

**SUSTAINABLE LOGISTICS MANAGEMENT AND OPERATIONAL EFFICIENCY
AT BIDCO UGANDA LIMITED**

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**A DISSERTATION SUBMITTED TO THE SCHOOL OF BUSINESS IN PARTIAL FULFILLMENT
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Declaration.


I, Sanyu Bridget Kiwala, hereby declare that this dissertation titled: "Sustainable Logistics Management and Operational Efficiency at Bidco Uganda Limited "is my original work and has not been submitted, either wholly or in part, for the award of a degree or any other academic qualification in any university or institution of higher learning.

Signature:  Date: 06/08/2025

Sanyu Bridget Kiwala.

Approval.

The dissertation titled: "Sustainable Logistics Management and Operational Efficiency at Bidco Uganda Limited" has been submitted for examination with my approval as the supervisor.

Signature: 

Date: 06/06/25

Mukisa Simon Peter.

Acknowledgment.

To God be the Glory. If it wasn't for his help, I wouldn't have made it through the late nights, panic attacks, and moments where I thought my brain was actually melting. Philippians 4:13 pretty much sums it up for me: "I can do all things through Christ who strengthens me." For real. That verse carried me. I would like to take this opportunity to express my heartfelt gratitude for my supervisor, Mr. Mukisa Simon Peter for the guidance and support that has helped me produce this quality work.

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Table of Contents

Declaration.....	i
Approval.....	ii
Acknowledgement.....	iii
List of Tables.....	vii
Abstract.....	viii
Chapter one.....	1
Introduction.....	1
1.0 Introduction.....	1
1.1 Background of the Study.....	1
1.2 Problem Statement.....	2
1.3 Purpose of the Study.....	3
1.4. Objectives of the study.....	3
1.5 Research Questions.....	3
1.6 Scope of the Study.....	3
1.6.1 Subject Scope.....	3
1.6.3 Time Scope.....	4
1.7 Justification of the study.....	4
1.8 Significance of the Study.....	4
1.9 Limitations and Delimitations of the Study.....	5
1.10 Conceptual Framework.....	6
Chapter two.....	7
Literature Review.....	7
2.0 Introduction.....	7
2.1 Operational Efficiency.....	7
2.2 Green Transportation Practices and Operational Efficiency.....	8
2.3 Eco-Friendly Warehousing and Operational Efficiency.....	9
2.4 Reverse Logistics and Operational Efficiency.....	10
2.5 Research Gap.....	11
Chapter Three.....	13
Methodology.....	13
3.0 Introduction.....	13

3.1 Research Design	13
3.2 Data Sources.....	13
3.3 Study Population.	13
3.4. Sample size and Selection technique.....	13
3.5 Sampling Techniques.....	15
3.5.1 Probability Sampling Technique	15
3.5.2 Non-Probability Sampling Technique	15
3.6 Data Collection Methods.....	16
3.6.1 Questionnaire Survey Method:.....	16
3.7 Reliability and Validity of Research Instruments	16
3.8 Data Collection Instruments.	17
3.9 Data Collection Procedure.....	17
3.10 Data Management and Analysis	17
3.10.1 Quantitative Analysis	17
3.11 Measurement of Variables	17
3.12 Conclusion.....	18
4.0 Introduction.	19
4.1 Response Rate.	19
4.2 Back ground of the respondents.	19
4.3 Description of the Dependent Variable: Operational Efficiency.	21
Source: Primary Data 2025	22
4.4 Green Transportation Practices and Their Effect on Operational Efficiency.	22
4.5 Eco-friendly Warehousing and Packaging and Operational Efficiency.	23
4.6 Reverse Logistics and Waste Management and Operational Efficiency.	24
4.7 Linear Regression results.	24
Chapter Five.....	27
Discussion, Conclusion and Recommendations.	27
5.0 Introduction	27
5.1 Discussions.....	27
5.1.1 Green Transportation Practices and Operational Efficiency.	27
5.1.2 Eco Friendly Warehousing and Packaging and Operational Efficiency.....	28
5.1.3 Reverse Logistics and Waste Management and Operational Efficiency.	28
5.2 Conclusion.....	29
5.3 Recommendations for Policy and Practice.....	30

5.4. Recommendations for Further Research.	30
Appendices.....	35
APPENDIX I: QUESTIONNAIRE FOR RESPONDENTS.....	35
SECTION II: GREEN TRANSPORTATION PRACTICES.....	36
SECTION III: ECO-FRIENDLY WAREHOUSING AND PACKAGING.....	37
SECTION IV: REVERSE LOGISTICS AND WASTE MANAGEMENT	37
SECTION V: OPERATIONAL EFFICIENCY.	38

List of Tables

Table 1: Population Category and Sample Size of the Respondents.	14
Table 2: Reliability Results.	16
Table 3: Respondents Rate.	19
Table 4: background information of respondents.	20
Table 5: Statistics for respondents' self-rating on operational efficiency.	21
Table 6: Statistics for respondents' self-rating on green transportation practices.	22
Table 7: Descriptive results for respondents' self-rating on Eco-friendly Warehousing and packaging.	23
Table 8: Descriptive results for Reverse Logistics and waste management.	24
Table 9: Linear Regression Analysis Results.	25

Abstract.

This study investigated the relationship between sustainable logistics management practices and operational efficiency in manufacturing firms, with a focus on BIDCO Uganda Limited. Specifically, the research sought to: examine the effect of green transportation practices on operational efficiency, assess the influence of eco-friendly warehousing and packaging, and analyze the impact of reverse logistics and waste management on operational efficiency.

The study adopted a cross-sectional research design and employed a quantitative research approach. Data was collected through structured questionnaires administered to 59 respondents, selected through simple random sampling from various departments within the firm. The data was coded and analyzed using SPSS, applying both descriptive statistics (frequencies, means, standard deviations) and inferential statistics to draw meaningful conclusions.

The standardized coefficient statistics revealed that Reverse logistics and waste management ($\beta= 0.497$, $t=4.351$, $p=0.001$) was the only significant factor determining operational efficiency at Bidco Uganda limited among the factors considered in the study. green transportation practices ($\beta=0. 175$, $t=1.637$, $p=0.107$) and Eco-friendly warehousing and packaging ($\beta=0.239$, $t=1.921$, $p=0.060$) were insignificant because they had the p values greater than 0.01.

The study concludes that the adoption of sustainable logistics practices is essential for improving operational efficiency in manufacturing firms. It recommends that manufacturing companies should invest in fuel-efficient and environmentally friendly transport systems, adopt energy-saving and biodegradable warehousing methods, and strengthen reverse logistics frameworks to enhance cost efficiency and promote environmental sustainability

Chapter one.

Introduction.

1.0 Introduction.

This study included the background of the study, the problem statement, the objectives of the study, the research questions, the justification, scope of study, significance, limitations and delimitations and conceptual framework.

1.1 Background of the Study.

Globally, sustainable logistics has gained significant attention as industries strive to minimize their carbon footprint and enhance efficiency. Logistics and transportation account for a significant share of global greenhouse gas emissions, prompting governments and organizations to implement green logistics strategies (United Nations Conference on Trade and Development [UNCTAD], 2021). Leading manufacturing firms worldwide have embraced sustainable practices such as electric vehicles, renewable energy in warehouses, and digital supply chain optimization to reduce environmental impact while improving cost efficiency (Jabbour et al., 2020).

