and take economic advantages of used bottles. The implementation of the RL system also allows to smoothen the process and drives down the price per unit of soft drinks and beer that they produce (BRASIMBA, 2015). Simba Breweries has implemented the RL system in the operation of its business to account for the end of the end of its product life cycle, take advantage of the RL system, and comply with the green and sustainable development by collecting used glass bottles from clients, as they are becoming more aware of the need of the protection of the environment. The RL system implemented by Simba Breweries also have an impact on the performance of the company.

However, the implementation of this system has not been effective and efficient enough due to some realities faced by the industry. The quantity of collected bottles through reverse logistics is not matching the quantity of bottles that are moving out of the company in the forward logistics. This has resulted into a main challenge of lack of enough glass bottles need in the normal operation of the business. To stabilise this challenging situation, Simba breweries decided to start importing glass bottles from other counties such as Tanzania due to the contains of quantity, quality, and cost of production (BRASIMBA, 2015). Reverse logistics can be considered as a tool that can be used in this situation for its ability to reduce significantly the sourcing cost and imports, as well as the reduction of the inventory shortages (Afum, et al., 2019; Agrawal, et al., 2016; Oliviera & Correia, 2019; Yu, et al., 2018).

Reverse logistics practices put in place at Simba Breweries for glass bottles are also known to not take into consideration damaged bottles, resulting in disposal options that are not environmentally friendly, therefore destroying the environment and aspect of unsustainable development. (Ramos, et al 2013; Tian and Chen, 2014, Grabara, et al., 2014). If this phenomenon keeps going, Simba Breweries will continue facing the same problems in the reverse logistics of glass bottles, which will negatively affect the performance of the company by decreasing the economy. The company will also keep facing the problem of shortages of glass bottles needed in the operation of the business. The implementation of the reverse

logistics practices has to be constantly evaluated to know its effect on the performance of the company.

Several studies have been conducted in this to show the relationship between reverse logistics and company performance. The research conducted by Vlachos, (2014) on the Conceptual Framework of Reverse Logistics Impact on Firm Performance showed that the implementation of RL practices can have a positive impact on the performance of a company and the environment. Betelhem, (2016), Muttimos, (2014), and Nyarega, (2015) conducted their studies on the relationship between RL practices and organizational performance in Kenya and found that there is a positive relationship between the two. Malindzakova, et al. (2022) researched the Economic–Environmental Performance of Reverse Logistics of disposable beverage Packaging in the Slovak Republic and found that there was a relationship. However, few studies focused on the evaluation of the effect of the reverse logistic practices in the context of the DRC.

RL is still a very new concept for businesses in DRC, several manufacturing companies in different industries do not know yet how to implement it effectively and efficiently. Thus, having challenges to identify its role and evaluate its effects on their performances. Traditional logistics receive much more attention and care than RL does. This is why this study sought to evaluate the effects of the reverse logistics practices on the performance of Simba Breweries.

### **1.3 General Aim and Objectives**

#### **1.3.1 General Aim**

This research is aimed at evaluating the effects of reverse logistics practices on the performance of SIMBA Breweries.

#### **1.3.2 Specific Objectives**

The specific objectives of the study were the following:

- To determine the impact of Remanufacturing practices on the performance of the company.
- To measure the effects of the Recycling practice on the performance of the company.
- To evaluate the effects of Reuse practice on the performance of the company.

## **1.4 Research Hypothesis**

- H01: Remanufacturing practice doesn't affect the company's performance ( $r=0$ ).
- H02: Recycling practice doesn't affect the company's performance ( $r=0$ ).
- H03: Reuse practice doesn't affect the company's performance ( $r=0$ ).

## **1.5 Significance of the Research**

The findings of this study will contribute to theory as well as in practice to the body of knowledge in the field of supply chain management. The results will be used as a guide for the management system of firms in the brewery industry of RDC in general, and at SIMBA breweries in particular; it will be used by academicians and researchers as a preamble for further research on studies in the field of reverse logistics. It will also enable policymakers to make sound decisions about the protection of the environment against waste from the brewery industry such as glass bottles.

It will help stakeholders of the brewery industry to know more about reverse logistics and its economic implications in the decision-making process. It shows the importance of reverse logistics activities to firms and to the environment we live in. It raises awareness among all customers of breweries and the entire community on the way to deal with used glass bottles. The findings of this study will be used as a tool in the fight against environmental pollution, it shows an effective way through which firms can cut the total cost of production in their supply chain. It highlights the economic benefit of implementing reverse logistics in the brewery industry.

This research constitutes a background on reverse logistics for RDC, for developing countries and developed ones. Other beneficiaries of the results of this study are regulatory bodies; based on these findings, they will be able to come up with strategies and guidelines that will structure the adoption of reverse logistics in all manufacturing firms. It makes it possible for firms to compete on an equal basis and benchmark their supply chain. The result of this study promotes sustainable development in general and economic benefits in particular in the RDC context.

## **1.6 Scope of the Research**

This study was limited to the evaluation of the effects of the RL practices on the economic benefits of Simba breweries for the management of the glass packaging material when they reach the end of their life cycle. Simba Breweries is in Lubumbashi, the town of the High

Katanga in the Republic Democratic of Congo. Data was collected from a sample size of 70 respondents from different departments.

### **1.7 Thesis Outline**

The dissertation is divided into five main chapters presented as follows.

**Chapter one:** The first chapter is all about giving the background of the study, presenting the objectives of the study, hypothesis, significance, and the statement of the problem under investigation.

**Chapter Two:** Literature Review: Reviews previous studies in reverse logistics to find out what has been already found by previous researcher. It focuses on empirical literatures that align with the study's hypotheses.

**Chapter Three:** Research Methodology: This chapter describes the different techniques put in place in the process of collecting and analysing data.

**Chapter Four:** Results and Discussion: This chapter presents the findings in the form of descriptive and inferential statistics of the study variables and discusses the findings.

**Chapter Five:** Conclusion and Recommendation: Lastly, chapter five closes the study with the conclusions and recommendations based on the research findings and their implication, it also presents suggestions for future research.

## CHAPTER TWO: LITERATURE REVIEW

### 2.0 Introduction

The literature review is undertaken to collect relevant data on the topic under investigation to provide answers to inferences and shed light on different objectives; the focus here is to review what has been done previously around the topic.

### 2.1 Overview of Reverse Logistics

Recently, the world has experienced a significant increase in interest in the topic of reverse logistics, this shift is mainly due to global awareness of the environmental concerns because of resource depletion and environmental degradation (Abdukrahman, et al., 2014). Reverse logistics has gained considerable attention in the operation strategy of businesses, and companies are using this tool as their competitive advantage (Starostka-Patyk, 2017). Until recently, this topic was not given as much importance as it is now, and many authors have defined it in heterogeneous ways as companies from different industries are forced to implement different practices of this system (Agrawal, et al., 2016; Chan, et al., 2012; Elmas & Erdigmus, 2011).

Reverse logistics is generally known as the process of moving products in the opposite direction of forward logistics to capture value. In the early nineties, the Council of Logistics Management (CLM) defined for the first time reverse logistics RL was defined as the term referring to the role of logistics in recycling, waste disposal, and management of hazardous materials; a broader perspective includes all action relating to logistics activities carried out in source reduction, recycling, substitution, reuse of materials and disposal (Stock, 1992). It is the process through which the flow of goods and products are moved from their typical final destination to the point of origin for recapturing value, or proper disposal (Abdullah & Yaakub, 2014; Vaz, et al., 2013; Roy, et al., 2014).

Reverse logistics is the system in which the flow of material moves in the opposite direction of the supply chain (Abdullah & Yaakub, 2014); it is a process of recapturing value from used products or waste from the downstream to the upstream (Afum, et al., 2019); Rogers, et al. (2012) included products and packaging in the reverse flow of the supply chain. The reverse logistics function can be defined also as the management of material flow from the point of consumption to the point of origin to recapture value or proper disposal (Vaz, et al., 2013; Santos, et al., 2014; Mbovu & Mburu, 2018; Kumar & Chandrakar, 2012; Govindan &

Soleimani, 2016; Ngadiman, et al., 2016; Ali, et al., 2018; Corrêa & Xavier, 2013; Dudubo, 2017; Hazen, 2011).

It refers to the sequence of all activities required in the process of collecting used products from customers to the producers for reuse, repair, re-manufacture, recycling, or disposal (Agrawal, et al., 2016). Yu, et al. (2018) included remanufacturing and refurbishing activities in the definition of reverse logistics. Reverse logistics has been recognized as the system that plans, operates, controls, and collects used broken, and expired products. RL makes the recovery and the revalorization of used products possible as they reach the end of their lifecycle (Dias & Junior, 2016; Yu, et al., 2018; Halabi, et al., 2013).

According to Elmas & Erdigmus (2011) and Paula, et al. (2019) reverse logistics is not only about reusing containers and recycling materials; it goes a step further and includes secondary activities such as redesigning packaging materials, reducing energy consumption, and reducing environment pollution. Govindan, et al. (2015) stipulate that customer awareness of environmental concerns has led firms to engage more with reverse logistics practices. Along the same line, Zhu & Geng, (2013) state that firms are incorporating reverse logistics in their businesses because of pressures put on them by laws and regulations bodies; Chen, et al. (2021) indicate that in secular economies, government and customer awareness of environmental issues encourage firms to deal with this system. Furthermore, Abdullah & Yaakub (2017) highlight that regulations and laws have had a significant impact on the level of reverse logistics implementation. However, Starostka-Patyk, (2017) and Borges, et al. (2020) reveal that the implementation of reverse logistics practices can be seen as a cost and challenge, thus a drawback to firms' performance if it is not effectively and efficiently implemented. This system is seen as a strategic tool and an opportunity that firms can exploit to increase competitiveness and sustainable development (Oko & Anayo, 2013; Ezeah & Robert, 2014).

This research adopts the definition given by Mwanza (2018) in her study titled "An African Reverse Logistics Model for Plastic Solid Wastes". Reverse logistics is defined as the process in which key stakeholders participate in the collection of used and recyclable plastic bottles from the point of consumption to the point of origin for recapturing value. When incorporated properly in a business, reverse logistics brings direct and indirect profits to companies' performances (Dias & Junior, 2016; Bernon, et al., 2011); Mondota (2015) indicates that a reverse logistic system brings economic advantages and a green image to the performance of

firms; Tian, et al. (2019) opine that manufacturing firms can implement processes of reverse logistics system as a tool for waste minimization and cost savings.

Reverse logistics is more effective in developed nations than it is in developing countries, firms have been motivated and forced to implement different practices of this system (Xevgenos, et al., 2015; Dudubo, 2017; Muhammad, et al., 2018). Several authors conducted their studies on this topic. Sas, et al. (2015) researched reverse logistics in the US; Lai, et al. (2013) and Zhu & Geng (2013) conducted research on reverse logistics in China; Chileshe et al. (2017) researched barriers to the implementation of reverse logistics in Australia; Demirel, et al. (2014) researched on of reverse logistics in Turkey.

However, in developing countries, the implementation of this system is still in its infancy stage (Mwanza, et al., 2018; Ezeah & Robert, 2014; Mwanza, et al., 2016 ). Companies are not yet able to account for the end of their product's life cycle, this lack of accountability in terms of post-consumption of products brings about environmental pollution and the waste of resources. A few Studies have been conducted in some developing countries, Somuyiwa & Adebayo (2014), Dudubo (2017), and Oko & Anayo (2013) researched the effect of reverse logistics objectives in the performance of companies in Nigeria. Patricia, et al (2017) researched reverse logistics of the packaging industry in Brazil; Kinobe, et al. (2015) investigated barriers to reverse logistics in Uganda; Afum, et al (2019) conducted research in the Ghanaian manufacturing industry; Mondota (2015) conducted a research in Malawi in the manufacturing sector. Mwanza, et al., (2017) researched the Significance of reverse logistics in developing economies; in 2019 she conducted another one on barriers to the implementation of reverse logistics in the manufacturing industry of Zambia. The logistics function is divided into two different processes forward logistics and reverse logistics (Dale, et al., 2012; Rogers, et al., 2012). The focus of this study is on the reverse logistics process.

## **2.2 Company Performance and its Indicators**

Company performance is the general effectiveness and success of an organisation in the process of reaching its goals and objectives in different dimensions of its business. It takes into consideration financial, operational, strategic, market, employee, and social/environmental aspects (Souza, et al., 2020). It can also be defined as a combination of all the financial and nonfinancial factors and indicators offering information on the level of achievement of objectives, performance, and goals set par a company. Put another way, company performance

is the sum of all the actual results that the company has as compared to what it wanted to have (Ezeah & Robert, 2014).

The term company performance is related to the general productivity of an organization in terms of material acquisition, inventory turnover, customers, profitability, and market share among others. This concept is key to the business given that the primary objective of business is to make a profit (Kifordu, 2022). Ongori, Munene, and Iravo, (2018) stated that one of the main questions in today's business environment is why some companies succeed and others fail, and they also found that this is what drives performance. For Arasaand Obonyo (2016) the performance of a company is a formula for assessing how it works under certain parameters such as environment social productivity, employee morale, profitability, and effectiveness. Along the same lines, Owolabi and Makinde (2015) mentioned that the management of the performance of a company is central to success. Njagi (2016), Lawal, Elizabeth, and Oldayo (2017) argue that for an organization to be successful in the operation of its business, it needs to record high returns and identify performance drivers from top to bottom.

Furthermore, the study conducted by Salah (2015) indicated that the performance of a company can be affected by the reverse logistics practices and have mainly three impacts. The first impact is on the financial performance including the decrease in the cost of purchasing new raw materials, an increase in the profitability, and waste treatments. The second impact is on the operational performance including the decrease in the level of inventory, the capability of utilization, and product quality. The third impact is on the environment including the reduction of solid waste, the reduction of air, and the decrease of accidents in the environment. The performance of a company can be viewed and categorized in three dimensions namely economic performance, social performance, and social performance (Agrawal, et al., 2016).

The company's performance includes financial (economic) and non-financial indicators. Financial indicators measure the financial performance and health of a company such as Revenue which is the total income generated by the company from its operations, profitability, cost savings, and return on investment among others. On the other side, non-financial indicators provide insight into other aspects of the operations of the company such as environmental impact, corporate social responsibility customer satisfaction among others (Kotane & KuzminaMerlino, 2012). A company can use key performance indicators to quantify, measure, and determine how well it meets the set organizational goals. Financial indicators are mostly used by businesses to measure performance as they allow an organization to compare different

business types. The indicators that can be used are the inventory turnover and the asset turnover which measures how effectively the company puts its assets to work (Muttimos, 2012).

Environmental performance refers to the measures and practices that are adopted by a company to assess, manage, and improve its impact on the environment. It evaluates the company's efforts to minimize negative environmental effects associated with its operations, products, and services (Ezeah & Robert, 2012). It can also maximize positive contributions to environmental sustainability. Among the indicators of environmental performance, we can think of the following: Waste management, water management, pollution prevention, and greenhouse gas emission among others (Azzone, et al., 2014). The study is going to focus on the financial performance with profitability and reduction of cost as indicators.

### **2.3 Simba Breweries Company**

Simba Breweries is a manufacturing company operating in the beverage and brewery industry of the Republic Democratic of Congo, the company was established in Lubumbashi town of the High Katanga province, The company was founded in 1925 with a production capacity of more than 1,250,000 bottles per month. It is a subsidiary of Castel group and the leading Company in the region, Simba breweries produce a diverse range of beer and soft drinks such as Simba, Tembo, Skol, Doppel, 33Export, Lemonades, Grenadine, Soda, Tonic, Orange, Cola, and Djino that are sold in glass and plastics bottles (Brasimba, 2023). Glass bottles used by the company for packaging come from outside the country, thus a scarce asset that needs to be dealt with attention.

### **2.4 Reverse Logistics and Company Performance**

The implementation of reverse logistics practices in the supply chain management a company has a significant role to play in an organization. It decreases the negative impact that activities of a business have on the environmental, it helps companies to comply with the regulation by introducing policies and procedures to improve existing infrastructure, and it also makes it possible for firms to improve their economic performance (Waqas, et al., 2018). By managing the flow of goods and products appropriately in the forward and reverse logistics, a company can improve its environmental, economic, and social performance. Reverse logistics practices close the loop of the supply chain of companies and at the same time provide an opportunity for the organizations to save cost and maximize on the profitability (Khor & Udin, 2012).

Several studies discovered that there is a significant relationship between the company performance and the different reverse logistics that the organization can implement (Muttimos, 2012). The impact of the reverse logistics practices can be either on the economic, environmental, or social performance of the company. This is to say that reverse logistics practices can expand the firm performance when implemented efficiently and effectively enough (Ye, et al., 2013). Huang, Jim Wu et al. [2012] demonstrated that the implementation of the reverse logistics practices has a positive impact on the performance of the company. Ongombe (2012) investigated the relationship between reverse logistics and competitive advantage in water bottling companies in Nairobi. The findings of his study concluded that there was a strong relationship between reverse logistics and competitive advantage. Companies that implemented reverse logistics practices benefitted from increased profit margins due to a reduction in production costs and increased sales (Muttimos, 2012). In contrast, the results of the study conducted by Mamu, et al. (2024) affirmed that reverse logistics practices have a significant negative influence on the performance of food and beverage manufacturing firms in Kenya.

Eltayeb et al. (2011) looked at the outcomes of reverse logistics practices among companies in Malaysia and found four possible outcomes, which are environmental, economic, cost reductions, and intangible outcomes. Serut (2013) demonstrated that there is a positive relationship between reverse logistics and organizational performance. Waithaka (2012) and Azevedo et al., (2011) also investigated the impact of the reverse logistics practice on the performance of the company. The results of their studies indicate that reverse logistics practices have a great impact on the performance of companies that are implementing it effectively and efficiently. Thus, reverse logistics practices are considered to have a strong relationship and significant positive impact on the performance of companies.

#### **2.4.1 Remanufacturing practices and Company Performance**

Remanufacturing practices are a sequence of manufacturing steps and activities that a company puts in place to deal with products and materials when they reach the end of their life cycle (Ding, et al., 2020). Through remanufacturing practices, products and materials are returned to their initial condition with the same or better performance. Remanufacturing practices have immense potential to impact the social, economic, and environmental performance of a company when implemented appropriately (Graham, et al., 2015).

Remanufacturing practices are among the main means through which a company can recapture or retain value from used products, materials, and components to take advantage of its benefits on the environment and economic performance (Jiang, et al., 2019). Activities involved in the remanufacturing practices are more complex than those in traditional manufacturing. It is a strategic component of the competitive advantage of manufacturing companies. Decisions on the implementation of this practice and its outcomes affect greatly the performance of a company. It can have effects on productivity, profitability, cost saving, environmental and social performance (Sakraan, et al., 2019).

Remanufacturing practices are known to have a very great impact on the economic, environmental, and social performance of companies. Companies are implementing the remanufacturing of EOL products and materials not only to reduce the acquisition cost of raw materials but also to minimize the discharge of waste and realize the revalorization of resources. It is improving product quality, reducing economic costs, and at the same reducing the negative impact on the environment (Jiang, et al., 2019). Several other others have demonstrated that remanufacturing practices have huge impact on the company performance (Wang H, et al., 2019; Heda, et al., 2017).

#### **2.4.2 Recycling Practice and Company Performance**

Recycling is the process of changing waste or used material into new products to prevent waste of raw materials, reduce the consumption of materials, reduce energy usage, and reduce air pollution. It proves to be advantageous for several reasons as it reduces the amount of waste sent to landfills, conserves natural resources, saves energy, and reduces greenhouse gas emissions which translates into cost savings and new streams of income thus improving the performance of companies (George, et al., 2015). The study conducted by Odia (2022) focused on the evaluation of the impact of recycling sustainability on organizational performance. This study found that adopting recycling practices is a possible solution to the dwindling raw materials, increasing costs, and high rate of returns. Kamanga, et al. (2022) Indicated that there is a significant positive relationship between recycling practice and firm performance. The finding of this study recommended that recycling practices should be adopted by manufacturing firms as a way of improving their performance material recovery and environmental improvement.

Recycling practices have been identified as one of the techniques that can be used to optimize the performance of the supply chain of companies. The study conducted by Dacha, et al (2023)

on the recycling Practices and Value Chain Performance in the Food and Beverage Industry in Kenya found that the performance of companies was significantly and positively influenced by recycling practices. It indicated that recycling practices reduced the operational costs and improved the profitability of companies. The results of the study conducted by Vlachos (2016) also showed that recycling reverse logistics practices influences the performance firm performance of companies. However, Simpson (2012) Argued that when firms are pressured to recycle their used materials and products, it is not necessarily translated into the level of performance benefits desired by firms.

### **2.4.3 Reuse Practice and Company Performance**

Reuse practices are all about the utilization of products, components, or materials that have been to extend their lifespan, cut the cost of production, and reduce waste. The reuse of reverse logistics practices can take place throughout the supply chain of a product and whenever the need arises (Mogaka, 2015).The integration of reuse practices into the operations of manufacturing companies can result in various benefits, such as cost reduction, resource conservation, waste reduction, and enhanced brand reputation ultimately contributing to the improvement of the company's performance. Kaya, et al. (2021) indicated that Reuse practices can be considered as competitive advantage that can improve the performance of a business when implemented appropriately.

According to Amemba (2013), the reuse practice is one of the strategies of waste management that is environmentally friendly and that can significantly impact the performance of a company. Hazen et al. (2011) also indicated that reuse activities bring value to companies and increase the performance of a manufacturing company. Abdul-Rashid, et al. (2017) indicated that reverse logistics practices such as reuse implemented by manufacturing companies have the most significant impact on their performances. This study indicated that several manufacturing companies in Malaysia are strongly focused on the performance of their businesses, this is the main reason why they are implementing green practices in their operations. Dacha, et al (2023); by Odia (2022) and Sakraan, et al. (2019) also found that reuse practices are key in the performance manufacturing companies from different industries. By implementing reuse practices in their operations, companies can minimize the quantity of waste they produce, conserve resources, reduce costs of production, and enhance sustainability throughout their operations and supply chains. The reuse practices align with the principles of

the circular economy and significant influence on the performance of manufacturing companies (Abdullah & Yaakub, 2017; Afum, et al., 2019; Dudubo, 2017).

## **2.5 Reverse Logistics Processes**

Reverse logistics is defined as a set of activities associated with the collection of products from customers to producers to recapture value through reprocessing or proper disposal (Banihashemi, et al., 2019); even though reverse logistics has been defined by several others and in a different manner, its core definition refers to different disposition options that are existing in this back ward logistics process (Somuyiwa & Iyabo, 2014). There are four basic steps in reverse logistics for the management of solid waste which are namely gatekeeping, collection, sorting, and disposal (Bangueraa, et al., 2018). According to Sangwan (2017), collection, inspection, sorting, and product recovery are the core activities of reverse logistics. In the reverse logistics process, the first activity is product acquisition, the next collection of used products, followed by inspections/ sorting, and the last one is disposal; redistribution can also be included in this process to close the loop (Agrawal, et al., 2016; Banihashemi, et al., 2019).

### **2.5.1 Product Acquisition or Gatekeeping**

The first step in the process of reverse logistics is known as product acquisition or gatekeeping, it is a door through which used products are reinjected in the process (Lambert, et al., 2011). This is a critical stage for obtaining a profitable reverse logistics flow, it opens the acquisition of used products, components, or materials coming from the end customers to recapture the value through further processing (Banihashemi, et al., 2019; Ali, et al., 2018). Through gatekeeping, the number of products allowed into the flow is eliminated and controlled; this process cuts the costs associated with returning products (Rogers, et al., 2012). Gatekeeping can also refer to the process of collecting products from the market to the gatekeeping centre. If the company wants its reverse logistics system to be successful enough, it has to pay more attention at this stage of the process because there is always uncertainty in terms of time, quantity, and quality when it comes to talking about product return (Agrawal, et al., 2016).

### **2.5.2 Collection**

In the reverse logistics process collection is the second step after gatekeeping, it is defined as the process through which the company can gather all used products after the first step which is the acquisition of products. It includes all activities through which the company takes

complete ownership of the used products (Banihashemi, et al., 2019; Agrawal, et al., 2016). The collection process aims at putting together returned products from customers to their suppliers' point of production. According to Atasu, et al., (2013), the selection of the collection methods will depend on two main factors which are namely cost structure and quantities. The company may decide to engage itself in the collection process or decide to contract a third-party company that has expertise in this process.

### **2.5.3 Inspection/Sorting**

The third step of the reverse logistics process is the inspection of products which is also known as sorting, it is an important part of this process (Banihashemi, et al., 2019). Companies and consumers have more than one different reason for the product return, from the company's perspective there will be a great number of products received through the process; different items, products, or materials need to be inspected to ensure their quality and condition before the next step, the reason why at this stage products are inspected and sorted carefully (Agrawal, et al., 2016). Inspection seeks to identify the quality of returned products and selects appropriately the option of product disposition options (Karamchandani & Srivastava, 2017). It is very important for companies to properly implement this stage when collected items arrive.

### **2.5.4 Disposition**

This is the fourth component of the backward process after sorting; it is the decisive step through which companies are deciding on what to do with return goods (Banihashemi, et al., 2019). The product disposition stage has a big role to play in the reverse logistics flow, each company needs to ensure that the total cost of its recovery doesn't exceed the cost of virgin material (Ali, et al., 2018; Agrawal, et al., 2016). This stage is where the firm must decide how to dispose of products received appropriately and recapture intrinsic value. Among common disposition options that can be taken into consideration in the reverse flow of materials, we can think of reuse, repair, remanufacturing, recycling, and disposal (Agrawal, et al., 2016; Khor, et al., 2016).

#### **2.5.4.1 Repair**

Repair activities of reverse logistics are defined as the processes and actions involved in restoring products to their initial and functional state after they have reached the end of their life cycle or return due to damage or defects issues. It is all about fixing or replacing components, products, or goods that are no longer functioning as expected to restore them to

their initial usage, it aims to protect the environment, minimize waste, and recover the value of returned products (Khor, et al., 2016).

#### **2.5.4.2 Recondition**

Reconditioning is one of the processes of reverse logistics activities in which used and returned products by customers are disassembled, refurbished, or repaired to recapture their value. It involves testing, repairing, or replacing components that are not working efficiently. Recondition makes it possible to extend the life cycle of a product, reduce waste, minimize the cost of production, and protect the environment (Khor, et al., 2016).

#### **2.5.4.3 Reuse**

Reuse reverse logistics activities are known as the processes and practices concerned with the reintroduction of used products or goods in the supply chain of a company for extended usage. It is all about reinserting post-consumer items to remove specific faults in them through several processes (Yao & Kong, 2012). It is the act of taking back old and used items such as glass bottles and finding a new use for them after some processes. Reuse activities contribute to the sustainable development of companies and the environment by reducing the amount of waste, cutting the cost of production, and conserving resources; the term reuse is applied only to products that have been previously used (Heda, et al., 2017).

#### **2.5.4.4 Recycling**

Recycling is among disposition options that have a positive impact on the environment and the performance of companies; it is a set of processes and activities involved in the revalorization of used products (Khor, et al., 2016). It is a component of the reverse logistics system that deals with non-reusable products or destroyed ones to modify them and add some value to them (Wainaina, 2014). It is a recovery operation in which materials initially considered to be waste are being reprocessed into valuable products. Recycling involves the utilization of discarded material in the process of reproduction of another product. According to Mwanza, et al (2017) recycling is a strategy put in place by firms to contribute to the sustainable management of solid waste.

#### **2.5.4.5 Remanufacturing**

Remanufacturing can be defined as the set processes and practices of returning a good or a product that has been already used in its initial state by extending its original performance and

standard of quality. It denotes a higher process than recondition, by involving other processes such as disassembling, rebuilding, and replacing among others (Khor, et al., 2016). It can also be defined as an industrial process through which used goods or products are restored to their initial useful life (Wainaina, 2014). Remanufactured goods or products will have a warranty to be equal to the previous one. This option can be also defined as the process of returning a used product to at least its original performance (Yao & Kong, 2012). Remanufacturing is all about rebuilding the product to refund the previous specification as when the product was manufactured at first; it improves the quality of the returned products to functional or initial condition (Khor, et al., 2016; Heda, et al., 2017).

#### **2.5.4.6 Disposal**

In the process of reverse logistics, disposal refers to the processes and actions of managing and disposing of used products in an environmentally friendly manner. It is a way of getting rid of products that are no longer needed through action such as incineration or landfill in an environment possible manner (Banihashemi, et al., 2019). Whenever products cannot be reused, repaired, remanufactured, or reprocessed, companies can decide to implement landfilling or incineration options (Khor, et al., 2016). However, disposing of waste using the landfills option is recognized as one part of an integrated and effective waste management system. A landfill refers to a site where waste materials can be buried or dealt with environmentally, and it is the best form of waste management (Wainaina, 2014). According to the United States Environment Protection Agency, a landfill in a modern sense refers to a well-engineered and managed facility that is used for the disposal of solid waste (UEPA, 2020).

#### **2.5.4.6 Redistribution**

The redistribution process is the last step in the reverse logistics disposition process journey, at this level all products, materials, and goods that have been reconditioned, reprocessed, and put again in usable conditions are redistributed to customers or reinserted in the market. This process pushes the backward logistics process into the traditional one. (Ali, et al., 2018). There are several drivers that companies from different industries should consider for an effective and efficient implementation of the reverse logistics system in the performance of their businesses. Figure 2.1 below illustrates both the forward and the reverse logistics as well as the different practices and options.