In Africa, manufacturing and logistics face challenges such as inadequate infrastructure, high transportation costs, and limited adoption of sustainable practices. Many African countries rely on road transport, which contributes to environmental degradation and inefficiencies due to poor road networks (African Development Bank [AfDB], 2021). However, regional initiatives such as the African Continental Free Trade Area (AfCFTA) aim to improve trade logistics and supply chain sustainability by enhancing transportation networks and promoting regional collaboration (UNIDO, 2021). Despite these efforts, the implementation of green logistics remains slow due to financial constraints, policy gaps, and limited technological adoption.

Uganda's manufacturing sector plays a crucial role in economic growth, contributing approximately 15% to the country's Gross Domestic Product (GDP) (MoFPED, 2022). However, logistics inefficiencies, including poor road infrastructure, high fuel costs, and regulatory barriers, hinder the competitiveness of manufacturing firms (World Bank, 2021).

Sustainable logistics adoption in Uganda remains low due to limited investment in green technology, lack of incentives for eco-friendly transportation, and inadequate enforcement of environmental regulations (National Planning Authority [NPA], 2022).

BIDCO Uganda Ltd is one of the country's leading manufacturers, specializing in edible oils, fats, and other consumer products. The company heavily depends on efficient logistics management for sourcing raw materials, manufacturing, and distributing finished products. Given the growing demand for sustainable business operations, BIDCO Uganda Ltd has made efforts to incorporate sustainable logistics practices, such as optimizing transportation routes and improving waste management (BIDCO, 2021). However, challenges such as high operational costs, inadequate infrastructure, and evolving regulatory requirements continue to hinder full-scale adoption of sustainable logistics strategies. Addressing these challenges is critical for enhancing the company's efficiency and aligning with global sustainability trends. This study, therefore, explores how sustainable logistics management affects operational efficiency in Uganda's manufacturing sector, with BIDCO Uganda Ltd serving as a case study.

1.2 Problem Statement.

Operational efficiency is essential for manufacturing firms to remain competitive, minimize costs, and enhance productivity. Ideally, firms should have streamlined logistics operations that ensure timely delivery of raw materials and finished products, efficient resource utilization, and minimal environmental impact. However, Uganda's manufacturing sector, including BIDCO Uganda Ltd, continues to experience logistics inefficiencies such as transportation delays, high fuel consumption, excessive waste generation, and suboptimal inventory management (Agyabeng-Mensah, Afum, & Acquah, 2020). Previous studies have established that sustainable logistics management can enhance operational efficiency by reducing costs and improving supply chain performance (Abubakar et al., 2022). However, most research has focused on developed economies, with limited empirical evidence on how these practices impact manufacturing firms in Uganda (Kusi-Sarpong, Bai, & Sarkis, 2019). There was a need for an in-depth analysis of how sustainable logistics management influences operational efficiency in manufacturing firms within Uganda's unique economic

and infrastructural context. This study, therefore, sought to fill this gap by investigating the relationship between sustainable logistics practices and operational efficiency at BIDCO Uganda Ltd, providing insights to inform both corporate strategies and policy interventions.

1.3 Purpose of the Study.

The purpose of this study was to examine the impact of sustainable logistics management on operational efficiency in manufacturing firms, with a specific focus on BIDCO Uganda Ltd.

1.4. Objectives of the study.

The objectives of the study were to:

- i. Examine the effect of green transportation practices on operational efficiency at Bidco Uganda Limited.
- ii. Assess the influence of eco-friendly warehousing and packaging on operational efficiency at Bidco Uganda Limited.
- iii. Analyze the impact of reverse logistics and waste management on operational efficiency at Bidco Uganda Limited.

1.5 Research Questions.

- iv. What is the impact of green transportation practices on operational efficiency at Bidco Uganda Limited?
- v. What is the impact of eco-friendly warehousing and packaging on operational efficiency at Bidco Uganda Limited?
- vi. What is the impact of reverse logistics and waste management on operational efficiency at Bidco Uganda Limited?

1.6 Scope of the Study

1.6.1 Subject Scope.

This study focused on sustainable logistics management and operational efficiency at Bidco Uganda Limited.

1.6.2 Geographical Scope

The study was conducted at bidco Uganda limited in walukuba masese industrial area plot No 152, one of the biggest manufacturing firms in Uganda.

1.6.3 Time Scope.

The study was carried out for the period of three months from March to May 2025. This timeframe was selected because it captured recent trends, developments, and challenges in sustainable logistics management in Uganda's manufacturing sector.

1.7 Justification of the study.

This study was justified by the increasing need for sustainable logistics management in Uganda's manufacturing sector to enhance operational efficiency and environmental sustainability. As global industries shift towards green supply chain practices, Ugandan manufacturers, including BIDCO Uganda Ltd, faced growing pressure to adopt sustainable logistics strategies to remain competitive (Jabbour et al., 2020). However, the sector continues to grapple with inefficiencies such as high transportation costs, supply chain delays, and excessive waste generation, all of which hinder productivity (World Economic Forum, 2021). Furthermore, given that most existing research focus on developed economies, this study filled a critical knowledge gap by providing empirical evidence on sustainable logistics management in a developing economy like Uganda (Kusi-Sarpong, Bai, & Sarkis, 2019).

1.8 Significance of the Study

It was hoped that this study may be of help to procurement managers, logistics coordinators, and operational leaders at Bidco Uganda Limited by providing actionable insights into adopting sustainable logistics practices such as route optimization, eco-friendly transportation, and energy-efficient warehousing.

It was hoped that the findings may guide institutions like the National Environment Management Authority and Ministry of Works and Transport in designing incentives for sustainable logistics adoption.

It was hoped that the findings of this study may be of help to fellow scholars as it would contribute to literature on sustainable supply chains in emerging economies, offering a case

study of Bidco Uganda Limited.

1.9 Limitations and Delimitations of the Study.

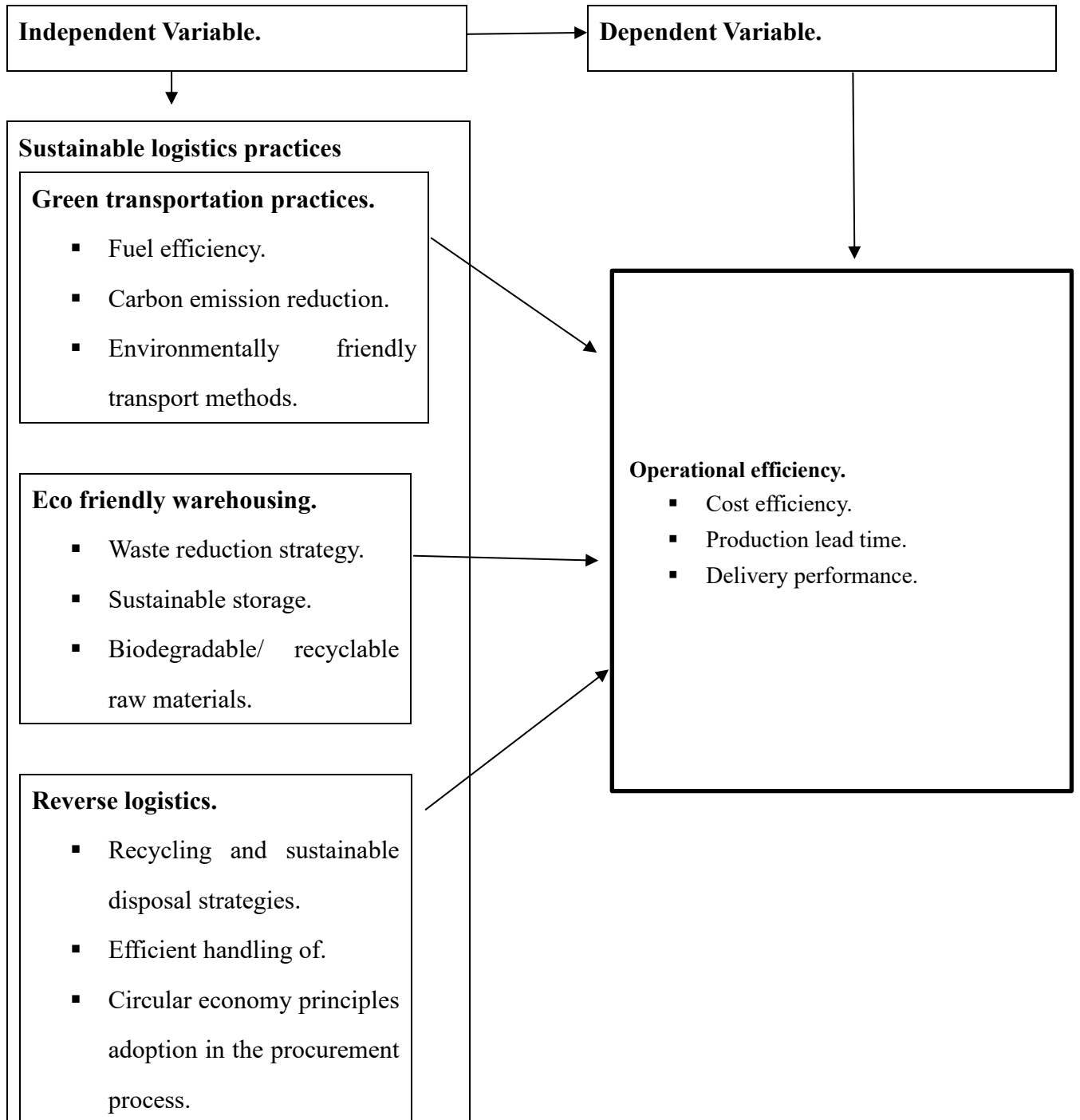
The researcher faced challenges in accessing comprehensive data on sustainable logistics practices at BIDCO Uganda Ltd, as the company treated logistics and supply chain information as confidential. However, I used multiple data collection methods, such as publicly available reports, to ensure a comprehensive analysis. I also sought prior approval from BIDCO Uganda Ltd.'s management to facilitate smoother access to internal data

The researcher faced time limitations since the study was set to be conducted within a short timeframe (March to May 2025). This restricted the ability to conduct extensive field research or gather in-depth responses from key stakeholders who were 500 and above. The researcher overcame this by employing targeted strategies, including online surveys and scheduled surveys, to optimize efficiency.

The researcher also encountered financial limitations in securing resources for, surveys, and site visits. Budget restrictions that narrowed the scope and depth of my data collection, to overcome this the researcher leveraged cost-effective methods like electronic questionnaires in form of google forms to reduce travel expenses.

1.10 Conceptual Framework.

The conceptual framework outlines the relationships between the independent, dependent, and moderating variables based on the study's objectives.



Chapter two.

Literature Review.

2.0 Introduction

This chapter presents a critical review of existing literature on sustainable logistics management and operational efficiency of manufacturing firms' objective by objective

2.1 Operational Efficiency.

Globally, operational efficiency is widely recognized as a critical determinant of business competitiveness, particularly in manufacturing. It involves the optimal use of resources, minimization of waste, and timely delivery of products and services (Porter & Heppelmann, 2019). Technological advancements, such as automation and data-driven supply chain management, have significantly improved operational outcomes in manufacturing firms across developed economies (Ivanov & Dolgui, 2020). Companies with efficient operations typically report improved customer satisfaction, reduced costs, and enhanced sustainability outcomes (Choi, Guo, & Luo, 2023).

In the African context, achieving operational efficiency remains a persistent challenge due to infrastructural deficiencies, limited access to technology, and high input costs. African manufacturing firms often face delays in procurement, frequent production disruptions, and high transportation costs, which undermine productivity (African Union Commission, 2022). Efforts to enhance operational efficiency have included regional integration policies and industrial parks aimed at improving logistics and supply chain performance (UNIDO, 2023).

In Uganda, operational inefficiencies in the manufacturing sector are often attributed to poor road infrastructure, high energy costs, and weak regulatory frameworks. The World Bank (2021) noted that Ugandan firms experience longer lead times and higher costs compared to regional counterparts, due to logistical bottlenecks and outdated production systems. Government initiatives like the National Industrial Policy (2020) and the establishment of free zones aim to improve operational efficiency by supporting infrastructure development and enhancing regulatory clarity (MoFPED, 2022).

At BIDCO Uganda Ltd, operational efficiency is essential for maintaining competitive advantage in the fast-moving consumer goods sector. The firm's operations, which involve importing raw materials, local processing, and national distribution, depend heavily on effective logistics coordination. BIDCO has attempted to optimize operational processes through route planning, inventory control, and energy management; however, infrastructure constraints and sustainability pressures continue to affect its performance (BIDCO, 2023). Addressing these challenges is key to enhancing its resource utilization and maintaining its market leadership.

2.2 Green Transportation Practices and Operational Efficiency.

Green transportation, also referred to as sustainable or eco-friendly transportation, involves the adoption of practices and technologies that minimize environmental impacts while enhancing the efficiency of logistics operations. Globally, many firms have adopted strategies such as route optimization, fleet electrification, and the use of alternative fuels to reduce greenhouse gas emissions and improve delivery timelines (Zhang, Sun, & Wang, 2022). These green initiatives have been shown to lower fuel consumption and vehicle maintenance costs, thereby improving operational efficiency (Jabbour, Ndubisi, & Roman Pais Seles, 2020).

In Africa, the adoption of green transportation remains limited due to poor infrastructure, high costs of clean energy alternatives, and policy barriers. However, there is growing awareness among logistics stakeholders of the economic and environmental benefits of sustainable transportation. Regional initiatives such as the African Union's Green Logistics Strategy aim to reduce emissions while enhancing supply chain reliability (African Union, 2023). Studies have shown that in countries like Kenya and South Africa, investment in hybrid vehicles and improved road networks has led to noticeable improvements in delivery times and fuel economy (Mburu & Kamau, 2022).

In Uganda, logistics systems heavily rely on fossil-fuel-based road transport, which is both costly and environmentally taxing. According to the Uganda Investment Authority (2023), the sector contributes significantly to urban air pollution and traffic congestion, which

in turn increases transportation lead times and fuel consumption. Government initiatives such as the National Logistics Policy (2021) and the Uganda Green Growth Development Strategy (UGGDS) advocate for low-carbon transportation solutions. However, their implementation has been slow due to financial and institutional constraints (National Planning Authority, 2022).