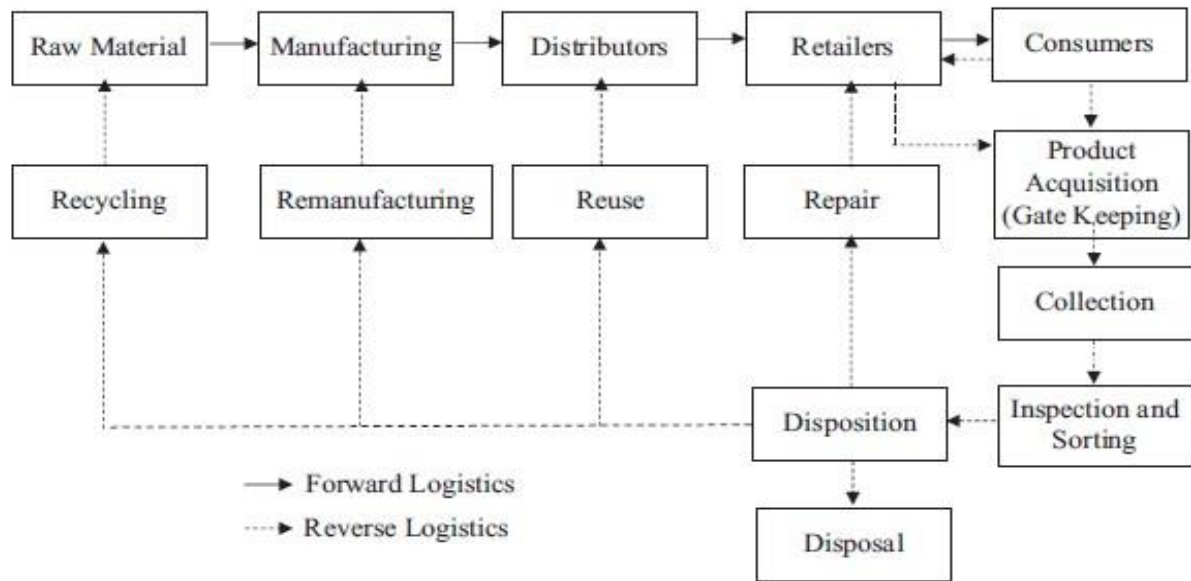


Figure 2.1: The basic flow of the reverse and forward logistics process (Agrawal, et al., 2016)

## 2.6 Drivers of Reverse Logistics

Driving forces of reverse logic vary from country to country and depending on the industries or sectors in which firms are doing business, and the incorporation of the reverse logistics system in any given business is influenced by many drivers (Mwanza, 2018; Mwanza, et al., 2016). There are many drivers of reverse logistics, among which we can think of the following three: economic, corporate citizenship, and environmental/ regulation (Ngadiman, et al., 2016; Reddy, 2011; Mobolaji, 2017).

Firms implement reverse logistics in their businesses because of the economic profits that the system brings, the obligatory forces, or the social pressure (Coşkun, 2012 ). Drivers(2017) researched the three key drivers of reverse logistics in the construction industry which are: compliance with law and regulation, open-minded to the use of recycled materials, and management experience in reverse logistics implementation; Srivastava (2008), cited by Mwanza et al (2016) indicated that there are mainly three drivers of the reverse logistics system which are namely government legislation, environmental concerns, and economic concern; a study conducted by NGadiman, et al. (2016) showed that the main driving forces of reverse logistics are legislation, corporate citizenship ( environment), and economics drivers are the principal catalysers of the implementation of reverse logistics practices. This study focuses attention on them.

### **2.6.1 Legislation**

In several countries, especially in developed nations, regulation such as EPR, PPW, RoHS, and WEEE are effectively and efficiently implemented, and it is viewed as the first driver of reverse logistics (Akdoğan & Coşkun, 2021; Mwanza, et al., 2017). Due to regulations in place, manufacturers are obliged to take back and recover their products at the end of their life cycle to reduce the volume of waste disposed of in the environment (Kinobe, et al., 2015). Legislation is recognized to have a great influence in material recovery and. it is the main driver of reverse logistics (Abdullah & Yaakub, 2014; Mwanza, 2018; Xevgenos, et al., 2015). Any jurisdiction, body, law, or regulation put in place by a regulatory system or authority to show the direction in which organizations should behave toward the protection of the environment is recognized as a legislation driver (Ngadiman, et al., 2016).

The term legislation refers to actions or activities undertaken by authorities to minimize the negative effect of the business activities on the environment (Agrawal, et al., 2016). Regulation such as Extended Producer Responsibility (EPR) is an environmental regulation in which a producer's responsibility for products goes beyond the post-consumer stage of a product's life cycle (Bangueraa, et al., 2018). This regulation is already operational and effective in the packaging and manufacturing industries of many developed countries such as the United States, Australia, and Italy inter alia (Mwanza, et al., 2017). Waste Electrical and Electronic Equipment Directive (WEEE) is another regulation introduced in 2017 that is forcing all manufacturing firms to comply with this regulation in Europe (Abdullah & Yaakub, 2017; Lambert, et al., 2011). Packaging and Packaging Waste Directives (PPW), and the Restriction of Use of Certain Hazardous Substances Directive (RoHS) are also added to the list of regulations that are driving the implementation of reverse logistics practices (Mobolaji, 2017).

### **2.6.2 Environmental / Corporate Citizenship Drivers**

Corporate citizenship is a set of values and principles that affirm can put in place to be as responsible as possible when implementing different activities of the reverse logistics system (Akdoğan & Coşkun, 2021). Environmental regulations implemented by regulatory bodies are forcing firms to behave ethically regarding the environment they operate in (Afum, et al., 2019). Corporate citizenship refers to several values or principles that an organization considers as indicators of their responsibility toward society through practices such as reverse logistics activities; this means firms are supposed to behave in an ethical and responsible possible

manner to meet their objectives and gain customers' confidence (Abdullah & Yaakub, 2014; Mwanza & Mbohwa, 2017).

Corporate citizenship can also be defined as a set of moral values and ethical principles guiding firms in their way of running business by complying with regulations throughout the processes of their businesses (Somuyiwa & Iyabo, 2014). Ethics is a set of moral values or principles that govern an organization and push it to become responsibly engaged in reverse logistics processes, it refers to the concept of corporate social responsibility (CSR), reverse logistics is an effective way by which manufacturing companies are embracing good corporate citizenship in their businesses (Afum, et al., 2019; Govindan & Soleimani, 2016). To date, several companies are forced to recognize their responsibilities as producers; therefore, they take responsibility for the end of their product life cycle by maintaining the environment they operate safely (Reddy, 2011).

### **2.6.3 Economic Drivers**

Economic factors are the second drivers to the implementation of the reverse logistics system in the operation of a business (Lambert, et al., 2011). All activities that lead to direct and indirect economic gains can be seen as economic drivers of reverse logistics practices. Among the direct drivers of economic benefits of this system, we can include activities related to the reduction of raw material usage and the addition of value through processes such as recovery, recycling, reselling, decreasing waste production, and obtaining valuable spare parts.

On the indirect economic profit, the improvement of the relationship between customers and their suppliers, increase in customer loyalty, and a good reputation or image will be considered (Reddy, 2011). Economic factors are recognized as the second drivers of reverse logistics according to Lambert (2011) cited by Mwanza (2017), reverse logistic practices are economically beneficial to companies as they recover the value of products, goods, or components that were supposed to be lost. It is an effective way through which a firm can save costs and reduce its negative impact on the environment (Mwanza, et al., 2017). Indirect benefits of reverse logistics refer to the green image, good relationship with clients and suppliers, and adaptability to future change (Mwanza, et al., 2017; Reddy, 2011). Several barriers are preventing companies from implementing effectively and efficiently the RL system in their businesses.

## **2.7 Barriers to Reverse Logistics Implementation**

Companies in developed and developing countries have different approaches to the implementation of reverse logistics systems in their businesses; this is due to the maturity level of reverse logistics, rules, and regulations in place, company size, and operation systems, they are facing different barriers and dealing with them differently (Waqas, et al., 2018). Muhammad, et al., (2018) researched the critical barriers to the implementation of reverse logistics in the manufacturing industry, according to this study the most critical barriers to the implementation of reverse logistics are the high cost of reverse logistics adoption, the lack of skilled professionals, lack of law and regulation, poor management system toward reverse logistics, and lack of new technology among many other factors.

According to Sharma, et al (2011), there are different barriers to the implementation of the reverse logistics system in India such as a lack of systems, management inattention, financial resources, personal resources, and company policies. Chileshe, et al. (2015) identified the following barriers to the implementation of reverse logistics in the Australian construction industry: lack of incorporation of salvaged materials by designers; regulation restrictions to the usage of recovered materials and components; potential legal liabilities; higher costs; and longer-time association with deconstructing buildings; Abdukrahman, et al. (2014) put key barriers into four categories which are namely: management; financial; policy; and infrastructure. Waqas, et al. (2018) identified five main barriers including the lack of initial capital, the companies' policies against reverse logistics, the lack of skilled professionals in RL, the lack of community pressure, and the lack of new technologies and information systems. Shaharudin, et al. (2015) discovered seven main barriers to the implementation of reverse logistics in developing countries which are the lack of rules and regulations, costly operations, lower adaption rate of RL practices, customer perception, inadequate support, lack of customer operation performance and limited usage of material.

According to Mwanza & Mbohwa, (2019), barriers to the implementation of reverse logistics in the Zambian context are the lack of household participation in the process of plastic solid wastes, the lack of recycling technology and infrastructure, the lack of sound regulation and legislation toward waste management system. In DRC, there are a few regulations and laws that have been put in place for the protection of the environment, but firms are not yet able to observe them as expected. The environment is still polluted by packaging from manufacturing

firms when they reach the end of their life cycles, and the implementation of reverse logistics is one of the effective ways to deal with these issues.

The RL system is a more difficult and costly process than the traditional one, however, it remains an effective and efficient way through which the cost and the environment can be dealt with. Reverse logistics practices are implemented to improve customer satisfaction, financial performance, competitiveness, as well as cost reduction (Somuyiwa & Iyabo, 2014). In the context of this study, the following barriers will be taken into consideration Management inattention, financial constraints, Infrastructure barriers, Personal Resources, Legal Issues, and the lack of awareness about the reverse logistics system.

### **2.7.1 Management inattention**

In today's business world, companies are implementing processes of the reverse logistics system not for their economic profits but primarily because of the pressure put on them by government regulation and legislation (Mwanza, et al., 2017), this makes the management pay less attention on this system as it considered being a nonprofit activity (Sharma, et al., 2011). The management system of a business has a key role to play in the implementation of the reverse logistics system, in case of management failure; this will lead to a poor organizational culture implementing the reverse logistics system more complicated and difficult to deal with (Waqas, et al., 2018).

### **2.7.2 Financial constraints**

The implementation of a strong, effective, and efficient reverse logistics system in the operation activities of any given business requires the mobilization of funds and many other resources, this is to say that this system needs enough financial support to be effective (Sharma, et al., 2011); in the implementation of the reverse logistics system, financial barriers refer mostly to various economical (monetary) activities such as training control and supervision system (Abdullah & Yaakub, 2014). When a firm lacks financial support and enough funds from its operations, it will be very difficult if not impossible to implement activities of the reverse logistics system in its business.

### **2.7.3 Infrastructure barriers**

The implementation of the reverse logistics system requires the existence of good equipment and materials in terms of infrastructure; when a company does have the appropriate infrastructure, this will make the backward flow of material effective and efficient; Among

infrastructure barriers, we can think of the lack of an appropriate technology, the limited forecasting and planning initiatives, and the lack of in-house facilities (Abdullah & Yaakub, 2014).

#### **2.7.4 Personal Resources**

If a given company doesn't have a proper training and educational system in place for its employees and members of staff, this will lead to difficulties when implementing the reverse logistics system because this system requires skilled people with enough knowledge to manage this complex environmentally friendly system; this is to say that lack of skilled professionals in the operation of the business willing to implement/or implementing the reverse logistics system will make it difficult to handle (Sharma, et al., 2011; Waqas, et al., 2018).

#### **2.7.5 Legal Issues**

All stakeholders of a business have a role to play in the success of the business, and all of them have to learn to deal with the policy barriers or legal issues; Among legal barriers to the implementation of a reverse logistics system, we can think of the lack of enforceable law, the lack of waste management practices, and the Lack of awareness in environmental regulations as well as the lack of the government support (Abdullah & Yaakub, 2014; Waqas, et al., 2018).

#### **II.5.6 Lack of awareness about reverse logistics**

The lack of knowledge on the existence of benefits brought by the implementation of the reverse logistics system is the primary barrier to this system; when firms ignore that the implementation of the reverse logistics system can lead to economic benefits made possible when used products are revalued through processes such as remanufacturing, recycling, reuse among others (Sharma, et al., 2011).

#### **2.8 Benefits of Reverse Logistics**

The implementation of reverse logistics activities will bring benefits not only to the environment and firms; further, this system will be also beneficial for customers (Abdullah & Yaakub, 2014). However, the primary reason for implementing a reverse logistics system in the process of any given business is to minimize cost and increase profits (Grabara, et al., 2014); this system can bring tangible and intangible benefits by recapturing value from used or returned goods and extending the life cycle of products through activities such as recycling, recovery reuse, and repair (Banihashemi, et al., 2019).

Today, even firms that were previously resistant to the adoption of reverse logistics have begun to pay more attention to this system which is a very important tool in the performance of the supply chain (Elmas & Erdigmus, 2011). The global attention and commitment to environmentally friendly operations have increased the interest of firms in the subject of reverse logistics; reverse logistics system is now considered a major weapon in the fight against environmental pollution (Kulwiec, 2006); cost savings and environment protection can be achieved by implementing effectively and efficiently this (Somuyiwa & Adebayo, 2014; Grabara, et al., 2014); reverse logistics plays a great role in the journey towards customers satisfaction as it enhances the loyalty (Aitken & Harrison, 2013).

The inclusion of reverse logistics in the operation of a given business leads to both tangible and intangible profits, Roberta and Pier, (2012) cited by Mbovu & Mburu, (2018) pointed out that different reasons can motivate and convince firms to embrace reverse logistics practices, some of these reasons are: environmental laws, economic benefits and the growing environmental consciousness of consumers. Reverse logistics system brings many advantages, the most significant ones are the following: Economic, Legal, and Social (Yu, et al., 2018). This system can be seen as a key factor in manufacturing firms, as it has the potential to contribute positively to environmental protection as well as economic benefits if properly implemented (Mwanza, et al., 2017). This is to say that by recapturing value from used or returned items and extending the life cycle of products through different processes, reverse logistics can provide many advantages among which we can notice economic, social, and environmental. For this study, the focus will be on economic benefits.

## **2.9 Economic Benefits of Reverse Logistics**

Reverse logistics can bring many economic benefits to the performance of manufacturing firms which can be classified into two groups which are direct benefits and indirect benefits (Reddy, 2011); these benefits include the reduction of costs and the aggregation of socio-environmental value among others. However, there are also some drawbacks in the inclusion of this system in the operation of the businesses (Borges, et al., 2020). Reverse logistics practices in an organization save/minimize costs and natural resources related to the production process and increase the profitability of the firm by reutilizing used materials instead of buying new raw materials from suppliers and wasting manpower and time (Grabara, et al., 2019; Banihashemi, et al., 2019).

Among the key economic benefits resulting from the implementation of reverse logistics in each firm, we can think of the benefit coming from secondary sales, reduction in the cost of sales and operating expenses, and customer loyalty. The implementation of the reverse logistics system in the process of a business can bring both direct and indirect economic benefits (Akdoğan & Coşkun, 2021; Agrawal, et al., 2016). The reverse logistics system can also be seen as a tool that can be used for cost reduction in the process of a business, when materials initially used are reutilized after the end of their life cycle, this will cut on the cost of buying new raw materials (Vaz, et al., 2013).

### **2.9.1 Direct Benefits**

The implementation of the Reverse logistics system in the process of any given business can bring both direct and indirect economic benefits as stated previously; on the direct economic benefits, we can think of advantages such as the reduction of raw materials usage and cost, addition of value through activities such as recovery, remanufacturing, recycling, and reuse initially used product (Ngadiman, et al., 2016; Reddy, 2011).

### **2.9.2 Indirect Benefits**

Under the indirect economic benefits brought by the reverse logistics system, we can include the following: compliance with the regulation, the increase of relationships between suppliers and customers in the supply chain, market protection and reputation or good image building, tax benefits, (Reddy, 2011; Agrawal, et al., 2016). In today's business, customers are becoming more and more aware of environmental issues, this awareness puts pressure on manufacturing firms toward the inclusion of sustainable practices such as those of the reverse logistics system (Abdullah & Yaakub, 2014); because of this awareness, customers are willing to purchase of products that do not impact negatively the environment in which they live in, this is to say that companies implementing the reverse logistics activities in their business will capture significant competitive advantage and customers' loyalty, and increase at the same time its reputation also known as goodwill. RL brings about the economic benefits of a business, it reduces costs, strengthens brand image, and competitive advantage, and increases profit; it brings about environmental benefits, reduces waste, gas emissions, and energy usage, and increases efficiency.