At BIDCO Uganda Ltd, transportation is a critical component of the logistics chain, involving the movement of raw materials from ports and the distribution of finished products across the country. To improve efficiency, the company has explored route optimization and vehicle maintenance scheduling to reduce fuel usage and delivery delays. However, challenges such as poor road conditions, high diesel prices, and limited access to green vehicle technology hinder the scalability of such efforts (BIDCO, 2023). Thus, while BIDCO has made strides in integrating green transportation practices, there is still a need for greater investment, policy support, and infrastructure development to fully realize their potential impact on operational efficiency.

2.3 Eco-Friendly Warehousing and Operational Efficiency.

Eco-friendly warehousing refers to the adoption of sustainable practices within storage and distribution facilities to reduce environmental impact while optimizing operational performance. Globally, leading firms are increasingly investing in green building materials, energy-efficient lighting, renewable energy sources (such as solar panels), and intelligent warehouse management systems (WMS) to enhance resource efficiency (Shekari, Abbasi, & Sabzehmeidani, 2022). These measures not only minimize carbon emissions but also lead to cost savings through reduced energy consumption and improved inventory accuracy (Jabbour et al., 2020).

In Africa, however, eco-friendly warehousing is still emerging, primarily due to high initial investment costs and a lack of technical expertise. Nevertheless, countries such as South Africa and Morocco have begun incorporating green warehouse design principles, including the use of skylights, passive ventilation, and solar energy (Biyase & Kgari-Masondo, 2022). These practices have demonstrated positive impacts on both

environmental sustainability and operational efficiency, particularly in reducing electricity costs and enhancing storage conditions for perishable goods.

Uganda's warehousing sector is characterized by outdated infrastructure, inadequate storage capacity, and high energy costs. Although the government's Industrial Park Development Program aims to modernize warehousing facilities, progress has been limited by budgetary constraints and limited private sector participation (MoFPED, 2022). As a result, most warehouses rely heavily on grid electricity and diesel-powered generators, contributing to high operational costs and inefficiencies (UIA, 2023).

At BIDCO Uganda Ltd, warehousing plays a central role in the supply chain, involving storage of raw materials and finished goods. The company has made some efforts toward sustainability by implementing inventory management systems to reduce waste and improve space utilization. Additionally, BIDCO has begun exploring the use of solar energy for lighting and temperature regulation in its warehouses, in line with its broader sustainability goals (BIDCO, 2023). However, limitations such as high installation costs, power instability, and lack of government incentives continue to impede the full adoption of eco-friendly warehousing practices. Addressing these challenges is essential for enhancing operational efficiency through improved energy management, reduced storage costs, and minimized environmental impact.

2.4 Reverse Logistics and Operational Efficiency.

Reverse logistics refers to the process of moving goods from their final destination back to the manufacturer or distributor for the purposes of returns, recycling, refurbishing, or disposal. Globally, reverse logistics has become an essential component of sustainable supply chain management, especially in industries where waste reduction, product recalls, and circular economy practices are prioritized. Effective reverse logistics can significantly enhance operational efficiency by recovering value from returned goods, reducing waste disposal costs, and improving customer satisfaction (Govindan, Soleimani, & Kannan, 2021).

Across Africa, the adoption of reverse logistics remains limited due to challenges such as poor infrastructure, low recycling capacity, and a lack of formal return channels. However,

countries like Kenya and Nigeria have begun integrating reverse logistics in sectors like agro-processing and electronics, driven by private-sector initiatives and growing environmental awareness (Agyabeng-Mensah et al., 2020). Studies suggest that reverse logistics in Africa can reduce operating costs and enhance sustainability, but progress is hindered by informal sector dominance and limited government involvement (Biyase & Kgari-Masondo, 2022).

In Uganda, reverse logistics is underutilized, particularly in the manufacturing sector, where waste disposal often occurs through informal or inefficient channels. The National Environment Management Authority (NEMA) has issued guidelines encouraging industries to adopt environmentally sound waste management practices, including recycling and take-back schemes. However, compliance remains low due to financial constraints, weak enforcement, and inadequate public awareness (NEMA, 2023). The Uganda National Industrial Policy (2020) highlights reverse logistics as a potential strategy for reducing industrial waste and improving resource efficiency, but practical implementation is still lacking.

At BIDCO Uganda Ltd, reverse logistics is particularly relevant due to the company's production of edible oils, packaging materials, and fast-moving consumer goods, which generate substantial waste across the supply chain. The company has initiated some waste collection and recycling programs aimed at minimizing landfill use and reprocessing by-products (BIDCO, 2023). For example, BIDCO collaborates with third-party recyclers to recover used packaging materials, contributing to waste reduction and cost savings. Nevertheless, inefficiencies persist due to the absence of a robust reverse logistics framework, lack of consumer engagement in product returns, and limited infrastructure for waste segregation and recycling. Strengthening reverse logistics systems could therefore significantly improve BIDCO's operational efficiency by reducing raw material dependency, minimizing waste disposal costs, and supporting compliance with environmental regulations.

2.5 Research Gap

While extensive literature underscores the positive relationship between sustainable

logistics management practices and operational efficiency globally, several critical research gaps persist, particularly concerning the African and Ugandan manufacturing sectors. Most existing studies on sustainable logistics (e.g., Zhang, Sun, & Wang, 2022; Jabbour et al., 2020) are concentrated in developed economies where infrastructure, technological adoption, and regulatory environments are highly advanced. These studies predominantly assume the presence of mature logistics systems, readily available clean energy alternatives, and strong institutional support, conditions that are often absent in developing contexts like Uganda. Consequently, there remains limited empirical understanding of how sustainable logistics practices, specifically green transportation, eco-friendly warehousing, and reverse logistics, impact operational efficiency under infrastructural, financial, and policy constraints typical of Uganda (African Union, 2023; NPA, 2022).

Chapter Three.

Methodology.

3.0 Introduction

This chapter presents the research design, study population, sample size and selection sampling techniques, data collection procedures, Data management and analysis measurement of variables and conclusion.

3.1 Research Design

According to Jenkins-smith et al (2017) a research design is the general plan to answer your research topic or question. This study used quantitative approach, this is because it allowed for in-depth investigation into the relationship between sustainable logistics and operational efficiency

3.2 Data Sources

Primary data was collected through questionnaires, conducted with in the various departments at BIDCO Uganda Ltd. On the other hand, secondary data was obtained from organizational reports, government policy documents, journal articles, and industry publications related to sustainable logistics and operational efficiency (Creswell & Creswell, 2022).

3.3 Study Population.

The study population consisted of employees from four key departments at BIDCO Uganda Ltd: Logistics, Warehousing, Procurement, and operations departments. According to internal company records (BIDCO Uganda Ltd, 2023), Bidco Uganda Ltd had 120 employees, however, according to the human resource manager, the accessible population was 70 employees. This population was considered because they were responsible for and had knowledge about sustainable logistics practices and operational efficiency, the distribution of employees across these departments was shown in Table 1.

3.4. Sample size and Selection technique.

According to C.R. Kothari, a sample is a subset of a population that is selected to be

studied. It comprises some selected members who are referred to as elements. Sampling is the process of selecting a sufficient number of elements from the population so that a study of the sample and an understanding of its characteristics would make it possible to generate such characteristics to the population elements. The study used the Yamane’s formulae (1967) for a finite population for determining the sample size.

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

Were,

n= Sample population.

N= Study population.

e= margin of error.

$$n = \frac{70}{1 + 70(0.05)^2}$$

n= 59 employees.

Table 1: Population Category and Sample Size of the Respondents.