## **2.10 Critique of Existing Literature**

The existing literature on reverse logistics practices and their effect on company performance has been found to have certain limit in terms of evidence that links directly the practices such as reuse, recycling, and remanufacturing to the measurement of the company performance. The metrics used to measure the effect of this practice are not coming out clearly. We didn't come across clear studies that demonstrated metrics used to measure the performance of companies such as profitability, market share, or customer satisfaction. Most studies were limited to the discussion on the importance of reverse logistics practices on the environment, the social, and the economic while fewer studies rigorously analyse its direct effects on financial performance.

The reverse logistics system has several practices from the sourcing of raw materials to the different disposition options. However, the literature review mainly focused attention only on three practices of this system (reuse, recycling, and remanufacturing). It didn't take into consideration the remaining practices which might make the analyse of the effect of the reverse logistics practices incomplete and unclear. Several studies that we reviewed generalized their results based on small sample sizes taken into consideration due to some constraints such as the level of knowledge, the cost, and time which can make it challenging to draw strong conclusions about the relationships between the reverse logistics practices and company performance.

## **2.11 Lessons Learned**

This chapter focused attention on the review of the literature on reverse logistics practices and their effects on the company's performance. It gave an understanding of the benefits of implementing the reverse logistics system in the operation of a business in the general case, and particularly the economic benefits of this system, it also provided a clear view of different barriers that firms are effacing when embracing the reverse logistics system. The chapter also presented the theoretical ground of the subject matter. The empirical review indicated that reverse logistics is a tool that can be implemented by companies from both developed and developing nations to improve the performance of their businesses. However, the implementation of reverse logistics practices should be effective and efficient enough to be considered as a competitive advantage, from the perusal of the available literature, could observe that most studies focusing on reverse logistics were mostly conducted in developed countries. Several published papers were from Australia, the US, Asia, and many more

advanced countries. On the other side, developing nations did not have as many publications as developed ones. Nigeria, South Africa, and Kenya were among the African countries where several papers on reverse logistics were published. There is a need to investigate more on the effect of reverse logistics practices and their impact on the performance of manufacturing companies especially in the context of companies in developing nations. The findings of several studies recommended the implementation of reverse logistic manufacturing companies as a strategic tool for competitive advantage. However, no study has been found to have been conducted on the evaluation of the effects of reverse logistics in the context of the Republic Democratic of Congo.

## **CHAPTER THREE: THEORETICAL AND CONCEPTUAL FRAMEWORK**

### **3.0 Introduction**

The chapter three is divided in two parts, part one on theoretical framework that presents the fundamental theories on which the study was based, and part two focuses attention on the conceptual framework providing the visual representation of the expected relationship and behaviour between variables and hypotheses.

### **3.1 Theoretical Framework**

As announced in the introduction, the section on the theoretical framework presents the fundamental theories that attempt to explain the relationships between the variables considered in the study. Two relevant theories to the study were identified to explain the source and origine or background of the conceptual framework. The two theories that have been considered include Resource-Based View Theory (RBV), and Product Life Cycle Theory (PLC) that are being presented in the next section.

#### **3.1.1 Resource-Based View Theory**

The Resource-based View (RBV) theory is a perspective attempting to illustrate, explain, and demonstrate, the way companies can manage to reach a sustainable competitive advantage over their competitors through acquisition and control over resources.

In the field of strategic management, Resource-Based View theory appears to be one of the most widely used theories (Bentamar & Ourahou., 2021). Barney (1991) cited by Bentamar & Ourahou (2021) indicates that a company's resources could be a potential source of competitive advantage. Barney (1991) stretched on the fact that the competitive advantage of a firm comes mainly from valuable, rare, inimitable, and non-substitutable resources and capabilities that are possessed by the company. From the Resource-Based View theory point of view, keeping a stock of resources and skills will give a competitive advantage to a company, when these resources and resources are at the same time marketable, scarce, inimitable, and not substitutable, they can create a sustainable competitive advantage in the long term (Bentamar & Ourahou., 2021) .

In today's work environment and ever-changing marketplace, only firms that can respond to rapidly changing challenges and conditions by adapting both their internal and external resources can remain competitive and operate sustainably. Companies that are not up to speed

will be unable to survive in such an environment thus fail to do business. Resource-based view is all about the way resources of the company are being selected and the way the firm utilizes them. The capability of every single company is defined fundamentally by the type of resources it possesses and the way it is exploiting them (Mudavadi, et al., 2012 ).

From the Resource-Based View theory perspective, the competitive advantage of a firm comes from its superior resources, this implies that companies should choose their strategy based on taking into consideration their resources (Barney, 1991). Resources of a given company can be classified into organizational resources such as information and experience as well as physical resources such as plant and machinery, and human resources such as managerial and technical staff. The uniqueness of the resources of a company and their capabilities can ensure the maximization of profits, and that business opportunities are captured to the maximum extent possible; it also pushes the performance of the company to constantly be improved (Kshetri, 2017).

Several others agrees that resources of a company can take various forms and contribute in different ways to its profitability, its competitiveness and performance. The ability of a firm to acquire and manage its resources will automatically affect its performance and competitiveness over its competitors (Zhao & Morgan, 2017). In the Resource-Based View theory it is indicated that all the internal strength, capability, and the environmental dynamics that a company has should be put together and used effectively to provide the company competitive advantage over competitors and facilitate the company's performance (Maravedi, Madani, & White, 2012.)

The Resource-Based View (RBV) theory gives valuable insights into understanding and enhancing the supply chain management practices organizations. It is focusing on the internal, external resources, and the capabilities of an organization. This theory emphasizes the importance of leveraging unique, scarce, and non-easy-to-copy assets to achieve sustainable competitive advantage. Thus, a firm must be able to able to manage effectively and efficiently its resources such as technology, human capital, inventory, and relationships with suppliers and partners to be competitive in the marketplace.

### **3.1.2 Closed-Loop Supply Chain Theory**

The Closed-Loop Supply Chain (CLSC) theory has been defined by Uide, Jayaraman, & Srivastava (1999) as a conceptual framework that emphasizes the integration of forward and reverse logistics activities within a supply chain of an organization. This theory recognizes that

products and materials can flow in both directions, from suppliers to customers (forward logistics) and from customers back to suppliers (reverse logistics) through processes such as returns, reuse, recycling, remanufacturing, and disposal. This system aims to optimize resource utilization, minimize waste, maximize profit, and promote the sustainability of the company by closing the loop between production activities, consumption activities, and recovery activities within the supply chain of a company.

A Closed-Loop Supply Chain starts the moment a manufacturing company decides to take care of the return of used product or materials through different reverse logistics practices for recapturing value or proper disposal, in this system, the returned material or product is reinjected back into the market after appropriate actions on them (Govindan & Soleimani, 2017). It seeks to decrease the consumption of resources, energy and to reduce the emissions of pollutants from a company to create a socially responsible enterprise. It also seeks to maximize and balance economic benefits, social effects, and environmental effects.

A Closed-Loop Supply Chain (CLSC) has been defined in the research conducted by Sillanpää & Ncibi (2022) as “the design, control, and operation of a system to maximize value creation over the entire life cycle of a product with the dynamic recovery of value from different types and volumes of returns over time”. It relies on innovative practices and activities, technologies, and services that enable the recycling, remanufacturing, and reconditioning of products and materials that were taken back from the point of consumption to the point of production (Sillanpää & Ncibi, 2022). The theory has been also defined as a framework that emphasize on the integration of both traditional and reverse logistics activities in the same company to create a closed-loop system. It recognizes that the flow of products and materials can move in both ways, the back and forth, meaning from the point of production to the point of consumption and from the point of consumption back to the point of production through reverse logistics practices such as returns, reuse, recycling, and remanufacturing among others (Zhao & Morgan, 2017).

In a Closed-Loop Supply Chain, materials that were initially supposed to be considered waste are recaptured and used to create new products, rather than being discarded. This can be achieved through appropriate reverse logistics practices such as recycling, reuse, and remanufacturing. The Closed-Loop Supply Chain system makes it possible to reduce the negative impact of manufacturing companies on the environment and at the same moment it leads to the reduction of cost and increase of profit, as materials and products are taken back

from the point of consumption to the point of production and reused or recycled after an number of processes on them instead of being considered as waste and disposed of (Sillanpää & Ncibi, 2022).

The Closed-Loop Supply Chain system brings several benefits for both businesses and the environment by reusing materials through reverse logistics practices such as reuse, remanufacturing, and recycling. This system reduces the need to extract new raw materials from the earth and explore virgin materials by saving energy and conserving resources. It reduces pollution and prevents gas emissions from manufacturing processes and minimizes business costs by reducing the need to purchase new materials constantly (Radian, 2022). It relies on innovative practices and activities, technologies, and services that enable the recycling, remanufacturing, and reconditioning of products and materials that were taken back from the point of consumption to the point of production (Sillanpää & Ncibi, 2022) .

The Closed-Loop Supply Chain (CLSC) theory has been mainly used by researchers and practitioners to provide a detailed framework that makes it possible to enhance the performance of companies through the integration of both, the forward and reverse logistics activities, and practices within the supply chain of a company. Companies that can adopt the Closed-Loop Supply Chain (CLSC) theory and principles effectively and efficiently can achieve several benefits that positively impact their overall performance.

### **3.2 Theoretical Literature Summary**

The previous section focused on the literature review of the two main theories upon which the study was built. The first one was the Resource-Based View theory which states that the competitive advantage of a firm comes mainly from valuable, rare, inimitable, and nonsubstitutable resources and capabilities that are possessed by the company. It also indicates that keeping a stock of resources and skills will give a competitive advantage to a company only if these resources and resources are at the same time marketable, scarce, inimitable, and not substitutable. It is only by fulfilling these conditions that they can create a sustainable competitive advantage in the long term and upgrade the performance of a company. Secondly the Clo Closed-Loop Supply Chain (CLSC) theory The theory that provides a framework emphasizing the integration of both traditional and reverse logistics activities in the supply chain of a company to create more value by creating a closed-loop system. This theory reveals that the flow of products and materials can move in both ways, back and forth, through reverse

logistics practices such as returns, reuse, recycling, and remanufacturing for proper disposal or adding value to materials that were supposed to get lost.

### **3.3 Conceptual Framework**

#### **3.3.0 Introduction**

Chapter 2 was dedicated to the literature review, with special regard to identifying the relationship between the reverse logistics practices and the company's performance. The present section elaborates on the expected behaviour and the relationship between the dependent variable (Company performance) and the independent variables (Recycling, Reuse, and Remanufacturing). The section shows the place of the hypothesis in the conceptual formwork.

#### **3.3.1 Reverse Logistics Practices**

The empirical review of previous studies demonstrated that there are several factors that can influence the company's performance and its supply chain management. Among the factors that have been pointed out by several others, reverse logistics practices are predominant. Several studies defined the reverse logistics function as the management of material flow from the point of consumption to the point of origin to recapture value or proper disposal thus improving the performance of companies (Vaz, et al., 2013; Santos, et al., 2014; Mbovu & Mburu, 2018; Kumar & Chandrakar, 2012; Govindan & Soleimani, 2016; NGadiman, et al., 2016; Ali, et al., 2018; Corrêa & Xavier, 2013; Dudubo, 2017; Hazen, 2011). This system refers to the sequence of all activities required in the process of collecting used products from customers to the producers for reuse, repair, re-manufacture, recycling, or disposal (Agrawal, et al., 2016). Yu, et al. The performance of the company therefore can be affected and improved by an appropriate way of the reverse logistic system such as revers logistics practices (reuse, recycling, and remanufacturing).

Studies conducted Ngadiman, et al (2016) and Reddy (2011) indicated that the implementation of reverse logistics practices brings direct advantages such as the reduction of raw materials usage and cost, and the addition of the value of the products to the performance of the company. Agrawal, et al. (2016) demonstrated that through reverse logistics practices, a company can better perform in terms of its compliance with the regulation, the increase of relationships between suppliers and customers in the supply chain, market protection and reputation, or good image building. Abdullah & Yaakub, 2014 also demonstrated

that the implementation of reverse logistics practices can significantly affect the performance of companies. Khor, et al. (2016) and Agrawal, et al. (2016) found that reuse, remanufacturing, recycling, repair, and disposal are the most implemented by company toward the improvement of their performance (Agrawal, et al., 2016; Khor, et al., 2016).

On the theoretical side, the study was based on two main theories, the Resource-Based View, and the closed-loop supply Chain theory. These two theories explain the strategic place occupied by resources in the competitive advantage of a company and the role that they play in the supply chain. They also indicate that there are practices of the reverse logistics practices such as recycling, reuse, and remanufacturing that can be implemented in the supply chain of a company to close the loop and improve the performance of the company by giving value to the resources that were supposed to be wasted initially.

### 3.3.2 Company Performance

Eltayeb et al. (2011), Green et al. (2011), De Giovanni and Vinzi (2012), and Azevedo et al. (2011) demonstrated in their studies that the implementation of reverse logistics practices such as reuse, remanufacturing, and recycling is directly linked with organizational performance. Based on the empirical and theoretical literature views, the conceptual framework of the study is built, and it is illustrated in Figure 3.1 below. It demonstrates the expected relationship between remanufacturing, recycling, and reuse reverse logistics practices (independent variables) and the company's economic performance (dependent variable). It also shows the impact the independent variables have on the dependent variable. This framework has been inspired by previous studies conducted in reverse logistics.

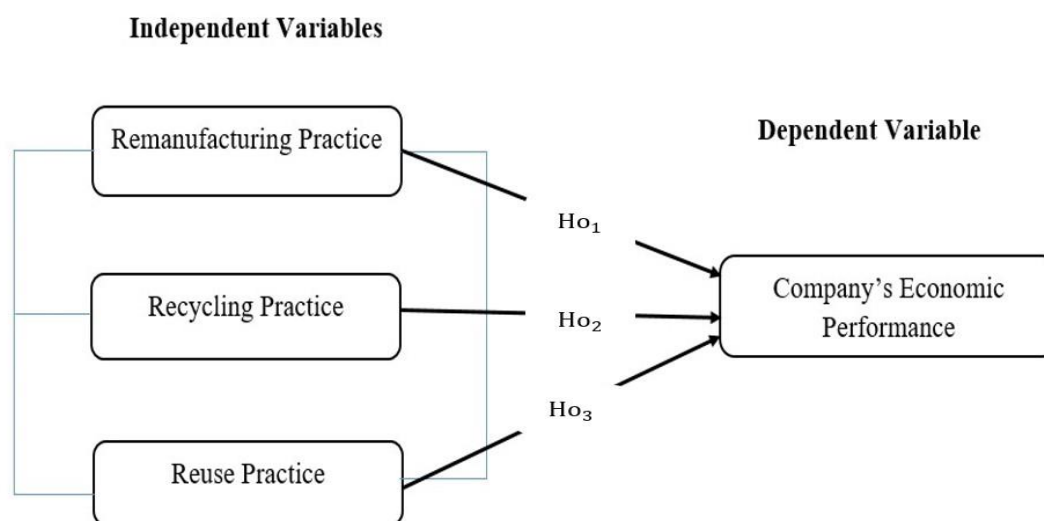


Figure 3.1: Conceptual framework Source: Author

### **3.3.3 Operationalization of Study Variables**

This study considers three variables independent variables and one dependent variable, as presented in the conceptual framework above. The dependent variable is the company performance, and the independent variables are the reuse, recycling, and remanufacturing practices as stated in the conceptual framework above. A change of one unit in any of the independent variables is expected to have a direct impact on the performance of the company. This will be measured using the Likert scale ranging from 1 to 5 Point Likert scale.