POPULATION CATEGORY	TOTAL POPULATION	SAMPLE SIZE	SAMPLING TECHNIQUE
Logistics	22	19	Stratified & Simple random
Procurement.	6	6	Purposive.
Warehouse.	10	8	Stratified & Simple random
Operations	18	15	Stratified & Simple random
Environment, Health and Safety. (EHS).	14	11	Stratified & Simple random
Total	70	59	

Source: **BIDCO Uganda Ltd. (2023)**

As Table 1 indicates, a sample of 59 employees was considered out of the population of 70 employees based on Yamane’s formulae (1967) for a finite population. In this study, simple random sampling was used for departments, logistics, operations, and EHS while purposive sampling was used for the procurement department because they are few. Stratified

and simple random sampling techniques was employed. Each department forms a stratum, and random samples proportional to the department sizes was selected to ensure each functional area is adequately represented.

3.5 Sampling Techniques.

The study employed a combination of probability and non-probability sampling techniques to ensure the collection of both representative and insightful data.

3.5.1 Probability Sampling Technique

A stratified random sampling method, a form of probability sampling, was utilized to select respondents from the different operational departments at BIDCO Uganda Ltd. Each department, Logistics, Warehousing, Procurement, and operations represented a stratum. Within each stratum, simple random sampling was conducted to select participants proportionately according to departmental size. Lottery technique was used where names in each category were written on a piece of paper and one picked at a time until the required number is reached.

This technique ensured that every employee within the target departments has an equal and known chance of being selected, thereby minimizing sampling bias and enhancing the representativeness of the sample (Bryman, 2021).

3.5.2 Non-Probability Sampling Technique

The study employed purposive sampling, a type of non-probability sampling. Participants were deliberately selected based on their roles, expertise, and in-depth knowledge of logistics, warehousing, and sustainability practices at BIDCO Uganda Ltd. Specifically, procurement department, departmental heads, logistics supervisors, and senior production managers were chosen because procurement are few and have specialized knowledge about sustainability practices and the heads, they are best positioned to provide rich, relevant, and insightful information necessary for addressing the research objectives (Creswell & Creswell, 2022). By using purposive sampling, the research gained deeper contextual understanding of the item under study.

3.6 Data Collection Methods

The study used a quantitative approach where questionnaires were provided and used as discussed below

3.6.1 Questionnaire Survey Method:

Structured questionnaires were distributed to selected employees to collect quantitative data regarding sustainable logistics practices and their effects on operational efficiency.

3.7 Reliability and Validity of Research Instruments

Reliability:

The study instrument was pretested for its reliability on a sample of 5 respondents from the logistics department to examine individual questions as well as the whole questionnaire very carefully. In this study a Cronbach's alpha coefficient was computed to show how reliable the data is, using Statistical Package for Social Sciences (SPSS) taking only variables scoring above 0.70 as suggested by Nunally (1978) as reflected in the table below;

Table 2: Reliability Results.

Variable	Total No. of Item	Cronbach's alpha
Green transportation	6	0.711
Eco friendly warehousing	5	0.820
Reverse logistics	6	0.826
Operational efficiency	4	0.672

Source. Primary data.

According to Table 2 above, only variables that scored above 0.70 were taken on as they were considered reliable.

Validity:

The research instrument was designed to collect valid data and content validity was ensured by having the items in the conceptual framework reflect items in the tool (questionnaire). My research supervisor also revised and guided me to ensure the tools validity.

3.8 Data Collection Instruments.

Self-Administered Questionnaire:

A structured questionnaire was used to collect primary quantitative data from employees, focusing on the relationship between sustainable logistics practices and operational efficiency. The Likert scale was used ranging from 1-5 where; 5 – Strongly Agree, 4 – Agree, 3 – Not Sure, 2 – Disagree, 1 – Strongly Disagree.

3.9 Data Collection Procedure.

The data collection process proceeded in a phased manner. First, permission was sought from BIDCO Uganda Ltd.'s management to conduct the study. After approval, participants were contacted through email and physical meetings to explain the purpose of the study, assured them of confidentiality, and sought informed consent. The questionnaires were distributed physically and electronically (where necessary) to accommodate employees' schedules. Observation of logistics and production operations took place during routine work hours, ensuring minimal disruption to normal activities (Creswell & Creswell, 2022).

3.10 Data Management and Analysis

Data management involved organizing, coding, and cleaning the collected information to ensure accuracy and completeness before analysis. Quantitative data was processed for interpretation of findings.

3.10.1 Quantitative Analysis

Quantitative data from the questionnaires was coded and entered into SPSS Version 27 for analysis. Descriptive statistics, such as means, frequencies, and percentages, summarized the data. Inferential statistics, particularly multiple regression analysis, was employed to determine the strength and direction of the relationship between sustainable logistics practices and operational efficiency (Field, 2022). Statistical significance was tested at the 99% confidence level ($p < 0.01$).

3.11 Measurement of Variables

The Likert scale (strongly disagree to strongly agree) was used to allow the

quantification of participants' perceptions and experiences regarding sustainable logistics and operational efficiency (Bryman, 2021).

3.12 Conclusion

This chapter has outlined the methodological framework to be used in assessing the impact of sustainable logistics management on operational efficiency at BIDCO Uganda Ltd. It has discussed the research design, data sources, study population, sampling design, data collection methods and instruments, validity and reliability procedures, and data analysis techniques. The next chapter will present the results based on the methodology elaborated here.

Chapter Four.

Data Analysis, Presentation and Interpretation.

4.0 Introduction.

This chapter presents analysis and interpretation of the study findings. It specifically presents the response, background of the respondents, description of variables and findings of the study objective by objective.

4.1 Response Rate.

A total of 59 questionnaires were issued and all the 59 questionnaires were returned as shown in Table 3 below.

Table 3: Respondents Rate.

Category	Questionnaires issued	Questioners returned	Response rate (%)
Procurement	6	6	100
Logistics	22	22	100
Operations	18	18	100
Environmental health and safety	14	14	100
Ware housing	10	10	100

Source: Primary Data 2025.

Table 3 above shows an overall response rate of 100% which was very high and this response is acceptable and representative enough for a survey

4.2 Back ground of the respondents.

This section reflects the distribution of respondents by gender, age, departments, and years of experience as shown in Table 4.

Table 4: background information of respondents.

Item	Details	Frequency	Percentage (%)
Gender	Male	33	55.9
	Female	26	44.1
	Total	59	100.0
Age.	18-25	19	32.2
	26-35	18	30.5
	36-45	11	18.6
	46-55	10	16.9
	Above 55	1	1.7
	Total	59	100.0
Department.	Procurement	6	10.2
	Logistics	19	32.2
	Operations	15	25.5
	Environment Health and Safety	11	18.6
	Warehousing	8	13.6
	Total	59	100.0
Years of experience.	Less than 2	8	13.6
	2-5	22	37.3
	6-10	19	32.2
	More than 10	9	15.3
	Total.	59	100.0

Source: Primary data 2025

According to the table 4, 55.9% male contributed more to the sample compared to the women who made 44.1%. This suggests that the majority of the staff at Bidco Uganda limited are male. Table 4 also shows that the category of 18-25 years dominated the sample by contributing 32.2% of the respondents. This was followed by the category of 26-35 years that contributed 30.5% of the respondents. This was further followed by the category of 36-45 years that contributed 18.6% and the category of 46-55 years that contributed 16.9% yet the category of above 55 years had the least contribution of 1.7%. This suggests that majority of the staff within Bidco Uganda Limited were aged 18-25 years which is a n indicator of diversification in the employee base.

Additionally, Table 4 revealed that, Logistics dominated the sample with a contribution of 32.2% of the respondents, Operations department followed with a contribution of 25.5% of the respondents, and then Environmental Health and Safety 18.6% of the respondents.

Warehousing followed with a contribution of 13.6% of the respondents and procurement was the department with the least contribution of 10.2%. This suggests that data was collected efficiently from the logistics department which was the primary department and majority of the respondents came from this department and procurement contributed the least because it had the least number of employees and sample size.

According to the table 4, majority of the respondents represented by 37.3% have spent a period between 2-5 years working with Bidco Uganda Limited. This was followed by the category of 6-10 years that contributed 32.2% of the respondents. This was followed by the category of more than 10 years that contributed 15.3% of the respondents and the category of less than 2 years had the least contribution of 13.6% of the respondent. This suggests that majority of the respondents (employees) at Bidco had spent 2-5 years working with Bidco which shows a good employee retention environment and the least category of less than 2 years is also an indicator of good employee turnover rate and retention program at Bidco Uganda Limited.

4.3 Description of the Dependent Variable: Operational Efficiency.

The dependent variable, operational efficiency comprised of 4 quantitative items which were measured using a five-point scale ranging from 1-5 where 1 is strongly disagree, 2=disagree, 3=neutral, 4=agree and 5=strongly agree as presented in Table 5.

Table 5: Statistics for respondents' self-rating on operational efficiency.

Operational efficiency	Agree F (%)		Disagree F (%)		Mean	SDV
	SA	A	DA	SDA		
1. Our logistics operations are cost efficient	15 (25.4)	25 (42.4)	6 (10.2)	3 (5.1)	3.73	1.112
2. The time taken to complete production processes is satisfactory	13 (22.0)	28 (47.5)	4 (6.8)	3 (5.1)	3.75	1.044
3. Delivery performance (on-time and complete orders) has improved over the last year	16 (27.1)	27 (45.8)	4 (6.8)	3 (5.1)	3.83	1.069
4. Overall, sustainable logistics practices have enhanced our operational efficiency	22 (37.3)	25 (42.4)	4 (6.8)	3 (5.1)	4.00	1.099

Source: Primary Data 2025

Table 5 revealed that, the responses totaled a consensus that sustainable logistics practices enhance operational efficiency of the company with (mean = 4.00, STD 1.009) which was most agreed on. The findings also reveal that delivery performance has improved over the past years (mean =3.83and STD=1.069). This was followed by the time taken to complete production process being satisfactory (mean=3.75 and STD=1.044). These emerged as the key company factors determining success of operations performance in Bidco Uganda limited which had significantly the highest mean but relatively low standard deviation.

4.4 Green Transportation Practices and Their Effect on Operational Efficiency.

The first objective of the study was to examine the effect of green transportation practices on operational efficiency at Bidco Uganda Limited. Green transportation practices construct was measured using 6 items with the help of a 5-point Likert scale ranging from (5) = Strongly agree, (4) = Agree, (3) = Neutral, (2) = Disagree and (1) = Strongly disagree as presented in Table 6.

Table 6: Statistics for respondents' self-rating on green transportation practices.

Green transportation practices	Agree F (%)		Disagree F (%)		Mean	STD
	SA	A	DA	SDA		
1.Our organization uses fuel- efficient vehicles.	13 (22.0)	28 (47.5)	8 (13.6)	0 (0.0)	3.78	0.948
2. Carbon emission reduction is a priority in our transportation choices	20 (33.9)	25 (42.4)	4 (6.8)	3 (5.1)	3.93	1.096
3. We use environmentally friendly transport methods (e.g., electric vehicles, rail)	11 (18.6)	23 (39.0)	12 (20.3)	7 (11.9)	3.32	1.319
4. Route planning is used to reduce fuel consumption and emissions	22 (37.3)	18 (30.5)	5 (8.5)	4 (6.8)	3.83	1.220
5. Green transportation practices have improved our cost efficiency	14 (23.7)	26 (76.3)	5 (8.5)	3 (5.1)	3.73	1.080
6. Green transportation has enhanced delivery performance.	15 (25.4)	27 (45.8)	3 (5.1)	3 (5.1)	3.81	1.042

Sources: Primary Data 2025

The table 6 above reveals that reduction of carbon emissions is a priority and was rated with the highest mean (3.93) and STD (1.096). The table also reveals that Route planning is

used to reduce fuel consumption and emissions with (Mean =3.83 and STD =1.220). These showed that they are key organizational factors determining success of sustainable logistics management in Bidco Uganda limited as they emerged as key green transportation indicators that determine operational efficiency.

4.5 Eco-friendly Warehousing and Packaging and Operational Efficiency.

The second objective of the study was the influence of eco-friendly warehousing and packaging on operational efficiency among manufacturing firms. Eco friendly packaging and warehousing construct was measured using a 5-point Likert scale ranging from (5) = Strongly agree, (4) = Agree, (3) = Neutral, (2) = Disagree and (1) = Strongly disagree as presented in Table 7.

Table 7: Descriptive results for respondents’ self-rating on Eco-friendly Warehousing and packaging.

Eco-friendly warehousing and packaging	Agree F (%)		Disagree F (%)		Mean	STD
	SA	A	DA	SDA		
1. Our warehouses apply waste reduction strategies (e.g., minimal inventory waste)	22 (37.3)	24 (40.7)	3 (5.1)	3 (5.1)	4.00	1.083
2. Sustainable storage practices (e.g., energy-efficient lighting, smart systems) are used	21 (35.6)	24 (40.7)	3 (5.1)	3 (5.1)	3.97	1.082
3. Biodegradable and recyclable materials are used in packaging	24 (40.7)	21 (35.6)	5 (8.5)	1 (1.7)	4.05	1.024
4. Eco-friendly warehousing practices have reduced operational costs	15 (25.4)	19 (32.2)	9 (15.3)	6 (10.2)	3.47	1.305
5. Eco-friendly warehousing has contributed to shorter production lead times	20 (33.9)	19 (32.2)	6 (10.2)	5 (8.5)	3.73	1.271

Source: Primary Data 2025.

According to table 7, Utilization of biodegradable and recyclable material for packaging had the largest mean value (4.05) and low STD (1.024) to indicate high initiative in adopting green packaging. The table also reveals that sustainable storage practices like energy efficient, lighting, smart systems also had a high mean of (4.00) and low STD (1.083).

4.6 Reverse Logistics and Waste Management and Operational Efficiency.

The third objective of the study was to analyze the impact of reverse logistics and waste management at Bidco Uganda Limited. The construct was measured using 6 items scored on a five Likert scale from ranging from (5) = Strongly agree, (4) = Agree, (3) = Neutral, (2) = Disagree and (1) = Strongly disagree as presented in Table 8.

Table 8: Descriptive results for Reverse Logistics and waste management.