### **3.3.4 Research Hypotheses**

Three hypotheses were formulated following the expected relationship between variables as indicated in the conceptual framework and the theoretical framework. All the three are the null hypothesis and have the opposite as alternative hypothesis. The null hypotheses are stated as follows:

1. Remanufacturing practice doesn't affect the company's performance ( $r=0$ ).
2. Recycling practice doesn't affect the company's performance ( $r=0$ ).
3. Reuse practice doesn't affect the company's performance ( $r=0$ ).

The alternative hypotheses on the other side are stated as follows:

1. Remanufacturing practice affect the company's performance.
2. Recycling practice affect the company's performance.
3. Reuse practice affect the company's performance.

## **CHAPTER FOUR: RESEARCH METHODOLOGY**

### **4.0 Introduction**

The research method is a scientific and systematic way through which researchers can gather needed data to reach objectives and solve research questions; it refers to all the means, techniques, and processes put in place to solve the research problem (Jansen & Warren, 2020). Cited by Mbovu & Mburu, (2018), it shows the direction in which the study process will be systematically conducted (Khotary & Garg, 2014).

This chapter explains the research design, describes the population sample methods, and instruments used for data collection, and gives motivation behind the choice; it indicates the type of data used, the software and tools used in the process of analysis, it also presents the ethical consideration during data collection.

### **4.1 Research Philosophy/ Paradigm**

A paradigm is a research perspective or school of thought that defines the appropriate method, techniques, and goals that will be followed when conducting a research study. It is a model that can be followed for further research and problem-solving. The paradigm specifies how research should be conducted and has its assumptions and values. In social sciences, there are mainly two dominant paradigms: Qualitative (phenomenology) and Quantitative (Positivism).

#### **4.1.1 Positivism**

Positivism is a paradigm or school of thought that Favors the quantitative methodology using probability sampling and statistical data collection and analysis techniques. This philosophy of research states that the social world can be studied, viewed, and understood objectively (Zukauskas, et al., 2018).

#### **4.1.2 Phenomenology**

Phenomenology or interpretivism is a paradigm that Favors the collection of qualitative data through qualitative methodology using focus group discussions and observation. According to this philosophy, it is not easy to understand the social world in a subjective world (Zukauskas, et al., 2018). This study will combine both methods for the collection of qualitative and quantitative data.

## **4.2 Research Design**

Research design is the conceptual structure within which research is conducted; it is a logical model guiding the study in solving problems investigated, and it is a systematic guide in the process of collection, measurement, and analysis of data. The study adopted a descriptive research design. A descriptive research design is a set of all conditions, parameters, and steps undertaken in the process of data collection and analysis it is a set of methods and procedures that describe variables (Mbovu & Mburu, 2018). The descriptive research design was used in previous studies such as Felix, et al. (2022), Nyarega, (2015), and Alloys, (2019) among others.

## **4.3 Area of Study**

Simba Breweries is a manufacturing company operating in the brewery and beverage industry of Lubumbashi in the Republic Democratic of Congo. The company belongs to the Castel group BGI and produces mainly two types of beer Tembo and Simba, and it is packaged in glass bottles. The company also manufactures different ranges of soft drinks packaged in plastic and glass bottles. The study considered Simba Breweries because it is one of the biggest companies in the brewery industry of Lubumbashi/DRC.

## **4.4 Target Population**

The target population is the total collection of objects or elements on which the study is willing to make an inference by confirming or rejecting a hypothesis. It is the entire group of people, individuals, or objects to which investigators rely on the collection of data for the generalization of findings and conclusions (Mbovu & Mburu, 2018). This study collected data from managers, their assistant managers, and senior members from different departments related to the reverse logistics system of the company. The target population is presented in Table 3.1 below.

Table 4.1: Target Population

Department	Number
Production	15
Purchasing	10
Logistics	15
Procurement	10
Finance	10
Stores	15
Conditioning	10
<b>Total</b>	<b>85</b>

Source: Research Data

#### 4.5 Sample size

To determine a sample that will be representing the targeted population of 85 respondents working in the reverse logistics of Simba Breweries, the study used the formula developed by Krejcie & Morgan's (1970) and presented in equation (1) below.

$$n = \frac{x^2NP(1-P)}{e^2(N-1)+x^2P(1-P)}$$

With: n = Required Sample Size N = The Population Size  $x^2$ = Chi-square

which 3.841 at 95% confidence level with a degree of freedom 1 P = The population proportion 0.5 (50%) e = The margin of error which is 0.05 at 95% confidence level

By replacing each value in the equation suggested by Krejcie & Morgan's (1970) a sample size of 70 respondent was found as optimum value for the study.

## **4.6 Sampling design**

The study adopted probability sampling to draw a sample that represents the respondents of Simba Breweries. Stratified sampling technique was employed to separate respondent according to the department they are working in. The simple random sampling technique was used to randomly select respondents from each department using generated random numbers in Microsoft Excel.

## **4.7 Instrument for Data Collection**

The study adopted a mixed method where both primary and secondary data were gathered, and the questionnaire was used as the main instrument for data collection under the inspiration of UNZA guidelines. Secondary data was collected from published and unpublished sources, and primary data on the other and was collected directly from respondents.

### **4.7.1 Secondary data collection**

Secondary data was collected through the revision of the relevant literature review published on reverse logistics (economic benefits) such as articles from journals, theses, books, as well as other unpublished documents focusing on the economic benefits of reverse logistics.

### **4.7.2 Primary data collection**

A questionnaire is a document that translates research objectives and hypotheses into specific questions; it is a repository of questions that result from the operational definitions of concepts in the hypotheses and objectives. The questionnaire was divided into six parts. The part one dealt with the background of participants, two investigated the existence of RL, three the reverse logistics process and practices, four the link between economic performance and RL practices, five challenges faced by the company, and six with the improvement of the RL.

The collection of data using a survey questionnaire has been previously used by many others such as Dudubo Mobolaji (2017); Nurmallasari, et al., (2018), Yu, et al., (2018); Abdullah & Yaakub, (2014); Khor, et al., (2016); Mbovu & Mburu, (2018), Kinobe, et al., 2015).

## **4.8 Procedure of Data Collection**

For this study, primary data was collected from respondents through questionnaires administered by a method known as a drop and pick later, and 70 questionnaires were sent to respondents. On the other hand, secondary data was collected from both published and

unpublished material such as actives, books, thesis, and electronic media among others. This was done to achieve the different objectives of the study.

#### **4.9 Data Analysis Technique**

Data analysis is the process of giving meaning to the collected data. Based on the variables chosen and the questions asked, descriptive and inferential statistics were adopted and analysed in Microsoft Excel. Microsoft Excel was chosen as the data analysis tool for its ability to present data and results good and simple visual form, including charts, tables, graphs, and its simplicity of interpretation. For descriptive analysis, data were summarized using mean and standard deviation. Mand the results were presented in a tabular explanation way. For inferential analysis on the other side, Correlation and multiple regression tools were used.

Below is an explanation of these tools:

##### **4.9.1 Correlation Analysis**

Correlation analyses are used to determine the direction and the strength of the relationship between the dependent and independent variables. The study adopted the Pearson correlation ( $r$ ) where the value of  $r$  will always range between  $-1$  and  $+1$ . A positive value means that there is a positive relationship between variables, and a negative value on the other side means that the relationship between the variables is negative. The significant level with a 95% confidence level and error value of  $0,05$  was set when finding the correlation.

##### **4.9.2 Multiple Linear Regression Analysis**

The study developed a multiple linear regression model to predict the value of the dependent variable using independent variables, multiple regression is also used to determine the relationship between dependents and independent variables and formulate the model. The multiple linear regression adopted the form illustrated in the equation (2):

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \alpha$$

With:

Y: Company's economic performance.

$\beta_0$ : Intercept

$\beta_i$  ( $i = 1 - 3$ ): The coefficients of the estimated regression model;

X1: Remanufacturing practice

X2: Recycling practice

X3: Reuse practice and  $\alpha$ : Error

#### **4.10 Reliability and Validity Test**

To ensure the quality of data that will be collected, and the methods that will be put in place for data collection, the study conducted both Reliability and validity tests on the data collection instrument.

##### **4.10.1 Reliability**

The concept of reliability finds its place where there is stability or consistency of measurement regardless of the conditions under which the measurements are made. Reliability shows the extent to which results of the study can be reproduced in another study, based on reliability the same results should be obtained even though there is a change in conditions. One must have the same results when using a given instrument, reliability is all about the consistency of a measure (Middleton, 2020). If the results found are different, then there is no reliability in the measurement used. Cronbach's Alpha was used to test the reliability and the result is presented in table 3.2 below.

##### **4.10.2 Validity**

Validity is the capacity of an instrument to measure what it was supposed to measure, it is a way through which researchers can know how the instrument fulfils their functions (Peat 2002). Validity is all about accuracy, it refers to how accurately a method can measure a variable (Middleton, 2020). To ensure validity, the questionnaire used for data collection was standardized based on previous studies, it was reviewed by the supervisor and readjusted accordingly based on her advice, and data was collected from knowledgeable people on the subject matter working in different departments.

#### **4.11 Ethical Consideration**

Ethical issues were highly considered, and the rights of respondents were recognized and protected. Before the collection of data, ethical clearance was obtained from the University of Zambia through the ethical body as required by the University regulation. Participants were asked for their authorization before the collection of data. Respondents signed the consent form to show that they agreed to participate in the study voluntarily. Participants were assured that their names would not appear in whichever form in the data, which is why the study referred

to them as pseudonyms. Information collected was kept secretly on a PC (Portable Computer) protected by a password and treated with confidentiality.

#### **4. 12 Summary of the Chapter**

This chapter presented the methodology undertaken in this study to meet the overall objective; it presented the research design chosen, the sampling technique used in the research, the targeted population of the study, the sample size, the sampling technique, the instrument of data collection as well as the data analysis instrument put in place to analyse findings of this research.

## CHAPTER FIVE: RESULTS AND DISCUSSION

### 5.0 Introduction

Chapter four presents the analysis of data that has been collected and discusses the findings on the relationship between the three reverse logistics practices (Remanufacturing, Recycling, and Reuse) and the effect of the RL practices on the economic performance of the company.

### 5.1 Response Rate

Out of the total of 70 questionnaires sent out to different departments at Simba Breweries, 65 questionnaires were collected out of which 5 questionnaires were uncompleted, and the 5 remaining were not given back. Table 5.1 below depicts the overall response rate of the study.

*Table 5.1: Response rate*

Sample	Numbers	Percentage
Number of questionnaires sent out	70	100%
Number of complete questionnaires collected	60	86%
Number of questionnaires non-collected	5	7%
Number of uncompleted questionnaires	5	7%

Source: Research Data

From Table 5.1 above, we can see that there were 60 questionnaires, or 86% that were correctly answered and collected, 5 questionnaires, or 7% not collected, and 7% of the questionnaire remaining was uncompleted. This means that respondents participated actively in the study.

### 5.2 Demographic analysis

#### 5.2.1 Age distribution of respondents

The study investigated the age distribution of respondents to determine the extent to which they impacted the economic performance of the company when implementing RL practices. Results are depicted in Table 4.2 below.

**Table 5.2: Age distribution**

Age in year	Frequency	Percentage
Less than 25	6	10%
26-35	12	20%
36-45	27	45%
46 and above	15	25%
Total	60	100%

Source: Field Data

The result of the study indicates that most respondents were between the age of 36-45 years or 45%, this was followed by respondents having 46 years and above, or 25%, followed by respondents between 26-35 years corresponding to 20%, and respondents with less than 25 years corresponding at 10%. The study revealed that most respondents were adults.

### **5.2.2 Gender of Respondents**

The study investigated the gender composition of respondents, and the results are summarized in Table 4 below.

**Table 5.3: Gender of respondents**

Gender	Frequency	Percentage
Male	45	71.6%
Female	15	28.4%

Total	60	100%
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Source: Field Data

From the results presented in Table 4.3 above, we can see that more male respondents were participating in this study 45 corresponding to 71.6%, than female respondents 115 representing 28.4%.

### 5.2.3 Level of education

The study sought to investigate the level of education of respondents to determine the level to which they were equipped with knowledge and skills related to the field of RL. Table 5.4 below summarizes the findings of the study on the respondents' level of education.

**Table 2.4: Levels of education**

Level of education	Frequency	Percentage
State Diploma	10	16.7%
Degree	48	80%
Masters	2	3.3%
PHD	0	0%
Total	60	100%

Source: Field Data

The findings of the study indicated that many respondents attended a degree as their highest academic qualification, 48 respondents in total corresponding to 80% of the respondents' rate had a degree, this was followed by respondents who had a state diploma as their highest qualification, 10 respondents corresponding at 16.7% add a state diploma, and finally, respondents who attended a master's degree were 2 corresponding to 3.3%. No respondent owned a Ph.D.

### 5.2.4 Respondent's Current Position in the Company

The study investigated the positions occupied by respondents to evaluate their level of involvement and knowledge in the subject of RL and its influence on the company's economic performance. The results are presented in Table 5.5 below.

**Table 5.5: Respondent's current position in the company**

Respondent's position	Frequency	Percentage
Director	3	5%
Managers	7	11.7%
Sub managers	20	33.3%
Signor team members	30	50%
Total	60	100%

Source: Field Data

The results of the study indicated that most respondents were signor members of departments corresponding to 50%, this was followed by Sub managers who represented 33.3%, Managers represented 11.7%, and directors representing 5%. This demonstrated that respondents were placed in a good position to provide information related to the subject matter.

### 5.2.5 Current Department in the Company

The study sought to find the department in which respondents are working and the extent to which they are skilled and equipped in the file of reverse logistics. Results are summarized in Table 5.6 below.

**Table 5.6: Current department of respondents**

Current department	Frequency	Percentage
Production	10	16.7%
Packaging	10	16.7%
Logistics	10	16.7%
Procurement	10	16.7%
Finance	5	8.3%
Stores	5	8.3%
Conditioning	10	16.7%
<b>Total</b>	<b>60</b>	<b>100%</b>

Source: Field Data

From Table 5.6 above the results of the study indicated that respondents were selected fairly, they were selected from the following departments: Production, Packaging, Logistics, Procurement, and Conditioning with 10 respondents corresponding at 16.7% each, and Finance and Stores 8.3%. The results indicated that all the departments selected participated actively in the study.

### 5.3 Descriptive Analysis

To evaluate the extent to which reverse logistics practices are implemented in the performance of the company, descriptive statistics were undertaken, and results are presented in the following tables.

#### 5.3.1 Reverse Logistics Practices

The study sought to establish the extent to which RL practices were implemented by the company, therefore respondents were asked to use a 5-point Likert scale where 1 represented “no extent at all”, 2 “small extent”, three, 3 “moderate extent”, 4 “large extent”, and 5 “very large extent” to indicate the extent to which the RL practices are implemented.

##### 5.3.1.1 Remanufacturing Practice

Results found on the implementation of the Remanufacturing practice are presented in Table 5.7 below.