Reverse logistics and waste management	Agree F (%)		Disagree F (%)		Mean	STD
	SA	A	DA	SDA		
1. Our organization actively implements recycling and reuse practices	9 (15.3)	23 (39.0)	9 (15.3)	6 (10.2)	3.34	1.212
2. Returned products are efficiently handled and reintegrated into the supply chain	15 (25.4)	19 (32.2)	11 (18.6)	4 (6.8)	3.51	1.251
3. Waste is sustainably disposed of through proper disposal strategies	18 (30.5)	22 (37.3)	3 (5.1)	2 (3.4)	3.86	1.025
4. The organization has adopted circular economy principles in logistics and procurement	23 (39.0)	24 (40.7)	2 (3.4)	3 (5.1)	4.05	1.057
5. Reverse logistics has improved our delivery performance	18 (30.5)	22 (37.3)	5 (8.5)	3 (5.1)	3.80	1.126
6. Reverse logistics has reduced overall operational costs.	12 (20.3)	25 (42.4)	7 (11.9)	3 (5.1)	3.61	1.099

Source: Primary Data 2025

According to the Table 8, the organization has adopted circular economy principles in logistics and procurement (Mean = 4.05; STD = (1.057), Delivery performance improvement as a result of reverse logistics achieved a mean of (3.80) and STD (1.126), demonstrating improvement in operations.

In addition, according to the table 8, Waste is sustainably disposed of through proper disposal strategies and this got a mean of (3.86) and (1.025). These emerged as the key reverse logistics and waste management indicators determining operational efficiency in Bidco Uganda limited. They scored the highest means and relatively low standard deviation.

4.7 Linear Regression results.

Multiple regression analysis was carried out to establish the overall causal effects of

using adjusted R² statistics. The linear regression analysis was conducted to establish which among the dimensions of the independent variable was the most significant in determining the level of operational performance at Bidco Uganda limited and are presented in Table 9.

Table 9: Linear Regression Analysis Results.

Model Summary						
Model		R	R Square	Adjusted R Square	Std. Error of the Estimate	
1		.810 ^a	.657	.638	.4618	
ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig
1	Regression	22.429	3	7.476	35.060	<.001b
	Residual	11.728	55	.213		
	Total	34.157	58			
Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig
		B	Std. Error	Beta		
1	(Constant)	.629	.340		1.851	.070
	Green transportation practices emerged.	.187	.114	.175	1.637	.107
	Eco friendly warehousing and packaging emerged.	.207	.108	.239	1.921	.060
	Reverse logistics and waste management emerged.	.460	.106	.497	4.351	<.001
a. Dependent Variable. Operational efficiency. b. Predictors: (Constant) GT practices, EFW and packaging, RL and waste management						

P ≤ 0.01

Source: Primary data 2025

Table 9 shows a coefficient of determination (R-square) of 0.657 at a significance level of 0.001 suggesting that operational efficiency was 65.7% at a standardized error of estimate of 0.4618.

The correlation coefficient (R=0.810 or 81%) indicated the strength of the association between green transportation practices, eco-friendly warehousing and packaging, and reverse logistics and waste management taking into consideration all interactions among the study variables. The adjusted R² of 0.638 or 64% was the variance in the level of operational

efficiency explained by green transportation practices, eco-friendly warehousing and packaging, and reverse logistics and waste management strategies putting into consideration all the variables and the sample size of the study. The remaining variance of 36% is explained by the other factors other than green transportation practices, eco-friendly warehousing and packaging, and reverse logistics and waste management strategies.

The standardized coefficient statistics revealed that Reverse logistics and waste management ($\beta= 0.497$, $t=4.351$, $p=0.001$) was the only significant factor determining operational efficiency at Bidco Uganda limited among the factors considered in the study. green transportation practices ($\beta=0.175$, $t=1.637$, $p=0.107$) and Eco-friendly warehousing and packaging ($\beta=0.239$, $t=1.921$, $p=0.060$) were insignificant because they had the p values greater than 0.01.

Table 9 also presents the analysis of variance (ANNOVA).The findings reveal that on average, the mean score on the determinants of operational efficiency tended to differ significantly with the computed F-statistics ($f=35.060$) large enough as it's accompanying P value $0.001 < 0.01$.thus since the significancy or p-value ,0.001 is less than $\alpha=0.01$,then at 1% level of significancy ,it is deduced that the computed or observed F is large enough to infer that the responses differed significantly.

Chapter Five.

Discussion, Conclusion and Recommendations.

5.0 Introduction

This chapter presents the key findings from the study, discusses the recommendation, and draws conclusions based on the objectives of the study.

5.1 Discussions.

5.1.1 Green Transportation Practices and Operational Efficiency.

The first objective of the study was to examine green transportation practices on operational efficiency in Bidco Uganda limited. Study findings revealed a positive but statistically insignificant relationship, this suggests that while Bidco Uganda limited has initiated green transportation measures such as adopting fuel efficient vehicles and optimizing delivery routes, these efforts have not yet translated into significant improvements in operational efficiency. This finding collaborates with earlier studies that found that to enhance operational efficiency, investment in advanced green transportation technologies should be taken on (Namagembe et al 2019). The findings also align with previous studies indicating that the adoption of green transportation practices can enhance environmental sustainability but may not immediately impact operational efficiency due to implementation challenges and initial investment costs (Namagembe et al., 2019). Furthermore, the limited effect observed may be attributed to the early stages of green transportation adoption in Uganda's manufacturing sector, where infrastructural and regulatory support is still developing (Rugasira et al., 2022). The findings contradict with discoveries from other scholars (e.g., Chungu and Mumba 2021; Elemure et al., 2023, Uwamahoro et al., 2023, Kanyepe et al., 2023 and Rodrigue 2003). These found that logistics firms that integrated hybrid vehicle fleets and digital route planning significantly improved cost savings, additionally, the study in Rwanda found that green logistics practices including warehouse management and packaging, positively impact multinational construction firms' operational performance (Uwamahoro et al., 2023). These contradictions suggest that the positive operational effects of green transportation may be context-specific and dependent on the level

of adoption and supporting infrastructure.

5.1.2 Eco Friendly Warehousing and Packaging and Operational Efficiency.

The second objective was to assess the influence of Eco-friendly warehousing and packaging operational efficiency. The study revealed a positive but statistically insignificant influence on operational efficiency. Although respondents acknowledged the implementation of practices like biodegradable packaging and energy-efficient lighting these have not yet produced substantial operational benefits. Recent studies have shown mixed results regarding the impact of green practices on operational efficiency in various industries. While some research indicates that circular economy practices like recycling and reuse can improve operational performance (Salandri et al., 2022), others suggest that eco materials and green packaging do not significantly impact performance (Salandri et al., 2022; Kumar et al., 2019). On the other hand, the findings contradict with earlier discoveries that indicate that eco-friendly warehousing and packaging practices can positively influence operational efficiency, green logistics practices including green warehousing and packaging are positively associated with operational performance (Uwamahoro et al., 2023). The observed that integrating smart warehousing technologies reduced lead times and improved stock accuracy. Additionally, research by Otieno et al. (2018) found that recyclable packaging significantly reduced waste and enhanced order fulfillment rates in Kenya manufacturing firms. This disparity may be due to scale, implementation maturity, or sectoral differences, indicating a need for more localized and longitudinal studies.

5.1.3 Reverse Logistics and Waste Management and Operational Efficiency.

The third objective was to analyze the impact of reverse logistics and waste management on operational efficiency among manufacturing firms. Study findings reveal that the implementation of effective reverse logistics and waste management practices like adopting circular economy principles in the logistics operations, recycling, and reuse have led to improved delivery performance and reduced operational costs of the organization leading to higher chances of operational efficiency at Bidco Uganda Limited. This is supported by the positive outcomes of the analysis and the statistical significance of the variable in

determining operational efficiency. The findings align with earlier discoveries (e.g., Zhang Yu et al., 2018; Salandri et al., 2022; Fernando & Tew 2016) that found that reverse logistics operations positively correlate with operational and environmental performance, leading to improved efficiency and reduced costs. Similarly, Salandri et al., (2022) reported that circular economy practices like recycling, recovery and reuse enhance operational performance. However, they noted that agility can moderate these effects. On the other hand, the findings contradict with earlier discoveries (e.g., Mbabazi 2018 and Lwanga 2019) who found that reverse logistics in Uganda is underutilized due to logistical and cost-related constraints.

5.2 Conclusion.

Based on the study findings, the following conclusions are drawn:

Green transportation practices are not very important determinants operational efficiency among manufacturing firms and Bidco in particular. That is although reduction of carbon emissions is priority and route planning is used to reduce fuel consumption and reduce carbon emissions are regarded as determinants of operational efficiency though not to a significant level. Although the organization has adopted these practices, they have not yet significantly impacted operational efficiency at Bidco Uganda Limited. This is likely due to infrastructural challenges and early-stage implementation.

Eco-friendly warehousing and packaging positively determine operational efficiency although statistically insignificant. Thus, strengthening these practices through an integrated approach that aligns these practices with the company's broader operational strategies, integrating technology and training the company's staff on the adoption and effective implementation of these practices can increase efficiency in these practices and ensure operational efficiency at Bidco Uganda Limited.

Reverse logistics and waste management positively and statistically determine operational efficiency at Bidco Uganda Limited. That is the prioritization of reduction in carbon emissions and the utilization of route planning to reduce carbon emissions and fuel utilization as well as adoption of circular economy practices are positive and significant determinants of operational efficiency at Bidco Uganda Limited. Hence the need for departments to leverage on such favorable operating conditions to propel the operational

efficiency to a much higher level than it apparently stands.

5.3 Recommendations for Policy and Practice.

In this section, recommendations are given according to the respective conclusions on what to do in the quest to enhance the operational efficiency at Bidco Uganda Limited.

Bidco Uganda Limited should invest in advanced green transportation technologies such as hybrid or electric vehicles and implement comprehensive driver training programs focused on eco-driving techniques. This can be done in addition to the practices that are already existing like the already existing electric vehicles and also foster a culture of continuous improvement. Collaborations are also a strong pillar in improving green transportation practices in order to enhance operational efficiency, these can be with suppliers, government agencies, logistics providers among others to improve infrastructure and policy support for green logistics which can facilitate more effective implementation and operational efficiency.

The company should expand the adoption of biodegradable and recyclable packaging materials and integrate automation and energy-efficient technologies in warehousing operations. Intensified training on energy-efficient technologies should be upheld to enhance practices and ensure operational efficiency.

Bidco Uganda Limited should continue to optimize reverse logistics processes by investing in return tracking systems and promoting a circular economy framework within logistics and procurement policies. Engaging relevant stakeholders like suppliers and customers in sustainability initiatives can further enhance these efforts.

5.4. Recommendations for Further Research.

The study adopted a cross-sectional research design were the effect of sustainable logistics practices on operational efficiency in manufacturing firms was studied in a certain period in time, an interesting future research idea could be to conduct a longitudinal analysis to assess the long-term operational impacts of sustainable logistics practices. Since the results relate only to Bidco Uganda Limited, a future research idea could be to undertake a comparative study on a bigger sample of manufacturing firms, other than Bidco and also

replicate the study using a mixed approach rather than the quantitative approach that was undertaken by this study.

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Appendices

APPENDIX I: QUESTIONNAIRE FOR RESPONDENTS.

Dear Respondent,

My name is Sanyu Bridget Kiwala, a graduate student undertaking a research study entitled “Sustainable Logistics Management and Operational Efficiency in Manufacturing Firms”, in partial fulfillment of the requirements for the award of a Bachelor of Procurement and Logistics Management at Uganda Christian University (UCU). You have been selected to participate in this study due to your knowledge and/or involvement in logistics and operations within your organization.

Your participation is voluntary, and all information provided will be treated with the highest level of confidentiality and used strictly for academic purposes. If you agree to participate, please tick the box below and proceed to Section I.

I agree to participate in this study.

Sign: _____

SECTION I: BACKGROUND INFORMATION.

No.	Item	Response Options
1.	My Sex	<input type="checkbox"/> Male <input type="checkbox"/> Female
2.	My Age	<input type="checkbox"/> 18–25 <input type="checkbox"/> 26–35 <input type="checkbox"/> 36–45 <input type="checkbox"/> 46–55 <input type="checkbox"/> Above 55
3.	Job Title	

4.	Years of experience in the field of professional.	<input type="checkbox"/> Less than 2 <input type="checkbox"/> 2–5 <input type="checkbox"/> 6–10 <input type="checkbox"/> More than 10
5.	Type of organization	<input type="checkbox"/> Government <input type="checkbox"/> Private <input type="checkbox"/> NGO <input type="checkbox"/> Other (Specify) _____

SECTION II: GREEN TRANSPORTATION PRACTICES.

Indicate the extent to which you agree with the following statements using the scale:

(1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly Agree)

Green transport Practices.	1	2	3	4	5
1. Our organization uses fuel-efficient vehicles.					
2. Carbon emission reduction is a priority in our transportation choices.					
3. We use environmentally friendly transport methods (e.g., electric vehicles, rail).					
4. Route planning is used to reduce fuel consumption and emissions.					
5. Green transportation practices have improved our cost efficiency.					

6. Green transportation has enhanced delivery performance.					
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SECTION III: ECO-FRIENDLY WAREHOUSING AND PACKAGING.

Indicate the extent to which you agree with the following statements using the scale:

(1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly Agree)

Eco friendly warehousing and packaging	1	2	3	4	5
1. Our warehouses apply waste reduction strategies (e.g., minimal inventory waste).					
2. Sustainable storage practices (e.g., energy-efficient lighting, smart systems) are used.					
3. Biodegradable and recyclable materials are used in packaging.					
4. Eco-friendly warehousing practices have reduced operational costs.					
5. Eco-friendly warehousing has contributed to shorter production lead times.					

SECTION IV: REVERSE LOGISTICS AND WASTE MANAGEMENT

Indicate the extent to which you agree with the following statements using the scale:

(1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly Agree)

Reverse Logistics and waste management.	1	2	3	4	5
1. Our organization actively implements recycling and reuse practices.					
2. Returned products are efficiently handled and reintegrated into the supply chain.					
3. Waste is sustainably disposed of through proper disposal					

strategies.					
4. The organization has adopted circular economy principles in logistics and procurement.					
5. Reverse logistics has improved our delivery performance.					
6. Reverse logistics has reduced overall operational costs.					

SECTION V: OPERATIONAL EFFICIENCY.

Indicate the extent to which you agree with the following statements using the scale:

(1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly Agree)

Operational Efficiency.	1	2	3	4	5
1. Our logistics operations are cost-efficient.					
2. The time taken to complete production processes is satisfactory.					
3. Delivery performance (on-time and complete orders) has improved over the last year.					
4. Overall, sustainable logistics practices have enhanced our operational efficiency.					

END

THANK YOU.