**Table 5.7: Remanufacturing practice**

Statement on Remanufacturing Activities	Mean	SD
SIMBA Breweries has a return system for used bottles for remanufacturing	1	0
There are set qualities for the collection of used glass bottles for remanufacturing at SIMBA Breweries	1	0
Glass bottles used for packaging are designed for remanufacturing	1	0
SIMBA breweries implement remanufacturing to comply with regulations	1	0
Remanufacturing activities bring about economic benefits for the company	1	0
Grand mean	1	0

Source: Research data

From the results presented in Table 5.7 above, the study showed that respondents disagreed on the implementation of remanufacturing activities in their company as the overall mean found was 1. Respondents indicated that the company has no return system for remanufacturing as the mean found was 1. They stated that the company was not implementing remanufacturing to comply with regulations as the mean found was 1. Glass bottles used for packaging are not designed for remanufacturing as the mean found was 1. Respondents indicated that there was no set of qualities for the collection of used glass bottles for remanufacturing as the mean was 1. All respondents disagreed with the statement that said remanufacturing activities bring about the economic performance of the company as the mean was 1. The overall standard deviation was 0, which means that there was no variation in responses.

### 5.3.1.2 Recycling Practice

The study sought to determine the extent to which Recycling practice is implemented at SIMBA Breweries. Results are presented in Table 5.8 below.

**Table 5.8: Recycling practice**

Statement on Recycling Activities	Mean	SD
SIMBA breweries have an appropriate system for recycling	1	0
Returned glass bottles are recycled at SIMBA breweries	1	0
Customers are aware of the recycling of glass bottles by the company	1	0
Recycling activities are implemented to comply with regulations	1	0
Recycling activities increase the profitability of the company	1	0
Grand mean	1	0

Source: Research data

From the results presented in Table 5.8 above, respondents indicated that the company didn't have an appropriate system for recycling as the mean was 1 with a standard deviation of 0. All respondents revealed that returned glass bottles were not recycled as the mean was 1. Results also indicated that customers were not aware of the recycling of glass bottles by the company as the mean was 1. They disagreed with the statement that said recycling was implemented to

comply with regulations as the mean is 1, Respondent indicated that recycling activities were not increasing the profitability of the company as the mean is 1. The overall mean found was 1, and all respondents stated that the company was not implementing recycling activities in the operation of its business. The overall standard deviation was 0, which means that there was no variation in responses.

### 5.3.1.3 Reuse practice

The study sought to establish the extent to which the Reuse practice was implemented by the company. The results are depicted in Table 5.9 below.

**Table 5.9: Reuse practice**

Statement on Reuse activities	Mean	SD
SIMBA breweries have a return system for used bottles for reuse	3.5	0.624
There are set qualities for the collection of used glass bottles	3.71	0.613
Glass bottles used for packaging are designed for reuse activities	3.56	0.767
SIMBA breweries implement reuse activities to comply with regulations.	3.6	0.717
Reuse activities bring about economic benefits for the company	3.63	0.735
Grand mean	3.60	0.1331

Source: Research data

According to the results found in Table 5.9 above, respondents agreed with the statement that SIMBA Breweries had a return system for used glass bottles for reuse as the mean was 3.5. They agreed that there was a set of qualities for the collection of used glass bottles as the mean was 3.71. Most respondents indicated that glass bottles used for packaging were designed for reuse activities as the mean was 3.56. They also indicated that SIMBA Breweries implemented reuse activities to comply with regulations as the mean found was 3.6. They indicated that reuse activities brought about economic benefits for the company as the mean found was 3.63. As the overall mean found was 3.60, this indicated that respondents agree that the company implements reuse activities for glass bottles in its business. The overall standard deviation was

less than 1, which means that there was no significant variation in responses given by respondents.

### 5.3.2 Reverse Logistics Practices and Company Performance

The study sought to investigate the extent to which RL practices implemented by SIMBA Breweries had an impact on the economic performance of the company using the 5-point Likert scale. The results are shown in Table 5.10 below.

**Table 5.10: Reverse logistics practices and the company’s performance**

RL practices and the company’s economic performance	Mean	SD
Reverse logistics activities increase the profitability of the company	3.56	0.62
RL activities increase customer loyalty	3.76	0.59
RL activities of glass bottles decrease the cost of production	3.66	0.70
RL activities bring about an increase in market share	3.7	0.64
RL decreases the price of products	3.75	0.65
Grand mean	3.69	0.051

Source: Research data

Results in Table 5.10 above showed that RL activities increased customer loyalty with a mean of 3.7 and a standard deviation of 0.59. Respondents indicated that RL activities decreased the prices of the company’s products as the mean was 3.75 and a standard deviation of 0.65. They also indicated that RL practices decreased the costs of production as the mean was 3.66 and a standard deviation of 0.70. Most of them revealed that RL activities increased the profitability of the company as the mean was 3.56 and a standard deviation of 0.62. The overall mean found was 3.69 and a standard deviation of 0.051 meaning that respondents agreed that RL practices impacted positively the company performance.

### 5.3.3 Challenges in Reverse Logistics

The study investigated the challenges faced by the company, and respondents were requested to indicate the extent to which the company was facing challenges related to cost, management, information, product return, and problems in the Supply Chain and its partners.

#### 5.3.3.1 Cost-related challenge

The study identified the cost-related challenge, and the results are shown in Table 5.11 below.

**Table 5.11: Cost-related challenges**

Cost-related problem	Mean	SD
Lack of awareness of the hidden cost of RL	3.8	0.8791
Difficulties in identifying costs related to RL	4	0.7811
High cost related to the implementation of RL	4.483	0.7241
Grand mean	4.0944	0.0781

Source: Research data

Table 5.11 above depicts the results of the cost-related challenges that the company was facing when dealing with the RL system. The results indicated that the high cost related to the implementation of RL was the main challenge with a mean value of 4.4833 and a standard deviation of 0.724. Followed by difficulties in identifying costs related to the RL system with a mean value of 4 and a standard deviation of 0.781. Lack of awareness of the hidden cost of the RL system is the last one with a mean of 3.8 and a mean value of 0.8791.

#### 5.3.3.2 Management-Related Challenges

The study identified the management-related challenges, results are shown in Table 5.12 below.

**Table 5.12: Management-related challenge**

Management related challenge	Mean	SD
Lack of top management awareness of the need for RL practices	2.9	0.543

Lack of top management commitment to RL	3.5	0.8130
Lack of government implication in green practices	4.4	0.8067
Grand mean	3.6	0.154

Source: Research data

Table 5.12 above depicts the results of the management-related challenge. Lack of government implication in green practices was found to be the main management-related challenge with a mean of 4.4 and a standard deviation of 0.8067, the lack of top management commitment to the RL system was the following with a mean of 3.5 and a standard deviation of 0.8130, and the lack of the top management awareness of the need for RL practices was the last with a mean of 2.9 and a standard deviation of 0.543. Respondents agreed with the two challenges, however, they disagreed with the last one and the mean was less than 3.

### 5.3.3.3 Product Return Challenges

The study sought to identify the product-related challenges that SIMBA breweries are facing when implementing RL practices. Results are shown in Table 5.13 below.

**Table 5.13: Product return challenges**

Product return challenges	Mean	SD
Low level of expertise in the process	3.6	0.6689
A secondary usage of glass bottles by clients	3.9	0.9793
Defective glass bottles return	3.3	0.6457
Grand Mean	3.6	0.1862

Source: Research data

The results in Table 5.13 showed that secondary usage of glass bottles was the main retained challenge with a mean of 3.9 and a standard deviation of 0.9793, low level of expertise in the process was the second with a mean of 3.6 and a standard deviation of 0.6689. Defective glass bottle return was the last one with a mean of 3.3 and a standard deviation of 0.6457.

#### **5.3.3.4 Information-related challenge**

The study sought to identify the information-related challenges that SIMBA Breweries is facing when implementing RL practices. Results are shown in Table 5.14 below.

**Table 5.14: Information-related challenges**

Information related challenges	Mean	SD
Lack of communication concerning RL practices	3.5	0.504
Lack of training in RL practices	3.6	0.6689
Lack of implementation of IT solutions	3.8	0.8791
Grand mean	3.6333	0.1879

Source: Research data

Table 5.14 contains the results of the information-related challenges of the RL system implemented at SIMBA Breweries. Lack of implementation of IT solutions was found to be the main information-related problem with a mean of 3.8 and a standard deviation of 0.8791, Lack of training in RL practices was the second with a mean of 3.6 and a standard deviation of 0.6689. Lack of communication concerning RL practices was found to be the last with a mean value of 3.5 and a standard deviation of 0.504.

### **5.3.3.5 The challenges in the supply chain and its partners**

The research sought to identify challenges in the SC of SIMBA breweries and its. Results are shown in Table 5.15 below.

**Table 5.15: Challenges in the SC and its partners**

The challenge in the Supply Chain and its partners	Mean	SD
Lack of collaboration with partners in the SC	4.35	0.7552
Lack of a clear policy and procedure for product return	3.8	0.6050
Lack of incentive in the product return	4.1	0.9513
Grand mean	4.0833	0.1736

Source: Research data

Table 5.15 shows the results of challenges in the SC and its partners. Lack of collaboration with partners in the SC was found to be the main problem in the SC of SIMBA breweries with

a mean of 4.35 and a standard deviation of 0.7552, Lack of incentive in product return was the second with a mean of 4.1 and a standard deviation of 0.9513. The lack of a clear policy and procedure for product return was the last one with a mean of 3.8 and a standard deviation of 0.60.

### 5.3.4 Strategies to enhance RL implementation

Table 5.16 below presents the results of strategies that can be put in place to enhance RL implementation at SIMBA Breweries.

**Table 5.16: Strategies to Enhance RL Implementation**

Improvement of the RL system at SIMBA breweries	Mean	SD
Hire a third-party company that will oversee the RL	4.1	0.9513
Raise awareness of clients on the importance of retaining glass bottles.	4	0.7811
Utilize the full capacity of material and human resource	4.3	0.7876
Put in place strategies to implement effectively and efficiently RL	4.4	0.8067
Train employees on RL practices	4.7	0.4621
Involve all the partners of the Supply Chain in the RL system	4.5	0.5042
Grand mean	4.3	0.1909

Source: Research Data

Table 5.16 presented the results to enhance RL implementation at SIMBA Breweries, respondents indicated that the company needed to train employees on RL practices as the main improvement as the mean was 4.7 and a standard deviation of 0.4621, followed by Involving all the partners of the Supply Chain in the RL system as it had a mean of 4.5 and a standard deviation of 0.5042. To put in place strategies to implement effectively and efficiently RL was the next one with a mean of 4.4 and a standard deviation of 0.806u. The option to utilize the full capacity of material and human resources was the next with a mean of 4.3 and a standard deviation of 0.7876. Hire an awareness company that will oversee the RL had a mean of 4.1 and a standard deviation of 0.9513, and to raise awareness of clients on the importance of retaining glass bottles the last one had a mean of 4 and a standard deviation of 0.7811.

**5.4 Correlation analysis**

To evaluate the correlation between the RL system implemented at SIMBA Breweries and its economic performance, the study requested respondents to score for indicators of economic performance and the extent of adoption of the three reverse logistics practices (reuse, recycling, remanufacturing).

Pearson correlation analysis was the tool used to meet the objectives of the study. The Pearson correlation analysis is the most used technic to measure directions and strength that exist between variables. When applying the Pearson correlation, the value will always range from +1 to -1. If the value of found is +1, it means that there is a positive relationship between variables. However, if the value found is -1, it indicates that there is a negative relationship between variables, and when the value of r found is 0, it means that there is no relationship between variables. The result provided in Table 5.17 below is the interpretation guide that will be used to interpret the findings of the correlation analysis of this study.

**Table 5.17: Correlation interpretation guide**

Correlation value in the range	Interpretation
0	No relationship
0.10 - 0.29	Small correlation
0.3 – 0.49	Medium correlation
0.5 – 1	Strong correlation

Source: Stastutor.ac.uk, (2015)

**5.4.1 Person Correlation**

To determine the strength and orientation (sense) between the dependent and independent variables, the study carried out correlation analysis in Microsoft Excel to find the Pearson correlation. The results of the Pearson analysis of this study were indicated in Table 1 below, and they were interpreted based on the result of Table 5.17 above.

**Table 5.18: Person correlation**

	Remanufacturing	Recycling	Reuse	Company's performance
Remanufacturing	1			
Recycling		1		
Reuse	0	0	1	
Company's performance	0	0	0.91	1

Source: Excel output

From the results of Table 5.17 of the Pearson correlation above and based on the result of Table 4.17, we can see that there was only one independent variable that had a relationship with the dependent variable. The results of the Pearson correlation revealed that there was a positive and strong relationship between reuse practice and the company's performance as the value found was 0.91. The other two independent variables have absolutely no relationship with the company's performance.

## **5.4.2 Regression Analysis**

### **5.4.2.1 Relationship between RL practices and Company performance**

To determine the relationship between the three reverse logistics practices and the economic performance of the company, the researcher made use of regression analysis tools using Excel to build a mathematical model representing the relationships between dependent and independent variables. The study adopted the following model:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \alpha \text{ With:}$$

Y: Company's economic performance.

$\beta_0$ : Intercept

$\beta_i$  ( $i = 1 - 3$ ): The coefficients of the estimated regression model;

$X_1$ : Remanufacturing practice

X2: Recycling practice

X3: Reuse practice  $\alpha$ :

Error

Table 5.19 below depicts the result of the test of the coefficient.

#### 5.4.2.2 Test of coefficient

**Table 5.19: Test of Coefficient**

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	3.34	0.70	4.76	0.00
Remanufacturing	0	0	0	0
Recycling	0	0	0	0
Reuse	0.38	0.19	1.98	0.01

Source: Excel output

Now the equation of the model can be written as follows:

$$Y = 3.34 + 0 X1 + 0 X2 + 0.38 X3 + \alpha$$

The different values of the coefficient of determination indicated the intensity or strength of the effect that each independent variable has on the dependent variable. The intercept  $\beta_0$  is the point where the Y axis is crossed by the regression line.

Results presented in Table 5.19 above indicated that the value of  $\beta_0$  equals 3.34, this revealed that when all the independent variables are held constant, the expected value of the dependent variable will be at 3.34. However, when holding all variables constant and keeping X1, there won't be any change in the expected value of the dependent variable. This is the same thing that happened when we held all other variables constant and considered Remanufacturing practice since the value of its coefficient is 0. However, when all other factors were held constant and reuse was considered, a unit increase in X3 resulted in an increase of 0.38 in the economic benefit of the company. From the table above, we can see that the Reuse practice had a p-value equal to 0.05. This result indicated that the firm should focus more on the Reuse practice to improve its economic performance.

The study used Microsoft Excel to find regression analysis, table 5.20 below indicates the findings of the coefficient of determination.



### 5.4.2.3 Coefficient of Determination

**Table 5.20: Summary Output/ Coefficient of Determination**

Regression Statistics	
Multiple R	0.42
R Square	0.17
Adjusted R Square	0.13
Standard Error	0.57
Observations	60

Source: Excel output

The model summary presented in Table 5.20 above indicated that multiple regression coefficient R was 0.42 revealing that there was a median correlation between the dependent variable (Company's financial performance) and the independent variables. The value of R squared, which was equal to 0.17 in the table implied that the independent variables accounted for a 17% variation in the performance of the company. This meant that regression translated into a small change in the economic performance of the company. Table 5.21 below was the last table found in the regression analysis conducted in Excel.

**Table 5.21: F test for the full model ANOVA**

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	3.86	1.29	3.93	0.01
Residual	56	18.32	0.33		
Total	59	22.18			

Source: Excel out

The F-test was conducted to predict the overall validity of the model. Through this test, we can see if there was a linear relationship between the independent variables and the dependent variable and test the validity of the model. From Table 5.21 above, the total variance F was 3.93, and there was a significant goodness of fit between variables as the critical value found in the statistic table with F (3, 56) was 2.77, this indicated that the model considered between

variables was a good fit for the data. The P-value also indicated that there was significance as the value p found was 0.01 less than the significance level of 5%. This indicated that the regression model was fit to predict the value of the dependent variable.

Both null and alternative hypotheses were predefined for each RL practice. The reverse logistics practice considered doesn't have effects on the performance of the company and the reverse logistics considered has effects on the performance of the company respectively. From Table 5.19 above the P-value was represented by the Significance F and was equal to 0.01 and less than 0.05. Thus, at the 5% significance, the null hypothesis was rejected, and the alternative hypothesis was considered as there is at least one independent variable that affected the performance of the company. This proved that the model was fit and considered valid.

From the results of the test of coefficients indicated in Table 4.19 above, Remanufacturing and Recycling practices had a P-value of 0 which means that the two variables did not influence the performance of the company, and Reuse practice had a P-value  $< 0.05$  (0.01) meaning that it was significant. The study found that there was only one independent variable having a P value less than 0.05, and that was considered to predict the economic performance of the company. One unit increase in the Reuse practice resulted in an increase of 0.38 in the economic performance of the company. Table 5.22 presents the hypothesis testing summary.

**Table 5.22: Hypothesis Testing Summary**

Hypothesis number	P-Value	Accept/Fail to accept
H0 <sub>1</sub>	0	Accept
H0 <sub>2</sub>	0	Accept
H0 <sub>3</sub>	0,01	Fail to accept

From the ANOVA Table 5.21, the P value for remanufacturing and recycling was 0, thus the study accepts the null hypothesis. The P value found for Reuse was less than the predefined level of significance ( $p < 0.05$ ), it was 0,01 thus the study failed to accept the null hypothesis.

## **5.5 Discussion of the results**

### **5.5.1 Remanufacturing**

From the Pearson correlation coefficient presented in Table 5.18, the study found that there was not any relationship between the remanufacturing practice and the economic performance of the company as the value found was 0. On the other side, from the regression model, we can see that when all the other factors are kept constant and only remanufacturing is considered, there will be no changes in the economic performance dependent variable as the coefficient of determination found was 0. Remanufacturing practice doesn't bring any form of economic benefits to the performance of the company.

The study conducted by Muttimos (2014), Ding, et al.(2020), and Jiang, et al. (2019) indicated that remanufacturing practices implemented by manufacturing companies have a positive and strong relationship with the performance of companies, this finding was supported by the study conducted by Alloys (2019). The result of the study implies that the implementation of the remanufacturing practice in the performance of SIMBA Breweries will increase the economic performance of the company.

### **5.5.2 Recycling**

From the Pearson correlation coefficient depicted in Table 5.18, the study found that there was no form of relationship between the Recycling reverse logistics practice and the economic performance of the company as the Pearson correlation found was 0. From the regression mode, we can see that when we keep all the other variables constant and consider only the recycling practice. There won't be any change in the predicted value of the economic performance dependent variable as the coefficient of determination found was 0.

This indicated that the Recycling RL practice does not have an economic benefit in the performance of the company. However, the studies conducted by Alloys, (2019) and Guta, (2016) indicated that recycling RL practice has a strong and positive relationship with the economic performance of the company. Mandoto (2015) found the implementation of the recycling to have a positive effect on the performance of the company. George, et al. (2015), Kamanga, et al. (2022), and Odia (2022) also proved that reuse has positive effect on the performance of the company also argued that recycling has a positive effect on the performance the company. Thus, implementing the recycling practice in the performance of SIMBA Breweries will certainly affect positively the performance of the company.

### **5.5.3 Reuse**

From the Pearson correlation coefficient indicated in Table 19, the study found that there was a positive and significant correlation between the Reuse Reverse Logistics practice and the economic performance of the company with a correlation coefficient of 0.91. This indicated that whenever there is a change in a unit of the reuse practice, there will be a strong and positive effect on the economic performance of the company. From the regression mode, an increase in a unit of recycling practice by holding all other factors constant will lead to a 0.38 increase in the economic performance of the company which is a 38 % variance. The findings of the study were supported by the studies conducted by Muttimos (2014), Guta (2016), and Lilian (2015), found that reuse practice has a positive and significant impact on the economic performance of the company. Kaya, et al. (2021) argued that reuse practice is a competitive advantage in the performance of a company. Hazen et al. (2011), Dacha, et al (2023); Odia (2022), and Sakraan, et al. (2019) also concluded that reuse practice effect positively the performance of a company. A change of unit in the reuse RL practice will automatically affect the performance of the company.

### **5.5.4 Reverse logistics and company performance**

Results in Table 5.10 on the effect of reverse logistics practices on the company performance shows that RL activities have a direct effect on the performance of the company. The RL practices decrease the prices of the company's products as the mean was 3.75 and a standard deviation of 0.65. Result also indicated that RL practices decrease the costs of production as the mean was 3.66 and a standard deviation of 0.70. The findings reveal that RL activities increase the profitability of the company as the mean was 3.56 and a standard deviation of 0.62. From the analysis of data from respondent, the results indicates that the reverse logistics practices have a strong and positive effects on the performance of the company as the overall mean found was 3.69 and a standard deviation of 0.051.

The results conform with the results of the study conducted by Guta (2016) which indicated that reverse logistics practices have a significant correlation with the company performance of the company. Mandoto (2015) also found that reverse logistics practices have positive impact on the performance of a company. In addition, the findings of the study are supported by the results of the study conducted by Mogoka (2020). The adoption of the reverse logistic practices has a strong and positive effect on the company performance (Waqas, et al., 2018). However, the study conducted by (Ye, et al., 2013) found that the implementation of reverse logistics

practices can also have negative impact on the performance of a company. Mamu, et al. (2024) also found the reverse logistics practices have a significant impact on the performance of manufacturing companies.

## **5.6 Summary**

Chapter 5 presented the results of the study in the forms of means, standard deviations, and tables, and discussed the results of this study. The chapter focused attention on the extent to which Simba Breweries adopted the three RL practices namely Remanufacturing, Recycling, and Reuse. It identified the challenges faced by the company when implementing the RL practices, and the areas of improvement, and evaluated the economic impact that the RL practices have on the economic performance of the performance.

## **CHAPTER SIX: CONCLUSION AND RECOMMENDATION**

### **6.0 Introduction**

This chapter intends to summarize the study conducted through the literature review and the questionnaire survey in response to the main objective and the sub-objectives set for this research. The main objective of this study is to evaluate the effects of the Reverse Logistics system on the performance of SIMBA Breweries. Data analysis was carried out in Microsoft Excel, and the presentation of this chapter is as follows. Section 1 presents the conclusion regarding the objectives of the study, the extent of adoption of the Reverse Logistics practices, the relationship between the RL practices and the company's performance, the challenges in the implementation of the RL system, and the strategies to enhance that system. Section 2 presents the contribution of the study, and section 3 on the other hand presents the recommendations. Section 4 presents the perspectives for future studies and section 4 presents the limitation of the study.

### **6.1 Conclusion**

This section is a conclusion of the study based on the objectives and results of the analysis.

#### **6.1.1 Conclusion about the research objectives**

- To determine the impact of Remanufacturing practices on the performance of the company.

The literature review revealed that Remanufacturing Reverse Logistics practice is a competitive advantage for companies that are implementing it in their businesses. When effectively and efficiently implemented Remanufacturing can affect positively the economic performance of a manufacturing company. The literature also points out that practices of RL such as Remanufacturing are more implemented in developed countries than developing countries. Companies in developing nations are still struggling to implement this practice in their businesses.

The findings of the study showed that there was not an impact coming from the Remanufacturing practice in the performance of the company. Respondents disagreed on the implementation of remanufacturing activities in their company as the overall mean found was 1. They indicated that the company had no Remanufacturing practices in the operation of its businesses and

indicated that it did not bring about the economic performance of the company as the grand mean was 1.

- To measure the of the Recycling practice on the performance of the company.

Recycling RL practice is a strategic tool that is used by companies in developed countries to compete and comply with regulations as reviewed from the literature. Recycling activities are beneficial not only to the economic performance of the company but also to the protection of the environment and the consumers at the same moment. It brings about both direct and indirect benefits to the company by cutting the cost of production, increasing profit, and enhancing the reputation of the company.

The results of the study indicated that the company didn't have an appropriate RL system for recycling as the mean was 1 with a standard deviation of 0. All respondents stated that the company was not implementing recycling activities in the operation of its business as the grand mean found was 1 and the standard deviation 0. They also indicated that recycling activities were not increasing the profitability of the company as the mean is 1.

- To evaluate the effects of Reuse practice on the performance of the company.

From the literature review, an effective and efficient implementation of the Reuse RL practice in the performance of the company has a strong and positive effect on the performance of the company, it brings economic profits, as resources, and protects the environment we live in. However, this practice is still not implemented effectively and efficiently by several companies in developing countries due to several barriers such as infrastructure, training of employees, cost of this system, and IT among others.

The results reveal that the company implements Reuse activities for glass bottles in its business, and the Reuse RL practice implemented by SIMBA Breweries brings about economic benefits for the company as the mean found was 3.63. The results also point out that glass bottles used for packaging by the company were designed for reuse activities as the mean was 3.56. SIMBA Breweries implements Reuse activities to comply with regulations and save resources as the mean found was 3.6. The Reuse RL practice implemented by the company has been evaluated to reduce the cost of production by 65% and increase the profitability of the company by 60%.

### **6.1.2 Extent of Adoption of the Reverse Logistics**

The study investigated the extent to which the three Reverse Logistics practices are implemented at SIMBA Breweries based on the level of adoption of the elements of each practice using a five-point Likert scale. The results revealed that out of the three reverse logistics practices considered, only the Reuse practice was implemented in the performance of the company with an overall mean of 3.60 and a standard deviation of 0.113. The other two RL practices, Recycling and Remanufacturing were found to not be implemented by the company with their overall mean of 1 and a standard deviation of 0.

### **6.1.3 Relationship between RL practices and the company's economic performance**

The study performed the Pearson correlation analysis in Microsoft Excel to establish the relationship between the three independent variables (Remanufacturing, Recycling, and Reuse) and the dependent variable (economic performance). The study demonstrated that there was a strong and positive correlation between Reuse and the economic benefit of the company. A unit increase in the Reuse practice was found to translate into an increase of 0.39 in the predicted dependent variable. On the other hand, Remanufacturing and Recycling were found to not have any correlation with the dependent variable. This means that these two RL practices were not implemented by the company with their means of 1 and standard deviation of 0.

### **6.1.4 Challenges in the Implementation of the Reverse Logistics**

Concerning the cost-related challenges faced by the company in the implementation of the RL system, the study found that the high cost related to the implementation of this system was the biggest challenge that the company was facing with a mean of 4.483. Another main challenge found was the difficulty of identifying costs related to the implementation of the RL system with a mean of 4. The lack of awareness of the hidden cost of RL was also found to be among the main challenges that the company was facing when implementing the system with a mean of 3.8.

Regarding the management-related challenges, the result of the study revealed that the lack of government implication in green practices was the biggest challenge that the company was facing with a mean of 4.4. The lack of top management commitment to the implementation of the RL system was also found to be a major challenge with a mean of 3.5. The lack of top management awareness of the need for RL practices was also indicated to be a main challenge with a mean of 2.9.

The results indicated that the secondary usage of glass bottles by clients was the biggest challenge related to product return of the company with a mean of 3.9. The low level of expertise in the process of RL was the following with a mean of 3.6. Defective glass bottles through the RL system were also a big challenge faced by the company with a mean of 3.3.

In terms of Information-related challenges, the study indicated that the lack of the implementation of IT solutions was a major challenge with a mean of 3.8. The lack of training in the implementation of RL practices was also revealed to be a major challenge with a mean of 3.6. The lack of communication concerning RL practices was also identified to be a major challenge for the company with a mean of 3.5.

Talking about challenges in the Supply Chain of the company and its partners, the study indicated that the lack of collaboration with partners in the Supply Chain was the main challenge that the company with a mean of 4.35. The lack of incentive for product return was also found to be a major challenge for the company with a mean of 4.1. Finally, the lack of clear policies and procedures for product returns pointed out to be a big challenge for the company with a mean of 3.8.

### **6.1.5 Strategies to enhance RL implementation**

The finding of the study indicated that SIMBA Breweries needed to work on and improve its Reverse Logistics system in place to take advantage of its outcome. The results indicated that the company needs first to train its employees in the implementation of RL practices as the mean was 4.7. Followed by involving all the partners of the Supply Chain in the implementation of the RL system with a mean of 4.5. The company needs to put in place strategies to implement RL practices effectively and efficiently was the next with a mean of 4.4. It needs to utilize the full capacity of material and human resources with a mean of 4.3. The results also indicated that the company could hire a third-party company that will oversee the RL of glass bottles with a mean of 4.1; and lastly raise awareness of clients on the importance of returning glass bottles after consuming products with a mean of 4.

## **6.2 Conclusion**

The main objective of this study was to evaluate the effect of the Reverse Logistics system on the economic performance of SIMBA Breweries. The study concluded that the company has a Reverse Logistics system in place which has only one RL practice implemented out of the three

practices considered. Reuse practices have a positive and strong correlation with the economic performance of the company, a unit increase in the reuse practice increases the economic performance of the company. The Reuse RL practice implemented by SIMBA Breweries decreases the overall cost of production for the company and increases its profitability. Remanufacturing and Recycling practices on the other hand do not have any correlation with the performance of the company as they are not implemented, and thus do not influence the economic performance of the company.

The high cost related to the implementation of the RL system, the difficulty in identifying costs related to the implementation of the RL, the lack of awareness of the hidden cost of RL, the lack of government implication in green practices, the lack of top management commitment to the implementation of the RL system, the lack of top management awareness of the need for RL practices, the secondary usage of glass bottles, the low level of expertise in the process of RL system implementation, the lack of the implementation of IT solutions, the lack of training in the implementation of RL practices, the lack of communication concerning RL, the lack of incentive in product return, and the lack of clear policies and procedures for products are the main challenges that the company is facing.

### **6.3 Recommendation**

The study revealed that out of the three RL practices considered in this study, only the Reuse practice had effects on the performance of the company by having a strong and positive correlation with the dependent variable, Recycling and Remanufacturing were not implemented by the company. Based on the findings of the study and the literature review, the following recommendations are made:

- The top management of the company should consider the implementation of the RL practices as a competitive advantage and define clear and strong policies and procedures that will be followed.
- As the Reuse RL practice was found to have a positive impact on the economic performance of the company, it should be constantly and periodically evaluated to know about its evolution and take the best out of its implementation in the company.
- SIMBA Breweries should include the RL system in its strategic plan and include the two other practices, Recycling and Remanufacturing, to maximize the economic benefits of this system on its economic performance.

- SIMBA Breweries should involve all the plays of its supply chain in the implementation of the RL system. Every single participant should be educated on their role to play in this system.
- The company needs to invest in new and appropriate Information and Technology to make the adoption of the RL system more effective and efficient.
- Based on the findings of the study, the company needs to train and equip employees with sufficient and appropriate knowledge of the implementation of the Reverse Logistics system. This will allow balance and uniformity among members of staff.

#### **6.4 Suggestions for Future Studies**

The following studies are suggested for future research.

- Including other independent and dependent variables to determine the global effects of the RL practices on the performance of the company as the study found that there is only one single independent variable affecting one single dependent variable.
- Identifying barriers and drivers of Reverse Logistics in RDC in general and at SIMBA Breweries in particular. This will give a ground of understanding the raison why other practices of the RL such as recycling and remanufacturing are not implemented,
- Investigating more on the expected benefits of the implementation of the recycling and the remanufacturing practices in the supply chain of the company. This will not only fill the gap in the effects that the RL practices have on the performance of the company, but also make the system complete and dynamic.
- Evaluating the effects of Reverse Logistics practices on other indicator of company performance such as Social, and Environmental. From the finding of the study, the focus is more on the economic indicator of the performance of the company which is not enough in the evaluation of the effects of the reverse logistics practices on the company performance.
- Analyzing the effects of the Reverse logistics practices on the performance of the Brewery industry of Lubumbashi. The study was only on one company in this industry.
- Fether studies can include all the Breweries companies of the country and evaluate the effect of the RL practices on their performances.

## **6.5 Limitations of the Study**

The study was only limited to one company, SIMBA Breweries, due to its accessibility and flexibility. It was conducted in only one town of the country, Lubumbashi one of the big towns of the Republic Democratic of Congo. The reverse logistics system is made of several practices, but this study only considered 3 practices, Reuse, Remanufacturing, and Recycling. Reverse logistics practices have effects on the performance of the company measured in terms of environment, economic and social but the study only focused on one indicators of the performance. Data was collected only from the department and people who were more knowledgeable in the Reverse Logistics implemented by the company, thus the Sample size was limited to 70. The inclusion of more people and departments in the sample may improve the quality of the results.

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## APPENDICES

### 1. Researcher's Introductory Cover Letter

  
**THE UNIVERSITY OF ZAMBIA**

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Graduate School of Business  
P.O. Box 32379  
Lusaka, Zambia

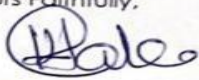
20<sup>th</sup> January, 2022

**TO WHOM IT MAY CONCERN**  
**RE: INTRODUCTORY LETTER FOR ALEX LUMBA KISUMPA**

This letter serves to introduce Alex Lumba Kisumpa a bonafide student in our Master of Science (MSc) Operations, Projects and Supply Chain Management programme at the University of Zambia – Graduate School of Business (UNZA–GSB). In partial fulfilment of their Postgraduate studies, each student is required to undertake a dissertation (research) in the final year of study.


May you kindly assist the student in granting permission for him to collect data from your Institution. The research is purely for academic purposes and the student is ethically bound to treat the provided information with strict confidentiality.

Should you have any queries or would like further information about the student, please contact the UNZA–GSB on the above e-mail address or telephone numbers.

Yours Faithfully,  


**Dr Lubinda Haabazoka**  
**DIRECTOR – GRADUATE SCHOOL OF BUSINESS**

cc    Acting Associate Director – Graduate School of Business  
      Acting Assistant Registrar - Graduate School of Business



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## 2. Survey Questionnaire

Dear Sir/Madam.

I am a master's student at the University of Zambia in the Department of Operations, Projects, and Supply Chain Management. I am currently in my final stage where I am asked to conduct research in partial fulfilment of obtaining a Master of Science. My research is entitled: "Evaluation of the Economic Benefits of Reverse Logistics on the Performance of the Company, a case study of the SIMBA Brewery". You have been sampled to complete this questionnaire due to your position and knowledge about the Reverse Logistics of glass bottles. Since the information collected will only be used for academic purposes, rest assured that it will be treated with a higher level of confidentiality. This shouldn't take too much of your time. Please do not provide your name or any other personal information to keep this process anonymous.

If you have any questions or comments regarding this study, please do not hesitate to contact me at +2602244357 or email me at [lumbakis.al@gmail.com](mailto:lumbakis.al@gmail.com)

Yours faithfully,

LUMBA KISUMPA Alex

**Section A: General information**

1. Please check the box to indicate your gender.

Male

Female

2. Please check the box to indicate your age.

Under 25  26 – 35 Years  36-45 Years   
 46 years and over

3. Please check the box to indicate your highest level of education.

State Diploma  Undergraduate   
 Master   
 PhD

4. In which department/area do you work?

**Section B: Reverse Logistics Practices**

To what extent does SIMBA Breweries implement the following RL practices in the operation of its business?

Using the five Likert scales provided below, kindly tick appropriately against each RL option; note that the scales stand for the following: 1 No Extent at All; 2 Very small Extent; 3 Small Extent; 4 Average Extent; 5 Large Extent

No	Remanufacturing Activities	No Extent	Very small	Small	Average Extent	Large Extent
		1	2	3	4	5
1	Remanufacturing					
2	Reuse					
3	Recycling					

**Section C: Reverse Logistics and the Economic Effects**

1. Remanufacturing activities for economic benefits:

- Does Remanufacturing contribute to the economic benefits of SIMBA Breweries?

YES

NO

- If yes, to what extent do you agree to the following statements regarding the economic effects of remanufacturing activities? Kindly indicate on a scale of 1(one) to 5 (five) by ticking the appropriate box (√).

No	Remanufacturing Activities	No Extent	Very small	Small	Average Extent	Large Extent
		1	2	3	4	5
1	SIMBA Breweries has a return system for used bottles for Remanufacturing					
2	There are set qualities for the collection of used glass bottles for Remanufacturing activities at SIMBA Breweries					
3	Glass bottles used for packaging are designed for Remanufacturing					
4	SIMBA breweries implement Remanufacturing to comply with regulations.					
5	Remanufacturing activities bring about economic benefits for the company					

2. Recycling activities for economic benefit:

- Do recycling activities contribute to the economic benefits of SIMBA Breweries?

YES

NO

- If yes, to what extent do you agree to the following statements regarding the economic effects of Reuse activities? Kindly indicate on a scale of 1(one) to 5 (five) by ticking the appropriate box (√).

No	Recycling Activities	No Extent	Very small	Small	Average Extent	Large Extent
		1	2	3	4	5
1	SIMBA breweries have an appropriate system for Recycling					
2	Returned glass bottles are Recycled at SIMBA breweries					
3	Customers are aware of the Recycling of glass bottles by the company					
4	Recycling activities are implemented to comply with regulations					
5	Recycling activities increase the profitability of the company					

### 3. Reuse activities for economic benefits

- Does Reuse activities contribute to the economic benefits of SIMBA Breweries?

YES

NO

- If yes, to what extent do you agree to the following statements regarding the economic effects of Reuse activities? Kindly indicate on a scale of 1(one) to 5 (five) by ticking the appropriate box (√).

No	Reuse Activities	No Extent	Very small	Small	Average Extent	Large Extent
		1	2	3	4	5
1	SIMBA Breweries has a return system for used bottles for Reuse activities					
2	There are set qualities for the collection of used glass bottles for Reuse activities					
3	Glass bottles used for packaging are designed for Reuse activities					
4	SIMBA Breweries implements Reuse activities to comply with regulations.					

5	Reuse activities bring about economic benefits for the company					
---	--	--	--	--	--	--

4. What is the level of increase in terms of profit created in your company because of the Reverse Logistics practice in your company?

25%                            50%                            60     

75 %                            90%                            100     

5. What is the level of decrease in terms of costs of production created by the Reverse Logistics Practices in your company?

25%                            50%                            60     

75 %                            90%                            100     

**Section D: Reverse Logistics Practices and Company’s Performance**

To what extent do you agree with the following statements regarding the Reverse Logistics and economic performance of the company? Kindly indicate on a scale of 1(one) to 5 (five) by ticking the appropriate box (√).

No	RL Practices and the Company’s Economic Performance	No Extent	Very small	Small	Average	Large
		1	2	3	4	5
1	Reverse logistics activities increase the profitability of the company					
2	RL activities increase customer loyalty					
3	RL activities of glass bottles decrease the cost of production					
4	RL activities bring about an increase in market share					
5	RL decreases the price of products					

**Section E: Challenges in Reverse Logistics** to what extent do you agree to the following statements regarding the challenges in the implementation of the Reverse Logistics system? Kindly indicate on a scale of 1(one) to 5 (five) by ticking the appropriate box (√).

No	Management related challenges	No Extent	Very small	Extent Small	Extent Average Extent	Large Extent
		1	2	3	4	5
1	Lack of top management awareness of the need for RL practices					
2	Lack of top management commitment to RL					
3	Lack of government implication in green practices					

No	Cost-related challenges	No Extent	Very small	Extent Small Extent	Average Extent	Large Extent
		1	2	3	4	5
1	Lack of awareness of the hidden cost of RL					
2	Difficulties in identifying costs related to RL					
3	High cost related to the implementation of RL					

No	Product return challenges	No Extent	Very small	Small Extent	Average Extent	Large Extent
		1	2	3	4	5
1	Low level of expertise in the process					
2	A secondary usage of glass bottles by clients					
3	Defective glass bottles return					

No	Information related challenges	No Extent	Very small	Small Extent	Average Extent	Large Extent
		1	2	3	4	5

1	Lack of communication concerning RL practices				
2	Lack of training in RL practices				
3	Lack of implementation of IT solutions				

No	The challenge in the Supply Chain and its partners	No Extent	Very small	Small	Average Extent	Large Extent
		1	2	3	4	5
1	Lack of collaboration with partners in the SC					
2	Lack of a clear policy and procedure for product return					
3	Lack of incentive in the product return					

**Section F enhancement of the RL system at SIMBA breweries**

To what extent do you agree to the following statements regarding the improvement of Reverse Logistics implemented at SIMBA Breweries? Kindly indicate on a scale of 1(one) to 5 (five) by ticking the appropriate box (√).

No	The challenge in the Supply Chain and its partners	No Extent	Very small	Small	Average Extent	Large Extent
		1	2	3	4	5
1	Hire a third-party company that will oversee the RL					
2	Raise awareness of clients on the importance of retaining glass bottles.					
3	Utilize the full capacity of material and human resource					
4	Put in place strategies to implement effectively and efficiently RL					
5	Train employees on RL practices					

END OF THE QUESTIONNAIRE

### 3. PUBLISHED ARTICLE

*Proceedings of the 4<sup>th</sup> African International Conference on Industrial Engineering and Operations Management  
Lusaka, Zambia, April 4-6, 2023*

## **The Effect of Reverse Logistics Practices on Economic Performance: A case study of Simba Breweries**

**Alex Lumba and Bupe Getrude Mwanza**

Postgraduate Student, Associate Director and Senior Lecturer

Graduate School of Business

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### **Abstract**

The subject of reverse logistics has grown exponentially due to an increase in production and consumption activities. Companies are now more pressurized by regulatory bodies to be more responsible in dealing with the environment and producing their products. Reverse logistics has been proven to be an effective and efficient way to deal with the environment and optimize the performance of organizations. However, this concept is often misunderstood and many companies still don't realize the benefits of implementing it in the operation of their businesses. Academic research in this field is limited, especially in the context of the Republic Democratic of Congo. There are no studies conducted to evaluate the effect of reverse logistics practices on the economic performance of companies, this is the case of the manufacturing companies such as Simba Breweries in particular. The gap has been identified and should be filled by researchers. The study aimed at evaluating the economic benefits of the reverse logistics system at Simba Breweries. For this, a descriptive research design was followed and data was collected through a questionnaire and analyzed using descriptive and inferential statistics. The results indicate that there was a positive and significant correlation between Reuse practice and the economic benefit of the company with a correlation and regression coefficient of 0.91 and 3.38. The study identified the economic benefit of implementing RL practices. Reuse practice decreases the cost of production by 65% and increased the profitability of the company by 60%. More research is needed to investigate further the implementation of other practices of this system.

### **Keywords**

Reverse logistics, Reuse, Remanufacturing, Recycling, and Company performance.

### **1. Introduction**

Over the years, the subject of reverse logistics has received growing importance across the globe (Agrawal et al. 2015). It accounts for the end of the life cycle of products such as packaging material in both, developed and developing countries (Govindan and Soleimani 2017). It has been pointed out by many others as being an effective and efficient way to deal with environmental pollution and improve companies' performance (Mwanza et al. 2017).

The study aimed at identifying the economic effect of reverse logistics practices on the economic performance of the company. The reverse logistics system deals with the inverse flow of products from their point of consumption to the point of production to recapture value and proper disposal (Banihashemi et al. 2019). It is implemented in developed countries as a strategic tool to protect the environment and decrease the cost of production. This system is more successful in developed countries with strong regulations for the protection of the environment (Mwanza et al. 2016).

Luthra et al. (2017) and Yu et al. (2018) indicated that in Europe, firms are held accountable for the waste they generate. However, in the context of developing countries, the subject of reverse logistics is still in a state of infancy due to several barriers (Bouzon and Rodriguez 2018). Waste management and reverse logistics practices are still in the infancy stage in developing countries (Waqas et al. 2018). Post-consumer products such as used glass bottles from beverages are buried in landfills, dumped on roadsides, burnt, and thrown away in significant amounts; this leads to issues such as environmental pollution, waste of resources, and health problems (Menon et al. 2017).

Manufacturing companies can take advantage of the benefits of the reverse logistic system to protect the environment in which there are doing business and cut off on their cost of production. In DRC, the subject of reverse logistics is a



## IEOM Society International

**The 4<sup>th</sup> African International Conference on Industrial Engineering and Operations Management**  
Lusaka, Zambia, April 4-6, 2023, Venue: Hilton Garden Inn, Host: Univ. of Zambia

### IEOM Masters Thesis Competition Awards

*This is to certify that*

**Alex Lumba**, Postgraduate Student, Graduate School of Business, University of Zambia, Lusaka, Zambia

**Bupe Getrude Mwanza**, Associate Director and Senior Lecturer, Graduate School of Business, University of Zambia, Lusaka, Zambia

In Recognition of Winning the THIRD Place of the IEOM Masters Thesis Competition Entitled "ID 108: The Effect of Reverse Logistics Practices on Economic Performance: A Case Study of Simba Breweries." Presented at the 4th IEOM Zambia Conference on April 6, 2023.

**Prof. Charles Mbohwa**  
Honorary Chair  
Past Pro-Vice Chancellor Strategic Partnerships and Industrialisation, University of Zimbabwe, Harare  
Past Professor and Executive Dean, Faculty of Engineering and the Build Environment, University of Johannesburg, South Africa

**Dr. Bupe Getrude Mwanza**  
Conference Chair  
Associate Director and Senior Lecturer, Graduate School of Business, University of Zambia, Lusaka, Zambia

**Dr. Ahad Ali**  
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## 4. Ethical Clearence



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#### APPROVAL OF STUDY

16<sup>th</sup> December, 2021

**REF NO.HSSREC-2021-NOV-013**

Alex Lumba Kisumpa  
The University of Zambia  
Graduate School of Business  
P.O. Box 32379  
**LUSAKA**

Dear Mr. Kisumpa,

**RE: "EVALUATION OF THE ECONOMIC BENEFITS OF REVERSE LOGISTICS:  
A CASE STUDY OF ZAMBIAN BREWERIES PLC"**

Reference is made to your submission of the protocol captioned above. The HSSREC resolved to approve this study and your participation as Principal Investigator for a period of one year.

REVIEW TYPE	ORDINARY REVIEW	APPROVAL NO. HSSREC-2021-NOV-013
Approval and Expiry Date	Approval Date: 16 <sup>th</sup> December, 2021	Expiry Date: 15 <sup>th</sup> December, 2022
Protocol Version and Date	Version - Nil.	15 <sup>th</sup> December, 2022
Information Sheet, Consent Forms and Dates	• English.	To be provided
Consent form ID and Date	Version - Nil	To be provided
Recruitment Materials	Nil	Nil
Other Study Documents	Questionnaire.	
Number of Participants Approved for Study		

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